BROWNFIELD SOLUTIONS LTD

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

STEWART MILNE HOMES

NEW BRIGHTON ROAD, MOLD

Geo-Environmental Assessment Report

DI/C3915/7867 Rev B

November 2018

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EXECUTIVE SUMMARY	
Location	The site covers an area of approximately 3.36 hectares and is situated approximately 1.7 miles northeast of Mold town centre at National Grid Reference 325214, 365549. The site is irregular in shape and is currently used as agricultural land. A row of mature trees is present in the west of the site. Approximately in the middle of the site there is a gentle slope to the east. At the base of the slope the ground becomes boggy. Residential properties are present to the west and south of the site. A couple of commercial properties are present along the southern boundary of the site including a stone mason and car sales. Farmland is present to the north of the site.
Ground Conditions	Made ground was only encountered locally down to between 0.30m and 2.00m. Topsoil was present across site down to between 0.10m and 0.50m bgl. Firm to stiff fractured slightly gravelly sandy clay was present across site, clay was generally present down to bedrock between 12.00m and 18.00m bgl. The clay was locally soft. Sand and gravel was present overlying the bedrock from between 13.50m and 15.40m bgl. Bedrock generally comprised interbedded of grey sandstone and mudstone, with sandstone being more prevalent towards the top of bedrock. A number of coal seams of varying quality were encountered across site up to 1.20m thick at a minimum depth of 13.20m bgl. No evidence of broken ground was encountered.
Soil Contamination	No elevated contaminants are present within the shallow soils on-site. Evidence for the on-site historic landfill identified within the desk study was not encountered.
Ground Gases	Analysis of the TOC of the soils classifies the site as CS1/Green, however the site is in an area requiring full radon protection measures.
Foundations and Floor Slabs	The most suitable foundations for houses are considered strip foundations, taken through any made ground, founding a minimum depth of 0.75m bgl within the brown orange slightly gravelly silty sandy clay, where a safe bearing pressure of 110 kN/m2 should be assumed. Floor slabs will need to be suspended to accommodate full radon precautions.
Highways	CBR values of 2% - 5% are likely to be achieved in undisturbed natural soils and proven by in-situ testing.
Soakaways	Soakaways will not be feasible for the site given the low permeability results obtained.
Mining Risk	Due to the quality of coal encountered, the thickness of superficial deposits, and lack of broken ground or loss of flush, the risk from mining subsidence is considered low.
Further Work	• Tree survey by qualified arboriculturist. • Production of Verification Plan for Radon Protection Measures (Remedial Strategy). • Detailed foundation design.

PROJECT QUALITY CONTROL DATA SHEET

Site Name:	New Brighton Road, Mold		
Report Name:	Geo-Environmental Assessment Report		
Report Number:	DI/C3915/7867 Rev B		
Date:	1st November 2018		
Status:	Final		
Revision:	Original	27/09/18	
	A	26/10/18	Inclusion of final groundwater monitoring results.
	B	01/11/18	Incorporated comments from client.

Client: Stewart Milne Homes	**Engineer:**
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C3915/04	-	Exploratory Hole Location Plan

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GEO-ENVIRONMENTAL ASSESSMENT REPORT
FOR A SITE OFF
NEW BRIGHTON ROAD, MOLD

1.0 INTRODUCTION

1.1 Objectives

1.1.1 This report describes a Geo-environmental Assessment carried out by Brownfield Solutions Limited (BSL) for Stewart Milne Homes on a site off New Brighton Road, Mold.

1.1.2 The objectives of the assessment were to determine the sites environmental setting and likely site conditions, highlighting potential areas of concern that may govern the sites redevelopment.

1.1.3 An initial intrusive investigation was undertaken to confirm the findings of the preliminary CSM outlined in the Desk Study Assessment Report Ref: DI/C3915/7613 Issued May 2018, which should be read in conjunction with this report. The initial investigation was undertaken using trial pitting, window sampling and rotary openhole boreholes.

1.1.4 The report has been completed in general accordance with CLR11 "Model Procedures for the Management of Land Contamination", BS 5930:2015 and BS 10175:2011+A2:2017.

1.2 Proposed Development

1.2.1 The proposed development is residential end use comprising circa 84 houses and associated gardens, soft landscaping areas, public open space, roads and infrastructure.

1.3 Limitations

1.3.1 This assessment has been carried out based on information obtained from a number of areas, BSL have assumed that this information is correct.

1.3.2 There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore not been taken into account by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

1.3.3 This report has been prepared for the sole use of the client. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report they rely on it at their own risk and BSL do not owe them any Duty of Care.

2.0 THE SITE

2.1 Location & Access

2.1.1 The site covers an area of approximately 3.36 hectares and is situated approximately 1.7 miles northeast of Mold town centre.

2.1.2 The site is centred on National Grid Reference 325214, 365549 as shown on the Site Location Plan C3915/01.

2.1.3 Access to the site is gained off New Brighton Road to the northeast of the site.

2.2 Site Description

2.2.1 The site has remained unchanged since the walkover undertaken during the Desk Study.

2.2.2 The site is irregular in shape and is currently used as agricultural land. A row of mature trees is present in the west of the site. Approximately in the middle of the site there is a gentle slope to the east. At the base of the slope the ground becomes boggy.

2.2.3 A row of mature trees is present in the west of the site, with a dense vegetation and a ditch sloping towards the northern boundary of the site in the northern half of the row of trees.

2.2.4 In the northwestern corner of the site telegraph poles and overhead cables are present. A footpath also crosses the site in this area.

2.2.5 Residential properties are present to the west and south of the site. A couple of commercial properties are present along the southern boundary of the site including a stone mason and car sales. Farmland is present to the north of the site.

3.0 METHOD OF INVESTIGATION

3.1 Objectives

3.1.1 The aim of the fieldwork was to:

- Investigate ground conditions on the site.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Assess the potential impact of any contamination on controlled waters.
- Assess the need for detailed investigation.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design and preliminary pavement design purposes.
- Install standpipes to allow future monitoring.
- Give an assessment of the geo-environmental risks associated with redevelopment of the site.
- Assess the risk of instability caused by historical mine workings.

3.2 Site Works

3.2.1 Eleven trial pits (TP101 to TP111) were excavated to depths of between 2.80m and 3.50m bgl using a JCB 3CX on 20th August 2018.

3.2.2 Eight soakaways (SA01 to SA08) were undertaken at depths of between 2.00m and 2.30m on 21st and 22nd August 2018.

3.2.3 Twelve window sample boreholes (WS101 to WS112) were drilled to depths of between 2.90m and 5.00m bgl using a tracked window sampling rig and liners (windowless) on 23rd and 24th August 2018.

3.2.4 Twelve rotary open hole boreholes (RO101 to RO112) were drilled to depths of between 30.00m and 40.00m bgl using a rotary percussive drilling rig and water flush methods between 20th and 22nd August 2018.

3.2.5 The approximate locations of the exploratory holes are indicated on the Site Location Plan Drawing Ref: C3915/04. The exploratory hole logs are presented in Appendix A.

3.2.6 The exploratory holes were positioned to establish general ground conditions on the site and investigate areas of specific interest such as the historic landfill and boggy ground. The exploratory holes were logged by an experienced geo-environmental engineer in general accordance with BS 5930 'Code of Practice for Site Investigations' 2015, BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil' and BS EN ISO 14689:2002 and 'Geotechnical investigation and testing – Identification and classification of rock'.

3.3 Sampling

3.3.1 During the drilling of the exploratory holes, representative samples were taken at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing.

3.3.2 A summary of the samples taken is presented in the table below:

Type	Number
Environmental	38
Disturbed	108

3.3.3 The type of sample taken is dependent upon the stratum and the purpose of analysis in accordance with current environmental and geotechnical guidance.

3.3.4 Disturbed samples of soil for chemical testing were placed in plastic tubs and amber jars as required by the UKAS accredited laboratory, and transported under secure refrigerated conditions.

3.3.5 The distribution of samples taken across the site is recorded on the exploratory logs in Appendix A.

3.4 Laboratory Testing

3.4.1 As part of the initial assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

3.4.2 The following were analysed at an UKAS approved laboratory:

Determinand	Matrix	Number
BSL Default Suite: Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc, speciated polycyclic Hydrocarbons (PAHs), total phenol, free cyanide, water soluble sulphate, soil organic matter and pH.	Soil	13
Waste Acceptance Criteria (WAC)	Soil and Eluate	1
Total Organic Carbon (TOC)	Soil	12
Asbestos Screen and ID	Soil	2

3.4.3 The Chemical Laboratory Testing Results are presented in Appendix B.

3.4.4 Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 2016. The following tests were scheduled:

BS Test Number	Description	No of Samples
Part 2:	Natural Moisture Content	10
Part 2:	Plasticity Index Analysis	10
Part 3:	pH Value	10
Part 3:	Water Soluble Sulphate Content	10

3.4.5 The Geotechnical Laboratory Testing Results are presented in Appendix C.

3.5 Monitoring

3.5.1 Groundwater monitoring standpipes were installed in the boreholes and subsequently three monitoring visits have been undertaken.

3.5.2 The standpipes consisted of 35mm internal diameter high-density polyethylene (HDPE) pipe. A bentonite seal was made around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth to Base of Borehole (m bgl)	Response Zone (m bgl)	Targeted Strata
WS101	5.45	1.00 – 5.00	Clay
WS103	5.45	1.00 – 5.00	Clay
WS106	5.45	1.50 – 5.45	Clay
WS108	5.45	1.00 – 5.00	Made ground, clay, sand
WS110	5.45	1.00 – 5.00	Clay

3.5.3 The groundwater monitoring results are presented in Appendix D.

4.0 GROUND CONDITIONS

4.1 Made Ground

4.1.1 Made ground was only encountered in seven of the exploratory locations (SA03, SA05, TP103, TP104, TP108, WS108, WS109) to depths of between 0.30m and 2.00m bgl.

4.1.2 The made ground most commonly comprised a brown grey slightly gravelly silty sand topsoil that was locally clayey down to between 0.30m and 0.40m bgl. This locally contained gravel of glass and pottery. In TP103 a layer of sandstone flag stones was encountered between 0.30m and 0.70m bgl.

4.1.3 Deeper made ground was encountered locally within WS108 and WS109. The made ground in WS108 comprised topsoil over a brown slightly gravelly sandy clay containing gravel of glass, pottery, siltstone and sandstone. This was present down to 1.10m bgl. Underlying this was a slightly gravelly silty clay containing gravel of pottery down to 2.00m bgl.

4.1.4 Within WS109 topsoil was encountered over a reworked slightly gravelly sandy clay to 0.60m bgl. Underlying this was a gravel of limestone to 1.00m bgl containing pieces of plastic.

4.2 Natural Ground

4.2.1 The natural strata at the surface comprised brown grey slightly gravelly silty sand topsoil that was locally clayey. This was encountered to depths of between 0.10m and 0.50m bgl.

4.2.2 Generally underlying the topsoil was a firm to stiff brown orange slightly gravelly sandy clay that contained gravel of siltstone, quartz and sandstone. This stratum was very friable and locally behaved more like granular strata. This stratum was encountered to between 0.60m and 3.10m bgl.

4.2.3 Within the topographically lower area of the site the brown orange clay was overlain by a firm to stiff silty sandy clay that was locally friable and occasionally contained fibrous plant material. This stratum was encountered down to 0.40m and 1.10m bgl.

4.2.4 Underlying the brown orange clay was a firm to stiff friable brown mottled grey slightly gravelly sandy clay that was locally laminated. The gravel comprised siltstone, sandstone, limestone and coal. This stratum occasionally also contained a low cobble content of siltstone and limestone, and locally boulders of siltstone, limestone and sandstone up to 600mm diameter.

4.2.5 Within a number of holes the brown orange clay contained lenses of very clayey fine to medium sand/slightly gravelly sand. A summary is presented in the table overleaf:

Location	Top Depth (m bgl)	Bottom Depth (m bgl)	Description
WS101	2.80	3.00	Slightly gravelly clayey fine to medium sand
WS102	4.00	4.90	Very clayey fine to medium sand
	5.20	5.45	Very clayey fine to medium sand
WS108	4.00	5.00	Silty clayey sand
WS109	5.00	5.45	Fine to medium sand
WS111	4.40	4.80	Slightly clayey fine to medium sand
WS112	3.70	4.90	Slightly gravelly sand

4.2.6 A soft to firm locally laminated purplish brown silty sandy clay was encountered beneath the brown orange clay. This stratum was most commonly encountered in the west of the site; however this is likely due to topographical differences and this stratum is anticipated to be present beneath the whole site. The purplish brown clay was encountered from between 1.50m and 4.10m down to the base of the exploratory holes down to 5.45m bgl.

4.2.7 The clays noted above were locally soft, a summary of these locations is presented in the table below:

Location	Top Depth (m bgl)	Bottom Depth (m bgl)	Description
WS107	1.40	2.00	Soft brown silty sandy clay
	2.00	4.20	Soft to firm silty sandy clay
WS108	2.00	4.00	Soft to firm purplish brown silty sandy clay
WS109	1.00	2.00	Soft to firm brown orange silty sandy clay
	2.00	5.00	Soft brown silty sandy clay
WS110	1.10	5.00	Soft to firm brown orange sandy silty clay
WS112	1.00	3.70	Soft to firm brown silty sandy clay
TP108	2.10	3.30	Soft brown sandy clay
SA01	1.60	2.30	Soft to firm purplish brown sandy clay
SA02	0.25	0.60	Soft to firm grey silty sandy clay
	1.80	2.10	Soft purplish brown silty sandy clay
SA04	1.80	2.00	Soft laminated purplish brown silty clay

4.2.8 Clay was generally encountered down to bedrock within the rotary boreholes. Within RO101 to RO106 a gravel/ sand and gravel lens was encountered at the base of the clay from between 13.50m and 15.40m bgl down to between 14.70m and 18.00m bgl.

4.3 Bedrock

4.3.1 Bedrock was encountered within the rotary boreholes (RO101 to RO112) at a depth of between 12.00m and 18.00m bgl.

4.3.2 Bedrock generally comprised interbedded grey sandstone and mudstone, with sandstone being more prevalent towards the top of bedrock.

4.3.3 A number of coal seams were encountered across the site. Full flush returns were maintained in each of the boreholes and no voids or broken ground were encountered. The coal was predominantly recorded to be shaley, which is potentially indicative of low quality. A summary of the coal seams encountered is presented in the table below:

Location	Top Depth (m bgl)	Bottom Depth (m bgl)	Description
RO101	15.40	16.40	Dark shale/coal
	35.90	36.50	Dark shale/coal
RO102	15.20	16.00	Dark shale/coal
	36.40	37.40	Dark shale/coal
RO103	18.00	18.80	Dark shale/coal
RO104	22.60	23.60	Dark shale/coal
RO105	22.20	23.20	Dark shale/coal
RO106	19.00	20.00	Dark shale/coal
	34.00	35.00	Dark shale/coal
RO107	19.30	20.40	Coal
RO108	17.50	18.50	Dark shale/coal
RO109	13.40	14.40	Dark shale/coal
	18.20	19.10	Dark shale/coal
	26.60	27.00	Dark shale with coal traces
RO110	20.20	21.00	Dark shale with coal traces
	22.80	23.70	Dark shale/coal
	25.20	26.00	Dark shale with coal traces
RO111	35.00	36.20	Dark shale/coal
RO112	13.20	14.20	Dark shale/coal
	15.00	15.70	Dark shale/coal
	20.60	21.00	Dark shale/coal
	27.80	28.80	Dark shale/coal

4.4 Groundwater

4.4.1 A summary of the groundwater strikes encountered during the site investigation are presented in the table below; the groundwater levels observed during monitoring are presented in Appendix D.

Location	Depth to Groundwater (m)	Remarks
WS101	4.00	
WS102	4.00	
WS107	3.00	
WS108	4.00	Within silty clayey sand
WS109	2.00	
WS110	4.00	
WS111	4.00	
WS112	4.00	Within slightly gravelly sand
TP108	1.60	Slight seepage
SA03	1.50	Seepage

4.5 Observations

4.5.1 During the works undertaken by BSL observations for both visual and olfactory evidence of contamination were made.

4.5.2 No visual or olfactory evidence of contamination was observed.

Side Stability and Ease of Excavation

4.5.3 The sides of the trial pits remained stable throughout excavation. TP108 partially collapsed from 1.60m to 1.80m bgl where a slight groundwater seepage was observed.

4.5.4 Some difficulty excavating was experienced where boulders were encountered.

5.0 TEST RESULTS

5.1 Chemical Test Results

5.1.1 The samples were tested for an assessment of the chemical contamination and results were examined with reference to a selection of guidance documents as detailed in Appendix E. In this case the LQM/CIEH S4ULs for a residential end use with homegrown produce have been adopted as generic Tier 1 screening values.

5.1.2 The apparent exceedance of the relevant Tier 1 generic screening value is taken as indicating further detailed assessment or remedial action is required.

Metals

5.1.3 None of the tested metals were elevated above their respective screening values.

Polyaromatic Hydrocarbons (PAHs)

5.1.4 None of the tested PAHs are above their respective laboratory level of detection.

Phenols

5.1.5 None of the tested phenols are above their respective laboratory level of detection.

Asbestos

5.1.6 Asbestos was not present within the two made ground samples tested.

Total Organic Carbon (TOC)

5.1.7 Eleven out of the twelve samples tested were less than 1%. The made ground sample from WS108 at 1.20m had a TOC content of 4.6%.

5.2 Geotechnical Testing

5.2.1 Plasticity index results within the natural strata ranged between 10% and 19% indicating the clays to be of low to medium plasticity.

5.2.2 After modification of particle size in accordance with NHBC Chapter 4.2 the modified plasticity indices range between 9% and 19% indicating the soils to be of low volume change potential.

5.3 Aggressive Ground Conditions

5.3.1 Water soluble sulphate testing was undertaken on 12 samples of the natural strata. The results revealed soluble sulphate (SO_4) contents of between 0.0093 g/l and 1.4 g/l. Associated pH values were obtained which ranged between 6.1 and 8.6 indicating slightly acid to slightly alkaline conditions.

5.4 Waste Acceptance Criteria (WAC) Results

5.4.1 The Landfill Directive (Directive 1999/31/EC on the landfilling of waste) led to the establishment of a methodology for classifying wastes. Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. There are three different WAC, these are for:

- Inert waste
- Non –hazardous waste
- Hazardous waste

5.4.2 Wastes should first be classified based on their total concentrations as detailed in the previous section. WAC testing is then required if the end disposal route is a landfill.

5.4.3 Solid and eluate WAC analysis was undertaken on one sample, the findings of which is presented in the table below.

Location	Depth (m)	Strata Type	WAC Analysis
WS108	0.30	MG: Firm brown slightly gravelly sandy clay with gravel of glass, pottery, siltstone, sandstone.	Inert

5.5 Soil Percolation Test Results

5.5.1 Soil percolation tests were undertaken at eight locations across site, a summary of the results is presented in the table below:

Location	Infiltration Rate (m/sec)
SA01	$6.31x10^{-8}$
SA02	$2.18x10^{-6}$
SA03	$1.90x10^{-6}$
SA04	$6.94x10^{-7}$
SA05	$6.09x10^{-8}$
SA06	$1.12x10^{-6}$
SA07	$3.19x10^{-7}$
SA08	$1.11x10^{-6}$

5.5.2 The full test results are presented in Appendix F.

6.0 GEOTECHNICAL ASSESSMENT

6.1 General

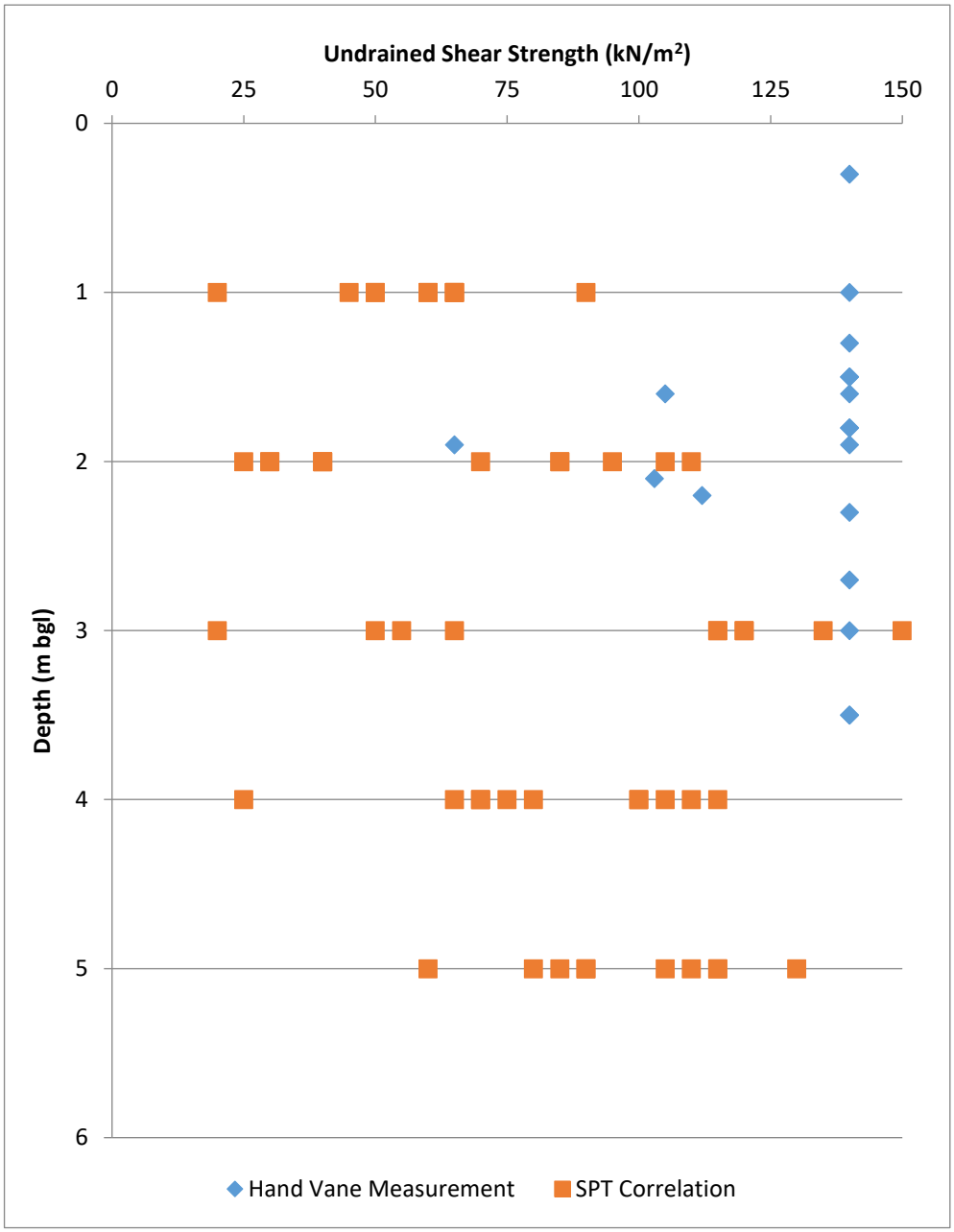
6.1.1 Made ground was only encountered in localised areas down to between 0.30m and 0.40m, and in an isolated area down to 2.00m. Topsoil was present across site down to between 0.10m and 0.50m bgl. Firm to stiff friable slightly gravelly sandy clay was present across site, clay was generally present down to bedrock between 12.00m and 18.00m bgl. The clay was locally soft. Sand and gravel was present overlying the bedrock from between 13.50m and 15.40m bgl.

6.1.2 Bedrock generally comprised interbedded grey sandstone and mudstone, with sandstone being more prevalent towards the top of bedrock. A number of coal seams of varying quality were encountered across site up to 1.20m thick at a minimum depth of 13.20m bgl. No evidence of broken ground or voids was encountered.

6.1.3 A rising main is indicated to cross the site near the southern boundary and will need to be considered prior to development at the site.

6.2 Soil Parameters

6.2.1 SPT and shear vane testing was undertaken on site and the test results have been evaluated to derive geotechnical soil parameters. A depth vs Undrained Shear Strength (Cu) value graph is presented overleaf to provide a profile of the ground conditions underlying the site. SPT N values were correlated to Cu values using the method derived by Stroud (1975). From the graph below it is apparent that the Cu derived from SPT N values are lower than those measured directly at a similar depth.



6.2.2 Characterisation of the geotechnical parameters above has been undertaken to obtain a characteristic value, which is a cautious estimate of the value affecting the occurrence of the limit state. A characteristic value of 50 kN m^2 has been selected for 1.0m bgl within the clays. Soils strengths gradually increased with depth except for where groundwater was present and resulted in ground softening during drilling.

6.3 Foundations

6.3.1 The most suitable foundations for houses in this area are considered strip foundations. The clay on the site is of low volume change potential, therefore the foundations should be at a minimum depth of 0.75m in the clay, deeper near trees and hedges in accordance with NHBC Chapter 4.2.

6.3.2 Made ground was encountered locally to depths of between 0.30m and 0.40m and locally down to 2.00m bgl. Foundations will need to be taken to the underside of this to found on undisturbed natural strata.

6.3.3 For a 600mm wide strip foundation founding at 0.75m bgl, a nett allowable bearing pressure not exceeding 110kN/m^2 should be assumed.

6.3.4 It is possible that a change in bearing stratum across individual plots may occur in across the site. If any sudden changes from clay to sand or gravel are encountered reference should be made to a suitably qualified engineer. Recommendations may include that the foundations should either be deepened to found on the same stratum, or reinforced to reduce the potential for differential settlement.

6.3.5 The bearing stratum should be inspected for 'soft spots' within the natural clay strata, resulting for instance from localised perched groundwater. Any such soft spots should be dealt with in accordance with good site practice.

6.3.6 If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during construction, work should cease and BSL contacted for further advice.

6.3.7 During the construction phase supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring.

6.3.8 Foundations should be a suitable distance away from the rising main crossing the site in agreement with the utility providers advice.

6.4 Building Near Trees

6.4.1 Foundations within cohesive strata in the vicinity of existing, proposed or recently removed trees should be adjusted in full accordance with NHBC Standards Chapter 4.2. All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings.

6.4.2 A survey of all trees and hedges on the site and within an influencing distance of foundations should be undertaken to identify tree species and heights. This information will be required to assess the effects of trees on the cohesive strata.

6.4.3 Where foundation depths due to trees already present or recently removed exceeds 1.50m there is a possibility for heave to occur on removal of the tree. NHBC guidance states that compressible material or void former is required against the inside face of all external wall foundations.

6.5 Floor Slabs

6.5.1 Due to the site being within an area requiring full radon precautions, floor slabs will need to be suspended to accommodate the ground gas precautions.

6.5.2 Where foundation depths due to trees already present exceeds 1.50m there is a possibility for heave to occur on removal of the tree. NHBC Guidance states that either a precast concrete floor, a suspended timber or in-situ concrete floor must be

used, we recommend the former. The required void size for beneath floor slabs on this site is 200mm.

6.6 Construction

6.6.1 Instability of excavations through natural soils is not anticipated provided they are not exposed to adverse weather conditions for any substantial period of time. All excavations should be carried out in accordance with CIRIA Report 97 'Trenching Practice'.

6.6.2 Excavation depths should generally be readily achieved using conventional plant (JCB or similar) although high specification plant (tracked 360° or similar) is recommended to maintain the build programme. Progress may be slowed where boulders are encountered within the clay.

6.6.3 A characteristic value for soluble sulphate content of the soils on site has been determined from the highest 20% as 0.3182 g/l. A characteristic value for pH has been calculated from the lowest 20% of values as 6.3.

6.6.4 Due to the impermeable nature of the strata on site it is considered that groundwater is static.

6.6.5 The results of laboratory pH and sulphate content indicate that ACEC Class AC-1 and sulphate class DS-1 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

6.7 Highways

6.7.1 CBR values of 2% - 5% are likely to be achieved in undisturbed natural soils for pavement design purposes, unless proven otherwise by in-situ testing at sub-base level by a specialist geotechnical engineer.

6.7.2 Some reengineering of the subgrade may be required prior to highway construction to achieve the required design CBR value.

6.8 Soakaways

6.8.1 Based on the low rates of infiltration obtained, soakaway drainage will not be feasible for the site.

6.9 Coal Mining Subsidence

6.9.1 The Desk Study identified a moderate risk from coal mining subsidence due to the coal seam anticipated to be underlying the site being identified as likely to be locally worked. Additionally it was calculated that there was likely an insufficient thickness of rock cover above the coal seam for subsidence not to affect the surface.

6.9.2 Coal has been identified as up to four seams across site with the shallowest seam being encountered from between 13.20m and 35.00m bgl. The coal seams varied in thickness from 0.40m to 1.20m.

6.9.3 Evidence of coal mine workings can be represented by voids, broken ground and/or loss of flush with evidence of potential workings indicated by intact coal of a suitable workable thickness and quality. An assessment should be made based on all the available evidence.

6.9.4 CIRIA SP32 calculates that collapses from any mine workings would migrate no more than ten times the seam thickness within competent rock cover. The maximum rock cover observed was 21m over a 1.20m seam, however was as little as 0.40m over a 1.0m thick seam.

6.9.5 This suggests that there is locally insufficient rock cover to prevent subsidence from collapsed mine workings from reaching the surface, however due to the poor quality of the coal and no evidence of mine workings being encountered (no loss of flush in any of the twelve holes drilled), it is considered unlikely that the seams on site will have been worked. Additionally, the thickness of superficial strata, between 12.00m and 15.00m thick, reduces the risk of mining related subsidence.

6.9.6 Due to the thickness of superficial strata the risk from unrecorded mine entries on site is considered low, particularly in light of the lack of evidence of mine workings from the rotary open holes

6.9.7 Therefore the overall risk from mining is considered low.

7.0 ENVIRONMENTAL ASSESSMENT

7.1 Contamination

Soils

7.1.1 Samples were tested within the top 0.50m of the superficial deposits across site to identify the risk to human health. None of the tested determinands were elevated above their respective residential with homegrown produce screening values.

Permanent Ground Gases

7.1.2 Total Organic Carbon (TOC) content was used in line with CL:AIRE RB17 to identify whether the site is at risk from carbon dioxide and methane.

7.1.3 The majority of the samples tested contained less than 1% TOC which RB17 correlated with Characteristic Situation 1 (CS1) of Wilson and Card, this is equivalent to the Green classification of the NHBC traffic light system i.e. no risk from carbon dioxide and methane.

7.1.4 One sample from localised deep made ground from WS108 comprising soft dark grey slightly silty clay contained 4.6% TOC which places it within CS3. However, in accordance with RB17, given the buildings will include full radon precautions this is unlikely to present a risk to site end users, however this will need to be agreed with the Local Authority. Due to the localised extent of this stratum, excavation of the materials could be explored and hence the removal of the potential ground gas source.

7.2 Qualitative Risk Assessment

7.2.1 The risk assessment methodology used in this instance is based on **Source – Pathway – Receptor** (SPR) philosophy. The **source** is the presence of contamination, or substance/event likely to cause harm. The **receptor** is the target that may be detrimentally affected by the source. The **pathway** is the means of the contamination to move from the source to the receptor. Where any of these three factors are removed there is deemed to be no risk. Further information on the methodology used is presented in Appendix G and Appendix H.

7.2.2 The CSMs have been revised based on the findings of the site investigation and laboratory testing results.

Human Health

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
ON-SITE					
Made Ground	Ingestion, direct contact, inhalation of dusts.	End-users	Unlikely	Medium	Low
Historic Pond (Ground Gas)	Migration of explosive and/or asphyxiant gases into confined spaces.	End-users	Unlikely	Severe	Moderate/ Low

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
ON-SITE					
Historic Landfill (Made ground/ ground gas)	Ingestion, direct contact, inhalation of dusts. Accumulation of explosive and/or asphyxiant gases.	End-users	Unlikely	Medium	Low
Coal Seams (Ground/mine gas)	Migration of explosive and/or asphyxiant gases into confined spaces.	End-users	Unlikely	Severe	Low
Radon	Migration of gases into confined spaces.	End-users	Likely	Medium	Moderate
OFF-SITE					
Historic Pits (Ground gas)	Migration of explosive and/or asphyxiant gases into confined spaces.	End-users	Unlikely	Severe	Moderate/ Low
Historic Colliery	Ingestion, direct contact, inhalation of dusts.	End-users	Unlikely	Medium	Low
Historic Landfill (Ground gas)	Migration of explosive and/or asphyxiant gases into confined spaces.	End-users	Unlikely	Severe	Moderate/ Low

Human Health Justification

7.2.3 Made ground was very localised and did not contain any elevated contaminants, with the concentrations of the tested determinands within the made ground similar to the natural soils. Therefore the risk to site end-users is low.

7.2.4 No organic rich soils or deep made ground were identified in the area of the historic pond, additionally this area is intended to be Public Open Space, therefore the risk to site end-users is considered moderate to low.

7.2.5 WS106 was positioned at the coordinates given for the historic landfill in the Groundsure Report and did not encounter any made ground. Additionally no evidence of a landfill was observed within any of the other exploratory holes. Therefore the risk from the historic on-site landfill is low.

7.2.6 No emissions of gas were detected while drilling through the coal seams and there is a significant thickness of impermeable strata above the bedrock, therefore the risk from mine gas emissions is considered low.

7.2.7 The site is indicated to be in an area requiring full radon precautions and given the site end-use it is considered likely that end-users would come into contact with the gas. Therefore the risk is considered moderate.

7.2.8 Despite the friable nature of the clay across site, soakaway testing has identified very low permeabilities making it unlikely that any off site contamination would be able to migrate on site, additionally no contamination has been identified on site, hence the risk is considered moderate to low.

Controlled Waters

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Made Ground	Migration through groundwater or granular soils	Superficial Secondary Aquifer – Undifferentiated	Unlikely	Medium	Low
Made Ground	Migration through groundwater or granular soils	Bedrock Secondary (A) Aquifer	Unlikely	Medium	Low
Off-site Historic Landfill	Migration through groundwater or granular soils	Superficial Secondary Aquifer – Undifferentiated	Unlikely	Medium	Low
Off-site Historic Landfill	Migration through groundwater or granular soils	Bedrock Secondary (A) Aquifer	Unlikely	Medium	Low

Controlled Waters Justification

7.2.9 The chemical determinands tested for were only present within the soils at very low concentrations or less than the laboratory level of detection and are therefore unlikely to leach out of the soils at concentrations that would impact the quality of groundwater. Additionally, a significant thickness of impermeable strata is present across the area preventing the migration of any groundwater. There are also no surface water or groundwater abstractions within 1000m of the site. The nearest watercourse is an artificial lake 66m north of the site.

7.2.10 As there are no on-site sources of contamination and no pathway for contaminants to migrate, the risk to controlled waters is considered low.

7.3 Remedial Measures

7.3.1 The site is within an area requiring full radon precautions and these should be included in the floor slab design.

7.3.2 A watching brief should be in place to identify any evidence of the historic landfill and the backfilled pond.

7.4 Health and Safety Issues

7.4.1 During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
ON-SITE					
Made Ground	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Unlikely	Medium	Low

Discussion

7.4.2 General guidance on these matters is given in the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Redevelopment of Contaminated Land". In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

7.5 Waste

7.5.1 Details of how material should be classified for waste disposal are presented in Appendix I.

Waste Acceptance Criteria

7.5.2 WAC testing undertaken on the thickest made ground in WS108 identified that if the end disposal route of the made ground is landfill, then material may be accepted at an Inert Landfill.

7.5.3 The possibility of automatic inert classification of the natural soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing, this is the case if:

- *They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source) and*
- *There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with*

the waste sufficiently to justify contamination and they do not contain other their disposal in other classes of landfill.

General

7.5.4 If any gross hydrocarbon contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous and testing should be undertaken at that time.

7.5.5 Where it is necessary to dispose material off site it is recommended that materials are segregated and where necessary sufficient time is allowed to further classify the material properly, including discussion with landfill sites and waste transfer stations to find the best disposal route.

7.5.6 As a significant proportion of the soils likely to be generated on site are clean it is recommended that where possible that the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route.

7.5.7 If the reuse of soils is proposed on the site this should be done in accordance with the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE CoP). Further guidance is provided on this in Appendix J. Any re-use scheme should be designed to minimise disposal costs.

7.6 Compliance

7.6.1 It is recommended that the approval of the Local Authority is obtained for to the proposed remedial schemes prior to any irrevocable action being taken.

7.6.2 Once the above body has approved the outline remedial proposals a remediation strategy should be produced. As the main remedial requirement is in respect to ground gas (radon), then this would simply comprise a Verification Plan for the gas protection measures. This will also give guidance to enable a suitably qualified contractor to carry out the works.

8.0 CONCLUSIONS

8.1 Summary

Environmental

8.1.1 No elevated contaminants are present within the shallow soils on-site.

8.1.2 Evidence for the on-site historic landfill identified within the desk study was not encountered.

8.1.3 A watching brief should be in place to identify any evidence of the historic landfill and historic pond.

8.1.4 The risk to end-users from on-site historic land use is considered low. The risk from off-site sources is considered low due to the low permeability of the on-site soils.

8.1.5 The risk to controlled waters is considered low due to the lack of on-site contamination and the low permeability of the soils.

8.1.6 The site falls into the CS1/Green classification for ground gas risk, however full radon precautions are required.

Geotechnical

8.1.7 The most suitable foundations for houses in this area are considered strip foundations, taken through any made ground, founding a minimum depth of 0.75m bgl within the brown orange slightly gravelly silty sandy clay, where a safe bearing pressure of 110 kN/m^2 should be assumed. Floor slabs will need to be suspended to accommodate full radon precautions.

8.1.8 Soakaways will not be feasible for the site given the low permeability results obtained.

8.1.9 Due to the quality of coal encountered, the thickness of superficial deposits, and lack of broken ground or loss of flush, the risk from mining subsidence is considered low.

8.1.10 CBR values of 2% - 5% are likely to be achieved in undisturbed natural soils and proven by in-situ testing.

8.2 Further Work

8.2.1 The following further work is considered necessary to progress the site to construction phase:

- Tree survey by qualified arboriculturist.
- Production of Verification Plan for Radon Protection Measures (Remedial Strategy).
- Detailed foundation design.

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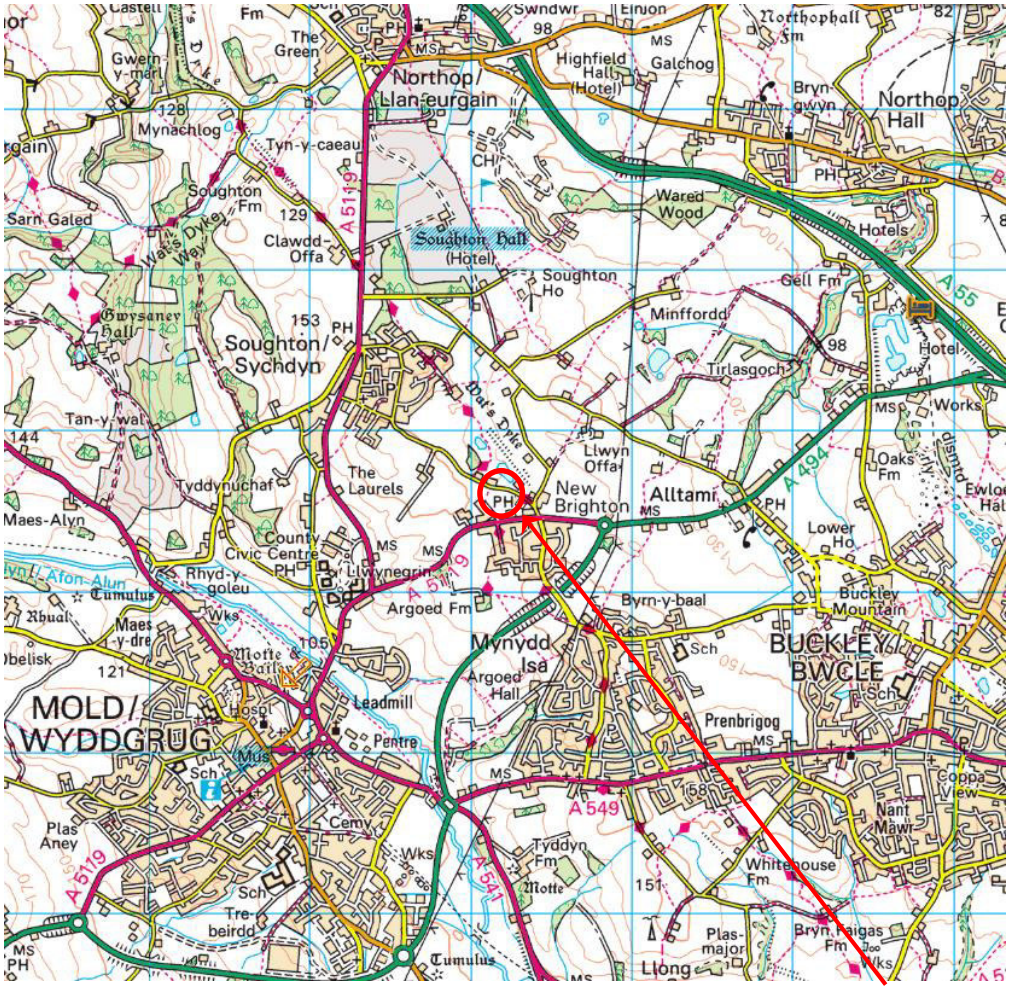
DRAWINGS



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GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

STEWART MILNE HOMES

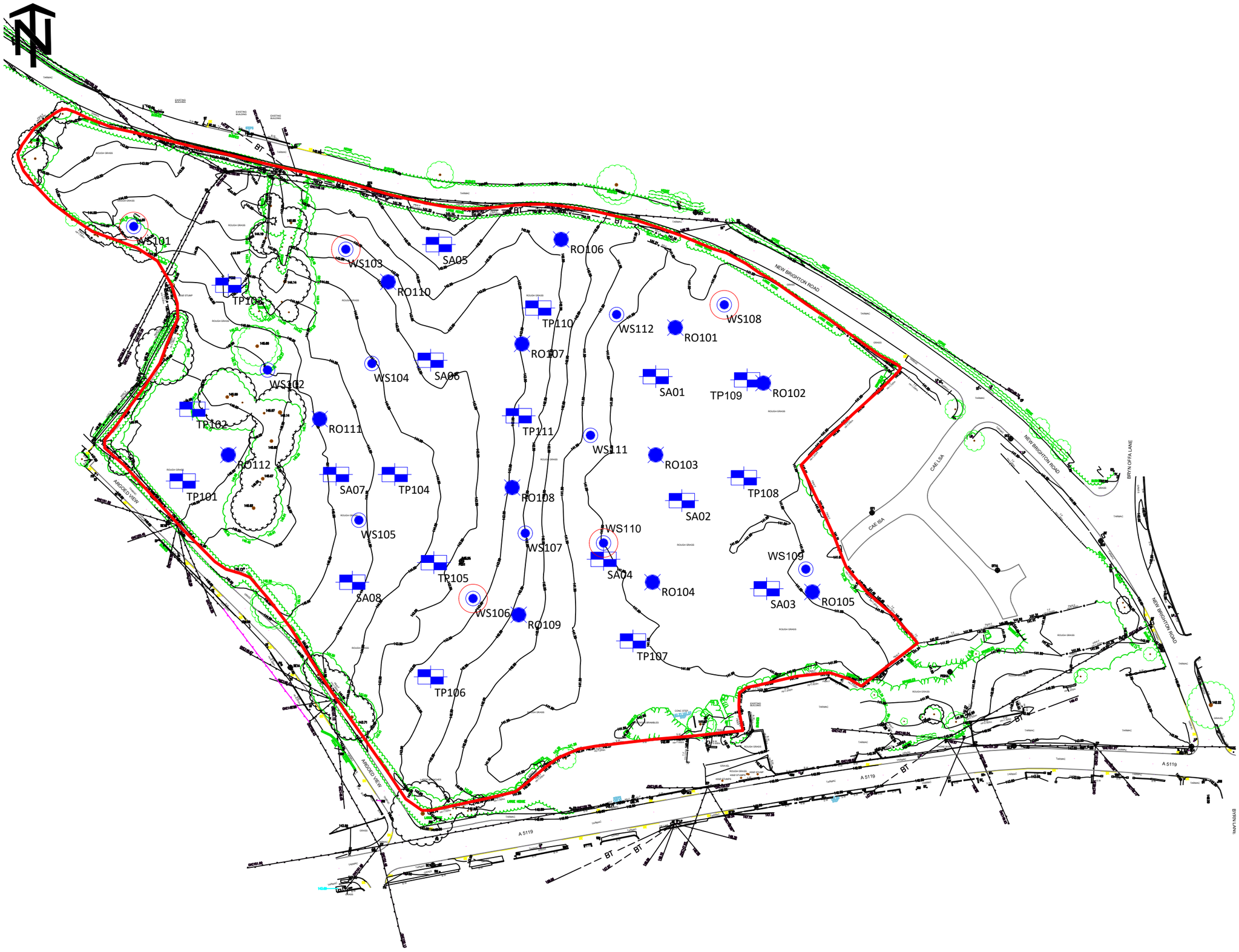
NEW BRIGHTON ROAD, MOLD

Site Location Plan

Drawing Number C3915/01

Scale: NTS

Drawn By: DI	Checked By: AJH



KEY

- TP/SAXX — TRIAL PIT/ SOAKAWAY TEST
- WSXX — WINDOW SAMPLE BOREHOLE
- ROXX — ROTARY OPEN BOREHOLE
- BOREHOLE INSTALLATION
- SITE BOUNDARY

NOTES

1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS REPORTS. THIS DRAWING IS COPYRIGHT OF BSL.
3. DRAWING NOT FOR CONSTRUCTION PURPOSES.

REV	DATE	DESCRIPTION	BY	CKD

BROWNFIELD SOLUTIONS LTD

CLIENT

STEWART MILNE

PROJECT TITLE

NEW BRIGHTON, MOLD

DRAWING TITLE

EXPLORATORY HOLE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C3915/04	-	NTS	17/09/18

DRAWN BY	CHECKED BY
DI	JMC

APPENDIX A
Exploratory Hole Logs

BROWNFIELD SOLUTIONS LTD

William Smith House,
173-183 Witton Street,
Northwich,
Cheshire,
CW9 5LP

Trial Pit Log

TrialPit No
SA01
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325244.00 - 365576.00 Level:	Date 21/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.30	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.30			Grass over brown grey slightly clayey SAND with rootlets. Sand is fine grained. (TOPSOIL)
	0.50	ES					Stiff friable grey sandy CLAY. Sand is fine grained. Some fibrous organic material.
	1.40	D		1.00			Firm friable brown orange silty sandy CLAY. Sand is fine grained.
	1.60	HSV	HSV=105kPa	1.60			Soft to firm purplish brown sandy silty CLAY. Sand is fine grained.
	2.30	D		2.30			End of Pit at 2.30m

Remarks: 1. No groundwater encountered.
2. Soakaway test undertaken in trial pit.

Stability: Stable.

AGS

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William Smith House,
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Northwich,
Cheshire,
CW9 5LP

Trial Pit Log

TrialPit No
SA02
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325252.00 - 365538.00 Level:	Date 21/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.10	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES		0.25			Grass over brown grey clayey SAND with rootlets. Sand is fine grained. (TOPSOIL)
	0.30 0.30	D HSV	HSV=140kPa	0.60			Soft to firm grey silty sandy CLAY with rootlets. Sand is fine grained.
	1.50	D		1.80			Firm friable locally laminated brown orange silty sandy CLAY. Sand is fine grained.
	1.90 1.90	D HSV	HSV=65kPa	2.10			Soft purplish brown silty sandy CLAY. Sand is fine grained.
							End of Pit at 2.10m

Remarks: 1. No groundwater encountered.
2. Soakaway test undertaken in trial pit.

Stability: Stable

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CW9 5LP

Trial Pit Log

TrialPit No
SA03
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325278.00 - 365511.00 Level:	Date 21/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30			MADE GROUND: Grass over brown grey clayey sand. Sand is fine grained. Rare medium to coarse angular gravel of glass and pottery.
	0.40	ES					Firm grey mottled brown silty sandy CLAY. Sand is fine grained. Fibrous organic material.
				0.70			Firm brown orange silty sandy CLAY. Sand is fine grained.
	1.30	HSV	HSV=140kPa				
▼	1.50	D					
				1.80			Firm purplish brown silty sandy CLAY. Sand is fine grained.
	1.90	D					
	1.90	HSV	HSV=140kPa	2.00			End of Pit at 2.00m

1
2
3
4
5

Remarks: 1. Groundwater seepage at 1.50m bgl.
2. Soakaway test undertaken in trial pit.

Stability: Stable

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Trial Pit Log

TrialPit No
SA04
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325228.00 - 365520.00 Level:	Date 21/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES					Grass over brown grey clayey SAND with rootlets. Sand is fine grained. (TOPSOIL)
				0.30			
	0.40	D					Firm to stiff grey friable silty sandy CLAY with rootlets. Sand is fine grained.
				0.50			
	0.60	D					Firm friable brown orange silty sandy CLAY. Sand is fine grained.
	1.60	D					
	1.60	HSV	HSV=140kPa				
	1.80	D		1.80			
	1.80	HSV	HSV=140kPa				Soft laminated purplish brown silty sandy CLAY. Sand is fine grained.
				2.00			End of Pit at 2.00m

1
2
3
4
5

Remarks:
1. No groundwater encountered.
2. Soakaway test undertaken in trial pit.
3. Shear vanes not possible due to friability of clay.

Stability: Stable.

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Cheshire,
CW9 5LP

Trial Pit Log

TrialPit No
SA05
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325176.00 - 365621.00 Level:	Date 22/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.10	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES					MADE GROUND: Grass over brown grey slightly gravelly silty sand. Sand is fine to medium grained. Gravel is rounded to subangular fine to medium of siltstone, sandstone and pottery. Low boulder content of sandstone.
	0.40	ES		0.30			Firm friable brown orange slightly gravelly sandy CLAY. Sand is fine grained. Gravel is rounded to subangular fine to medium of siltstone and sandstone.
	1.40	D					*Becoming brown red mottled grey from 1.30m bgl. Gravel of charcoal present. Low cobble content of siltstone and sandstone.*
	2.10	D		2.10			*Becoming laminated from 2.00m bgl.* End of Pit at 2.10m

1
2
3
4
5

Remarks:
1. No groundwater encountered.
2. Soakaway test undertaken in trial pit.
3. No shear vanes possible due to friability of clay.

Stability: Stable.

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Cheshire,
CW9 5LP

Trial Pit Log

TrialPit No: SA06
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325175.00 - 365581.00 Level:	Date 22/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30			Grass over brown grey slightly gravelly silty SAND. Sand is fine to medium grained. Gravel is rounded fine of siltstone. (TOPSOIL)
	0.40	D					Firm friable brown orange slightly gravelly silty sandy CLAY. Sand is fine grained. Gravel is subangular fine to medium of sandstone.
							Land drain present at 0.70m bgl.
							Becoming brown red mottled grey from 1.10m bgl. Fine to coarse gravel of siltstone and charcoal.
	1.30	D					
	2.00	D		2.00			End of Pit at 2.00m

1
2
3
4
5

Remarks:
1. No groundwater encountered.
2. Soakaway test undertaken in trial pit.
3. No shear vanes possible due to friability of clay.

Stability: Stable.

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William Smith House,
173-183 Witton Street,
Northwich,
Cheshire,
CW9 5LP

Trial Pit Log

TrialPit No
SA07
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325146.00 - 365546.00 Level:	Date 22/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.10	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.25			Grass over brown slightly gravelly clayey silty SAND with rootlets. Sand is fine to medium grained. Gravel is rounded fine to medium of siltstone. (TOPSOIL)
	0.30	D					Firm friable brown orange slightly gravelly sandy CLAY. Sand is fine grained. Gravel is subrounded to subangular fine to medium of sandstone and siltstone. Low cobble content of sandstone and siltstone.
	1.30	D					*Boulder of siltstone 600mm diameter at 1.40m bgl.*
	2.10	D		2.10			End of Pit at 2.10m

Remarks:
1. No groundwater encountered.
2. Soakaway test undertaken in trial pit.
3. No shear vanes possible due to friability of clay.

Stability: Stable.

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William Smith House,
173-183 Witton Street,
Northwich,
Cheshire,
CW9 5LP

Trial Pit Log

TrialPit No
SA08
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325151.00 - 365513.00 Level:	Date 22/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.10	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 0.30	ES D		0.25			Grass over brown grey slightly gravelly silty SAND with rootlets. Sand is fine to medium grained. Gravel is subrounded fine to medium of sandstone.
							Firm friable brown orange mottled grey slightly gravelly sandy CLAY. Sand is fine grained. Gravel is subrounded to subangular fine to coarse of siltstone, sandstone and charcoal. Low cobble content of siltstone and sandstone.
							Becoming brown red from 1.30m bgl.
	1.70	D					
				2.10			End of Pit at 2.10m

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2
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4
5

Remarks:
1. No groundwater encountered.
2. Soakaway test undertaken in trial pit.
3. No shear vanes possible due to friability of clay.

Stability: Stable.

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Trial Pit Log

TrialPit No: TP101
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325099.00 - 365544.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES					Grass over brown grey slightly gravelly silty SAND with rootlets. Sand is fine grained. Gravel is rounded fine to medium of siltstone. (TOPSOIL)
				0.40			
	0.50	D					Firm to stiff friable brown orange mottled grey slightly gravelly sandy CLAY. Sand is fine grained. Gravel is subrounded to subangular fine to coarse of sandstone.
	1.40	D					*Becoming brown mottled grey slightly gravelly silty sandy clay from 1.50m bgl.*
	2.20	D					
	3.00	D		3.00			*Locally becoming clayey slightly gravelly sand from 2.90m bgl.*
							End of Pit at 3.00m

1
2
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4
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Remarks: 1. No groundwater encountered.
2. No shear vanes possible due to friability of clay.

Stability: Stable.

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Trial Pit Log

TrialPit No: TP102
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325102.00 - 365566.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30 0.30	D ES		0.25			Grass over brown grey slightly gravelly silty SAND with rootlets. Sand is fine grained. Gravel is rounded to subrounded fine to medium of sandstone and quartz. (TOPSOIL)
				0.60			Brown orange clayey sandy GRAVEL. Sand is fine to medium grained. Gravel is rounded to subangular fine to coarse of siltstone, sandstone and lithorelics of stiff friable sandy clay.
	0.80	D					Stiff friable brown mottled grey slightly gravelly sandy CLAY. Sand is fine grained. Gravel is subrounded fine to medium of sandstone.
	1.80	D		1.80			Brown gravelly SAND. Sand is fine to medium grained. Gravel is subangular fine to medium of lithorelics of clay.
							Boulder of siltstone 300mm diameter at 2.00m bgl.
	2.60	D					*Low rounded cobble content of limestone and lithorelics of clay from 2.70m bgl.*
	3.00	D		3.00			End of Pit at 3.00m

Remarks: 1. No groundwater encountered.
2. No shear vanes possible due to friability of clay.

Stability: Stable.

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Trial Pit Log

TrialPit No
TP103
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325113.00 - 365604.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES					MADE GROUND: Grass over brown grey slightly gravelly sand with rootlets. Sand is fine to medium grained. Gravel is fine rounded of siltstone.
				0.40			*Layer of medium to coarse gravels and cobbles of sandstone flag stones between 0.30m and 0.70m bgl.*
	0.50	ES					Brown orange sandy GRAVEL. Sand is fine to coarse grained. Gravel is subrounded to subangular fine to coarse of sandstone, quartz, and lithorelics of stiff brown orange mottled grey sandy silty clay.
				0.80			
	0.90	D					Firm friable brown mottled grey slightly gravelly sandy CLAY. Sand is fine grained. Gravel is subrounded to angular fine to medium of siltstone.
							Becoming brown red from 2.00m bgl.
	2.20	D					
				2.80			Firm brown orange slightly gravelly sandy silty CLAY. Sand is fine grained. Gravel is subrounded fine to medium of siltstone and sandstone.
	3.00	D		3.00			End of Pit at 3.00m

1 2 3 4 5

Remarks: 1. No groundwater encountered.
2. No shear vanes possible due to friability of clay.

Stability: Stable.

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Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325164.00 - 365546.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES					MADE GROUND: Grass over brown grey slightly gravelly silty sand with rootlets. Sand is fine grained. Gravel is rounded to subangular fine of quartz and rare pottery.
	0.40	D		0.35			Firm friable brown orange slightly gravelly sandy CLAY. Sand is fine grained. Gravel is subrounded fine of quartz, siltstone and sandstone.
							Becoming brown mottled grey from 1.00m bgl.
	1.50 1.50	D HSV	HSV=140kPa				
	2.50	D					*Becoming stiff from 2.50m bgl. Fine gravel of charcoal. Low cobble content of siltstone.*
	3.00	D		3.00			End of Pit at 3.00m

Remarks: 1. No groundwater encountered.
2. Shear vanes not possible due to friability of clay.

Stability: Stable.

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Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325176.00 - 365519.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.20			Grass over brown slightly gravelly silty SAND with rootlets. Sand is fine grained. Gravel is subrounded to angular fine to medium of siltstone. (TOPSOIL)
	0.30	ES					Stiff friable brown orange slightly gravelly sandy CLAY. Sand is fine grained. Gravel is rounded to subrounded fine to medium of siltstone and limestone.
	1.20	D					*Becoming brown mottled grey and slightly damp from 1.20m bgl.*
	1.80	HSV	HSV=140kPa				*Occasional gravel of charcoal and low cobble content of siltstone and sandstone from 1.80m bgl.*
	2.00	D					*Boulder of bedded sandstone c.450mm diameter at 2.50m bgl.*
				3.00			End of Pit at 3.00m

Remarks: 1. No groundwater encountered.
2. Shear vanes not possible due to friability of clay.

Stability: Stable.

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Trial Pit Log

TrialPit No: TP106
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325175.00 - 365484.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30	ES		0.20			Grass over light brown grey slightly gravelly silty SAND with rootlets. Sand is fine grained. Gravel is rounded to subrounded fine to medium of sandstone and siltstone. (TOPSOIL)
							Brown orange mottled grey clayey very gravelly SAND. Sand is fine to medium grained. Gravel is subangular to subrounded fine to coarse of siltstone, sandstone, and lithorelics of very sandy clay. Low cobble content of limestone.
	1.40	D		1.30			Firm friable brown mottled grey slightly gravelly sandy silty CLAY. Sand is fine grained. Gravel is subangular to angular fine to coarse of siltstone, sandstone and charcoal.
							Boulder of sandstone 300mm diameter at 1.40m bgl.
	2.00	D					*Boulder of limestone 600mm diameter at 2.00m bgl. Clay becoming dark brown grey from 2.00m bgl..*
							Becoming firm to stiff at 3.00m bgl.
	3.00	D		3.00			End of Pit at 3.00m

Remarks: 1. No groundwater encountered.
2. No shear vanes possible due to friability of clays.

Stability: Stable.

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Trial Pit Log

TrialPit No
TP107
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325237.00 - 365495.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.20			Grass over brown grey slightly gravelly SAND with rootlets. Sand is fine to medium grained. Gravel is rounded fine to medium of siltstone. (TOPSOIL)
	0.30	D					Firm to stiff friable grey sandy CLAY. Sand is medium grained.
	0.90	D		0.80			Firm friable brown silty sandy CLAY. Sand is fine grained.
	2.00	D		2.00			Firm laminated purplish brown silty sandy CLAY. Sand is fine grained.
	2.20	HSV	HSV=112kPa				
	3.00	D		3.00			End of Pit at 3.00m
	3.00	HSV	HSV=140kPa				

1 2 3 4 5

Remarks: 1. No groundwater encountered.
2. Shear vanes not possible due to friability of clay.

Stability: Stable.

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Trial Pit Log

TrialPit No
TP108
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325271.00 - 365545.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.50	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30			MADE GROUND: Grass over brown grey slightly clayey slightly gravelly sand with rootlets. Sand is fine grained. Gravel is subrounded to angular fine to medium of siltstone, sandstone and glass.
	0.40	ES		0.60			Stiff grey friable laminated silty sandy CLAY. Sand is fine grained. Occasional fibrous plant material.
▼	1.60	D					Stiff friable brown orange mottled grey laminated silty sandy CLAY. Sand is fine grained.
							Becoming damp brown orange from 1.60m bgl.
	2.10	HSV	HSV=103kPa	2.10			Soft brown sandy CLAY. Sand is fine grained. Locally laminated.
	2.20	D					
	3.50	D		3.50			End of Pit at 3.50m
	3.50	HSV	HSV=140kPa				

1 2 3 4 5

Remarks: 1. Slight groundwater seepage at 1.60m bgl.

Stability: Partial collapse from 1.60m to 1.80m bgl.

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Trial Pit Log

TrialPit No
TP109
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325272.00 - 365572.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.50	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30	ES		0.30			Grass over brown grey slightly clayey slightly gravelly SAND with rootlets. Sand is fine grained. Gravel is subrounded fine to medium of quartz. (TOPSOIL)
	1.00 1.00	D HSV	HSV=140kPa				Firm brown orange mottled grey silty sandy CLAY with rootlets. Sand is fine grained. Locally laminated.
	1.50 1.50	D HSV	HSV=140kPa	1.50			Firm purplish brown silty sandy CLAY. Sand is fine grained. Laminated.
	2.70 2.70	D HSV	HSV=140kPa				
	3.50	HSV	HSV=140kPa	3.50			End of Pit at 3.50m

1
2
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4
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Remarks: 1. No groundwater encountered.

Stability: Stable.

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BROWNFIELD SOLUTIONS LTD William Smith House, 173-183 Witton Street, Northwich, Cheshire, CW9 5LP	**Trial Pit Log**		TrialPit No TP110 Sheet 1 of 1
Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325208.00 - 365597.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 3.00	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.30			Grass over brown slightly gravelly silty SAND. Sand is fine to medium grained. Gravel is subrounded fine of quartz. (TOPSOIL)
	0.50	D					Brown orange slightly clayey slightly gravelly SAND. Sand is fine to medium grained. Gravel is subrounded to subangular fine to coarse of lithorelics of friable brown orange slightly gravelly sandy clay. Low cobble content of sandstone.
	1.50	D					*Becoming brown red from 1.50m bgl. Gravel of siltstone present.*
	2.30	HSV	HSV=140kPa	2.30			Firm damp brown red slightly gravelly sandy CLAY. Sand is medium grained. Gravel is subrounded fine of siltstone and coal. Low cobble content of siltstone and coal.
	2.40	D					
	3.00	D		3.00			End of Pit at 3.00m

Remarks: 1. No groundwater encountered.
2. Shear vanes not possible due to friability of clay.

Stability: Stable.

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Trial Pit Log

TrialPit No
TP111
Sheet 1 of 1

Project Name: NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325202.00 - 365564.00 Level:	Date 20/08/2018
Location: NEW BRIGHTON, MOLD		Dimensions (m): Depth 2.80	Scale 1:25
Client: STEWART MILNE HOMES			Logged DI

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40	ES		0.30			Grass over brown silty SAND with rootlets. Sand is fine grained. (TOPSOIL).
							Stiff friable brown orange slightly gravelly sandy CLAY. Sand is fine grained. Gravel is rounded to subrounded fine to medium of siltstone, quartz and sandstone. Low cobble content of sandstone.
							Becoming brown red from 0.80m bgl.
	1.30	D					*Boulder of sandstone 600mm diameter at 1.30m bgl.*
	1.60	D		1.60			Brown red slightly clayey slightly gravelly SAND. Sand is fine to medium grained. Gravel is rounded to subrounded fine of quartz and sandstone.
	2.80	D		2.80			End of Pit at 2.80m

Remarks: 1. No groundwater encountered.
2. No shear vanes possible due to friability of clay.

Stability: Stable.

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Borehole Log

Borehole No. **WS101**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325084E - 365622N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:30
Client:	STEWART MILNE HOMES		Dates: 23/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.10	ES		0.10			Grass over light brown SAND with rootlets. Sand is fine to medium grained. (TOPSOIL)
		1.00	D					Stiff friable brown orange slightly gravelly sandy CLAY. Sand is fine to medium grained. Gravel is subrounded fine to medium of siltstone, sandstone and charcoal.
		1.00	S	N=31 (5,5/6,8,8,9)				
								Becoming brown red from 1.30m bgl.
		2.00	D					
		2.00		N=21 (4,5/5,5,5,6)				*Cobble of sandstone at 2.00m bgl.*
		2.80	D					*Becoming slightly gravelly clayey fine to medium sand between 2.80m and 3.00m bgl.*
		3.00	D					
		3.00		N=24 (3,5/5,5,7,7)				
	▼	3.90	D					
		4.00		N=14 (3,3/3,3,3,5)				
		5.00		N=18 (3,3/4,4,4,6)				
					5.45			End of Borehole at 5.45m

Remarks

1. Groundwater encountered at 4.00m bgl.
2. Standpipe installed to 5.00m bgl; 1.00m plain, 4.00m slotted.

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Borehole Log

Borehole No. **WS102**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325125E - 365578N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:30
Client:	STEWART MILNE HOMES		Dates:	23/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	ES		0.30			Grass over dark brown slightly gravelly SAND. Sand is fine to medium grained. Gravel is subrounded to subangular medium to coarse of siltstone and sandstone. (TOPSOIL)
		0.40	D					Stiff friable brown orange slightly gravelly sandy CLAY. Sand is fine to medium grained. Gravel is subrounded to subangular fine to coarse of siltstone and sandstone.
		1.00		N=18 (4,3/5,4,5,4)				
		1.50	D					*Becoming brown and less friable from 1.50m bgl.*
		2.00		N=17 (3,2/3,4,5,5)				*Becoming gravelly from 2.00m bgl. Rare gravel of granite.*
		2.50	D					
		3.00		N=24 (4,6/6,6,6,6)				*Becoming silty and firm from 2.90m bgl.*
		3.50	D					
	▼	4.00		N=20 (4,5/5,5,5,5)				*Lens of medium dense very clayey fine to medium sand between 4.00m and 4.90m bgl.*
		4.50	D					
		5.00		N=12 (2,2/3,3,3,3)				*Lens of very clayey fine to medium sand from 5.20m bgl.*
					5.45			End of Borehole at 5.45m

Remarks
1. Groundwater encountered at 4.00m bgl.
2. Hole backfilled upon completion.

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Borehole Log

Borehole No. **WS103**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325149E - 365615N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:30
Client:	STEWART MILNE HOMES		Dates: 23/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			Grass over brown slightly gravelly SAND with rootlets. Sand is fine to medium grained. Gravel is subangular to subrounded fine to medium of siltstone and charcoal. (TOPSOIL)
		0.30	ES					Firm brown orange slightly gravelly sandy CLAY. Sand is fine to coarse grained. Gravel is subrounded fine to medium of siltstone and sandstone. Some fibrous organic material.
		0.80	D					*Becoming firm to stiff and brown from 0.70m bgl. Fibrous organic material no longer present.*
		1.00		N=10 (1,1/2,2,3,3)				
		1.70	D					
		2.00		N=17 (2,2/3,4,5,5)				
		2.50	D					
								Cobble of sandstone at 2.80m bgl.
		3.00		N=27 (4,5/6,7,7,7)				
		3.50	D					
		4.00		N=20 (4,4/4,4,7,5)				
		4.20	D		4.10			Firm to stiff purplish brown sandy CLAY. Sand is fine grained.
		5.00		N=22 (3,4/4,5,6,7)				
					5.45			End of Borehole at 5.45m

1 2 3 4 5 6

Remarks
1. No groundwater encountered.
2. Standpipe installed to 5.00m bgl; 1.00m plain, 4.00m slotted.

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Borehole Log

Borehole No.
WS104
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325157E - 365580N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:30
Client:	STEWART MILNE HOMES		Dates: 23/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.20			Grass over brown clayey SAND with rootlets. (TOPSOIL)
		0.50	D					Firm to stiff brown orange slightly gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of siltstone and sandstone.
		1.00		N=13 (2,3/3,3,3,4)				*Becoming brown from 0.90m bgl. Gravel of charcoal present.*
		1.50	D					
		2.00		N=19 (3,3/4,4,5,6)				
		2.50	D					
		2.90		50 (25 for 135mm/50 for 205mm)	2.90			*Hole terminated at 2.90m bgl due to SPT refusal.* End of Borehole at 2.90m

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Remarks

1. No groundwater encountered.
2. Hole backfilled upon completion.

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Borehole Log

Borehole No. **WS105**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325153E - 365532N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:30
Client:	STEWART MILNE HOMES		Dates:	23/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.30			Grass over brown grey slightly gravelly clayey SAND. Sand is fine to medium grained. Gravel is rounded fine to medium siltstone. (TOPSOIL)
		0.60	D					Stiff brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium of siltstone, sandstone, limestone and charcoal.
		1.00		N=13 (2,2/2,3,3,5)				
		1.50	D					*Cobble of limestone at 1.40m bgl.*
		2.00		N=22 (4,4/5,5,5,7)				*Becoming gravelly from 2.00m bgl.*
		2.50	D					
		3.00		N=23 (4,5/6,5,6,6)				*Becoming grey brown from 3.10m bgl.*
		3.50	D					
		4.00		N=21 (10,5/4,4,6,7)				*Becoming firm from 4.00m bgl.*
		4.50	D					
		5.00		N=18 (3,5/5,4,4,5)	5.45			End of Borehole at 5.45m

Remarks
1. No groundwater encountered.
2. Hole backfilled upon completion.

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CW9 5LP

Borehole Log

Borehole No. **WS106**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325188E - 365508N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:30
Client:	STEWART MILNE HOMES		Dates: 23/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.10	ES		0.20			Grass over brown SAND with rootlets. (TOPSOIL)
		0.50	D					Firm to stiff brown orange slightly gravelly sandy CLAY. Sand is fine grained. Gravel is subrounded to subangular fine to medium of siltstone, sandstone and charcoal.
		1.00		N=12 (2,3/3,3,3,3)				
		1.20	D					*Becoming brown from 1.20m bgl.*
		2.00		N=14 (2,3/4,3,3,4)				
		2.50	D					
		3.00		N=30 (4,5/5,7,8,10)				
		3.50	D					
		4.00		N=22 (4,5/4,6,6,6)				*Becoming brown grey from 4.00m bgl.*
		4.30	D					
		5.00		N=23 (3,4/5,5,6,7)				
					5.45			End of Borehole at 5.45m

Remarks
1. No groundwater encountered.
2. Standpipe installed to 5.50m bgl; 1.50m plain, 4.00m slotted.

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Borehole Log

Borehole No. **WS107**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325204E - 365528N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:30
Client:	STEWART MILNE HOMES		Dates:	24/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.50			Grass over brown SAND with rootlets. Sand is fine to medium grained. (TOPSOIL)
		0.70	D					Firm to stiff brown slightly gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of siltstone and sandstone.
		1.00		N=4 (1,1/1,1,1,1)				*Lens of orange medium sand between 0.60m and 0.65m bgl.*
		1.50	D		1.40			Soft brown silty sandy CLAY. Sand is fine to medium grained.
		2.00		N=6 (1,2/1,2,1,2)				*Becoming soft to firm from 2.00m bgl.*
		2.50	D					
	▼	3.00		N=23 (13,11/9,4,5,5)	3.40			Medium dense brown slightly gravelly clayey silty SAND. Sand is fine to medium grained. Gravel is subangular fine to medium of coal and siltstone.
		3.60	D					
		4.00		N=14 (1,3/3,3,4,4)				
		4.20	D		4.20			Firm brown slightly gravelly sandy CLAY. Sand is fine to coarse grained. Gravel is subrounded fine of siltstone.
		5.00		N=26 (4,4/6,6,7,7)	5.45			End of Borehole at 5.45m

Remarks
1. Groundwater encountered at 3.00m bgl.
2. Hole backfilled upon completion.

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Borehole Log

Borehole No.
WS108
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325265E - 365598N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:30
Client:	STEWART MILNE HOMES		Dates: 24/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.30			MADE GROUND: Grass over light brown slightly gravelly sand with rootlets. Sand is fine to medium grained. Gravel is subrounded fine to medium of sandstone.
		1.00	ES					MADE GROUND: Firm brown slightly gravelly sandy clay. Gravel is subangular to angular fine to medium of glass, pottery, siltstone and sandstone.
		1.00		N=0 (0,0/0,0,0,0)	1.10			
		1.20	ES					MADE GROUND: Soft dark grey slightly gravelly silty clay. Gravel is angular medium to coarse of pottery. Slight organic odour.
		2.00		N=6 (1,1/1,1,2,2)	2.00			
		2.10	D					Soft to firm purplish brown silty sandy CLAY. Sand is fine grained.
		3.00		N=10 (1,2/2,2,3,3)				
		3.30	D					
	▼	4.00		N=13 (4,3/2,3,4,4)	4.00			Medium dense brown silty clayey SAND. Sand is fine grained.
		4.50	D					
		5.00		N=21 (3,3/5,5,5,6)	5.00			Firm to stiff brown sandy CLAY. Sand is fine to coarse grained.
					5.45			End of Borehole at 5.45m

Remarks

1. Hole damp from 3.50m bgl, groundwater encountered at 4.00m bgl.
2 Standpipe installed to 5.00m bgl; 1.00m plain, 4.00m slotted.

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Borehole Log

Borehole No. **WS109**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325290E - 365517N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:30
Client:	STEWART MILNE HOMES		Dates:	24/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Grass over brown grey sand with rootlets. Sand is fine to medium grained.
		0.20	ES					MADE GROUND: Firm brown orange slightly gravelly sandy clay. Gravel is subrounded fine to medium of siltstone, quartz and sandstone.
					0.60			MADE GROUND: Grey gravel. Gravel is subangular fine to medium of limestone. Piece of plastic.
		0.70	D					
		1.00		N=9 (2,1/2,2,2,3)	1.00			Soft to firm brown orange silty sandy CLAY. Sand is fine grained.
		1.30	D					*Fibrous organic matter present to 2.00m bgl.*
▼		2.00		N=5 (2,1/1,1,1,2)				*Becoming soft and brown from 2.00m bgl.*
		2.30	D					
		3.00		N=4 (1,1/1,1,1,1)				
		3.50	D					
		4.00		N=5 (1,1/1,1,1,2)				
		4.50	D					
		5.00		N=23 (4,4/5,6,5,7)	5.00			Medium dense brown SAND. Sand is fine to medium grained.
					5.45			End of Borehole at 5.45m

Remarks
1. Groundwater encountered at 2.00m bgl.
2. Hole backfilled upon completion.

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Borehole Log

Borehole No.
WS110
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325228E - 365525N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:30
Client:	STEWART MILNE HOMES		Dates: 24/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.20			Grass over slightly gravelly clayey SAND with rootlets. Sand is fine to medium grained. Gravel is subrounded to subangular fine to medium of siltstone. (TOPSOIL)
		0.50	D					Firm to stiff brown grey sandy silty CLAY. Sand is fine grained.
		1.00		N=10 (2,2/2,3,2,3)				
		1.30	D					*Becoming soft to firm brown orange from 1.10m bgl.*
		2.00		N=8 (1,1/2,2,2,2)	2.00			Firm purplish brown sandy silty CLAY. Sand is fine grained.
		2.40	D					
		3.00		N=11 (2,2/2,3,3,3)				
		3.50	D					
	▼	4.00		N=16 (2,2/3,3,4,6)				
		5.00		N=33 (6,6/6,8,10,9)	5.00			Brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of siltstone and quartz.
					5.45			End of Borehole at 5.45m

Remarks

1. Groundwater encountered at 4.00m bgl.
2. Standpipe installed to 5.00m bgl; 1.00m plain, 4.00m slotted.

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Borehole Log

Borehole No.
WS111
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325224E - 365558N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:30
Client:	STEWART MILNE HOMES		Dates: 24/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			Grass over firm brown sandy CLAY with rootlets. (TOPSOIL)	
		0.30	ES		0.40			Grey brown orange silty sandy CLAY. Sand is fine grained.	
		0.70	D					Firm brown orange silty sandy CLAY. Sand is fine grained.	
		1.00		N=13 (2,3/3,3,3,4)				*Rootlets present to 1.00m bgl.*	1
		1.50	D						
		2.00		N=8 (1,1/2,2,2,2)	2.00			Firm purplish brown silty sandy CLAY. Sand is fine grained.	2
								Becoming slightly gravelly from 2.10m bgl. Gravel is subrounded to subangular fine of siltstone and charcoal. Clay becoming laminated.	
		2.70	D						
		3.00		N=33 (4,4/5,6,15,7)					3
		3.50	D						
	▼	4.00	D						
		4.00		N=15 (4,3/3,3,4,5)				*Sand becoming fine to coarse from 4.00m bgl.*	4
								Becoming brown slightly clayey fine to medium sand from 4.40m to 4.80m bgl.	
		5.00		N=16 (4,3/3,5,4,4)					5
					5.45			End of Borehole at 5.45m	
									6

Remarks

1. Groundwater encountered from 4.00m to 4.80m bgl.
2. Hole backfilled upon completion.

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Borehole Log

Borehole No. **WS112**
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325232E - 365595N	Hole Type WS
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:30
Client:	STEWART MILNE HOMES		Dates:	24/08/2018	Logged By DI

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.30			Grass over brown slightly gravelly SAND with rootlets. Sand is fine to medium grained. Gravel is subrounded fine to medium of quartz. (TOPSOIL)
		0.40	D					Firm to stiff brown silty sandy CLAY. Sand is fine grained.
		1.00		N=12 (1,2/3,3,3,3)				*Becoming soft to firm from 1.00m bgl.*
		1.50	D					
		2.00		N=8 (1,1/2,2,2,2)				*Becoming brown grey from 1.90m bgl.*
		2.50	D					
		3.00		N=13 (2,3/3,3,3,4)				
		3.50	D					
		3.80	D		3.70			Medium dense brown slightly gravelly SAND. Sand is fine to coarse grained. Gravel is subrounded fine of siltstone, quartz and limestone.
	▼	4.00		N=23 (4,4/6,6,7,4)				
		4.50	D					
		5.00	D		4.90			Firm brown slightly gravelly sandy CLAY. Sand is fine to medium grained. Gravel is subrounded fine of siltstone and quartz.
		5.00		N=17 (3,3/4,4,4,5)				
					5.45			End of Borehole at 5.45m

Remarks

1. Groundwater encountered at 4.00m bgl.
2. Hole backfilled upon completion.

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Borehole Log

Borehole No. **RO101**

Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325250E - 365591N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:200
Client:	STEWART MILNE HOMES		Dates:	20/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					13.70			GRAVEL.
					15.00			Grey SANDSTONE.
					15.40			Dark SHALE/COAL.
					16.40			Grey SANDSTONE with MUDSTONE bands.
					35.90			Dark SHALE/COAL.
					36.50			Grey MUDSTONE.
					40.00			End of Borehole at 40.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No.
RO102
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325277E - 365574N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:200
Client:	STEWART MILNE HOMES		Dates: 20/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					13.50			GRAVEL.
					14.70			Grey SANDSTONE.
					15.20			Dark SHALE/COAL.
					16.00			Grey SANDSTONE with MUDSTONE bands.
					36.40			Dark SHALE/COAL.
					37.40			Grey MUDSTONE.
					40.00			End of Borehole at 40.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No. **RO103**

Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325244E - 365552N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:200
Client:	STEWART MILNE HOMES		Dates:	20/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					15.00			GRAVEL.
					17.00			Grey MUDSTONE.
					18.00			Dark SHALE/COAL.
					18.80			Grey MUDSTONE with SANDSTONE bands.
					30.00			End of Borehole at 30.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No.
RO104
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325243E - 365513N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:200
Client:	STEWART MILNE HOMES		Dates:	20/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					15.40			GRAVEL.
					17.80			Grey/dark grey MUDSTONE.
					22.60			Dark SHALE/COAL.
					23.60			Grey MUDSTONE/SANDSTONE.
					30.00			End of Borehole at 30.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No.
RO105
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325292E - 365510N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:200
Client:	STEWART MILNE HOMES		Dates:	20/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					15.00			GRAVEL.
					15.20			Grey/dark grey MUDSTONE.
					22.20			Dark SHALE/COAL.
					23.20			Grey MUDSTONE with SANDSTONE bands.
					30.00			End of Borehole at 30.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No.
RO106
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325215E - 365618N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:200
Client:	STEWART MILNE HOMES		Dates: 21/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					15.00			SAND and GRAVEL.
					18.00			Grey MUDSTONE.
					19.00			Dark grey SHALE/COAL.
					20.00			Grey SANDSTONE with MUDSTONE bands.
					31.30			Dark grey SHALE/MUDSTONE.
					32.00			Grey MUDSTONE.
					34.00			Dark grey SHALE/COAL.
					35.00			Grey MUDSTONE.
					40.00			End of Borehole at 40.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No.
RO107
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325203E - 365586N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:200
Client:	STEWART MILNE HOMES		Dates: 21/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					13.50			Grey MUDSTONE.
					19.30			COAL.
					20.40			Grey MUDSTONE/SANDSTONE.
					28.70			Dark grey MUDSTONE.
					30.00			End of Borehole at 30.00m

Remarks
1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No. **RO108**

Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords:	325200E - 365542N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:		Scale 1:200
Client:	STEWART MILNE HOMES		Dates:	21/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					14.00			Grey MUDSTONE.
					17.50			Dark SHALE/COAL.
					18.50			Grey MUDSTONE with SANDSTONE bands.
					30.00			End of Borehole at 30.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No.
RO109
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325202E - 365503N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:200
Client:	STEWART MILNE HOMES		Dates: 21/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					12.00			Grey MUDSTONE.
					13.40			Dark SHALE/COAL.
					14.40			Grey MUDSTONE.
					18.20			Dark SHALE/COAL.
					19.10			Grey MUDSTONE with SANDSTONE bands.
					26.60			Dark SHALE with coal traces.
					27.00			Grey MUDSTONE.
					30.00			End of Borehole at 30.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No. **RO110**

Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325162E - 365605N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:200
Client:	STEWART MILNE HOMES		Dates: 21/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					12.00			Grey MUDSTONE/SANDSTONE.
					20.20			Dark SHALE with coal traces.
					21.00			Grey MUDSTONE.
					22.80			Dark SHALE/COAL.
					23.70			Grey MUDSTONE.
					25.20			Dark SHALE with coal traces.
					26.00			Grey MUDSTONE/SANDSTONE.
					30.00			End of Borehole at 30.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

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Borehole Log

Borehole No. **RO111**

Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325141E - 365563N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:200
Client:	STEWART MILNE HOMES		Dates: 21/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					14.00			Grey MUDSTONE/SANDSTONE.
					35.00			Dark SHALE/COAL.
					36.20			Grey MUDSTONE.
					40.00			End of Borehole at 40.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

AGS

BROWNFIELD SOLUTIONS LTD
William Smith House,
173-183 Witton Street,
Northwich,
Cheshire,
CW9 5LP

Borehole Log

Borehole No.
RO112
Sheet 1 of 1

Project Name:	NEW BRIGHTON ROAD	Project No. C3915	Co-ords: 325113E - 365552N	Hole Type RO
Location:	NEW BRIGHTON, MOLD		Level:	Scale 1:200
Client:	STEWART MILNE HOMES		Dates: 22/08/2018	Logged By DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CLAY.
					12.70			Grey MUDSTONE.
					13.20			Dark SHALE/COAL.
					14.20			Grey MUDSTONE.
					15.00			Dark SHALE/COAL.
					15.70			Grey MUDSTONE.
					20.60			Dark SHALE/COAL.
					21.00			Grey MUDSTONE.
					27.80			Dark SHALE/COAL.
					28.80			Grey MUDSTONE.
					30.00			End of Borehole at 30.00m

Remarks

1. No loss of flush or dropping of rods observed.
2. No gases detected.
3. Hole backfilled upon completion.

AGS

APPENDIX B
Chemical Testing Results

Dylan Ingman
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

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i2 Analytical Ltd.
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Watford,
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WD18 8YS

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Analytical Report Number : 18-98450

Project / Site name:	New Brighton, Mold	**Samples received on:**	30/08/2018
Your job number:	C3915	**Samples instructed on:**	30/08/2018
Your order number:	C3915-5881-DI	**Analysis completed by:**	06/09/2018
Report Issue Number:	1	**Report issued on:**	06/09/2018
Samples Analysed:	20 soil samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035649	1035650	1035651	1035652	1035653
Sample Reference				WS108	WS109	TP103	WS106	TP110
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.20	0.50	0.10	0.20
Date Sampled				24/08/2018	24/08/2018	20/08/2018	23/08/2018	20/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	19	10	7.8	10	9.4
Total mass of sample received	kg	0.001	NONE	0.89	0.95	0.97	0.96	1.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.3	6.3	6.6	6.2	6.3
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.021	0.013	0.020	0.017	0.013
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	21.2	13.0	19.6	16.5	12.9
Organic Matter	%	0.1	MCERTS	3.2	1.2	0.7	3.5	4.6
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-
Phenols by HPLC								
Catechol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols (o-, m-, p-)	mg/kg	0.3	ISO 17025	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Total Naphthols (sum of 1- and 2- Naphthol)	mg/kg	0.2	ISO 17025	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
2-Isopropylphenol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol (2,3,5-)	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Xylenols and Ethylphenols	mg/kg	0.3	ISO 17025	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Total Phenols								
Total Phenols (HPLC)	mg/kg	1.3	ISO 17025	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035649	1035650	1035651	1035652	1035653
Sample Reference				WS108	WS109	TP103	WS106	TP110
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.20	0.50	0.10	0.20
Date Sampled				24/08/2018	24/08/2018	20/08/2018	23/08/2018	20/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	12	6.3	6.5	9.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	20	27	15	19	17
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	28	16	19	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	34	20	18	11	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	140	23	18	56	46
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	27	16	11	13
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	53	46	32	40

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035654	1035655	1035656	1035657	1035658
Sample Reference				TP101	WS111	TP104	WS112	WS102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.30	0.20	0.20	0.20
Date Sampled				20/08/2018	24/08/2018	20/08/2018	24/08/2018	23/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	9.6	12	13	8.0	9.0
Total mass of sample received	kg	0.001	NONE	0.82	0.85	0.93	0.90	0.79
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.1	8.6	7.6	7.6	6.5
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0093	0.010	0.047	0.014	0.0097
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	9.3	10.3	46.9	14.2	9.7
Organic Matter	%	0.1	MCERTS	5.5	0.9	3.0	2.1	6.8
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-
Phenols by HPLC								
Catechol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols (o-, m-, p-)	mg/kg	0.3	ISO 17025	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Total Naphthols (sum of 1- and 2- Naphthol)	mg/kg	0.2	ISO 17025	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
2-Isopropylphenol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol (2,3,5-)	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Xylenols and Ethylphenols	mg/kg	0.3	ISO 17025	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Total Phenols								
Total Phenols (HPLC)	mg/kg	1.3	ISO 17025	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035654	1035655	1035656	1035657	1035658
Sample Reference				TP101	WS111	TP104	WS112	WS102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.30	0.20	0.20	0.20
Date Sampled				20/08/2018	24/08/2018	20/08/2018	24/08/2018	23/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	5.3	4.7	3.7	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.5
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	16	24	12	19	17
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	24	12	19	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25	22	10	19	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	15	42	30	140
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	36	7.1	19	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	61	49	23	37	250

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035659	1035660	1035661	1035662	1035663
Sample Reference				TP106	SA05	WS101	WS108	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.40	0.10	1.20	1.30
Date Sampled				20/08/2018	22/08/2018	23/08/2018	24/08/2018	24/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	11	11	12	35	16
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.0	0.89	0.63
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.0	6.8	7.3	7.6	-
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.014	0.018	0.012	1.4	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	14.2	17.7	12.4	-	-
Organic Matter	%	0.1	MCERTS	0.8	1.6	2.5	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	4.6	0.7
Phenols by HPLC								
Catechol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	-	-
Resorcinol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	-	-
Cresols (o-, m-, p-)	mg/kg	0.3	ISO 17025	< 0.30	< 0.30	< 0.30	-	-
Total Naphthols (sum of 1- and 2- Naphthol)	mg/kg	0.2	ISO 17025	< 0.20	< 0.20	< 0.20	-	-
2-Isopropylphenol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	-	-
Phenol	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	-	-
Trimethylphenol (2,3,5-)	mg/kg	0.1	ISO 17025	< 0.10	< 0.10	< 0.10	-	-
Total Xylenols and Ethylphenols	mg/kg	0.3	ISO 17025	< 0.30	< 0.30	< 0.30	-	-
Total Phenols								
Total Phenols (HPLC)	mg/kg	1.3	ISO 17025	< 1.3	< 1.3	< 1.3	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	-	-

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035659	1035660	1035661	1035662	1035663
Sample Reference				TP106	SA05	WS101	WS108	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.40	0.10	1.20	1.30
Date Sampled				20/08/2018	22/08/2018	23/08/2018	24/08/2018	24/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.7	6.7	6.6	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	-	-
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	-	-
Chromium (III)	mg/kg	1	NONE	20	21	18	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	21	18	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21	20	10	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	28	27	29	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	18	11	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	33	38	35	-	-

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035664	1035665	1035666	1035667	1035668
Sample Reference				TP103	WS106	TP110	TP101	WS111
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	0.50	2.40	1.40	0.70
Date Sampled				20/08/2018	23/08/2018	20/08/2018	20/08/2018	24/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	10	12	10	12	13
Total mass of sample received	kg	0.001	NONE	0.70	0.61	0.72	0.57	0.68
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Free Cyanide	mg/kg	1	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Organic Matter	%	0.1	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.5	0.4	0.5	0.8	0.6
Phenols by HPLC								
Catechol	mg/kg	0.1	ISO 17025	-	-	-	-	-
Resorcinol	mg/kg	0.1	ISO 17025	-	-	-	-	-
Cresols (o-, m-, p-)	mg/kg	0.3	ISO 17025	-	-	-	-	-
Total Naphthols (sum of 1- and 2- Naphthol)	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Isopropylphenol	mg/kg	0.1	ISO 17025	-	-	-	-	-
Phenol	mg/kg	0.1	ISO 17025	-	-	-	-	-
Trimethylphenol (2,3,5-)	mg/kg	0.1	ISO 17025	-	-	-	-	-
Total Xylenols and Ethylphenols	mg/kg	0.3	ISO 17025	-	-	-	-	-
Total Phenols								
Total Phenols (HPLC)	mg/kg	1.3	ISO 17025	-	-	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	-	-	-

Analytical Report Number: 18-98450

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1035664	1035665	1035666	1035667	1035668
Sample Reference				TP103	WS106	TP110	TP101	WS111
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	0.50	2.40	1.40	0.70
Date Sampled				20/08/2018	23/08/2018	20/08/2018	20/08/2018	24/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	-
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	-	-	-	-
Chromium (III)	mg/kg	1	NONE	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-

Analytical Report Number : 18-98450

Project / Site name: New Brighton, Mold

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1035649	WS108	None Supplied	0.30	Grey clay and sand with gravel.
1035650	WS109	None Supplied	0.20	Brown clay and sand with gravel.
1035651	TP103	None Supplied	0.50	Light brown clay and sand with gravel.
1035652	WS106	None Supplied	0.10	Light brown loam and clay with gravel and vegetation.
1035653	TP110	None Supplied	0.20	Light brown loam and clay with gravel and vegetation.
1035654	TP101	None Supplied	0.10	Light brown loam and clay with gravel and vegetation.
1035655	WS111	None Supplied	0.30	Light grey clay and sand with vegetation.
1035656	TP104	None Supplied	0.20	Brown loam and clay with vegetation and gravel
1035657	WS112	None Supplied	0.20	Brown clay and sand with vegetation and gravel
1035658	WS102	None Supplied	0.20	Brown loam and clay with vegetation and gravel
1035659	TP106	None Supplied	0.30	Light brown clay and sand with gravel and vegetation.
1035660	SA05	None Supplied	0.40	Light brown clay and sand with gravel and vegetation.
1035661	WS101	None Supplied	0.10	Light brown clay and sand with gravel and vegetation.
1035662	WS108	None Supplied	1.20	Grey clay and sand with gravel.
1035663	WS109	None Supplied	1.30	Light brown clay.
1035664	TP103	None Supplied	0.90	Brown clay and sand with gravel.
1035665	WS106	None Supplied	0.50	Light brown clay with vegetation.
1035666	TP110	None Supplied	2.40	Brown clay.
1035667	TP101	None Supplied	1.40	Brown clay and sand.
1035668	WS111	None Supplied	0.70	Brown clay.

Analytical Report Number : 18-98450

Project / Site name: New Brighton, Mold

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Phenols, speciated, in soil, by HPLC	Determination of speciated phenols by HPLC.	In house method based on Blue Book Method.	L030-PL	W	ISO 17025
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

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

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Analytical Report Number : 18-98569

Project / Site name:	New Brighton, Mold	**Samples received on:**	30/08/2018
Your job number:	C3915	**Samples instructed on:**	30/08/2018
Your order number:	C3915-5881-DI	**Analysis completed by:**	06/09/2018
Report Issue Number:	1	**Report issued on:**	06/09/2018
Samples Analysed:	14 soil samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Analytical Report Number: 18-98569

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1036212	1036213	1036214	1036215	1036216
Sample Reference				TP104	WS112	TP108	TP106	SA05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	3.50	1.60	1.40	1.40
Date Sampled				20/08/2018	24/08/2018	20/08/2018	20/08/2018	22/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	14	16	11	12
Total mass of sample received	kg	0.001	NONE	0.61	0.59	0.74	0.64	0.63
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.5	0.6	0.6	0.7	0.5

Analytical Report Number: 18-98569

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1036217	1036218	1036219	1036220	1036221
Sample Reference				TP101	TP103	SA05	TP104	WS110
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	2.20	0.10	1.50	0.50
Date Sampled				20/08/2018	20/08/2018	22/08/2018	20/08/2018	24/08/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	9.6	9.9	9.8	12	13
Total mass of sample received	kg	0.001	NONE	0.64	0.64	0.92	0.65	0.79
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.5	7.3	6.4	7.5	7.6
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.021	0.057	0.022	0.039	0.015
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-

Analytical Report Number: 18-98569

Project / Site name: New Brighton, Mold
Your Order No: C3915-5881-DI

Lab Sample Number				1036222	1036223	1036224	1036225	
Sample Reference				SA04	SA03	SA02	WS112	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				1.60	1.90	0.30	1.50	
Date Sampled				21/08/2018	21/08/2018	21/08/2018	24/08/2018	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	15	15	17	12	
Total mass of sample received	kg	0.001	NONE	0.66	0.65	0.56	0.66	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	7.9	7.0	8.0	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.031	0.048	0.026	0.023	
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	

Analytical Report Number : 18-98569

Project / Site name: New Brighton, Mold

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1036212	TP104	None Supplied	0.40	Light brown clay and sand with vegetation.
1036213	WS112	None Supplied	3.50	Brown clay.
1036214	TP108	None Supplied	1.60	Brown clay.
1036215	TP106	None Supplied	1.40	Brown clay.
1036216	SA05	None Supplied	1.40	Brown clay.
1036217	TP101	None Supplied	0.50	Light brown clay with gravel.
1036218	TP103	None Supplied	2.20	Brown clay with gravel.
1036219	SA05	None Supplied	0.10	Brown loam and sand with gravel and vegetation.
1036220	TP104	None Supplied	1.50	Brown clay and sand.
1036221	WS110	None Supplied	0.50	Brown clay.
1036222	SA04	None Supplied	1.60	Brown clay.
1036223	SA03	None Supplied	1.90	Brown clay.
1036224	SA02	None Supplied	0.30	Light grey clay with vegetation.
1036225	WS112	None Supplied	1.50	Brown clay.

Analytical Report Number : 18-98569

Project / Site name: New Brighton, Mold

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

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

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Analytical Report Number : 18-98451

Project / Site name:	New Brighton, Mold	**Samples received on:**	30/08/2018
Your job number:	C3915	**Samples instructed on:**	30/08/2018
Your order number:	C3915-5881-DI	**Analysis completed by:**	10/09/2018
Report Issue Number:	1	**Report issued on:**	10/09/2018
Samples Analysed:	1 WAC 10:1 Sample		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Waste Acceptance Criteria Analytical Results

Report No:	**18-98451**						
					Client:	**BSL**	
Location	**New Brighton, Mold**						
Lab Reference (Sample Number)	1035669 / 1035670				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	24/08/2018				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	W108						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	1.9				3%	5%	6%
Loss on Ignition (%) **	5.4				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.9				100	--	--
pH (units)**	7.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	3.6				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0029			0.0214	0.5	2	25
Barium *	0.0138			0.102	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0019			0.014	0.5	10	70
Copper *	0.0085			0.063	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0013			0.0096	0.5	10	30
Nickel *	0.0018			0.014	0.4	10	40
Lead *	0.0060			0.045	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0078			0.058	4	50	200
Chloride *	2.0			15	800	4000	25000
Fluoride	0.60			4.4	10	150	500
Sulphate *	3.4			25	1000	20000	50000
TDS*	49			360	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	5.55			41.2	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.89						
Dry Matter (%)	81						
Moisture (%)	19						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
*= UKAS accredited (liquid eluate analysis only)
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation
** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 18-98451

Project / Site name: New Brighton, Mold

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1035669	W108	None Supplied	0.30	Grey clay and sand with gravel.

Analytical Report Number : 18-98451

Project / Site name: New Brighton, Mold

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	in-house method	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS

Analytical Report Number : 18-98451

Project / Site name: New Brighton, Mold

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

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

APPENDIX C
Geotechnical Testing Results

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

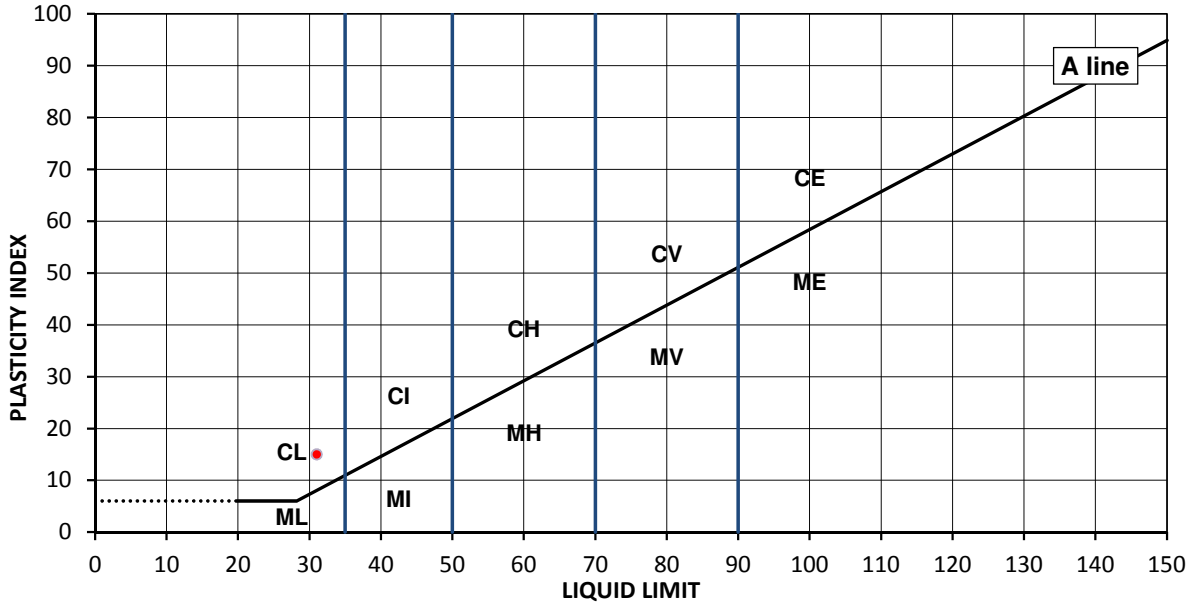
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035092	Depth Top [m]:	1.80
Hole No.:	TP102	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
9.0	31	16	15	80



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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Watford Herts WD18 8YS

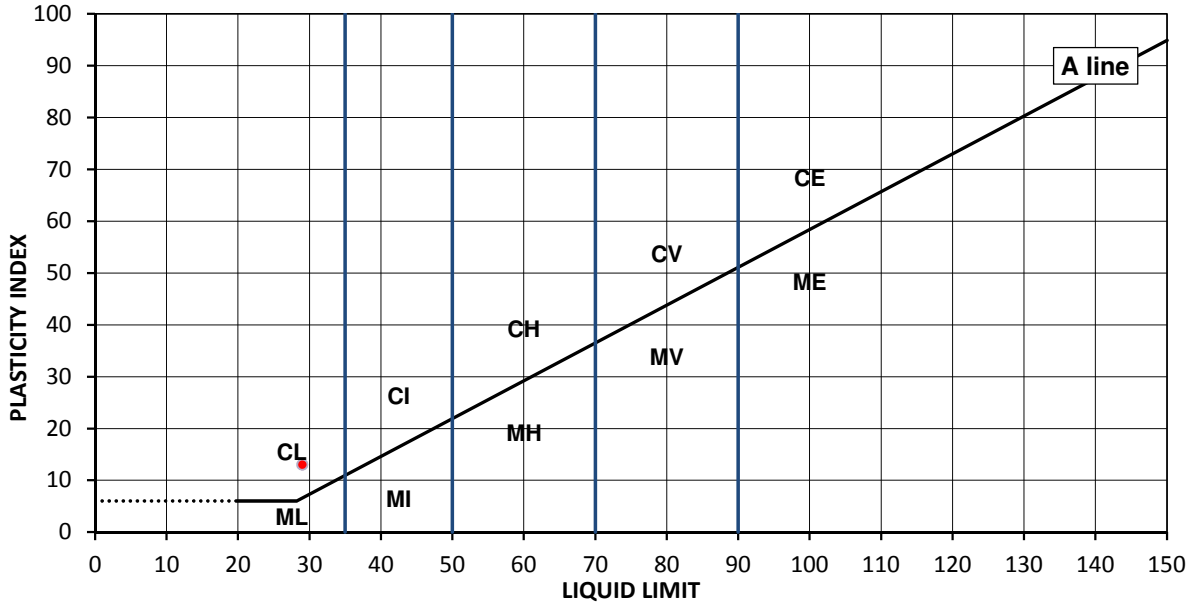
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035093	Depth Top [m]:	2.50
Hole No.:	WS104	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
12	29	16	13	85



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

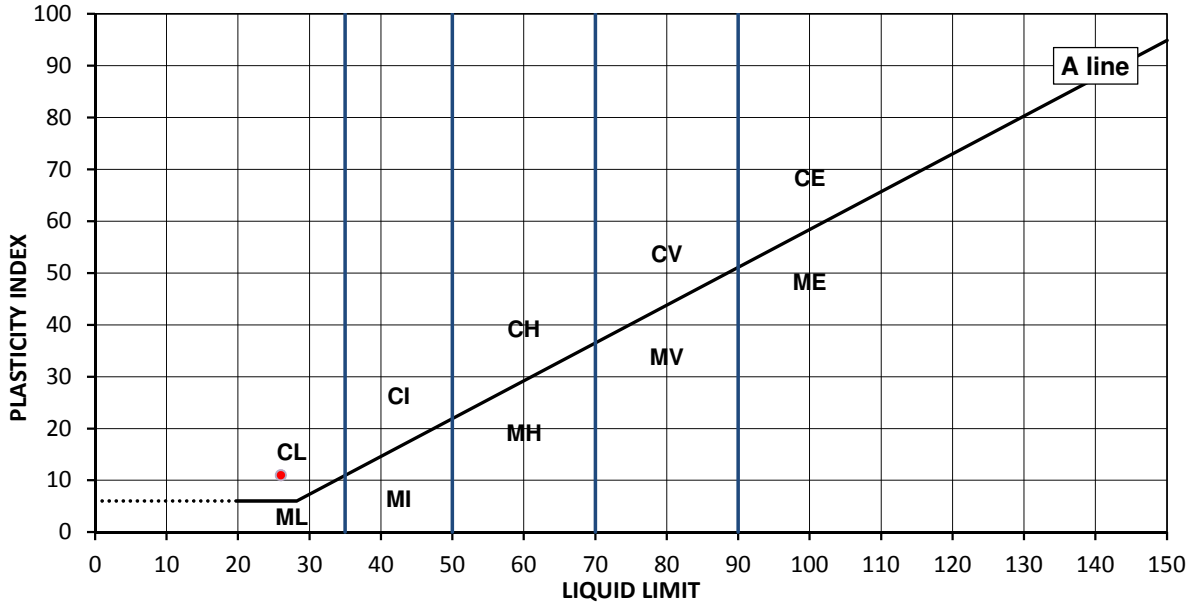
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035094	Depth Top [m]:	0.80
Hole No.:	WS103	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Mottled brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
11	26	15	11	85



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

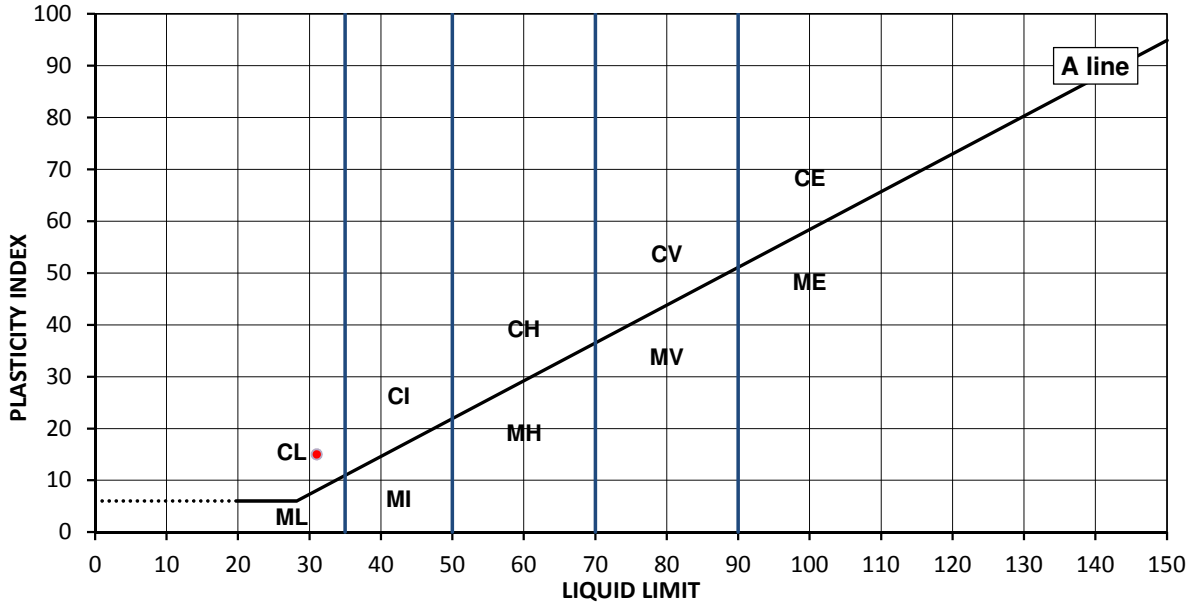
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035095	Depth Top [m]:	1.20
Hole No.:	TP105	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
14	31	16	15	83



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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Croxley Green Business Park
Watford Herts WD18 8YS

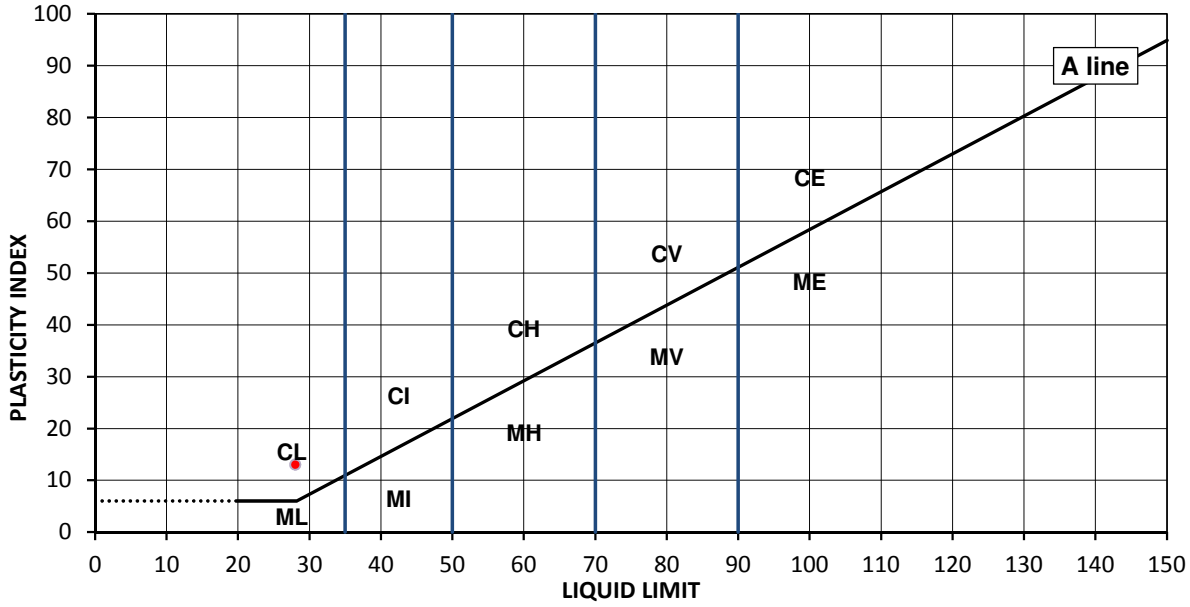
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035096	Depth Top [m]:	1.30
Hole No.:	TP111	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
16	28	15	13	94



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

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7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

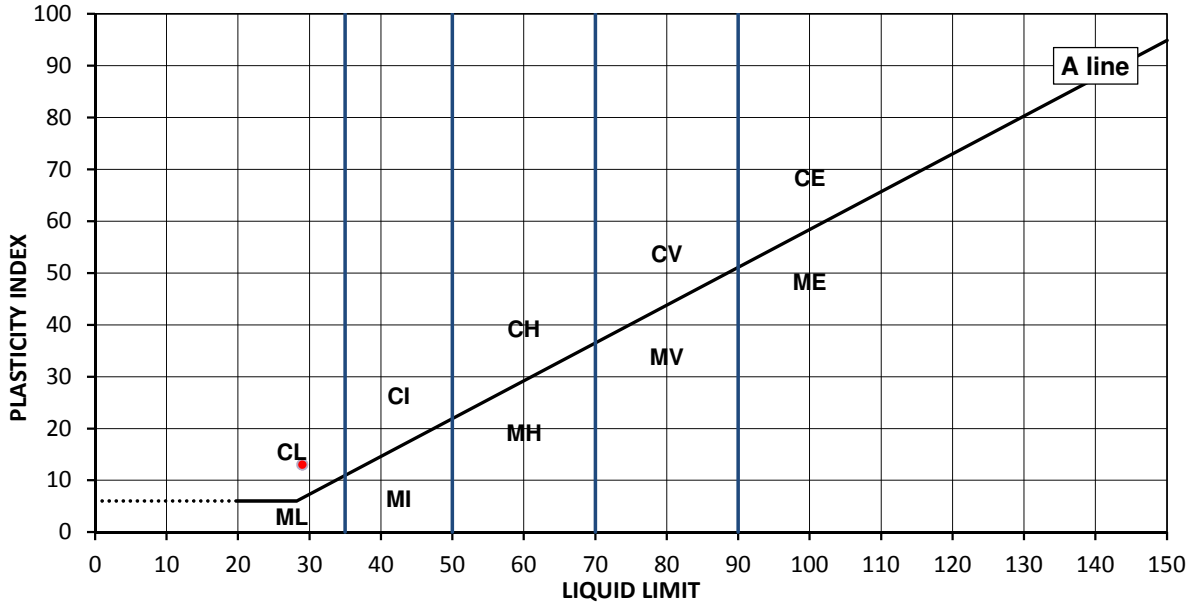
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035097	Depth Top [m]:	0.30
Hole No.:	TP107	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Grey very sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
13	29	16	13	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

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Geotechnical General Manager

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

UKAS TESTING 4041

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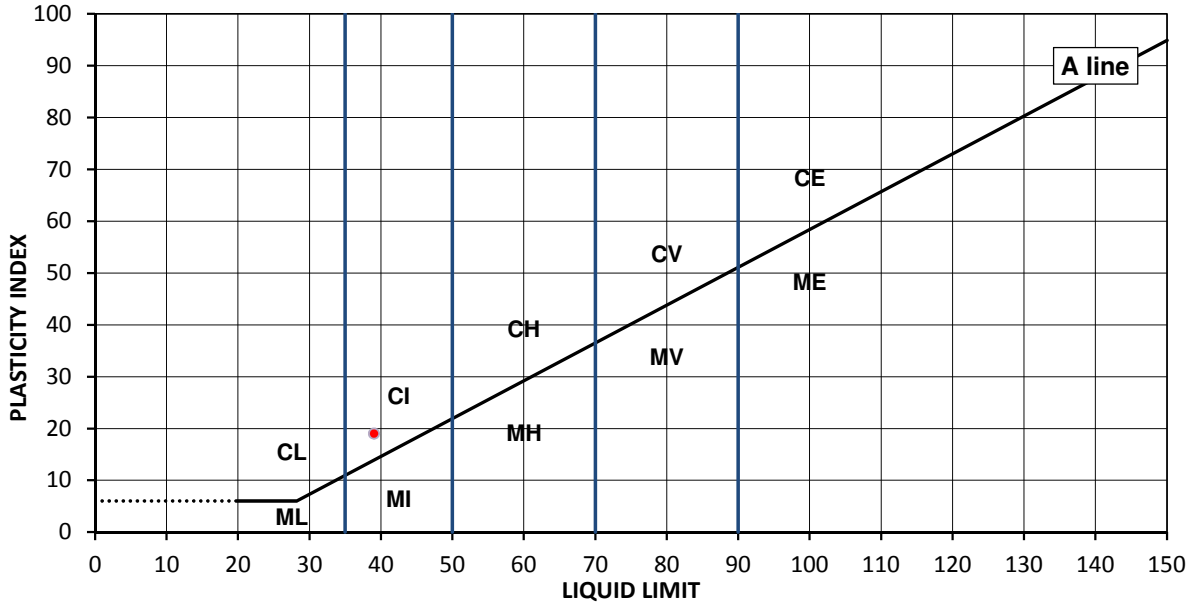
Croxley Green Business Park
Watford Herts WD18 8YS

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035098	Depth Top [m]:	0.40
Hole No.:	SA03	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Grey sandy CLAY with rootlets		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
20	39	20	19	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

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Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

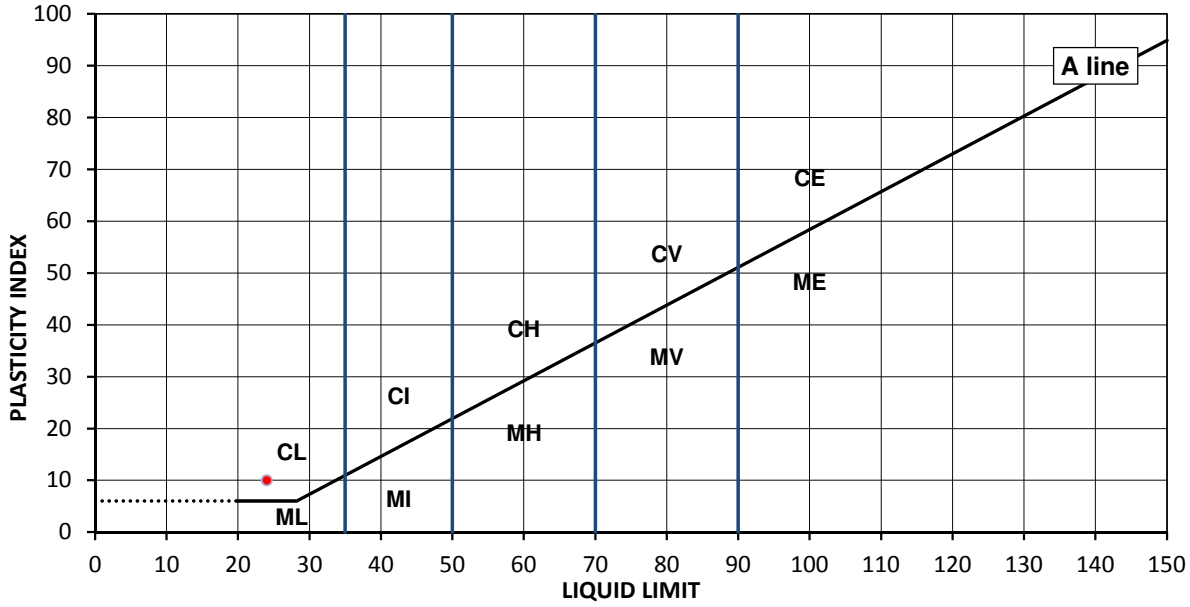
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035099	Depth Top [m]:	2.20
Hole No.:	TP108	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown clayey SAND		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
21	24	14	10	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

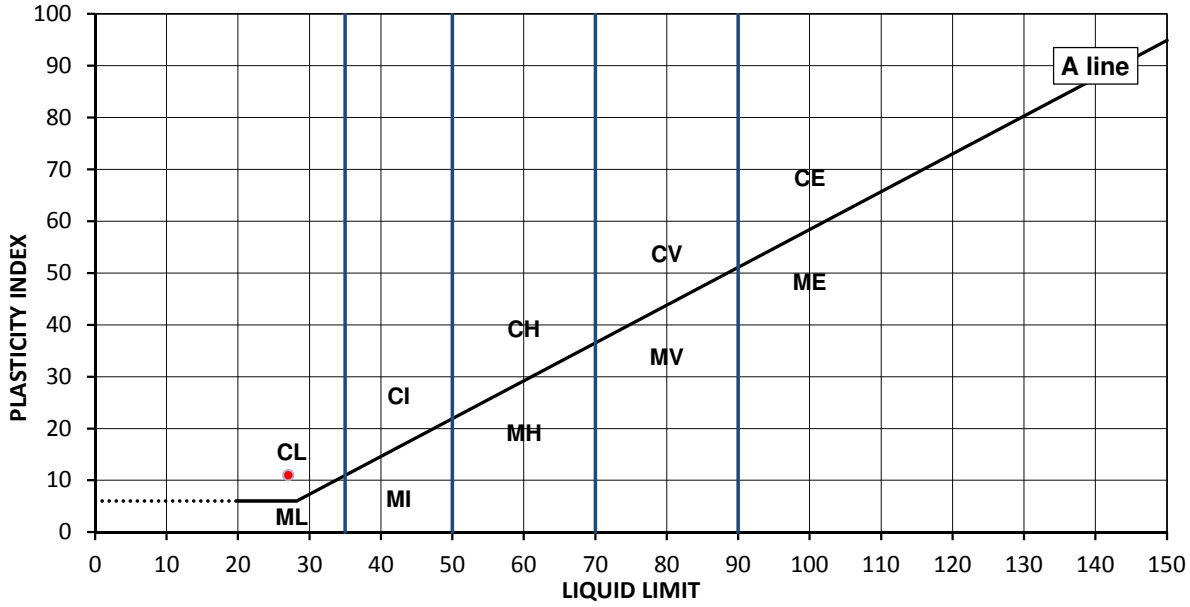
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035100	Depth Top [m]:	1.40
Hole No.:	SA01	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown very sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
17	27	16	11	99



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

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7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

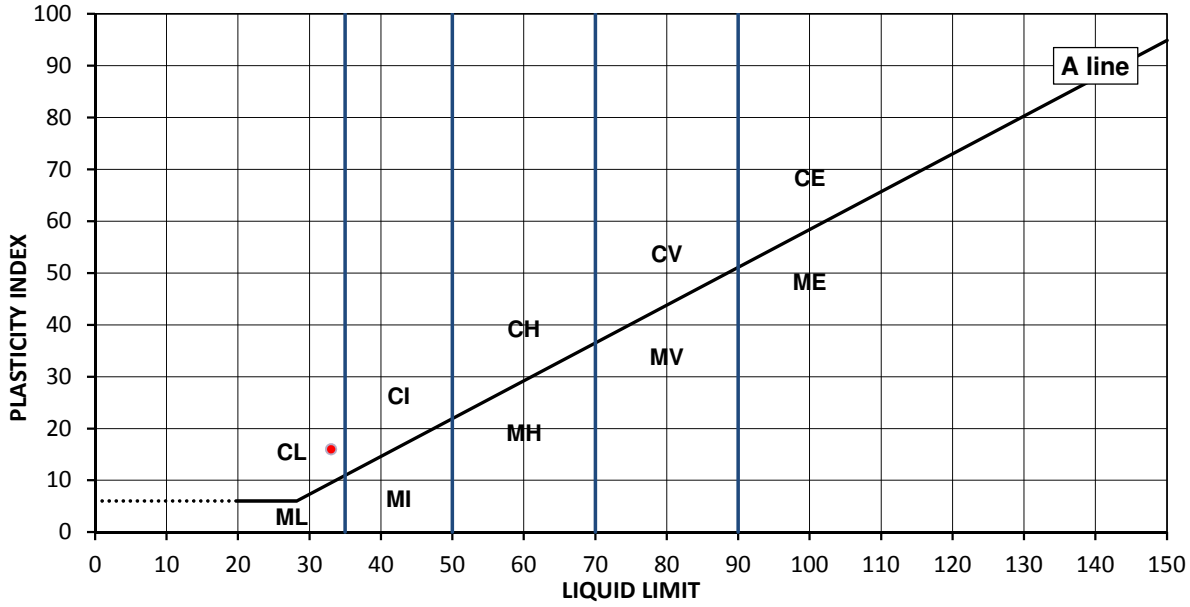
UKAS TESTING 4041

Client:	Brownfield Solutions Ltd	Client Reference:	C3915
Client Address:	William Smith House 173 - 183 Witton Street Northwich Cheshire CW9 5LP	Job Number:	18-98359
		Date Sampled:	Not Given
		Date Received:	30/08/2018
Contact:	Dylan Ingman	Date Tested:	08/09/2018
Site Name:	New Brighton Mold	Sampled By:	DI
Site Address:	Not Given		

Test Results

Laboratory Reference:	1035101	Depth Top [m]:	1.30
Hole No.:	SA07	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
15	33	17	16	87



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Client: Brownfield Solutions Ltd
Client Address: William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP
Contact: Dylan Ingman
Site Name: New Brighton Mold
Site Address: Not Given

Client Reference: C3915
Job Number: 18-98359
Date Sampled: Not Given
Date Received: 30/08/2018
Date Tested: 08/09/2018
Sampled By: DI

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	M/C	Atterberg				Density		Total Porosity
		Reference	Top depth [m]	Base depth [m]	Type			% Passing 425um	LL	PL	PI	bulk	PD	
							%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3
1035100	SA01	Not Given	1.40	Not Given	D	Brown very sandy CLAY	17	99	27	16	11			
1035098	SA03	Not Given	0.40	Not Given	D	Grey sandy CLAY with rootlets	20	100	39	20	19			
1035101	SA07	Not Given	1.30	Not Given	D	Brown slightly gravelly very sandy CLAY	15	87	33	17	16			
1035092	TP102	Not Given	1.80	Not Given	D	Brown slightly gravelly very sandy CLAY	9.0	80	31	16	15			
1035095	TP105	Not Given	1.20	Not Given	D	Brown slightly gravelly very sandy CLAY	14	83	31	16	15			
1035097	TP107	Not Given	0.30	Not Given	D	Grey very sandy CLAY	13	100	29	16	13			
1035099	TP108	Not Given	2.20	Not Given	D	Brown clayey SAND	21	100	24	14	10			
1035096	TP111	Not Given	1.30	Not Given	D	Brown slightly gravelly very sandy CLAY	16	94	28	15	13			
1035094	WS103	Not Given	0.80	Not Given	D	Mottled brown slightly gravelly very sandy CLAY	11	85	26	15	11			
1035093	WS104	Not Given	2.50	Not Given	D	Brown slightly gravelly very sandy CLAY	12	85	29	16	13			

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Date Reported: 13/09/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

APPENDIX D
Groundwater Monitoring Results

STEWART MILNE

NEW BRIGHTON ROAD, MOLD

C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Groundwater Monitoring Results

	Groundwater Level (m bgl)		
Location	13/09/2018	09/10/2018	23/10/2018
WS101	4.13	4.45	4.58
WS103	3.60	3.41	3.67
WS106	2.70	2.60	2.63
WS108	1.70	0.95	0.69
WS110	Lock on well head jammed.	Lock on well head jammed.	0.93

APPENDIX E
Contaminated Land Screening Values

Contaminated Land Screening Values

In assessing the potential for contamination Brownfield Solutions Limited (BSL) follows UK guidance and current best practice.

General

The current recommended method for assessing contamination is on the basis of:

Source-Pathway-Receptor

Where any one of these "pollution linkages" is absent there is deemed to be no risk.

Fundamentally receptors can be considered as humans and controlled waters (surface and ground waters).

The purpose of using Tier 1 screening levels is to have a simple means of assessing the potential contamination of a site and to inform decisions on whether further investigation is warranted or whether an option to undertake clean up based on the data to hand is cost effective.

Human Health

Current UK guidance is provided by DEFRA and the Environment Agency (EA). Publications forming part of the guidance include; CLEA Model, toxicological reports and soil guideline values (SGV), collectively referred to as the CLEA Guidance. The CLEA Guidance has included a number of publications which have provided initial screening values for soil contamination based on standard land uses and soil assumptions.

CLEA guidance has gone through a number of revisions, all of the original SGV's that were published have been withdrawn and publication of new SGV's commenced in 2009.

For determinands where no SGVs are available, S4UL values have been published using the CLEA 1.06 Model. These are the third set of generic assessment criteria generated by CIEH, and replace the previous two sets of GACs. The revised S4UL values are based on greater knowledge of relevant toxicology and further consideration of exposure frequencies.

No SGV or S4UL is available for lead as this is derived based on blood lead levels. C4SL values for six determinands including lead was published by DEFRA/CL:AIRE in December 2014 and they represent a low risk as opposed to minimal risk. The C4SL values are based on a sandy loam with 6% Soil Organic Matter. These screening values were published by DEFRA for Part 2A use, although with the dual purpose for use under planning. However these have not been officially accepted by Local Government for use under planning. S4ULs remain the first reference due to the broader range of end uses and soil organic content.

The preference from the EA is that site specific screening levels are used wherever possible. Due to numerous factors it is not always possible to utilise site specific values. In these instances the following data sources are used in the order of preference given below:

- Current UK SGV's
- CIEH S4UL values (derived by CIEH/LQM)
- DEFRA/CL:AIRE C4SL's
- CL:AIRE GAC values
- Guidance from other European countries
- Guidance from the outside Europe.

Controlled Waters

The European Water Framework Directive (WFD) became UK law in December 2003. It was created to ensure that European countries manage their rivers, groundwater and lakes so that they stay healthy for people and for wildlife.

This is achieved by the use of chemical standards for surface waters and groundwater. These values describe concentrations of chemicals that are not expected to cause harm to environmental organisms or human health, provided they are not exceeded. The same chemical may have several standards for different environmental regimes, and for different protection objectives.

Statutory Standards are set in legislation and if exceeded, this constitutes non-compliance with statutory obligations. European Directives are implemented in England and Wales by corresponding statutory instruments (i.e. regulations). The statutory instruments can be the exact same standards as they appear in the Directive or be more stringent.

A number of non-statutory standards also exist, these are set by various organisations (including the EA) for chemicals that are considered to be of concern, but are not covered by any specific legislation.

The chemical standards used in the UK to control impaction of contamination on controlled waters are Environmental Quality Standards (EQS). The EQS's cover a large number of compounds.

Where certain compounds are not covered by the EQS these are commonly compared to the UK Drinking Water Standards (DWS).

Further Assessment

When screening values are exceeded then further consideration is required. This could include the use of simple measures to break the pollution pathway and mitigate the risk, further more detailed investigation, including the deriving of site specific values to better define the risk and to design appropriate remedial measures.

APPENDIX F
Percolation Test Results

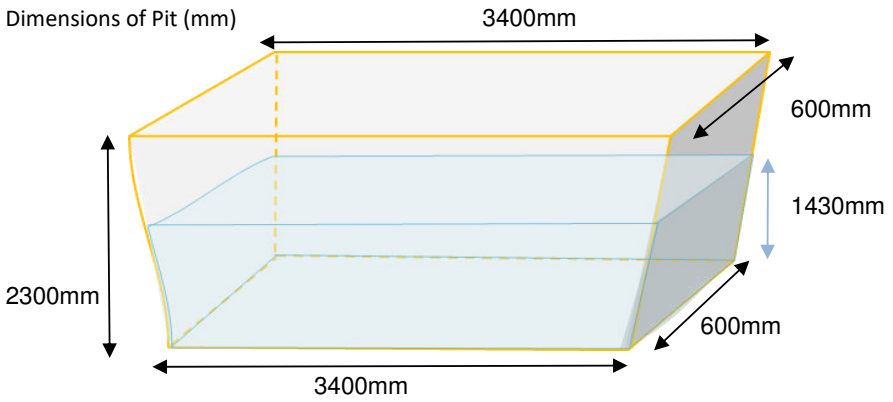
Percolation Test	STEWART MILNE HOMES
SA01 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test: 21/08/2018
Logged By: DI
Checked By: AJS

Dimensions of Pit (mm)



Depth of Pit	2300mm		
Depth of Water (start)	1430mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	2.917
Infill Volume (m^3)	N/A	Water Volume (m^3)	2.917

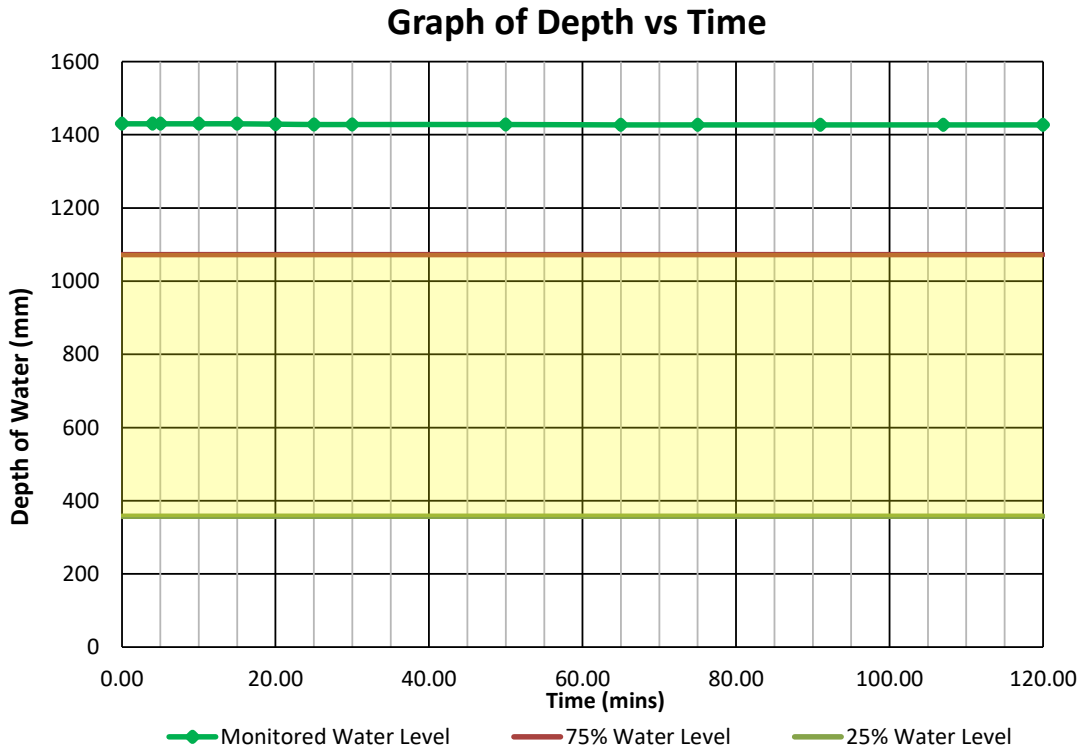
Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	870	1430			
4.00	870	1430			
5.00	870	1430			
10.00	870	1430			
15.00	870	1430			
20.00	871	1429			
25.00	872	1428			
30.00	872	1428			
50.00	872	1428			
65.00	873	1427			
75.00	873	1427			
91.00	873	1427			
107.00	873	1427			
120.00	873	1427			
End of Test	End of Test	End of Test			

Percolation Test	STEWART MILNE HOMES
SA01 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1430
Water Level 2 (mm)	1427
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m^3)	0.00612
Discharge Area (m^2)	13.468
Soil Infiltration Rate (m/min)	3.78675E-06

Soil Infiltration Rate (m/sec)	6.31E-08

Compliancy Check

Water Level at 75% effective depth (mm)	1072.5
Water Level at 25% effective depth (mm)	357.5

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

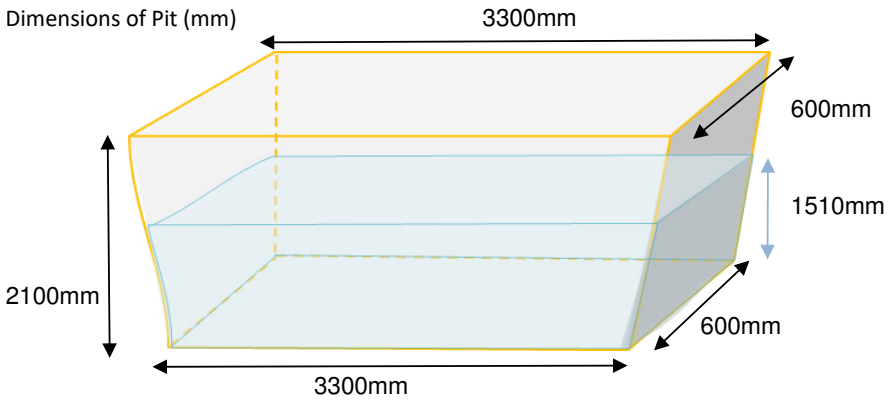
Percolation Test	STEWART MILNE HOMES
SA02 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test: 21/08/2018
Logged By: DI
Checked By: AJS

Dimensions of Pit (mm)



Depth of Pit	2100mm		
Depth of Water (start)	1510mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	2.990
Infill Volume (m^3)	N/A	Water Volume (m^3)	2.990

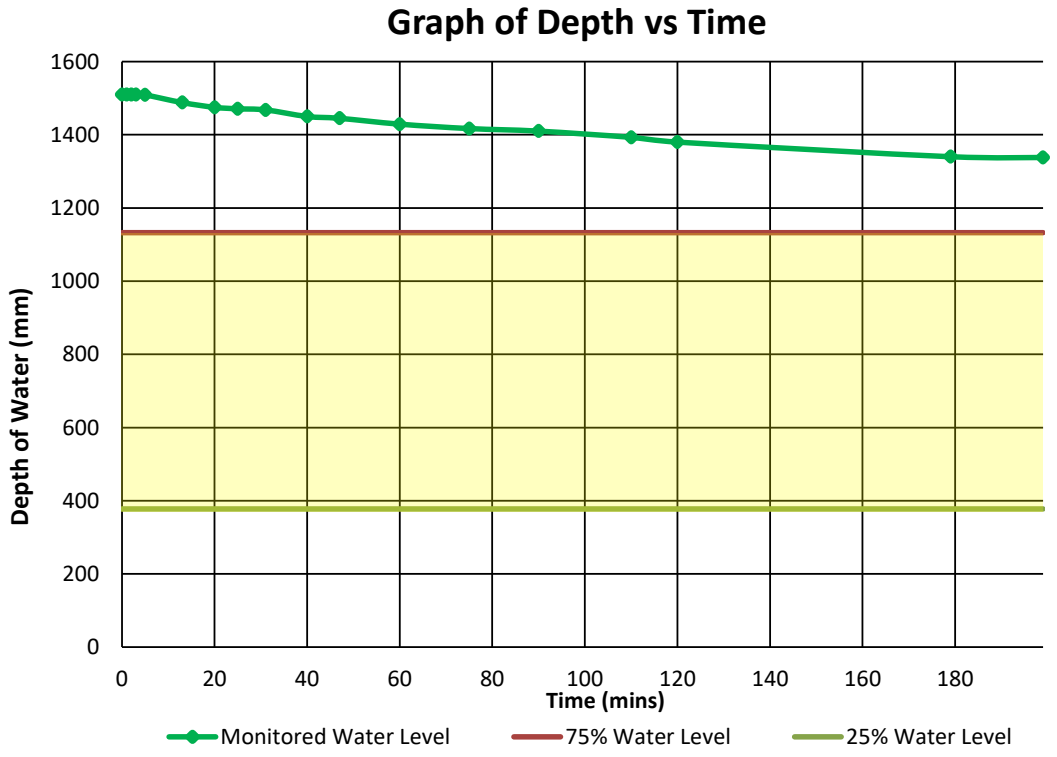
Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	590	1510	End of Test	End of Test	End of Test
1.00	590	1510			
2.00	590	1510			
3.00	590	1510			
5.00	591	1509			
13.00	612	1488			
20.00	625	1475			
25.00	629	1471			
31.00	632	1468			
40.00	650	1450			
47.00	655	1445			
60.00	671	1429			
75.00	683	1417			
90.00	690	1410			
110.00	707	1393			
120.00	720	1380			
179.00	760	1340			
199.00	762	1338			

Percolation Test	STEWART MILNE HOMES
SA02 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1510
Water Level 2 (mm)	1338
Time to Drain from Level 1 to Level 2 (mins)	199
Volume of water discharged (m^3)	0.34056
Discharge Area (m^2)	13.0872
Soil Infiltration Rate (m/min)	0.000130766

Soil Infiltration Rate (m/sec)	2.18E-06

Compliancy Check

Water Level at 75% effective depth (mm)	1132.5
Water Level at 25% effective depth (mm)	377.5

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

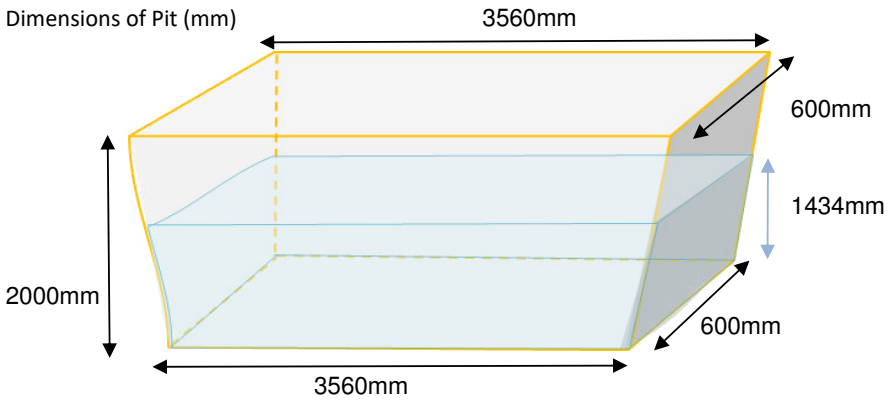
Percolation Test	STEWART MILNE HOMES
SA03 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test: 21/08/2018
Logged By: DI
Checked By: AJS

Dimensions of Pit (mm)



Depth of Pit	2000mm		
Depth of Water (start)	1434mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	3.063
Infill Volume (m^3)	N/A	Water Volume (m^3)	3.063

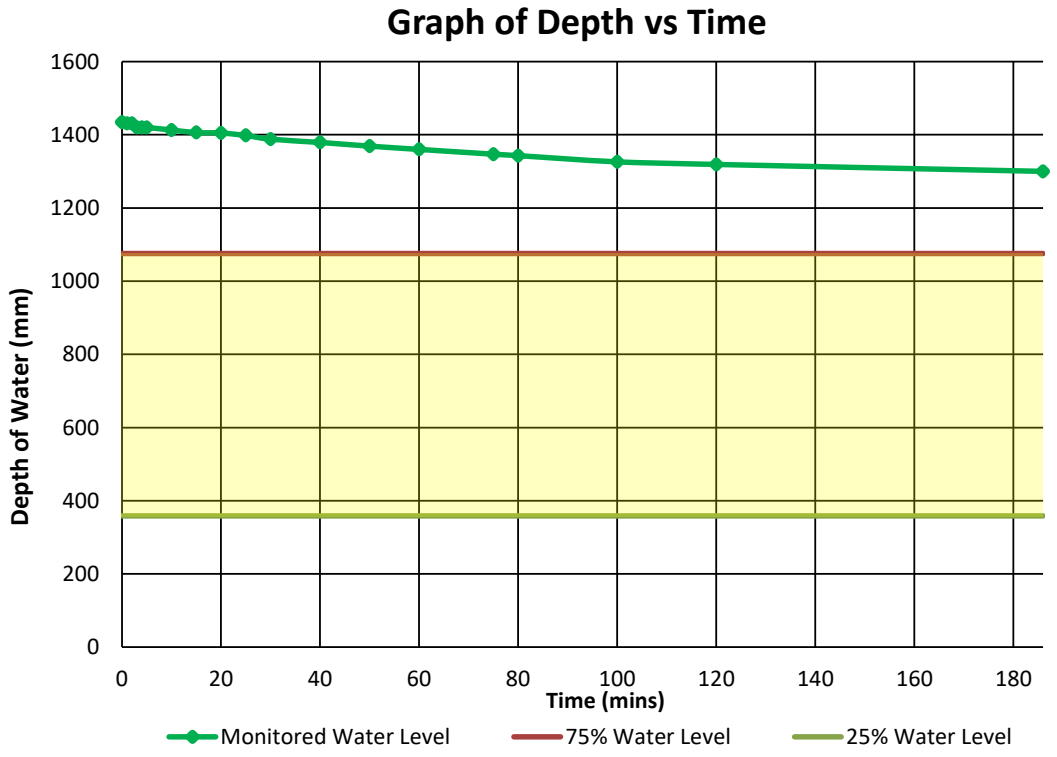
Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	566	1434	186.0	700	1300
1.00	569	1431	End of Test	End of Test	End of Test
2.00	569	1431			
3.00	580	1420			
4.00	580	1420			
5.00	580	1420			
10.00	587	1413			
15.00	594	1406			
20.00	595	1405			
25.00	602	1398			
30.00	612	1388			
40.00	621	1379			
50.00	631	1369			
60.00	640	1360			
75.00	653	1347			
80.00	657	1343			
100.00	674	1326			
120.00	681	1319			

Percolation Test	STEWART MILNE HOMES
SA03 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1434
Water Level 2 (mm)	1300
Time to Drain from Level 1 to Level 2 (mins)	186
Volume of water discharged (m^3)	0.286224
Discharge Area (m^2)	13.50944
Soil Infiltration Rate (m/min)	0.000113908

Soil Infiltration Rate (m/sec)	1.90E-06

Compliancy Check

Water Level at 75% effective depth (mm)	1075.5
Water Level at 25% effective depth (mm)	358.5

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

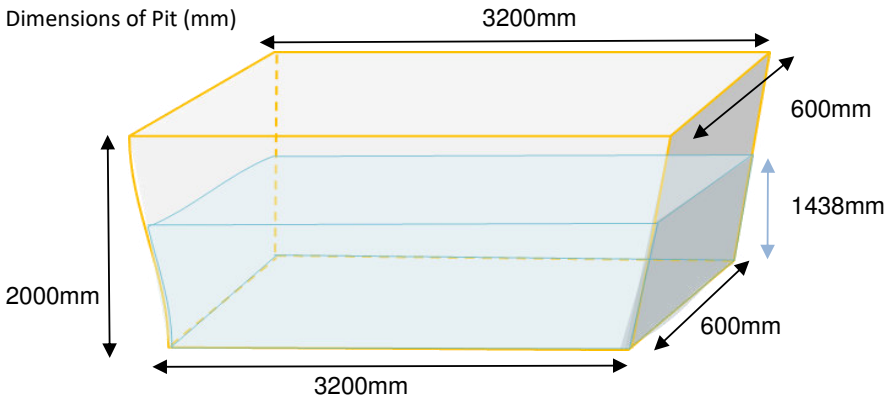
Percolation Test	STEWART MILNE HOMES
SA04 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test: 21/08/2018
Logged By: DI
Checked By: AJS

Dimensions of Pit (mm)



Depth of Pit	2000mm		
Depth of Water (start)	1438mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	2.761
Infill Volume (m^3)	N/A	Water Volume (m^3)	2.761

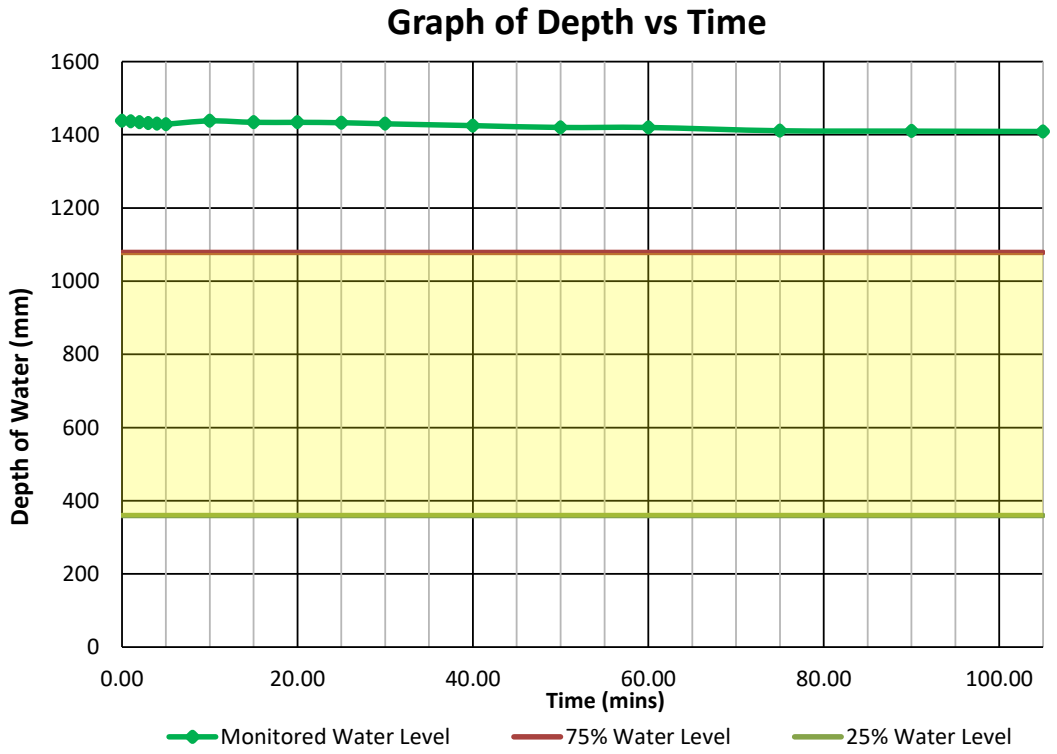
Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	562	1438			
1.00	563	1437			
2.00	566	1434			
3.00	568	1432			
4.00	570	1430			
5.00	571	1429			
10.00	562	1438			
15.00	566	1434			
20.00	566	1434			
25.00	567	1433			
30.00	570	1430			
40.00	575	1425			
50.00	580	1420			
60.00	580	1420			
75.00	589	1411			
90.00	590	1410			
105.00	591	1409			
End of Test	End of Test	End of Test			

Percolation Test	STEWART MILNE HOMES
SA04 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1438
Water Level 2 (mm)	1409
Time to Drain from Level 1 to Level 2 (mins)	105
Volume of water discharged (m^3)	0.05568
Discharge Area (m^2)	12.7386
Soil Infiltration Rate (m/min)	4.16283E-05

Soil Infiltration Rate (m/sec)	6.94E-07

Compliancy Check

Water Level at 75% effective depth (mm)	1078.5
Water Level at 25% effective depth (mm)	359.5

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

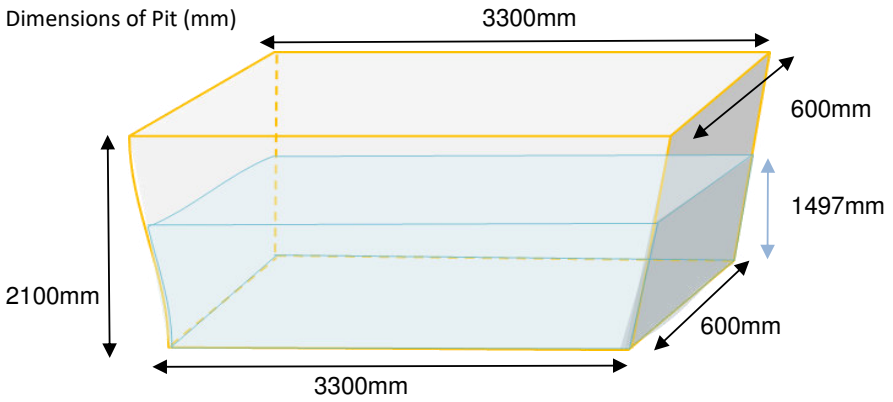
Percolation Test	STEWART MILNE HOMES
SA05 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test:
22/08/2018
Logged By:
DI
Checked By:
AJS

Dimensions of Pit (mm)



Depth of Pit	2100mm		
Depth of Water (start)	1497mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	2.964
Infill Volume (m^3)	N/A	Water Volume (m^3)	2.964

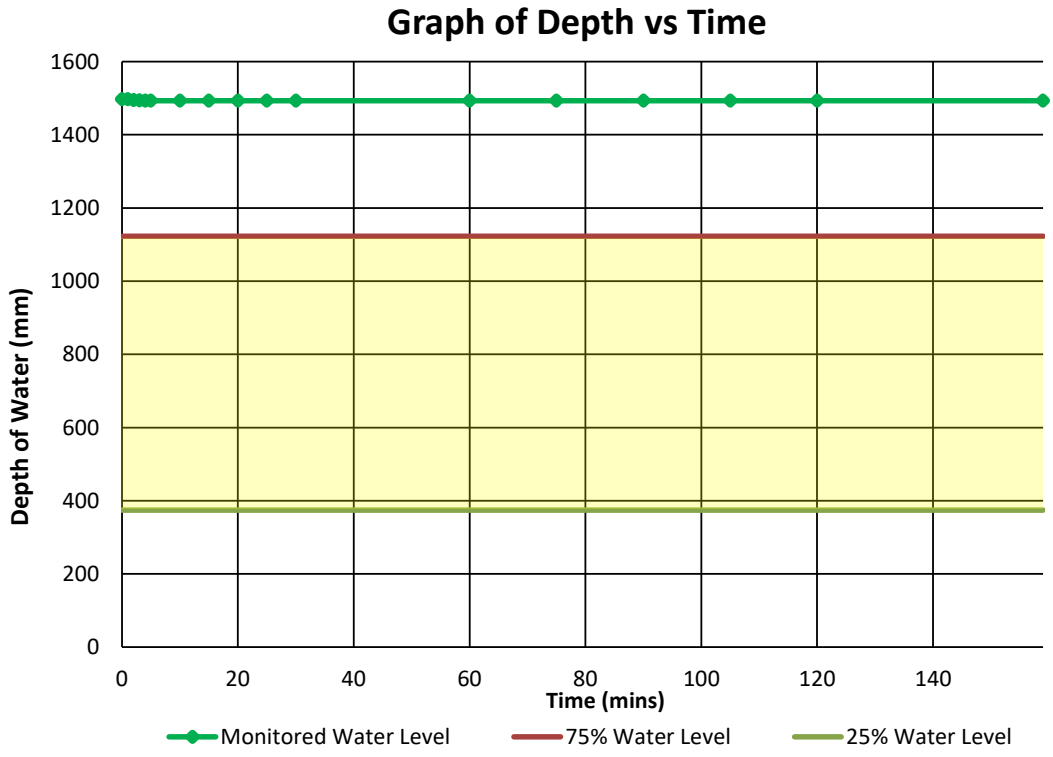
Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	603	1497			
1.00	603	1497			
2.00	605	1495			
3.00	606	1494			
4.00	607	1493			
5.00	607	1493			
10.00	607	1493			
15.00	607	1493			
20.00	607	1493			
25.00	607	1493			
30.00	607	1493			
60.00	607	1493			
75.00	607	1493			
90.00	607	1493			
105.00	607	1493			
120.00	607	1493			
159.00	607	1493			
End of Test	End of Test	End of Test			

Percolation Test	STEWART MILNE HOMES
SA05 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1497
Water Level 2 (mm)	1493
Time to Drain from Level 1 to Level 2 (mins)	159
Volume of water discharged (m^3)	0.00792
Discharge Area (m^2)	13.641
Soil Infiltration Rate (m/min)	3.65159E-06

Soil Infiltration Rate (m/sec)	6.09E-08

Compliancy Check

Water Level at 75% effective depth (mm)	1122.75
Water Level at 25% effective depth (mm)	374.25

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

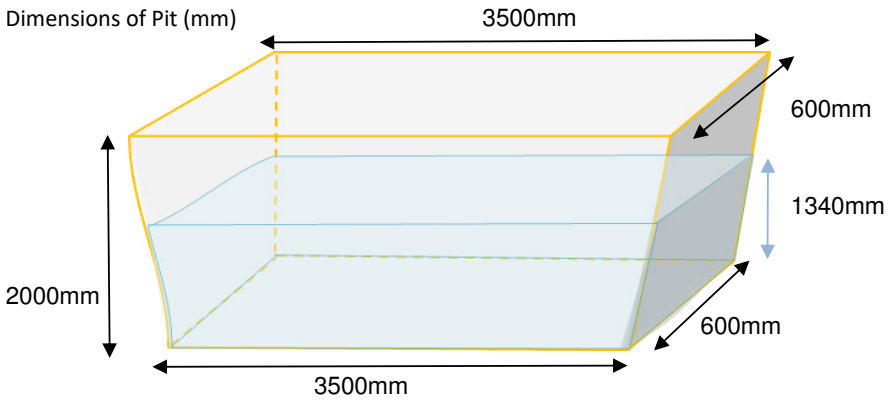
Percolation Test	STEWART MILNE HOMES
SA06 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test: 22/08/2018
Logged By: DI
Checked By: AJS

Dimensions of Pit (mm)



Depth of Pit	2000mm		
Depth of Water (start)	1340mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	2.814
Infill Volume (m^3)	N/A	Water Volume (m^3)	2.814

Site Recorded Data

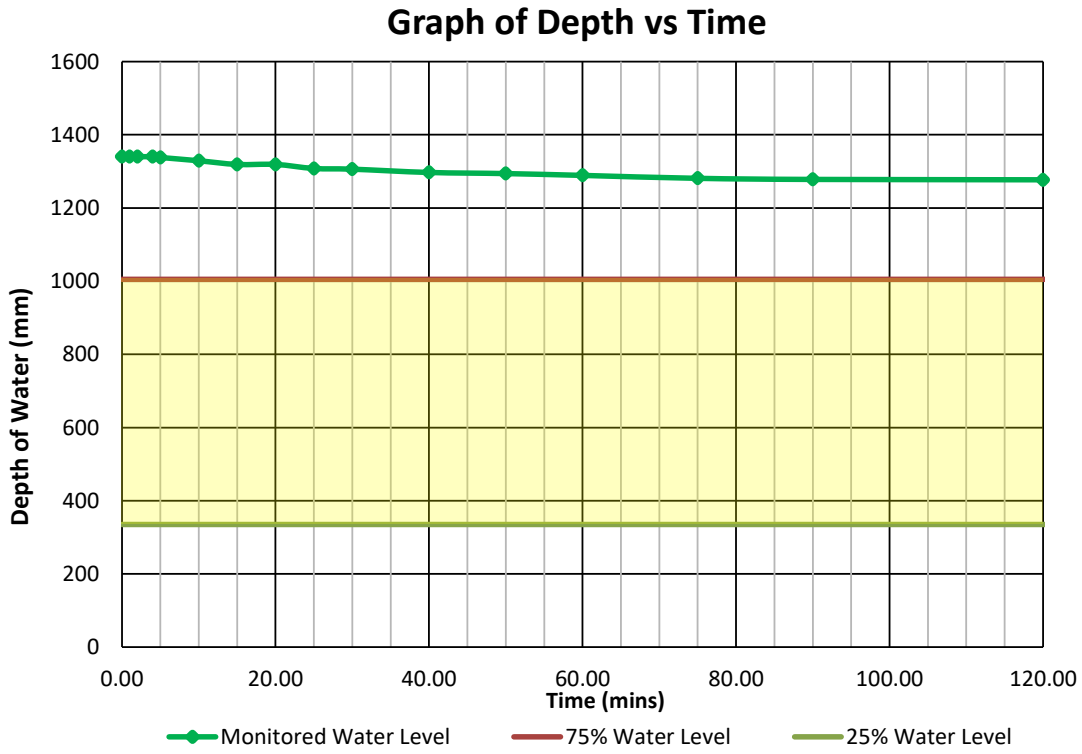
Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	660	1340
1.00	660	1340
2.00	660	1340
4.00	660	1340
5.00	662	1338
10.00	671	1329
15.00	681	1319
20.00	681	1319
25.00	692	1308
30.00	694	1306
40.00	703	1297
50.00	706	1294
60.00	711	1289
75.00	719	1281
90.00	722	1278
120.00	723	1277
161.00	726	1274
End of Test	End of Test	End of Test

Time (mins)	Depth to water (mm)	Depth of water (mm)

Percolation Test	STEWART MILNE HOMES
SA06 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1340
Water Level 2 (mm)	1274
Time to Drain from Level 1 to Level 2 (mins)	161
Volume of water discharged (m^3)	0.1386
Discharge Area (m^2)	12.8174
Soil Infiltration Rate (m/min)	6.71641E-05

Soil Infiltration Rate (m/sec)	1.12E-06

Compliancy Check

Water Level at 75% effective depth (mm)	1005
Water Level at 25% effective depth (mm)	335

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

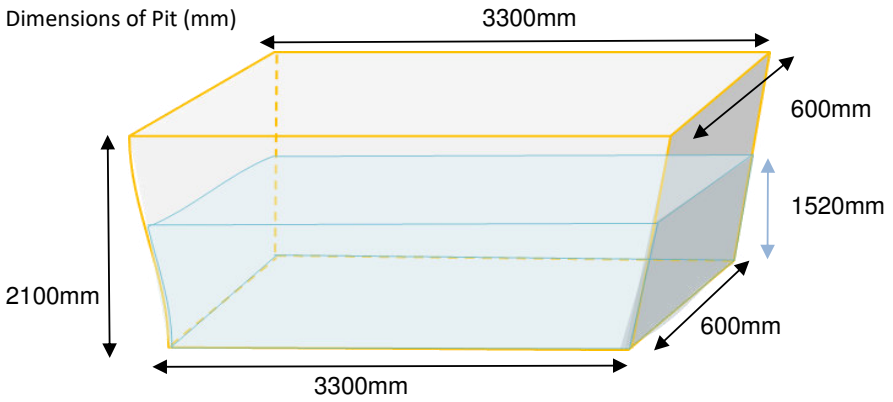
Percolation Test	STEWART MILNE HOMES
SA07 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test: 22/08/2018
Logged By: DI
Checked By: AJS

Dimensions of Pit (mm)



Depth of Pit	2100mm		
Depth of Water (start)	1520mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	3.010
Infill Volume (m^3)	N/A	Water Volume (m^3)	3.010

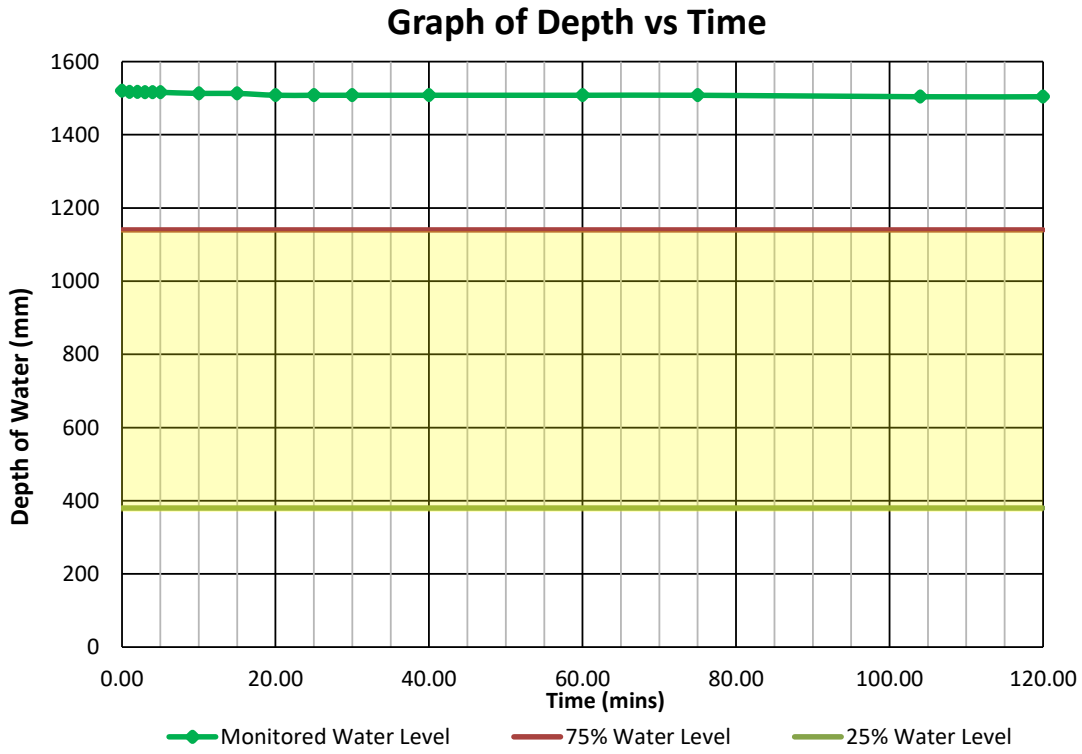
Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	580	1520			
1.00	583	1517			
2.00	583	1517			
3.00	584	1516			
4.00	584	1516			
5.00	584	1516			
10.00	587	1513			
15.00	587	1513			
20.00	592	1508			
25.00	592	1508			
30.00	592	1508			
40.00	592	1508			
60.00	592	1508			
75.00	592	1508			
104.00	596	1504			
120.00	596	1504			
End of Test	End of Test	End of Test			

Percolation Test	STEWART MILNE HOMES
SA07 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1520
Water Level 2 (mm)	1504
Time to Drain from Level 1 to Level 2 (mins)	120
Volume of water discharged (m^3)	0.03168
Discharge Area (m^2)	13.7736
Soil Infiltration Rate (m/min)	1.91671E-05

Soil Infiltration Rate (m/sec)	3.19E-07

Compliancy Check

Water Level at 75% effective depth (mm)	1140
Water Level at 25% effective depth (mm)	380

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

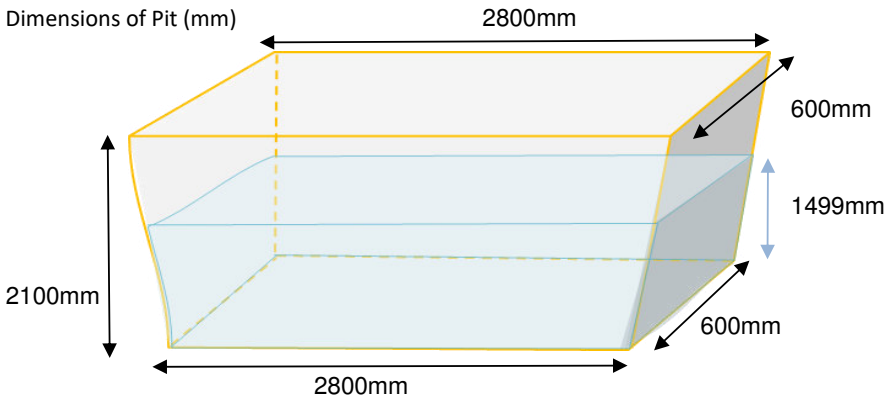
Percolation Test	STEWART MILNE HOMES
SA08 Test 1	NEW BRIGHTON, MOLD
	C3915

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

Test Pit Construction

Date of Test: 22/08/2018
Logged By: DI
Checked By: AJS

Dimensions of Pit (mm)



Depth of Pit	2100mm		
Depth of Water (start)	1499mm		
Pit Details	Open with no stone filling See Associated Log for Stratum Details		
Void Ratio	1	Volume of Pit (m^3)	2.518
Infill Volume (m^3)	N/A	Water Volume (m^3)	2.518

Site Recorded Data

Time (mins)	Depth to water (mm)	Depth of water (mm)	Time (mins)	Depth to water (mm)	Depth of water (mm)
0.00	601	1499	End of Test	End of Test	End of Test
1.00	607	1493			
2.00	607	1493			
3.00	608	1492			
4.00	611	1489			
5.00	616	1484			
10.00	616	1484			
15.00	619	1481			
20.00	627	1473			
25.00	628	1472			
30.00	629	1471			
50.00	638	1462			
60.00	638	1462			
75.00	641	1459			
90.00	656	1444			
105.00	656	1444			
120.00	661	1439			
134.00	663	1437			

Percolation Test	STEWART MILNE HOMES
SA08 Test 1	NEW BRIGHTON, MOLD
	C3915

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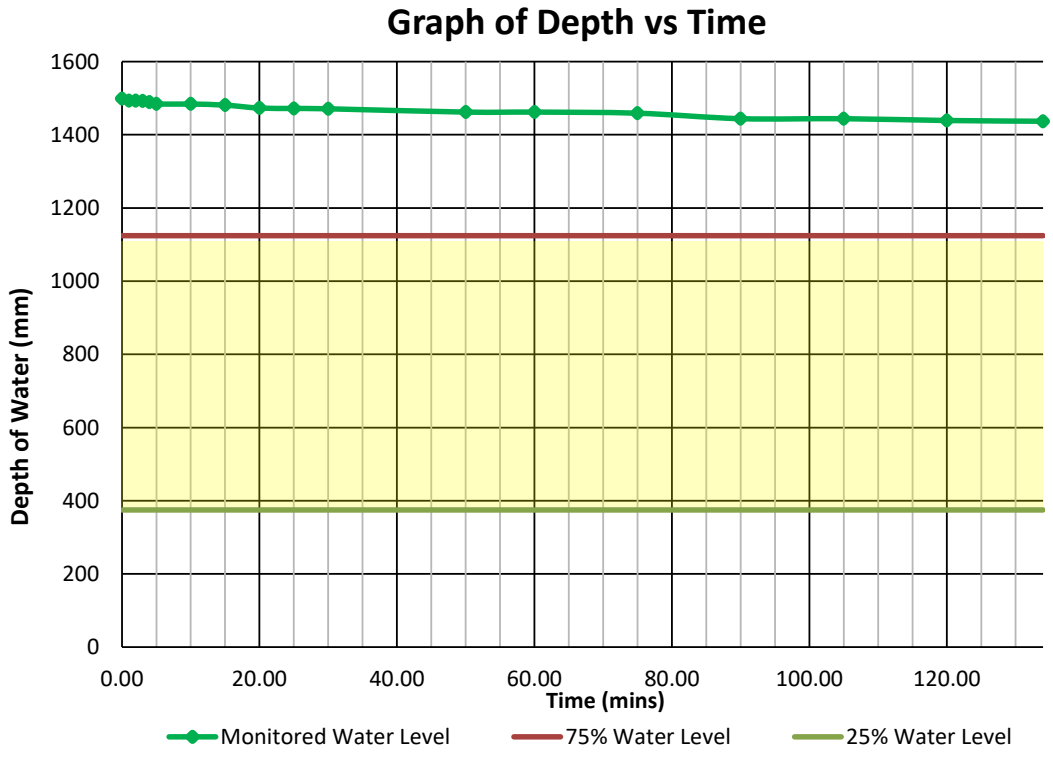
Data Analysis



Soil Infiltration Rate Calculation

Water Level 1 (mm)	1499
Water Level 2 (mm)	1437
Time to Drain from Level 1 to Level 2 (mins)	134
Volume of water discharged (m^3)	0.10416
Discharge Area (m^2)	11.6624
Soil Infiltration Rate (m/min)	6.66512E-05

Soil Infiltration Rate (m/sec)	1.11E-06

Compliancy Check

Water Level at 75% effective depth (mm)	1124.25
Water Level at 25% effective depth (mm)	374.75

Test not BRE 365 compliant - insufficient time to drain past 25% effective depth

APPENDIX G
CIRIA Risk Assessment Methodology

Contaminated Land Risk Assessment

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ⇨ Hazard Assessment ⇨ Risk Estimation ⇨ Risk Evaluation

CLR11 outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under CLR11, three tiers of risk assessment exist - Preliminary, Generic Quantitative and Detailed Quantitative.

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

- **High likelihood**: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;

- **Likely**: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;

- **Low likelihood**: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term;

- **Unlikely**: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

- **Severe**: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
  Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse;

- **Medium**: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
  Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve;

- **Mild**: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment;
  Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

- **Minor**: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
  Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**Highly likely**	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

- **Very high**: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required;

- **High**: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term;

- **Moderate**: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;

- **Low**: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild;

- **Very Low**: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX H
Contaminated Land Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

1) Significant harm is being caused or there is a significant possibility of such harm being caused;
2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- CLR11 – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;

APPENDIX I
Waste Disposal Guidance

WASTE CLASSIFICATION FOR SOILS

Introduction

Waste producers have a duty of care classify the waste they are producing:

- before it is collected, disposed of or recovered.
- to identify the controls that apply to the movement of the waste.
- to complete waste documents and records.
- to identify suitably authorised waste management options.
- to prevent harm to people and the environment.

The most sustainable and economic method of dealing with waste soil is usually the retention and re-use on site. Where this is not possible there are three main options for the disposal of soils:

1. Disposal to a permitted waste recycling facility.
2. Re-use on another site (subject to the suitability).
3. Disposal to a landfill site.

The disposal to a permitted facility will be subject to the **specific conditions of the permits for each of individual facility** and will vary dependent on location and environmental sensitivity of the receiving site. Re-use on another site with also be subject to the acceptability criteria of that site.

The guidance below relates to disposal to **landfill sites only**.

Background for Landfill Disposal

In July 2005 the United Kingdom implemented the European Directive 1999/31/EC (The Landfill Directive), this introduced the current regime for waste and waste disposal to landfill. The Landfill Directive places controls on waste disposal. These controls include requirements to follow the waste acceptance procedures and criteria that have been agreed by the Council of the European Union and are laid out in Council Decision 2003/33/EC.

Before a waste can be accepted at a landfill site, the landfill **operator** must be satisfied that the waste meets his permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).
If disposal to landfill is the best management option for the waste soils, these procedures **must** be followed or the operator may refuse to accept the waste.

Key Points

- Not all waste can be landfilled
- Landfills are classified according to whether they can accept **hazardous**, **non-hazardous** or **inert** wastes.
- Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
- Most wastes must be treated before you can send them to landfill.
- There are formal processes for identifying and checking wastes that must be followed before wastes can be accepted at a landfill site.

Classification

Wastes are listed in the European Waste Catalogue (EWC 2002) and grouped according to generic industry, process or waste types. Wastes within the EWC are either hazardous or non-hazardous. Some of these wastes are hazardous without further assessment (absolute entries) or are 'mirror' entries that require further assessment of their hazardous properties in order to determine whether they are hazardous waste.

Waste soil has mirror entries on the EWC and as such the first phase of the waste classification process is that of determining if the waste is hazardous or not ie the hazard assessment. The most common EWC waste codes related to soil are:

17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03

Soils may contain certain contaminants (eg asbestos, diesel) which have prescribed concentration thresholds, that if breached will render the material hazardous waste. These are based on "risk phrases" which can include risks such as carcinogenicity, flammability or toxicity.

In the first instance the concentrations of plausible contaminants within the soil should be identified and wastes should be **classified based on their total concentrations**.

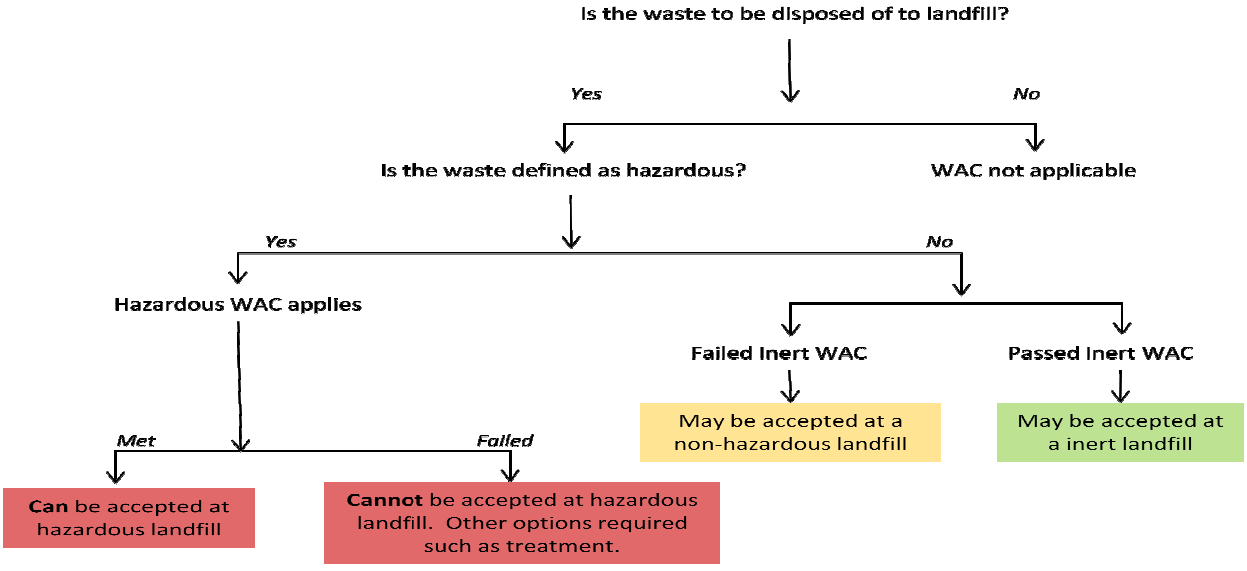
Waste Definitions

Inert	• Will not undergo any significant physical, chemical or biological transformations. • Will not dissolve. • Will not burn. • Will not physically or chemically react. • Will not biodegrade. • Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. • Has insignificant total leachability and pollutant content. • Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate).
Non-Hazardous	Is not inert (see above) Is not hazardous (see below)
Hazardous	Soil has hazardous properties as defined in WM3 (.Guidance on the classification and assessment of waste (1st edition 2015)- Technical Guidance)
Stable Non-reactive hazardous waste[#]	Hazardous waste, the leaching behaviour of which will not change adversely in the long-term, under landfill design conditions or foreseeable accidents: in the waste alone (for example, by biodegradation); under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints); by the impact of other wastes (including waste products such as leachate and gas).

This option allows hazardous waste that has been stabilised and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

WAC Testing

The purpose of WAC analysis is to confirm that the waste complies with the relevant WAC for the receiving landfill. The WAC limits **cannot be used to make an assessment of whether a waste is hazardous**. WAC testing does however define if a non-hazardous waste is suitable for an inert landfill.



Hydrocarbons in Soils

WM3 uses the term Oil or Waste Oil to cover hydrocarbons products such as fuel oil, petrol or diesel. These are defined by WM3 as hazardous under an absolute entry in the List of Wastes. However hydrocarbons in soils are a mixture rather than a pure product and absolute entries are not relevant.

Known Oils

The simplest scenario is where the identity of the contaminating oil is known, or can be identified. If the oil is known the manufacturer's or supplier's REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment.

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Oils may contain a range of hydrocarbons, so the presence of for instance Diesel Range Organics (DRO) does not enable the assessor to conclude that diesel is present. These hydrocarbons may have arisen from other oils, the laboratory needs to provide an interpretation that the chromatograph is consistent with diesel or weathered diesel as a whole.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Unknown Oils

Where hydrocarbons are contaminating soils it is likely that the oil will be unknown or cannot be determined.

WM3 states that:

> For contaminated land specific consideration must be given to the following before proceeding;
>
> - The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as, waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
> - The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

The use of **marker compounds** is optional; however it is recommended that where possible the marker compounds should be used.

WM3 states:

> If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:
>
> - The waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
> - This has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
> - The analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel.

For example:

TPH Concentration (mg/kg)	Petrol or Diesel	BaP (mg/kg)	Classification
10,000	No	0.9	Non- Hazardous
1,000	No	Not available	Hazardous
1,000	Yes	Not relevant	Hazardous

References

1. Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EP Regulations), the Landfill Directive (1999/31/EC) and the Council Decision (2003/33/EC).
2. Environment Agency Environmental Permitting Regulations: "*Inert Waste Guidance- Standards and Measures for the Deposit of Inert Waste on Land*" 2009.
3. Environment Agency "*Waste acceptance at landfills - Guidance on waste acceptance procedures and criteria*" Nov 2010.
4. Environment Agency "*Guidance on the classification and assessment of waste (Technical Guidance WM3)*" 1st edition May 2015.
5. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).

APPENDIX J
CL:AIRE CoP

RE-USE OF WASTE - GUIDANCE NOTE

Definition of Waste:

The Environment Agency considers waste to be *"...any material that is discarded, or intended to be discarded..."* This includes any soil from trenches, footing, site strip etc. It is no longer required in its original location, therefore it is considered to be waste.

Re-use of Waste

Previously large scale earthworks and remedial schemes relied on waste management exemptions to allow the re-use of waste. However in 2010 the Environment Agency in England and Wales removed many of the waste management licence exemptions and severely restricted the quantity of materials available for other exemptions.

For purposes of earthworks and remediation, the previous exemptions available have been replaced by CL:AIRE Code of Practice (CoP), also commonly referred to as a "Materials Management Plan".

CL:AIRE: Code of Practice

Where materials are excavated for construction purposes, wherever possible these should be retained on site for engineering purposes if they are suitable for use. The developer/contractor is advised to complete all works under the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE CoP).

Potential scenarios where soils may be able to be re-used:

- Material capable of being used in another place on the same site without treatment;
- Material capable of being used in another place on the same site following ex-situ treatment on site;
- Material capable of being used in another development site without treatment (Direct Transfer);
- Material capable of being used in another development site following ex-situ treatment on another site eg Hub site;

The Code of Practice requires 4 No. Factors to be addressed:

1. Protection of human health and protection of the environment.
2. Suitability of use, without further treatment.
3. Certainty of use.
4. Quantity of material.

In order to satisfy these requirements the following are required:

i) Consultation/approval with Local Authority & Environment Agency to confirm they have no objections to the proposed re-use of waste soils, or the risk assessments for the site.
ii) Risk Assessments to demonstrate that the site does not present an Environmental Hazard.
iii) Remediation Strategy for contaminated sites (or Design Statement for non-contaminated sites).
iv) Materials Management Plan (MMP) which details material generated stockpiles and the end use.
v) Volume calculations.
vi) Planning permission for the development.
vii) Contractual details to be clear, regarding who steps in is a contractor goes into administration/liquidation.

The use of the CoP is effectively industry regulated, there is a requirement to appoint an independent Qualified Person (QP) who checks all the requirements have been met and registers the documentation with the Environment Agency. This person must not have had any involvement with the preparing of the risk assessments or remedial strategy on the site.

Soils which require treatment on site (eg bioremediation, stabilisation) will require an Environmental Permit for treatment, together with justification and validation to prove, once treated, this material is suitable for use.

Site management procedures need to be in place to ensure that material is tracked through from excavation stockpiling, treatment and remediation processes. Should the process of material tracking be considered non-robust, or not adhered to, this may fail the test whether excavated materials may be considered non-waste.

APPENDIX K
Limitations

Standard Limitations

This desk study report was conducted and has been prepared for the sole internal use and reliance of the Client, Stewart Milne Homes. This report shall not be relied upon or transferred to any other parties without the express written authorisation of BSL. If an unauthorised third party comes into possession of this report they rely on it at their risk and the authors owe them no duty of care or skill.

The findings and opinions conveyed via the desk study are based on information obtained from a variety of sources as detailed within this report, which BSL believes are reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

Any recommendations made in this report should be confirmed with the Regulatory bodies and Planning Authority prior to implementation to ensure compliance.

No existing manhole covers were lifted or drainage runs inspected during the course of this ground investigation.

The site plans enclosed in this report should not be scaled off.