

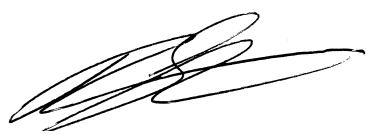
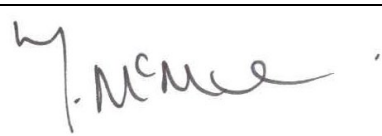
PHASE II GROUND INVESTIGATION REPORT



**SALESBURY VIEW ROAD, WILPSHIRE, LANCASHIRE, BB1 9PL
PREPARED FOR PERSIMMON HOMES (LANCASHIRE) LIMITED**



QUALITY CONTROL

Project No.	GEOL19-9938	Client	Persimmon Homes (Lancashire) Limited
Report Type	Phase II Ground Investigation Report		
Project Type	Proposed Residential Development		
Site Address	Salesbury View Road, Wilpshire, Lancashire, BB1 9PL		
NGR	368890, 431810		
Date	14/07/2020		
Prepared by	Richard Stripp		
Qualifications	BSc (Hons) MSc FGS MEnvSc		
Position	Director		
Approved by	Terry M^cMenam		
Qualifications	BSc (Hons) CSci CEnv FGS MEnvSc FCMI MIoD		
Position	Director		

This document has been prepared by Geol Consultants Limited (GEOL) for the titled project and should not be relied upon by any other third party or used for any other project without written authorisation being obtained from GEOL. This report was prepared for the sole use of the Client named above, and shall not be relied upon or transferred to any other party without the express written authorisation from GEOL.

The findings and opinions provided in this document are given in good faith and are subject to the limitations and constraints imposed by the methods and information sources described in this report. Factual information, including, where stated, a visual inspection of the site, has been obtained from a variety of sources. GEOL assumes the third-party information to be reliable, but has not independently confirmed this, therefore, GEOL cannot and does not guarantee the authenticity or reliability of third-party information it has relied upon. The findings and opinions presented in this report are also relevant to the dates when the assessment was undertaken but should not necessarily be relied upon to represent conditions at a substantially later date. Further information, ground investigation, construction activities, change of site use, or the passage of time may reveal conditions that were not indicated in the data presented and therefore could not have been considered in the preparation of the report. Where such information might impact upon stated opinions, GEOL reserves the right to modify the opinions expressed in this report. Where opinions expressed in this report are based on current available guidelines and legislations, no liability can be accepted by GEOL for the effects of any future changes to such guidelines and legislation.

REPORT REVISION HISTORY				
Issue	Description	Date	Author	Approval
1	Final Issue	14/07/2020	RS	TMc

TABLE OF CONTENTS

1.0 INTRODUCTION	PAGE 3
2.0 SITE DETAILS	PAGE 4
3.0 SCOPE OF WORKS & GROUND CONDITIONS	PAGE 4
4.0 LABORATORY TESTING	PAGE 7
5.0 GROUND GAS RISK ASSESSMENT	PAGE 10
6.0 RECOMMENDATIONS FOR NEW BUILDING FOUNDATIONS	PAGE 13
7.0 GENERAL OBSERVATIONS & RECOMMENDATIONS	PAGE 15

APPENDIX I	SITE LOCATION PLAN, AERIAL PHOTOGRAPH, EXISTING SITE LAYOUT PLAN & PROPOSED DEVELOPMENT LAYOUT PLAN
APPENDIX II	SITE INVESTIGATION LOCATION PLANS (EXISTING & PROPOSED) AND BOREHOLE, TRIAL PIT & DYNAMIC PROBE RECORD SHEETS
APPENDIX III	LABORATORY TESTING RESULTS
APPENDIX IV	GROUND GAS & GROUNDWATER MONITORING RECORD SHEET
APPENDIX V	FOUNDATION ZONE LOCATION PLAN

1.0 Introduction

Geol Consultants Limited (GEOL) were instructed by Persimmon Homes (Lancashire) Limited to undertake Phase II Ground Investigation Works over an area of undeveloped agricultural land situated to the east of Salesbury View Road in Wilpshire, Lancashire, prior to acquisition. There are proposals to develop the 'Greenfield' site with residential properties and including areas of public open space (POS) sometime soon. In addition, it is proposed to reduce the ground levels along the eastern portion of the site by between 1m up to 3m. A copy of the proposed development layout plan can be seen attached in Appendix I.

The purpose of this report is to provide information relating to the following.

- ▼ Identify the ground conditions and assess the geotechnical properties of the underlying deposits, with a view to assisting with new building foundation designs
- ▼ Determine the levels of contamination within the existing shallow soil deposits and to assess the impacts those contaminants may have on future site end-users (Human Health) and the wider environment
- ▼ Determine with more certainty the ground gas regime and required protection measures for the proposed residential development, if necessary
- ▼ Determine the scope of any further investigation works or remediation works required for the site prior to commencing with the proposed residential development

This technical report should be read in conjunction with the Phase I Preliminary Contamination Risk Assessment (PCRA) Report produced for this site by GEOL, reference GEOL19-9938, Rev.2, dated November 2019. The findings contained within the PCRA were used to aid the design and scope of the these intrusive investigation works. No abnormal or significant issues with regards to geotechnical hazards or potential sources of contamination affecting Human Health or Controlled Waters were noted within the PCRA, with the risks being assessed as LOW.

The information contained in this technical report is limited to the area of the site as shown on the proposed development layout plan attached in Appendix I, and to those areas accessible at the time of the ground investigation works being undertaken. When considering the scope of works completed for the development proposals, any features or issues not specifically mentioned cannot be assumed to have been covered.

All relevant details and descriptions relating to the site have been summarised in the Table on the following page.

2.0 Site Details

Detail	Description
Site address	Salesbury View Road, Wilpshire, Lancashire, BB1 9PL. Access to the site is gained via a field gate located on Salesbury View Road, leading from Whalley Road
NGR	368890, 431810
Site topography	The site displays a downslope gradient in a westerly and southerly direction, falling towards Salesbury View Road and Knotts Brook. Site levels range from circa 177m on the northern part of the site to circa 148m over the southern part of the site. Beyond the southern field boundary, the land falls towards Knotts Brook, from a level of circa 148m to circa 142m, forming a bank which slopes towards Knotts Brook with the bottom of the slope recorded at circa 136m AOD
Current site use	The site is currently undeveloped agricultural land
Proposed site use	Residential housing with private gardens and road infrastructure, along with areas of public open space (POS)
Historical site features / activities	The site area has remained undeveloped in accordance with Ordnance Survey (OS) maps dating back to 1893. The site appears to have been used as agricultural land with trees and bushes alongside boundaries. By c.1956 the site was shown to be occupied by two electricity pylons. A historical track is shown to cross the site from Whalley Road trending towards a Quarry located to the north-east of the site
Adjacent historical site features / activities	Buildings surrounding the north, south and westerly portion of the site were recorded from as early as 1893, with a quarry shown within c.250m to the north-east of the site. The quarry is no longer recorded by 1973 and is recorded to have been developed with residential properties by 1993
Other comments	The ground surface is noted to be heavily saturated / waterlogged. An electric fence surrounds the boundary of the two fields, with grazing cattle occupying the southern fields. An area of unmanaged / overgrown vegetation was noted on the north-western portion of the site, with occasional Himalayan Balsam noted. A large diameter water main crosses the southern portion of the site, trending west-northeast, and this can be located using a radio signal on a CAT

3.0 Scope of Works & Ground Conditions

When these investigation works were commissioned during October 2019, the ground surface over most of the site was heavily saturated and waterlogged. Footprints left behind in the ground from grazing cattle were waterfilled which added to the difficulty of tracking over the site. An attempt to investigate the site by way of mechanical excavation using a JCB type excavator, accompanied by tracked windowless sampling drilling methods, was aborted due to the equipment getting bogged down and trapped within the boundaries of site, close to the main site entrance. Parts of the site were also difficult to track across under foot, due to the standing water and the very soft nature of the topsoil deposits present.

3.0 Scope of Works & Ground Conditions (Cont'd)

Therefore, in order to obtain information on the ground conditions and to prevent significant disruption to the near surface deposits, specialist handheld window sampling equipment, tracked by an all-terrain vehicle was employed. The window sampling drilling commenced during December 2019, and trafficability over some parts of the site still proved extremely difficult even using this light-weight drilling equipment. This first phase of ground investigation works completed over the site area by GEOL comprised the sinking of 18 no. window sampling boreholes (labelled BH's 01 to 19, but excluding 03 as this was not undertaken), accompanied by the installation of 5 no. ground gas and groundwater monitoring wells. When the ground conditions had dried out / improved, a second phase of ground investigation works was completed during May 2020 comprising the sinking of 18 no. mechanically excavated trial pits using a 13tonne 360° tracked excavator across the site area (labelled TP's 01 to 18), accompanied by a third phase of ground investigation works comprising the sinking of 12 no. dynamic probe test holes (labelled DP's 01 to 12) to determine the strength / density characteristics of the coarse soil deposits encountered below parts of the site.

Detailed descriptions of the strata encountered during the several phases of ground investigation works, together with the results of all insitu field testing, are presented on the borehole, trial pit and dynamic probe record sheets, copies of which can be seen in Appendix II. The investigation positions can be seen on the site investigation location plan, a copy of which can be seen in Appendix II. A summary of the ground conditions encountered can be seen in the Table below.

Strata	Depths Recorded	Description & Comments
TOPSOIL & SUBSOIL	0.00m (GL) up to 0.30m to 0.90m	Dark brown sandy, clayey TOPSOIL was recorded below the initial surfacing of grass to depths of between 0.10m up to 0.30m, overlying sub-soil deposits comprising clayey, gravelly SAND to depths of between 0.25m up to 0.90m
SUPERFICIAL DEPOSITS: Glacial Till Deposits	From 0.30m to 0.90m to at least between 2.20m & 4.00m	Variable superficial deposits have been recorded across the site area. A mixture of very soft, soft, firm, and stiff sandy, gravelly and cobbly CLAYS, variable compositions of very loose, loose, medium dense, dense, and very dense clayey, silty, gravelly and cobbly SANDS, and sandy, gravelly COBBLES & BOULDERS of sandstone were encountered. At the location of BH18 only PEAT deposits were recorded from a depth of 0.20m to 1.25m
BEDROCK GEOLOGY: Millstone Grit Group	~	The bedrock was not proven during these investigation works

3.0 Scope of Works & Ground Conditions (Cont'd)

The boreholes, trial pits and dynamic probe positions have been accurately surveyed on site and the coordinates relating to their position, as well as the accompanying ground levels can be seen on each borehole, trial pit and dynamic probe record sheet.

During the investigation works and upon visual inspection of the ground conditions present, there was no evidence of any made ground deposits recorded across the site area. Furthermore, no visual or olfactory evidence of ashy type deposits, fuel / oil contamination or potential asbestos containing materials (ACM's – cement sheeting, tiles, and the like) or bundles of fibres were encountered.

During the first phase of investigation works undertaken during December 2019, ingresses of water were recorded within 8 no. out of the 18 no. boreholes put down at depths ranging between 0.45m and 1.85m below existing ground levels. The northern portion of the site characterised by marshy vegetation and underlain by peat deposits was noted to be wet / saturated at the surface. The remaining boreholes were noted to be dry during the investigation period, although some of these were terminated at shallow depths. During the second phase of works undertaken during May 2020, ingresses of water were only recorded within 4 no. out of the 18 no. trial pits put down at depths ranging between 1.95m and 2.50m below existing ground levels. The remaining trial pit locations were noted to be dry during the investigation period. When considering the ground conditions encountered, it is felt that a continuous groundwater surface (water table) is not present below the site, however, ingresses of water should be anticipated during construction related excavations. In addition, due to the thickness of the topsoil and subsoil deposits, when wet due to weather conditions these deposits prove difficult to traffic over.

Where possible, insitu hand shear vane tests were completed on the natural clay deposits to determine the shear strength of the natural clay deposits. Shear strengths ranging from 15kN/m² up to 120kN/m² were recorded indicating very low, low, medium, and high strength deposits.

Dynamic probe tests were completed across the site area to determine the density of the natural coarse soil deposits encountered at many of the trial pit locations. Dynamic probing involves driving a steel cone vertically into the ground and recording the number of blows for each 100mm of penetration. The results obtained from the dynamic probe tests can be correlated to the standard penetration test (SPT – N300). Across the northern, central and eastern portions of the site, targeted by DP's 01 to 09 & 12, the N300 ranged between 5 and 61 indicating loose, medium dense, dense and very dense sand deposits and soft, firm and stiff clays, although typically the N300 was generally at least >10 at anticipated foundation depth. The southern / southwestern portion of the site, targeted by DP's 10 & 11, were noted to be more geotechnically poor, where the dynamic probe rods were noted to progress through the initial shallow deposits at a rapid rate with very limited blows until more competent strata was reached at depths of between 1.00m and 2.50m below existing ground levels.

4.0 Laboratory Testing

4.1 Determination of Liquid & Plastic Limits

Seven representative samples of the natural clay deposits recovered at the borehole locations were tested to determine their moisture content and liquid & plastic limits, to ascertain their volume change potential (shrinkage or swelling), to help assist with future foundation design. The results of the tests are contained in the Ian Farmer Associates Test Report (reference 2280082 / 1), a copy of which can be seen attached in Appendix III.

The natural clay deposits tested fall within the low, intermediate and high plasticity range, and when considering the amount passing the 425um sieve, they display a negligible, low and moderate volume change (shrinkage or swelling) potential. As such some of the natural clay deposits tested may undergo significant changes in volume if large changes in their natural moisture content were to occur due to seasonal variations or the like, and therefore if new foundations were to be based within these clays, they should be placed at a minimum depth of 0.90m below finished ground levels. However, consideration will need to be given to the presence of nearby existing, proposed or recently removed vegetation to avoid the effects of future shrinkage and swelling of the natural clay deposits, and as such minimum foundation depths may need to be increased to take this into account. Reference should be made to the NHBC Technical Standards guidance, Part 4.2 Building Near Trees, and BS5837:2012 – Trees in relation to design, demolition and construction – Recommendations.

4.2 Determination of Particle Size Distribution

Six representative samples of the natural sand deposits encountered across the site have been tested to determine the particle size distribution (PSD). The results of the tests are contained in the Ian Farmer Associates Test Report (reference 2280082 / 1), a copy of which can be seen in Appendix III. The results have identified well graded and poorly graded variable deposits ranging from clayey gravelly sand, silty gravelly sand, silty sand, gravelly sand, and sandy gravel deposits.

4.3 Determination of Organic Matter Content

A representative sample of the peat deposits encountered at the location of BH18 has been tested by Derwentside Environmental Testing Services Limited (DETS) to determine the organic matter content of the peat layer at this location. The results of the tests are contained in the DETS Certificate of Analysis Report (reference 19-25707), a copy of which can be found in Appendix III.

4.0 Laboratory Testing (Cont'd)

4.3 Determination of Organic Matter Content (Cont'd)

The result has recorded an organic matter content of 21%, indicating a high organic content. This sample was also noted to be saturated during sampling. The result concurs with the visual description of this material as a peat deposit and is constrained within the upper 1.30m of the initial shallow soil deposits, and consequently, these types of materials will be highly compressible and subject to significant consolidation settlement through loss of water, under even light loading conditions, and therefore would not normally be considered suitable for supporting or remaining below any new structures.

4.4 Determination of Chemical Attack on Buried Concrete

Twenty representative samples of the topsoil and natural deposits recovered at the window sampling borehole locations have been tested by Derwentside Environmental Testing Services Limited (DETS) and Envirolab Limited to determine their pH value and soluble sulphate (sulphate aqueous extract SO_4) levels, so these materials can be classified in accordance with the guidance BRE Special Digest 1:2005, Concrete in Aggressive Ground.

The results of the tests are contained in the DETS Certificate of Analysis Report (reference 19-25707) and the Envirolab Final Analytical Test Report (reference 19/12077), copies of which can be found in Appendix III. The laboratory test results have recorded soluble sulphate concentrations ranging between <10mg/l to 33mg/l, and pH values ranging between 5.7 to 8.4. Based on these results obtained for this site and where future foundations and buried concrete are to be constructed, and when considering the mean of the highest 20% of the population, the natural deposits should be classified as Design Sulphate Class of DS-1. The Aggressive Chemical Environment for Concrete (ACEC) class for the deposits present can be assessed as AC-1.

4.5 Contamination Screening / Screening Strategy

Representative samples of the topsoil deposits encountered across the site have been screened for a range of chemical analytes to determine the levels of contamination and to allow an assessment of any risk these materials may pose to construction workers and future end-users where these materials are intended to be reused. Ground contamination laboratory testing was completed by DETS of Consett, Co. Durham (UKAS & MCERTS accredited), and the suite of chemical analysis carried out is summarised below. The laboratory results are contained within the DETS Certificate of Analysis Test Report (reference 19-25707), a copy of which can be found in Appendix III, and a summary of the contamination results can be seen in the Table below and on the following page.

4.0 Laboratory Testing (Cont'd)

4.5 Contamination Screening / Screening Strategy (Cont'd)

- ▼ 12 no. soil samples tested for Arsenic, Cadmium, Chromium (III & VI), Copper, Lead, Mercury, Nickel, Selenium, Zinc, Cyanide (free) and Total Organic Carbon (TOC) / Soil Organic Matter (SOM)
- ▼ 12 no. soil samples screened for Speciated Polycyclic Aromatic Hydrocarbons (PAH's) – based on the current USEPA 16 PAH's
- ▼ 12 no. soil samples tested for Asbestos (presence)

Analyte	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Arsenic	37 ⁽¹⁾	12	14
Cadmium	11 ⁽¹⁾	12	0.4
Chromium III	910 ⁽¹⁾	12	16
Chromium VI	6 ⁽¹⁾	12	<1.0
Copper	2400 ⁽¹⁾	12	42
Lead	200 ⁽³⁾	12	66
Mercury	40 ⁽¹⁾	12	0.1
Nickel	130 ⁽¹⁾	12	13
Selenium	250 ⁽¹⁾	12	1.4
Zinc	3700 ⁽¹⁾	12	60
Cyanide	34 ⁽²⁾	12	<0.1
Asbestos	Presence	12	No asbestos detected
Analyte (PAH's)			
Acenaphthene	1,100 ⁽¹⁾	12	<0.1
Acenaphthylene	920 ⁽¹⁾	12	<0.1
Anthracene	11,000 ⁽¹⁾	12	0.1
Benzo(a)anthracene	13 ⁽¹⁾	12	0.1
Benzo(a)pyrene	3.0 ⁽¹⁾	12	0.4
Benzo(b)fluoranthene	3.7 ⁽¹⁾	12	0.4
Benzo(ghi)perylene	350 ⁽¹⁾	12	0.1
Benzo(k)fluoranthene	100 ⁽¹⁾	12	0.2
Chrysene	27 ⁽¹⁾	12	0.5
Dibenz(ah)anthracene	0.3 ⁽¹⁾	12	0.4

⁽¹⁾ = The LQM/CIEH Suitable 4 Use Levels (Residential with homegrown produce – for organic contaminants 6% SOM has been adopted), ⁽²⁾ = ATRISK^{SOIL} SSV (2015), ⁽³⁾ = CL:AIRE C4SLs (Residential with homegrown produce)

4.0 Laboratory Testing (Cont'd)

4.5 Contamination Screening / Screening Strategy (Cont'd)

Analyte (PAH's)	Critical concentration (mg/kg)	No. of samples screened	Max. concentration recorded (mg/kg)
Fluoranthene	890 ⁽¹⁾	12	0.5
Fluorene	860 ⁽¹⁾	12	<0.1
Indeno(123cd)pyrene	41 ⁽¹⁾	12	<0.1
Naphthalene	13 ⁽¹⁾	12	<0.1
Phenanthrene	440 ⁽¹⁾	12	0.2
Pyrene	2,000 ⁽¹⁾	12	0.5

⁽¹⁾ = The LQM/CIEH Suitable 4 Use Levels (Residential with homegrown produce – for organic contaminants 6% SOM has been adopted), ⁽²⁾ = ATRISK^{SOIL} SSV (2015), ⁽³⁾ = CL:AIRE C4SLs (Residential with homegrown produce)

None of the maximum concentration values for any of the contaminants listed in the Table exceed the critical concentration values adopted for this site, based on an end use of residential with homegrown produce. In addition, none of the samples screened were found to contain the presence of asbestos. Therefore, based on the results obtained, it is felt that the topsoil deposits present over the site can remain on site without representing a significant risk towards the future end users (Human Health), and as such no remedial measures are required for this proposed development.

5.0 Ground Gas Risk Assessment

Combined ground gas & water monitoring standpipes were installed within three boreholes (BH's 05, 06, 08, 18 & 19), to confirm the ground gas regime below the site associated with a nearby Historical and Recorded Landfill Site to the south, as well as to monitor groundwater levels within the underlying deposits.

The monitoring installations have been constructed using 50mm diameter HDPE standpipe, comprising 1.00m of solid pipe within a bentonite seal and a response zone using slotted pipe to the terminal depths of the boreholes. Monitoring was undertaken using a Gas Data GFM436 soil gas analyser with integral flow meter, and a Geotechnical Instruments electronic dip-meter. The ground gas and water levels were allowed to reach equilibrium prior to the first monitoring visit. Due to the current COVID-19 pandemic, the monitoring period was disrupted somewhat, and the period of monitoring was unavoidably extended by 3 months. However, extending the gas monitoring period for any site is always beneficial and provides a more robust and conservative approach to assessing the overall risk.

5.0 Ground Gas Risk Assessment (Cont'd)

The design of the ground gas risk assessment for this site has been undertaken in general accordance with the CIRIA Report C665 (November 2007), BS8576:2013 – Guidance on investigations for ground gas and BS8485:2015 + A1:2019 – Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings, and is based on the following criteria.

- ▼ The proposed residential development has been classified as high sensitivity
- ▼ The risk associated with the generation potential of a source has been assessed as very low
- ▼ Therefore, in accordance with Tables 5.5a and 5.5b in CIRIA C665, the typical / idealised period of monitoring for this site has been determined as 6 no. recorded readings undertaken over a minimum period of 3 months
- ▼ Monitoring visits are undertaken to target and correlate with the worst-case conditions for ground gas emissions to occur, comprising falling atmospheric pressure trends and low atmospheric pressures. Monitoring of the weather conditions and predicted atmospheric pressures were carried out up to 72 hours in advance of the monitoring visits, in order that a reasonable period of data is obtained to determine atmospheric trends, and to target the worst-case scenario

A summary of the gas monitoring results can be seen in the Table below, and within the Ground Gas & Groundwater Monitoring Record Sheet contained in Appendix IV.

Borehole Position	Date of visit	Atmospheric Pressure (mbar)	Water level (m)	Max CH ₄ (%v/v)	Max CO ₂ (%v/v)	Min O ₂ (%v/v)	Flow Rate (l/hr)
BH05	17/12/2019	986-988 (Rising trend 976-999)	1.52	0.0	2.2	18.8	<0.1
BH06			1.27	0.0	3.7	17.4	0.1
BH08			0.75	0.0	3.1	18.1	0.1
BH18			1.01	0.0	3.9	17.1	1.2
BH19			Dry	0.0	4.4	15.3	0.1
BH05	29/01/2020	979-983 (Falling trend 1045-1004)	1.50	0.0	6.9	10.4	<0.1
BH06			0.70	0.0	4.4	18.3	<0.1
BH08 ⁽¹⁾			0.10	~	~	~	~
BH18			1.00	0.0	3.4	17.9	-1.5
BH19			Dry	0.0	7.9	7.3	<0.1

Atmospheric pressure trend shown in brackets taken from www.weatheronline.co.uk for Wharton Aerodrome Airport, ⁽¹⁾ – BH08 monitoring well flooded.

5.0 Ground Gas Risk Assessment (Cont'd)

Borehole Position	Date of visit	Atmospheric Pressure (mbar)	Water level (m)	Max CH ₄ (%v/v)	Max CO ₂ (%v/v)	Min O ₂ (%v/v)	Flow Rate (l/hr)
BH05	13/02/2020	968-971 (Falling trend 1010-994)	1.40	0.0	5.8	14.0	<0.1
BH06			0.95	0.0	3.5	18.7	0.2
BH08			0.50	0.0	8.8	15.5	0.1
BH18			1.10	0.0	4.4	17.7	-3.0
BH19			Dry	0.0	0.8	19.2	0.1
BH05	02/05/2020	984-987 (Falling trend 1023-999)	1.55	0.0	3.4	18.8	<0.1
BH06			1.20	0.0	7.5	16.4	<0.1
BH08			0.96	0.0	1.1	19.1	-0.9
BH18			0.90	0.0	3.2	13.9	<0.1
BH19 ⁽²⁾			~	~	~	~	~
BH05	05/06/2020	971-974 (Falling trend 1020-996)	1.55	0.0	2.1	19.6	<0.1
BH06			1.60	0.0	2.1	18.6	<0.1
BH08			1.15	0.0	2.1	19.2	<0.1
BH18			1.10	0.0	5.4	17.9	<0.1
BH19 ⁽²⁾			~	~	~	~	~
BH05	25/06/2020	994-996 (Falling trend 1022-1016)	1.60	0.0	3.7	17.3	<0.1
BH06			1.88	0.0	5.8	15.1	<0.1
BH08			1.04	0.0	2.8	18.4	0.6
BH18			0.96	0.0	4.6	18.1	1.0
BH19 ⁽²⁾							

Atmospheric pressure trend shown in brackets taken from www.weatheronline.co.uk for Wharton Aerodrome Airport, ⁽¹⁾ – BH08 monitoring well flooded,

⁽²⁾ – BH19 vandalised

No detectable concentrations of Methane have been recorded within the monitoring wells. Concentrations of Carbon Dioxide have been recorded ranging between 0.8% v/v up to 8.8% v/v, with depleted Oxygen concentrations also being recorded (min 7.3% v/v). Negligible, positive and negative flow rates were recorded during the monitoring visits undertaken, ranging between -3.0l/hr up to 1.2l/hr.

For the purposes of assessing the proposed development in accordance with Tables 8.5 & 8.7 in CIRIA C665 and Table 2 in BS8485:2015 + A1:2019, the site is characterised based on the limiting borehole hazardous gas flow rate (Q_{hg}) for methane and carbon dioxide, known as the Gas Screening Value (GSV), and the calculation can be seen on the following page.

5.0 Ground Gas Risk Assessment (Cont'd)

The GSV equates to a Characteristic Situation classification which in turn determines the level of gas protection required in accordance with Table 4 in BS8485:2015 + A1:2019.

- ▼ Due to the lack of Methane recorded, a GSV cannot be calculated
- ▼ Multiply the maximum Carbon Dioxide concentration (taken as 8.8% (0.088)) by the maximum flow rate (3.0l/hr – negative flow rate taken as a positive as a worst-case scenario), which gives a GSV value of 0.264l/hr

Based on the results obtained from the monitoring completed, whilst the GSV calculated for Carbon Dioxide exceeds the minimum GSV assessment value of 0.07l/hr for Characteristic Situation 1, the GSV falls below 0.78l/hr for Carbon Dioxide in accordance with the NHBC Traffic Light System (Green Classification for Situation B – Low rise housing with a ventilated underfloor void). As such the site falls within the Characteristic Situation 2 (CS2) classification, and Amber 1 based on the average of all values >5% for Carbon Dioxide (circa 6.7%).

Therefore, based on the findings of the monitoring and risk assessment completed hazardous ground gas protection measures will be required for all new residential properties. Appropriate ground gas protection measures should be selected based on the characteristic situation using the guidance contained in Section 7 of the BS8485:2015 + A1:2019 document. The designer / specifier of the gas protection measures needs to be able to understand the gas risk assessment findings and the building related influences, as these govern the design options and choices to be implement. The gas / volatile vapour protection design, provision of detailed pre-construction design drawings and product specification should be clearly defined and reference should be made to the solution scores in Tables 5, 6 & 7 to assist the design, in terms of meeting the requirements of the gas regime determined for this site.

This will need to be detailed in a Remediation Strategy, and once implemented / constructed the gas protection measures will need to be validated in general accordance with CIRIA C735, Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.

6.0 Recommendations for New Building Foundations

Variable ground conditions have been recorded across the central and southern / southwestern portions of the site, and as such it is difficult to identify a single homogenous foundation bearing strata for new properties located across these portions of the site.

6.0 Recommendations for New Building Foundations (Cont'd)

Conventional shallow strip foundations can be considered for the whole of the proposed development, however a plot specific foundation schedule has been devised based on the ground conditions encountered, and these foundation zones can be seen on the foundation zone location plan in Appendix V. Where necessary consideration has been given to the overall allowable bearing capacity and settlement characteristics of the ground where foundations are placed either directly within natural clay or sand strata. In addition, differential settlement has been taken into account where foundations could straddle between both sand and clay deposits. Foundations should be suitably reinforced which will provide added support given the variability of some of the recorded ground conditions encountered.

Foundation zone	Plot range	Investigation positions	Min. foundation depth	Max. allowable bearing pressure	Comments
Zone 1	52 to 66 and 80 to 87	TP's 01, 03, 06, 15, 16, BH's 04, 12, 14, 17, DP's 01, 03, 05 & 12	0.60m	150kN/m ²	Taking into account reductions in site levels, foundations will be wholly based within sand / coarse deposits
Zone 2	33 to 44 and 67 to 79	TP's 02, 12 to 14, BH's 05, 11, 15 & 16, DP's 02, 04, 08 & 09	0.90m	100kN/m ²	Foundations could straddle between both sand and clay deposits below these proposed plots
Zone 3	45 to 51	BH18	1.35m	100kN/m ²	Peat deposits in this location will require excavation and removal from below proposed building plots and foundations should be based wholly within sand deposits
Zone 4	1 to 32 and 88 to 106	TP's 07 to 11, 17, 18, BH's 01, 02, 06 to 10, DP's 06, 07, 10 & 11	0.90m	60kN/m ²	Variable clay and sand deposits will be present below these plots and therefore widened reinforced strip footings will be required, or alternative foundation options could be considered, i.e. ground improvement or piling

6.0 Recommendations for New Building Foundations (Cont'd)

At the location of BH18, a layer of very soft peat was recorded between depths of 0.20m up to 1.25m. These peat deposits should be fully delineated and removed from below the footprints of any new residential properties to prevent any future significant settlement.

Should development proposals change at any time in the future prior to commencing with the development in terms of the plot layouts, then a reassessment of the foundation zone plan should be undertaken to determine the appropriate foundation solution and allowable bearing pressure. Due to the variable nature of the natural deposits encountered below the entire site area, it would be prudent to make an allowance for all foundation excavations to be inspected by a suitably qualified Geotechnical Engineer during the construction phase of works, to verify the correct founding strata and depths have been achieved, and to ensure that there are no significant changes or variations in the ground conditions identified as part of these investigation works.

7.0 General Observations & Recommendations

The presence of Himalayan Balsam was noted on the northern portion of the site area. No other invasive weed species were noted during the site works. Therefore, it is recommended that a vegetation survey and treatment is carried out by an appropriate qualified Ecologist / Remediation Contractor so that existing Himalayan Balsam plants can be eradicated prior to the site development works.

Particularly during the winter period, water ingresses were experienced within the borehole positions put down across the site ranging between 0.45m and 1.85m below existing site levels within the natural superficial deposits. Water ingresses were not quite so problematic during the spring months (May & June) with minor seepages being noted at depths of 1.95m and 2.50m below existing site levels. Nonetheless, it would be considered prudent to allow for the introduction of appropriate and temporary groundwater control measures to manage any potential water ingresses which may occur within construction related excavations.

During the creation of deep excavations, potential instability issues may be encountered where excavations are left open for a long period of time. Therefore, temporary lateral trench support may be required for construction related excavations to prevent trench wall collapse and over-excavation, as well as providing a safe working environment for any operatives who may require access to deep excavations, those in excess of 1.20m deep.

7.0 General Observations & Recommendations (Cont'd)

In addition, for deeper excavations, drainage, service runs or the like that may pass close to or beneath any proposed new foundations, these should be undertaken with care and completed prior to the preparation of any new foundations, so as not to allow any loose or granular material to move or 'flow', thus causing settlement to occur to any new foundations based at a higher level.

It is also recommended for any new developments, adequate surface drainage should be designed and installed by a competent contractor, in order to prevent surface water 'ponding' or collection, during and post construction, particularly where the existing surface drainage system is disrupted or damaged.

Where the natural strata (excluding the topsoil) is to be disposed of as a waste it is likely that subject to the completion of appropriate classification screening (metals, organics and asbestos) and WAC testing, that these materials should meet the criteria for disposal at an Inert Waste Landfill. The number of samples to be screened would be dependent on the volume requiring disposal.

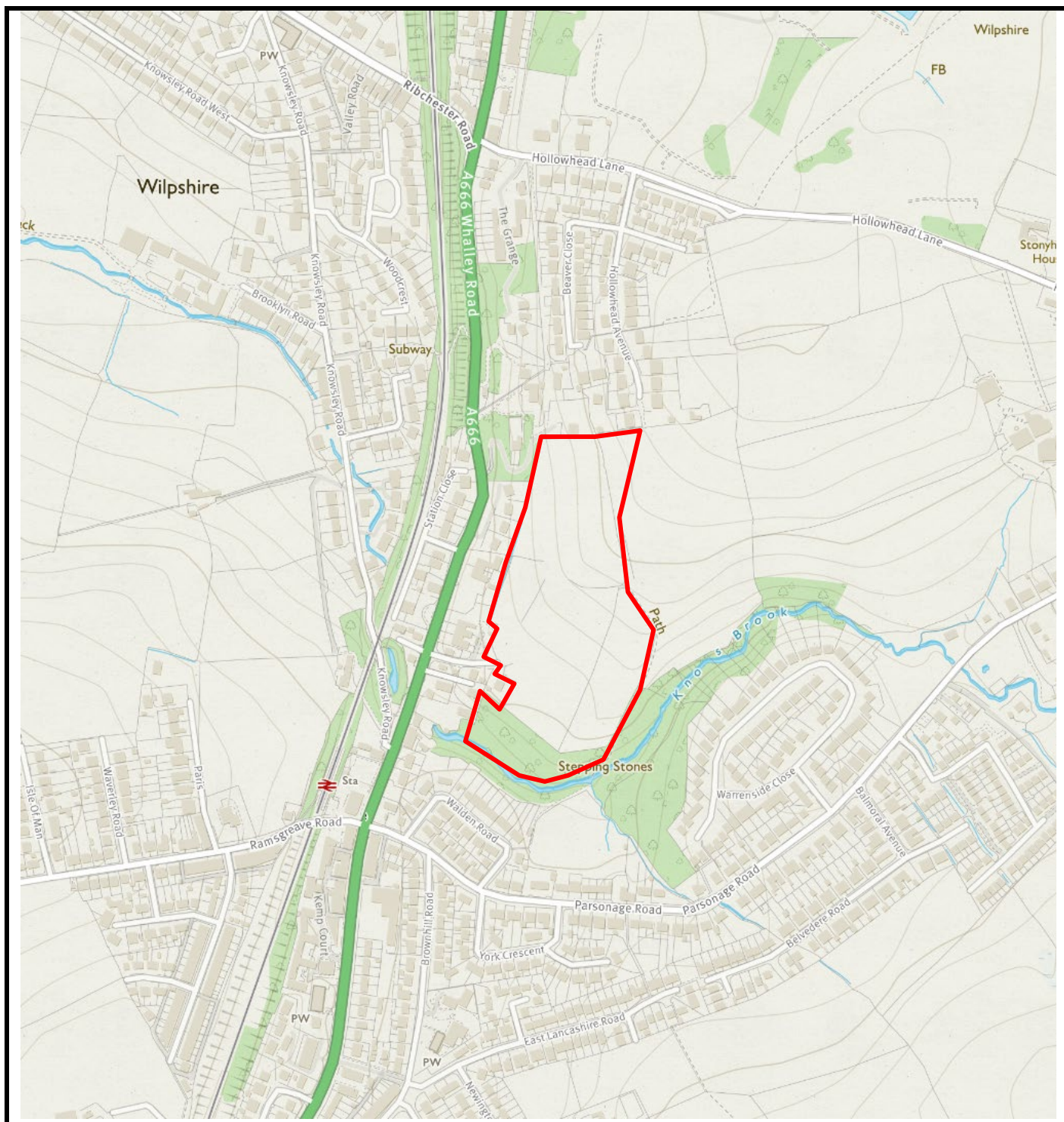
During the ground preparation works and the development of the site, should the ground conditions appear to differ from those already identified as part of these investigation works, then advice should be sought from a suitably qualified Engineer to determine if a reassessment of the ground conditions and recommendations is required before the development progresses further.

End of Report



APPENDIX I

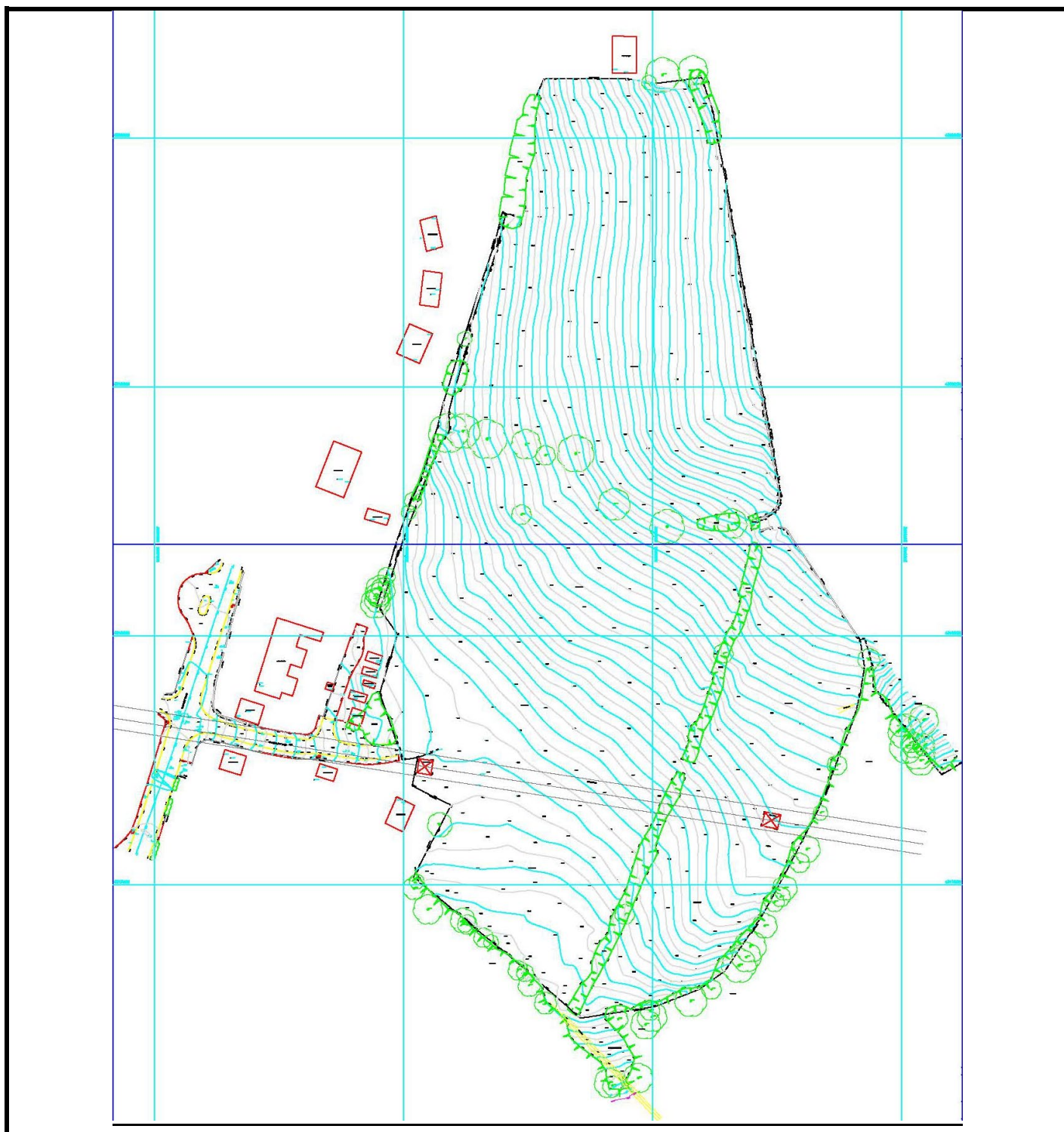
SITE LOCATION PLAN, AERIAL PHOTOGRAPH, EXISTING SITE LAYOUT PLAN AND PROPOSED DEVELOPMENT LAYOUT PLAN



SITE LOCATION PLAN



 AERIAL PHOTOGRAPH 



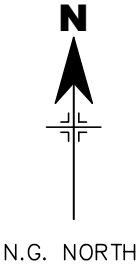
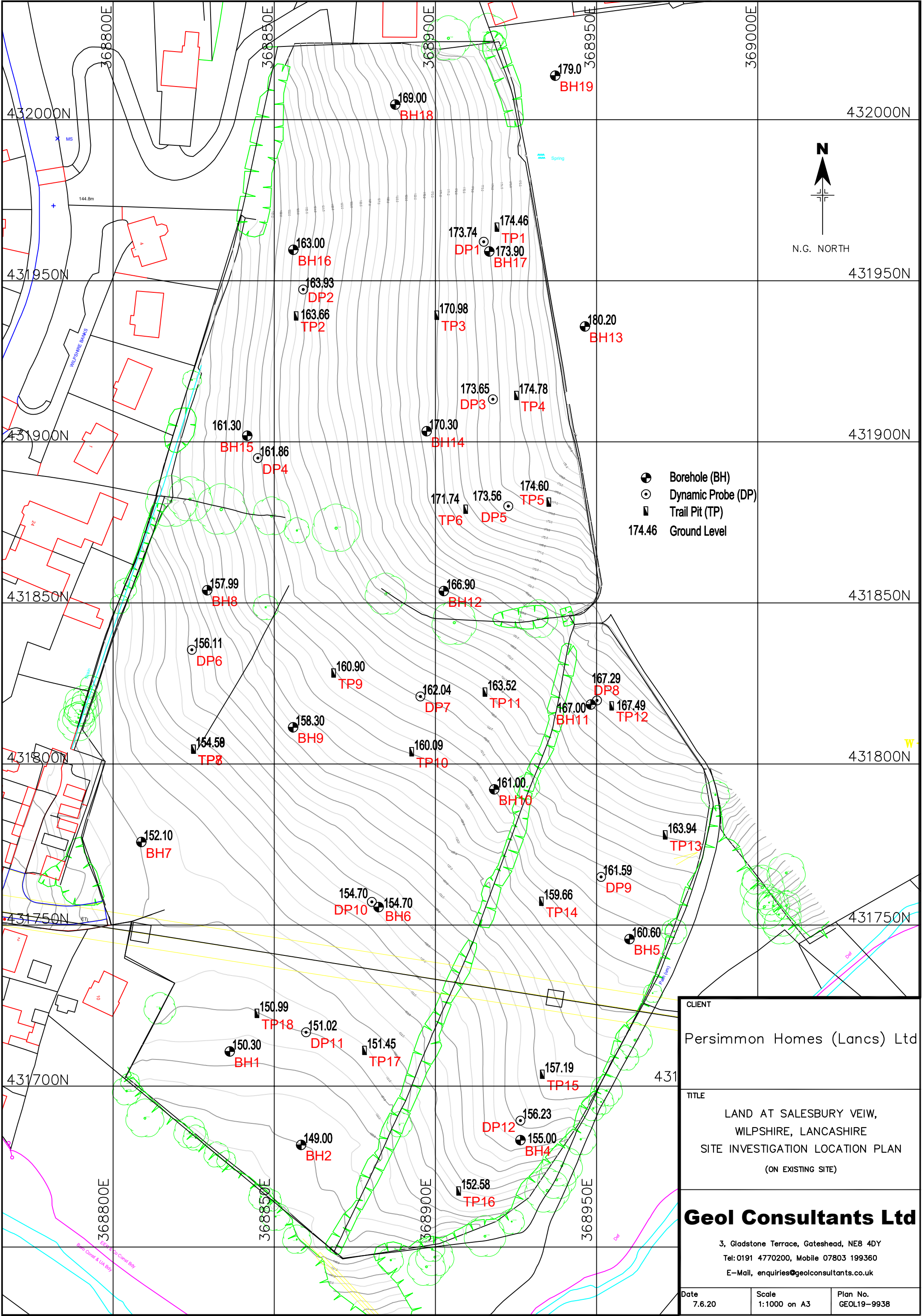
EXISTING SITE LAYOUT PLAN





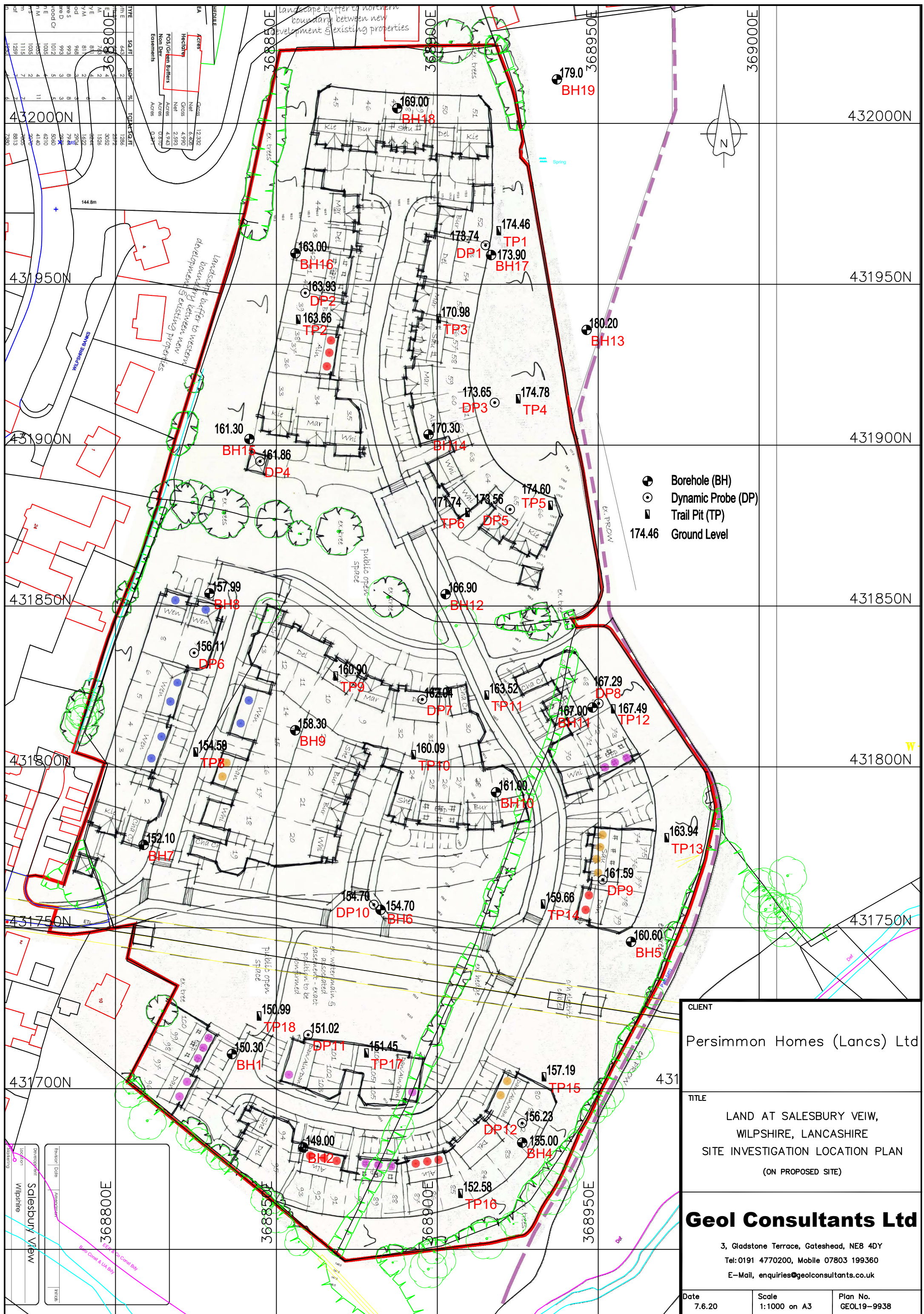
APPENDIX II

SITE INVESTIGATION LOCATION PLANS (EXISTING & PROPOSED) AND BOREHOLE, TRIAL PIT AND DYNAMIC PROBE RECORD SHEETS



- Borehole (BH)
- ⊙ Dynamic Probe (DP)
- ▬ Trail Pit (TP)
- 174.46 Ground Level

CLIENT		
Persimmon Homes (Lancs) Ltd		
TITLE		
LAND AT SALESBURY VIEW, WILPSHIRE, LANCASHIRE SITE INVESTIGATION LOCATION PLAN (ON EXISTING SITE)		
Geol Consultants Ltd		
3, Gladstone Terrace, Gateshead, NE8 4DY Tel: 0191 4770200, Mobile 07803 199360 E-Mail, enquiries@geolconsultants.co.uk		
Date	Scale	Plan No.
7.6.20	1:1000 on A3	GEOL19-9938





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 03/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368836.20 N431710.75	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH01	Hole Type BH	Level 150.30m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.15	ES		0.15	150.15		Grass overlying dark brown saturated sandy clayey TOPSOIL and greyish brown sandy clay (subsoil). Light brown becoming medium brown and orange clayey SAND (GLACIAL TILL DEPOSITS).	1
					0.70	149.60		Firm light brown and orange brown very sandy CLAY (GLACIAL TILL DEPOSITS).	
		0.80	B		1.18	149.12		Very loose grey slightly clayey very gravelly SAND (GLACIAL TILL DEPOSITS).	
					1.70	148.60		Firm dark greyish brown very sandy gravelly CLAY (GLACIAL TILL DEPOSITS).	2
		2.00	B		2.50	147.80		End of Borehole at 2.50m	3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.50	92										

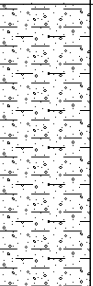
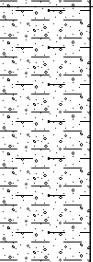
Remarks
WATER: Ingress noted at 0.90m.





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 03/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368858.36 N431681.73	
Project No. : GEOL19-9938		Crew Name:		Drilling Equipment:	
Borehole Number BH02	Hole Type BH	Level 149.00m AoD	Logged By	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.20	ES	HVP=40 HVP=42	0.20	148.80		Grass overlying dark brown saturated sandy clayey TOPSOIL and medium brown sandy clay (subsoil).	1
		0.25	B					Initially stiff becoming firm and soft (medium strength) greyish brown sandy slightly gravelly CLAY (GLACIAL TILL DEPOSITS).	
		0.25 0.40							
		0.90	B	HVP=40	1.15	147.85		Firm (low and medium strength) greyish brown sandy slightly gravelly CLAY (GLACIAL TILL DEPOSITS).	
		1.25 1.25	B						
1.90 1.90	B	HVP=38	2.00	147.00		End of Borehole at 2.00m	2		

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.00	92										

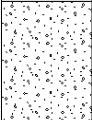
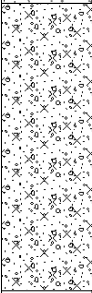
Remarks WATER: Ingress noted at 0.90m.	
---	---





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 04/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368960.22 N431745.62	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH05	Hole Type BH	Level 160.60m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.25	ES		0.25	160.35		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
								Medium brown clayey slightly gravelly SAND with small sandstone cobbles (subsoil).	
		0.65 - 0.80	B		0.65	159.95		Medium dense light brown very gravelly SAND with cobbles (GLACIAL TILL DEPOSITS).	
					1.60	159.00		End of Borehole at 1.60m	
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
1.60	92										

Remarks



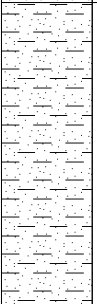
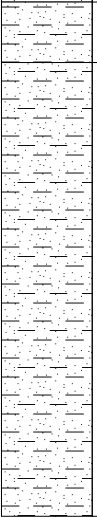
[illegible]

Remarks	
WATER: Ingress noted at 1.15m.	



Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 09/10/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368808.76 N431775.76	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Windowless Sampling	
Borehole Number BH07	Hole Type BH	Level 152.10m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.30	ES		0.30	151.80		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
		0.50		HVP=56				Firm (medium strength) becoming very soft (low strength) light brown and orange sandy CLAY (GLACIAL TILL DEPOSITS).	
		0.80		HVP=30					
		1.00	B						
		1.20	B		1.30	150.80		Very soft greyish brown very sandy CLAY with sandstone cobbles (GLACIAL TILL DEPOSITS).	2
		1.50 - 2.00	B		1.50	150.60		Stiff (high strength) becoming soft to firm (low and medium strength) brown sandy CLAY (GLACIAL TILL DEPOSITS),	
		1.70		HVP=90					
		2.00		HVP=60					
		2.50		HVP=50					
		3.00		HVP=35	3.00	149.10		End of Borehole at 3.00m	3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
3.00	110	1.00	115								

Remarks	
---------	---



Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368816.24 N431838.41	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH08	Hole Type BH	Level 157.60m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
<									

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.00	92										

Remarks
WATER: Ingress noted at 1.00m.





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 02/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368855.87 N431811.37	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH09	Hole Type BH	Level 158.30m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.10	ES		0.10	158.20		Grass overlying dark brown saturated sandy clayey TOPSOIL.	
					0.20	158.10		Dark brown clayey SAND (subsoil).	
								Medium brown and orange brown slightly clayey slightly gravelly SAND (GLACIAL TILL DEPOSITS).	
		1.00	B		1.20	157.10		Medium brown SAND (GLACIAL TILL DEPOSITS).	
					1.40	156.90		Medium dense dark brown clayey gravelly SAND (GLACIAL TILL DEPOSITS).	
		2.00	B		2.50	155.80		Medium dense medium brown very gravelly SAND (GLACIAL TILL DEPOSITS).	
		3.00 - 4.00	B		4.00	154.30		End of Borehole at 4.00m	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
4.00	92										

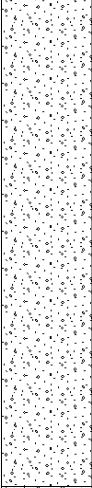
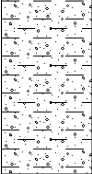
Remarks
WATER: Ingress noted at 0.95m.





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 02/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368918.26 N431792.12	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH10	Hole Type BH	Level 161.00m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.10	ES		0.10	160.90		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
					0.25	160.75		Dark brown and grey slightly clayey SAND (subsoil).	
		0.50	B					Light brown and orange slightly gravelly SAND, becoming clayey and cobbly with depth (GLACIAL TILL DEPOSITS).	
		1.90	B		1.90	159.10		Stiff (high strength) dark greyish brown very sandy gravelly CLAY (GLACIAL TILL DEPOSITS).	
		2.30		HVP=120					
		2.50	B		2.50	158.50		End of Borehole at 2.50m	2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.50	92										

Remarks
WATER: Ingress noted at 1.85m.





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 04/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368948.24 N431818.47	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH11	Hole Type BH	Level 167.00m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.25	ES		0.25	166.75		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
					0.45	166.55		Medium brown very clayey SAND (subsoil).	
		0.60 - 1.00	B					Medium dense medium brown very gravelly SAND with sandstone cobbles (GLACIAL TILL DEPOSITS)	
					1.30	165.70		Medium dense light brown very sandy GRAVEL & COBBLES of sandstone (GLACIAL TILL DEPOSITS).	2
					2.60	164.40		End of Borehole at 2.60m	3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.60	92										

Remarks
WATER: Ingress noted at 1.00m.





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 04/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368902.60 N431853.68	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH12	Hole Type BH	Level 166.90m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.15	ES		0.15	166.75		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
								Medium brown very clayey slightly gravelly SAND (subsoil).	
		0.40 - 0.70	B		0.40	166.50		Light brown gravelly SAND with sandstone cobbles (GLACIAL TILL DEPOSITS).	
					0.70	166.20		Medium dense orange brown very gravelly cobbly SAND (GLACIAL TILL DEPOSITS).	
					2.70	164.20		End of Borehole at 2.70m	3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.70	92										

Remarks





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368932.80 N431877.41	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH13	Hole Type BH	Level 178.30m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.15	ES		0.15	178.15		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
								Medium brown slightly clayey slightly gravelly SAND (subsoil).	
		0.40 - 0.80	B		0.40	177.90		Medium brown very gravelly SAND with sandstone cobbles (GLACIAL TILL DEPOSITS).	
					0.90	177.40		End of Borehole at 0.90m	
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
0.90	92										

Remarks





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 04/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368897.29 N431903.30	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH14	Hole Type BH	Level 170.30m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.25	ES		0.25	170.05		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
		0.45 - 0.80	B		0.45	169.85		Medium brown very clayey SAND (subsoil).	
					0.90	169.40		Dense to medium dense medium brown and orange brown slightly clayey gravelly cobbly SAND (GLACIAL TILL DEPOSITS).	
								End of Borehole at 0.90m	
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
0.90	92										

Remarks





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368841.63 N431901.91	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH15	Hole Type BH	Level 161.30m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.30	ES		0.30	161.00		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
		0.50 - 0.73	B					Medium dense medium brown very clayey gravelly SAND (subsoil).	
		0.73 - 1.10	B		0.73	160.57		Stiff medium brown and grey sandy gravelly CLAY (GLACIAL TILL DEPOSITS).	
					1.10	160.20		Medium dense light brown very gravelly SAND with cobbles (GLACIAL TILL DEPOSITS).	
					1.30	160.00		End of Borehole at 1.30m	
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
1.30	92										

Remarks





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 04/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368855.95 N431959.64	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH16	Hole Type BH	Level 163.00m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.18	ES		0.18	162.82		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
		0.30 - 0.90	B					Loose becoming medium dense light brown and orange brown clayey slightly gravelly SAND (GLACIAL TILL DEPOSITS).	
		1.25	B		1.25	161.75		Stiff medium brown sandy slightly gravelly CLAY (GLACIAL TILL DEPOSITS).	2
		1.55 - 2.00	B		1.55	161.45		Medium dense and dense light brown slightly clayey gravelly cobbly SAND (GLACIAL TILL DEPOSITS).	
					2.20	160.80		End of Borehole at 2.20m	5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.20	92										

Remarks





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368916.71 N431959.09	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH17	Hole Type BH	Level 173.90m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.15	ES					Grass overlying dark brown saturated sandy clayey TOPSOIL.	
		0.15 - 0.30	B		0.15	173.75		Medium brown slightly clayey SAND (subsoil).	
		0.30 - 0.90	B		0.30	173.60		Medium brown gravelly SAND with sandstone cobbles (GLACIAL TILL DEPOSITS).	
					0.50	173.40		Medium dense and dense light brown very gravelly cobbly SAND (GLACIAL TILL DEPOSITS).	
					1.10	172.80		End of Borehole at 1.10m	
									1
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
1.10	92										

Remarks





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 04/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368887.57 N432004.73	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH18	Hole Type BH	Level 169.00m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.20	ES		0.20	168.80		Grass and reeds overlying dark brown saturated slightly sandy clayey TOPSOIL.	1
		0.30 - 0.50	B					Soft becoming very soft dark brown saturated slightly clayey pseudo-fibrous very organic PEAT, with a high organic content.	
		1.30 - 1.80	B		1.25	167.75		Medium brown sandy CLAY.	2
					1.35	167.65		Medium brown, grey and orange brown slightly clayey gravelly SAND (GLACIAL TILL DEPOSITS).	
					1.80	167.20		Light brown very gravelly cobbly SAND (GLACIAL TILL DEPOSITS).	
					2.50	166.50		End of Borehole at 2.50m	3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.50	92										

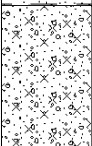
Remarks
WATER: Ingress noted at 0.45m.





Window Sampling

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/12/2019	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368946.39 N431935.82	
Project No. : GEOL19-9938		Crew Name: RS		Drilling Equipment: Window Sampling	
Borehole Number BH19	Hole Type BH	Level 180.20m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.20	ES		0.20	180.00		Grass overlying dark brown saturated sandy clayey TOPSOIL.	1
					0.40	179.80		Medium brown slightly clayey SAND (subsoil).	
		0.40 - 0.90	B					Medium brown gravelly cobbly SAND (GLACIAL TILL DEPOSITS).	
					0.90	179.30		End of Borehole at 0.90m	
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
0.90	92										

Remarks









Project Name: Salesbury View				Client: Persimmon Homes (Lancashire) Ltd				Date: 20/05/2020			
Location: Wilpshire, Lancashire, BB1 9PL				Contractor: Geol Consultants Limited				Co-ords: E368900.42 N431939.32			
Project No. : GEOL19-9938				Crew Name: RS				Equipment: Tracked excavator			
Location Number TP03		Location Type TP		Level 170.98m AoD		Logged By RS		Scale 1:25		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
					0.20	170.98		Grass overlying dark brown gravelly sandy TOPSOIL.		1	
								Orange brown silty gravelly SAND (subsoil).			
					0.70	170.78		Light grey and orange very sandy gravelly cobbly CLAY (TILL DEPOSITS).		2	
					1.15	170.28		Medium brown clayey gravelly cobbly SAND with small and occasional medium sized boulders (TILL DEPOSITS).		3	
					2.40	169.83		End of excavation at 2.40m		4	
Dimensions		Trench Support and Comment				Pumping Data					
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks			Date	Rate	Remarks		
Remarks											
											

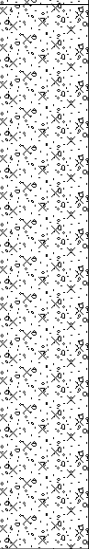






Trial Pit Log

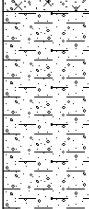
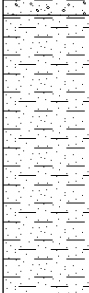
Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 20/05/2020	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368909.38 N431879.10	
Project No. : GEOL19-9938		Crew Name: RS		Equipment: Tracked excavator	
Location Number TP06	Location Type TP	Level 171.74m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25	171.74		Grass overlying dark brown gravelly sandy TOPSOIL.	1
								Orange brown gravelly cobbly SAND (subsoil).	
					0.70	171.49		Medium brown very gravelly cobbly SAND (TILL DEPOSITS).	
					2.50	171.04		End of excavation at 2.50m	2
									3
									4
									5

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
Remarks								





Project Name: Salesbury View				Client: Persimmon Homes (Lancashire) Ltd				Date: 20/05/2020			
Location: Wilpshire, Lancashire, BB1 9PL				Contractor: Geol Consultants Limited				Co-ords: E368824.93 N431804.62			
Project No. : GEOL19-9938				Crew Name: RS				Equipment: Tracked excavator			
Location Number TP08		Location Type TP		Level 154.58m AoD		Logged By RS		Scale 1:25		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.90		HVP=39	0.15	154.58		Grass overlying dark brown gravelly sandy TOPSOIL.		1	
					0.30	154.43		Light brown, brown and orange silty gravelly SAND (subsoil).			
								Soft to firm (low strength) grey and medium brown very sandy gravelly CLAY (TILL DEPOSITS).			
					1.00	154.28		Stiff dark brown and dark grey very sandy CLAY (TILL DEPOSITS).			
					1.95	153.58		Stiff grey slightly sandy CLAY with cobbles and small boulders of sandstone (TILL DEPOSITS).			
					2.10	152.63		Dark brown gravelly cobbly SAND (TILL DEPOSITS).		2	
					2.65	152.48		End of excavation at 2.65m		3	
Dimensions		Trench Support and Comment				Pumping Data					
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks			
Remarks WATER: Ingress noted at 2.40m.											









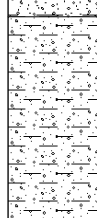
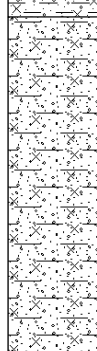
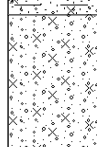










Project Name: Salesbury View				Client: Persimmon Homes (Lancashire) Ltd				Date: 20/05/2020				
Location: Wilpshire, Lancashire, BB1 9PL				Contractor: Geol Consultants Limited				Co-ords: E368878.01 N431711.09				
Project No. : GEOL19-9938				Crew Name: RS				Equipment: Tracked excavator				
Location Number TP17		Location Type TP		Level 151.45m AoD		Logged By RS		Scale 1:25		Page Number Sheet 1 of 1		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.75		HVP=36	0.20	151.45		Grass overlying dark brown gravelly sandy TOPSOIL.		1 -		
					0.40	151.25		Light brown slightly clayey slightly gravelly SAND (subsoil).				
								Soft (low strength) medium brown, orange and grey very sandy gravelly CLAY (TILL DEPOSITS).				
		1.30		HVP=15	1.10	151.05		Very soft (very low strength) dark brown very sandy gravelly CLAY (TILL DEPOSITS).			2 -	
					1.30	150.35		Very loose dark brown clayey gravelly SAND with bands of stiff sandy gravelly clay and rootlets (TILL DEPOSITS).				
		2.45	150.15		Loose becoming medium & dense medium brown silty sandy GRAVEL (TILL DEPOSITS).		3 -					
		2.90	149.00	End of excavation at 2.90m		4 -						
										5 -		
Dimensions				Trench Support and Comment				Pumping Data				
Pit Length		Pit Width		Pit Stability		Shoring Used		Remarks		Date	Rate	Remarks
Remarks WATER: Ingress noted at 2.45m.												



Trial Pit Log

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 20/05/2020	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368844.65 N431722.57	
Project No. : GEOL19-9938		Crew Name: RS		Equipment: Tracked excavator	
Location Number TP18	Location Type TP	Level 150.99m AoD	Logged By RS	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	150.99		Grass overlying dark brown gravelly sandy TOPSOIL.	1
								Firm medium brown, orange and grey sandy slightly gravelly CLAY (TILL DEPOSITS).	
					0.80	150.79		Very loose dark brown and grey very clayey gravelly SAND (TILL DEPOSITS).	
					1.80	150.19		Very loose medium brown silty gravelly SAND (TILL DEPOSITS).	2
					2.45	149.19		Firm dark brown very sandy gravelly CLAY (TILL DEPOSITS).	3
					3.00	148.54		End of excavation at 3.00m	
									4
									5

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks

Remarks WATER: Ingress noted at 2.50m.								
---	--	--	--	--	--	--	--	---



Dynamic Probe Test Log

Project Name: Salesbury View			Client: Persimmon Homes (Lancashire) Ltd			Date: 05/06/2020		
Location: Wilpshire, Lancashire, BB1 9PL			Contractor: Geol Consultants Limited			Co-ords: E368914.99 N431962.13		
Project No. : GEOL19-9938			Crew Name: IT			Drilling Equipment: Competitor dart rig		
Borehole Number DP01	Hole Type DP	Level 173.74m AoD	Logged By IT		Scale 1:25	Page Number Sheet 1 of 1		

Depth	Legend	Stratum Description	Blows Increments									
			0	10	20	30	40	50	60	70	80	90
0.5 <												

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



Dynamic Probe Test Log

Project Name: Salesbury View			Client: Persimmon Homes (Lancashire) Ltd			Date: 05/06/2020		
Location: Wilpshire, Lancashire, BB1 9PL			Contractor: Geol Consultants Limited			Co-ords: E368917.84 N431913.22		
Project No. : GEOL19-9938			Crew Name: IT			Drilling Equipment: Competitor dart rig		
Borehole Number DP03		Hole Type DP		Level 173.65m AoD		Logged By IT		Page Number Sheet 1 of 1

Depth	Legend	Stratum Description	Blows Increments															
			0	10	20	30	40	50	60	70	80	90	100					
0.5			1															
			3															
			4															
			4															
			4															
			2															
			2															
			2															
			2															
1.0			3															
			9															
			19															
			17															
			17															
1.5			10															
			10															
			10															
			5															
			12															
2.0			9															
			17															
			10															
			6															
2.5			13															
			15															
			16															
			13															
			13															
			12															
3.0			12															
			16															
			16															
			16															
			10															
3.5			13															
			14															
			11															
			10															
			14															
4.0			31															
			50															
4.5																		

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

Remarks



Dynamic Probe Test Log

Project Name: Salesbury View			Client: Persimmon Homes (Lancashire) Ltd			Date: 05/06/2020		
Location: Wilpshire, Lancashire, BB1 9PL			Contractor: Geol Consultants Limited			Co-ords: E368844.93 N431894.97		
Project No. : GEOL19-9938			Crew Name: IT			Drilling Equipment: Competitor dart rig		
Borehole Number DP04	Hole Type DP	Level 161.86m AoD	Logged By IT		Scale 1:25	Page Number Sheet 1 of 1		

Depth	Legend	Stratum Description	Blows Increments										
			0	10	20	30	40	50	60	70	80	90	100
0.5			1										
			2										
			4										
			4										
			4										
			5										
			4										
			4										
			3										
			3										
			4										
			4										
			4										
			13										
			13										
			11										
			7										
			7										
			7										
			1.0			6							
10													
8													
12													
8													
10													
9													
11													
14													
31													
50													

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



Dynamic Probe Test Log

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/06/2020	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368922.60 N431880.03	
Project No. : GEOL19-9938		Crew Name: IT		Drilling Equipment: Competitor dart rig	
Borehole Number DP05	Hole Type DP	Level 173.56m AoD	Logged By IT	Scale 1:25	Page Number Sheet 1 of 1

Depth	Legend	Stratum Description	Blows Increments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
			0	10	20	30	40	50	60	70	80	90	100																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
0.5			3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

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

Remarks	
---------	---



Dynamic Probe Test Log

Project Name: Salesbury View			Client: Persimmon Homes (Lancashire) Ltd			Date: 05/06/2020		
Location: Wilpshire, Lancashire, BB1 9PL			Contractor: Geol Consultants Limited			Co-ords: E368950.14 N431819.71		
Project No. : GEOL19-9938			Crew Name: IT			Drilling Equipment: Competitor dart rig		
Borehole Number DP08	Hole Type DP	Level 167.29m AoD	Logged By IT		Scale 1:25	Page Number Sheet 1 of 1		

Depth	Legend	Stratum Description	Blows Increments															
			0	10	20	30	40	50	60	70	80	90	100					
0.5			1															
			3															
			3															
			3															
			2															
			2															
			3															
			7															
			8															
1.0			9															
			10															
			13															
			11															
			7															
1.5			4															
			5															
			19															
			7															
2.0			2															
			3															
			2															
			2															
2.5			5															
			4															
			4															
			5															
			6															
			7															
			6															
3.0			7															
			7															
			7															
			15															
			13															
3.5			10															
			15															
			11															
			9															
			9															
4.0			10															
			9															
			15															
			9															
			6															
4.5			5															
			16															
			50															

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





Dynamic Probe Test Log

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/06/2020	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368951.39 N431764.92	
Project No. : GEOL19-9938		Crew Name: IT		Drilling Equipment: Competitor dart rig	
Borehole Number DP09	Hole Type DP	Level 161.59m AoD	Logged By IT	Scale 1:25	Page Number Sheet 1 of 1

Depth	Legend	Stratum Description	Blows Increments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			0	10	20	30	40	50	60	70	80	90	100																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
0.5			2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

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

Remarks





Dynamic Probe Test Log

Project Name: Salesbury View		Client: Persimmon Homes (Lancashire) Ltd		Date: 05/06/2020	
Location: Wilpshire, Lancashire, BB1 9PL		Contractor: Geol Consultants Limited		Co-ords: E368880.20 N431757.20	
Project No. : GEOL19-9938		Crew Name: IT		Drilling Equipment: Competitor dart rig	
Borehole Number DP10	Hole Type DP	Level 154.70m AoD	Logged By IT	Scale 1:25	Page Number Sheet 1 of 1

Depth	Legend	Stratum Description	Blows Increments										
			0	10	20	30	40	50	60	70	80	90	100
0.5			2										
			2										
			4										
			4										
1.0			1										
			1										
			4										
			6										
			5										
			6										
			2										
			4										
			3										
			3										
1.5			3										
			4										
			4										
			3										
			2										
			2										
			2										
			1										
			3										
			3										
2.0			4										
			4										
			3										
			2										
			2										
			2										
			1										
			3										
			3										
			4										
2.5			4										
			9										
			9										
			9										
			9										
			10										
			10										
			12										
			22										
			14										
3.0			9										
			9										
			9										
			9										
			10										
			10										
			12										
			22										
			14										
			9										
3.5			10										
			10										
			12										
			22										
			14										
			9										
			10										
			24										
			13										
			15										
4.0			24										
			13										
			15										
			24										
			20										
			25										
			50										

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



Dynamic Probe Test Log

Project Name: Salesbury View			Client: Persimmon Homes (Lancashire) Ltd			Date: 05/06/2020		
Location: Wilpshire, Lancashire, BB1 9PL			Contractor: Geol Consultants Limited			Co-ords: E368859.89 N431716.70		
Project No. : GEOL19-9938			Crew Name: IT			Drilling Equipment: Competitor dart rig		
Borehole Number DP11		Hole Type DP		Level 151.02m AoD		Logged By IT		Page Number Sheet 1 of 1

Depth	Legend	Stratum Description	Blows Increments									
			0	10	20	30	40	50	60	70	80	90
0.5 												

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



Dynamic Probe Test Log

Project Name: Salesbury View			Client: Persimmon Homes (Lancashire) Ltd			Date: 05/06/2020		
Location: Wilpshire, Lancashire, BB1 9PL			Contractor: Geol Consultants Limited			Co-ords: E368926.40 N431689.28		
Project No. : GEOL19-9938			Crew Name: IT			Drilling Equipment: Competitor dart rig		
Borehole Number DP12	Hole Type DP	Level 156.23m AoD	Logged By IT		Scale 1:25	Page Number Sheet 1 of 1		

Depth	Legend	Stratum Description	Blows Increments															
			0	10	20	30	40	50	60	70	80	90	100					
0.5 <																		

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



APPENDIX III

LABORATORY TESTING RESULTS

3 Gladstone Terrace,
Gateshead,
Tyne & Wear,
NE8 4DY

F.A.O.

Final Test Report - 2280082 / 1

Site: Salesbury View, Wilpshire, Lancashire, BB1 9PL
Job Number: 2280082
Originating Client: Geol Consultants Limited
Originating Reference: GEOL19-9938
Date Sampled: Not Given
Date Scheduled: 11/12/2019
Date Testing Started: 20/12/2019
Date Testing Finished: 07/01/2020

Previous Reports		Amendments	Date Issued

Amendments:

Authorised By:



Tim Robinson
Quality Technician

Report Issue Date: 07/01/2020

Page: 2





Site: Salesbury View, Wiltshire, Lancashire, BB1 9PL

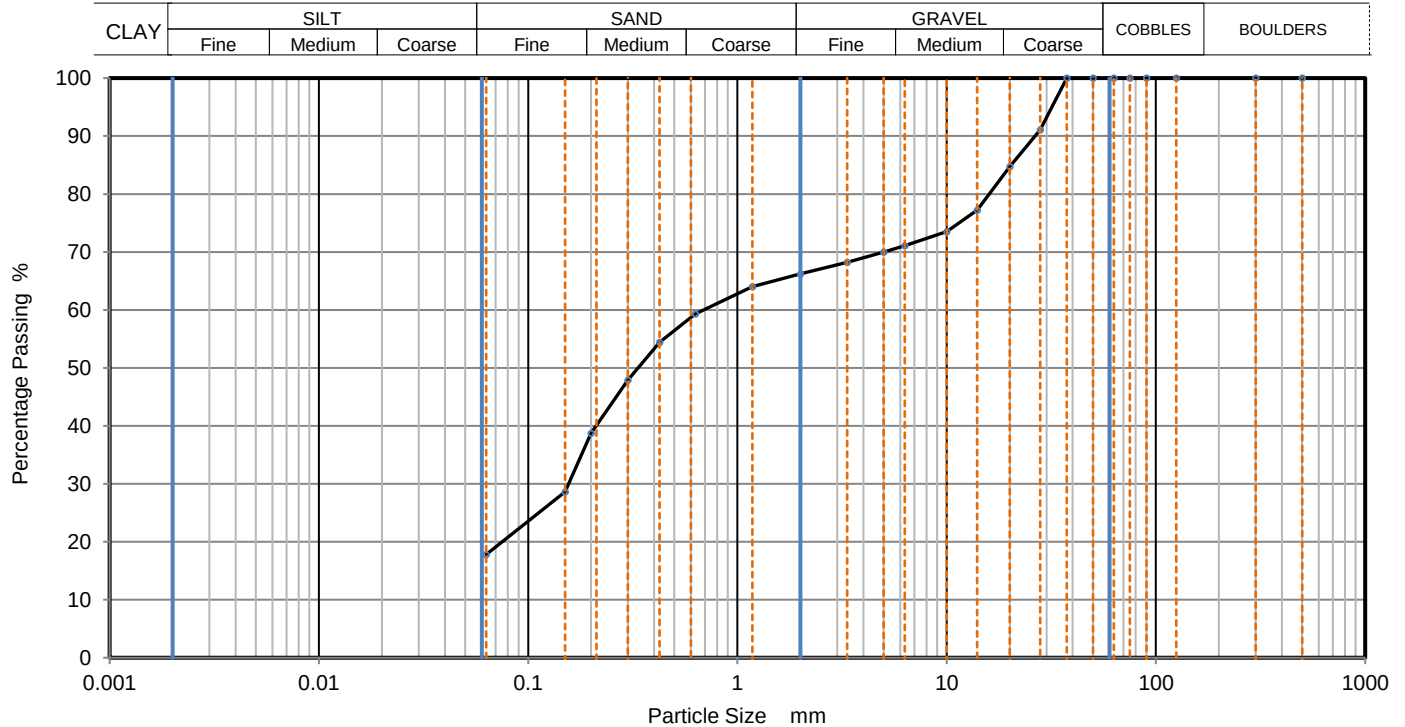
Job Number: 2280082

Client: Geol Consultants Limited

Page: 3

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH06	2.00	B	Wet Sieve	Brown clayey, gravelly SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	91		
20	85		
14	77		
10	74		
6.3	71		
5	70		
3.35	68		
2	66		
1.18	64		
0.63	59		
0.425	54		
0.3	48		
0.2	39		
0.15	29		
0.063	18		

Dry Mass of sample, g

1452

Sample Proportions	% dry mass
Very coarse	0
Gravel	34
Sand	48
Fines <0.063mm	18

Grading Analysis		
D100	mm	37.5
D60	mm	0.69
D30	mm	0.156
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Method of Preparation: BS EN 17892:Part4:2016, clause 5.2.2 Preparation of samples for wet sieving test

Method of Test: BS EN 17892:Part4:2016, clause 5.2.3 Determination of particle size distribution by wet sieving method



Site: Salesbury View, Wiltshire, Lancashire, BB1 9PL

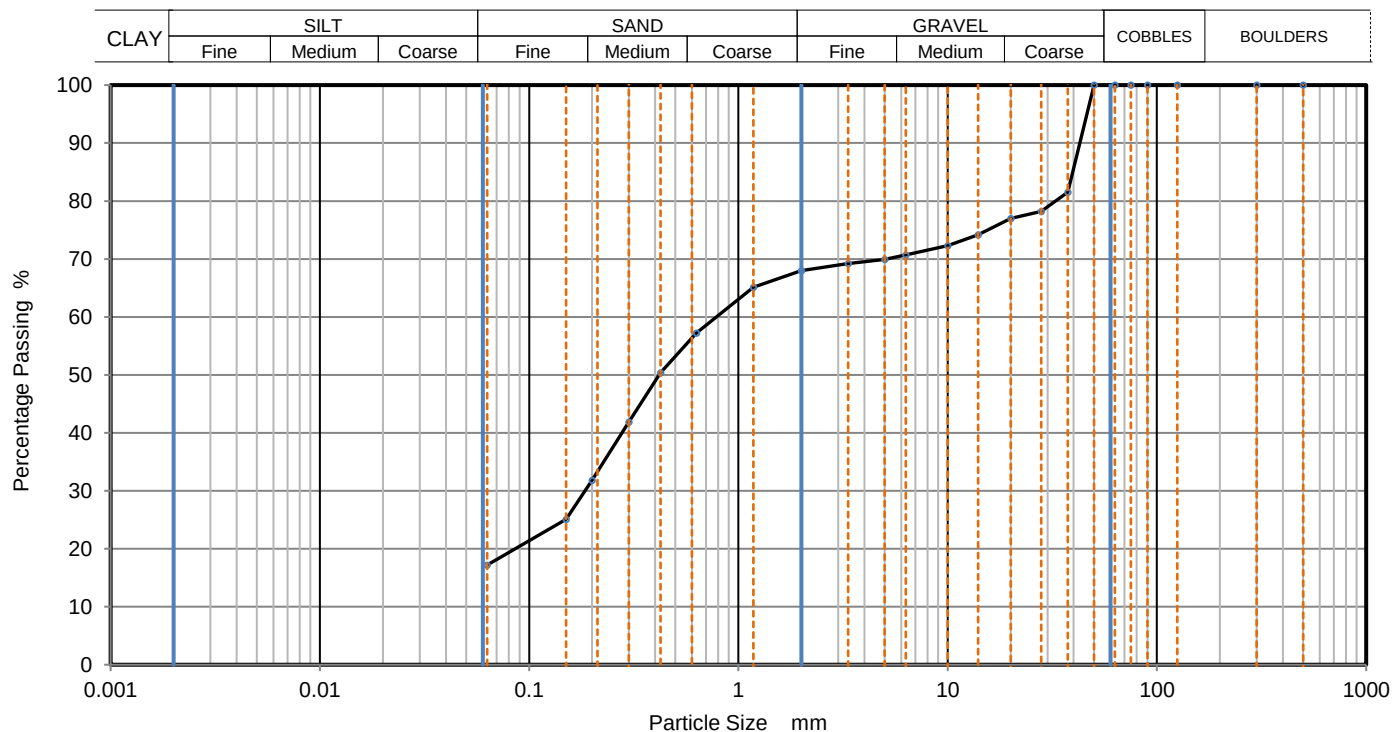
Job Number: 2280082

Client: Geol Consultants Limited

Page: 4

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH08	0.40	B	Wet Sieve	Brown silty, gravelly SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	82		
28	78		
20	77		
14	74		
10	72		
6.3	71		
5	70		
3.35	69		
2	68		
1.18	65		
0.63	57		
0.425	50		
0.3	42		
0.2	32		
0.15	25		
0.063	17		

Dry Mass of sample, g

954

Sample Proportions	% dry mass
Very coarse	0
Gravel	32
Sand	51
Fines <0.063mm	17

Grading Analysis		
D100	mm	50
D60	mm	0.785
D30	mm	0.185
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Method of Preparation: BS EN 17892:Part4:2016, clause 5.2.2 Preparation of samples for wet sieving test

Method of Test: BS EN 17892:Part4:2016, clause 5.2.3 Determination of particle size distribution by wet sieving method



Site: Salesbury View, Wiltshire, Lancashire, BB1 9PL

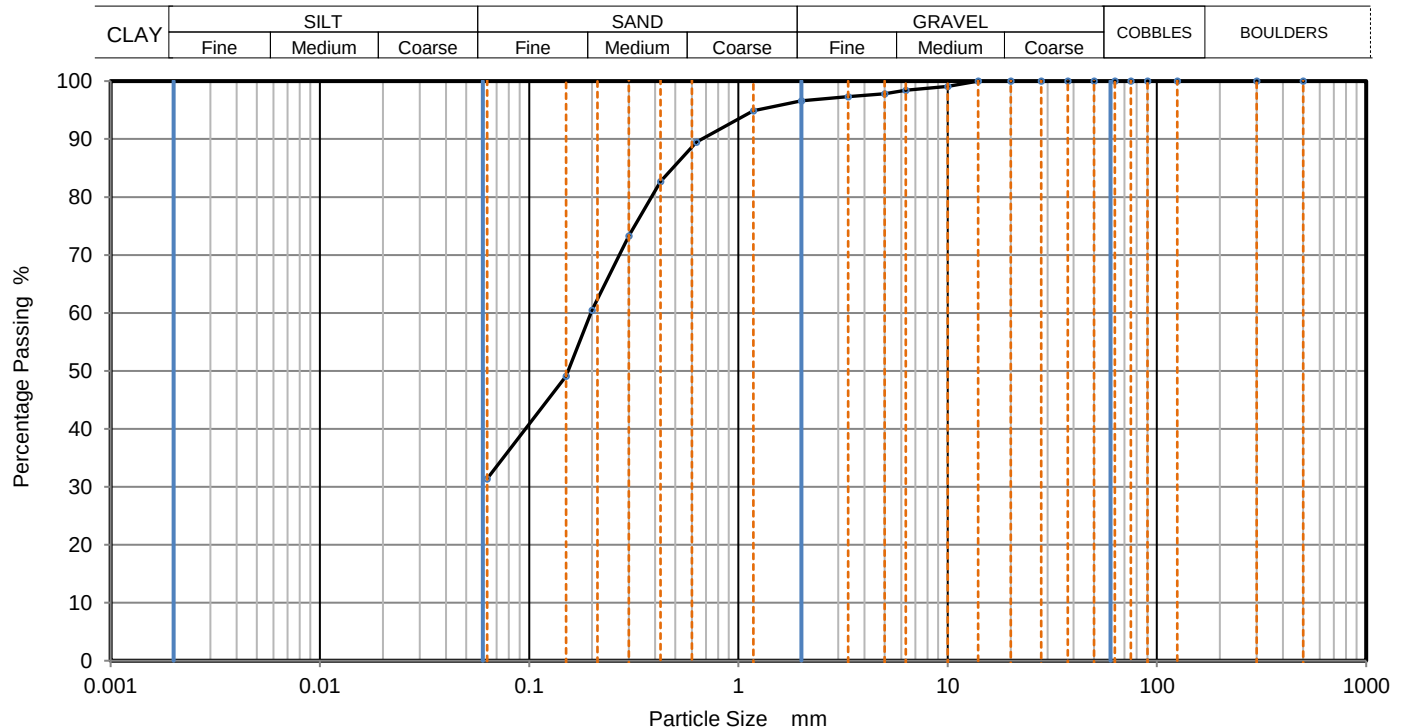
Job Number: 2280082

Client: Geol Consultants Limited

Page: 5

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH09	1.00	B	Wet Sieve	Brown silty SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	95		
0.63	90		
0.425	83		
0.3	73		
0.2	61		
0.15	49		
0.063	31		

Dry Mass of sample, g

1082

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	65
Fines <0.063mm	31

Grading Analysis		
D100	mm	14
D60	mm	0.198
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Method of Preparation: BS EN 17892:Part4:2016, clause 5.2.2 Preparation of samples for wet sieving test

Method of Test: BS EN 17892:Part4:2016, clause 5.2.3 Determination of particle size distribution by wet sieving method



Site: Salisbury View, Wiltshire, Lancashire, BB1 9PL

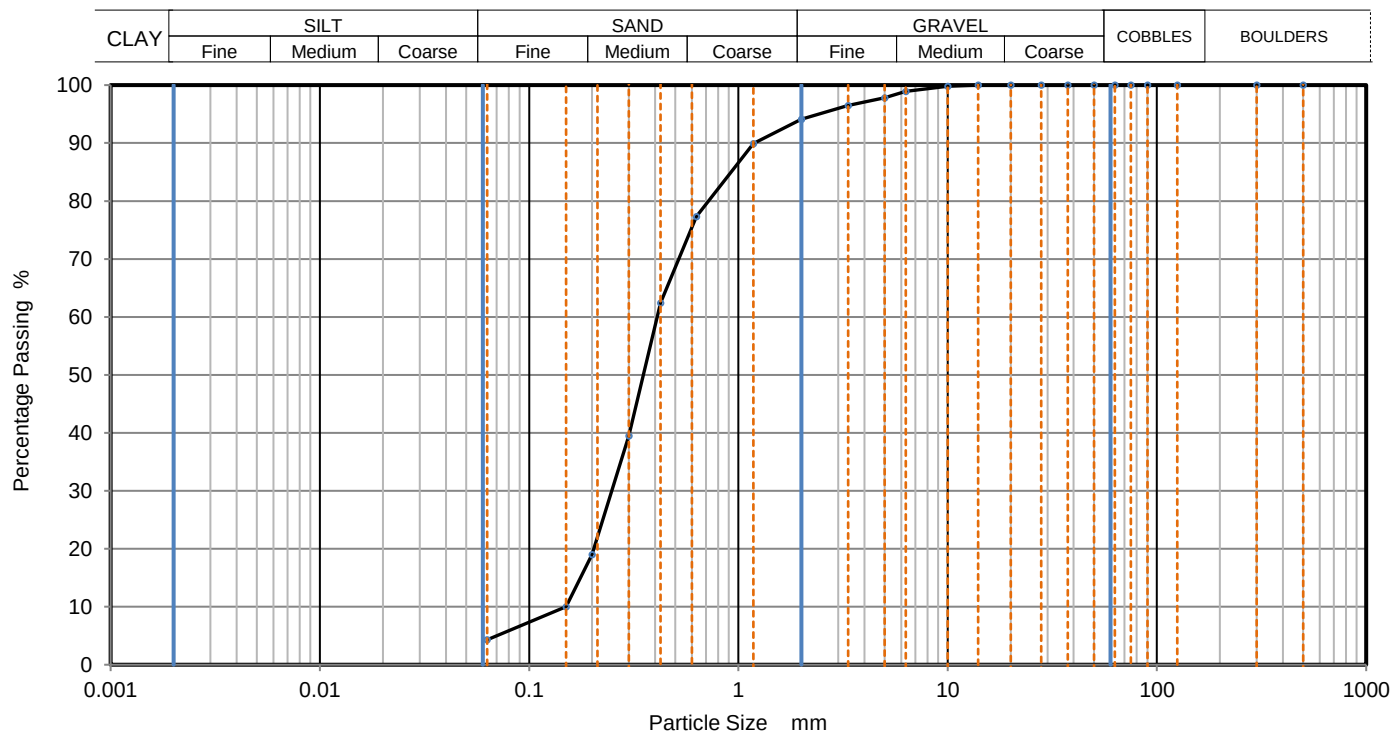
Job Number: 2280082

Client: Geol Consultants Limited

Page: 6

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH09	3.00	B	Wet Sieve	Brown slightly gravelly SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	98		
3.35	97		
2	94		
1.18	90		
0.63	77		
0.425	62		
0.3	40		
0.2	19		
0.15	10		
0.063	4		

Dry Mass of sample, g

1188

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	90
Fines <0.063mm	4

Grading Analysis		
D100	mm	14
D60	mm	0.41
D30	mm	0.249
D10	mm	0.15
Uniformity Coefficient		2.7
Curvature Coefficient		1

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Method of Preparation: BS EN 17892:Part4:2016, clause 5.2.2 Preparation of samples for wet sieving test

Method of Test: BS EN 17892:Part4:2016, clause 5.2.3 Determination of particle size distribution by wet sieving method



Site: Salesbury View, Wiltshire, Lancashire, BB1 9PL

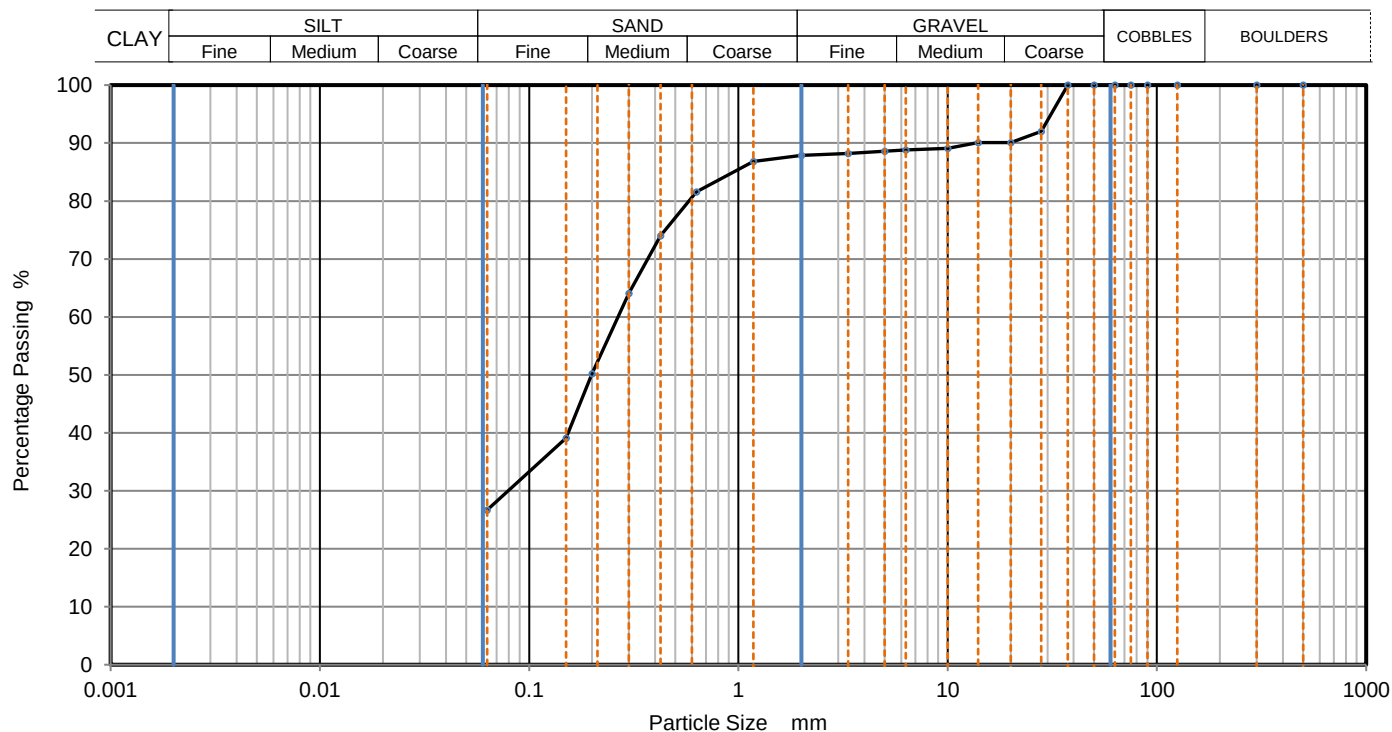
Job Number: 2280082

Client: Geol Consultants Limited

Page: 7

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH10	0.50	B	Wet Sieve	Brown gravelly, clayey SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	92		
20	90		
14	90		
10	89		
6.3	89		
5	89		
3.35	88		
2	88		
1.18	87		
0.63	82		
0.425	74		
0.3	64		
0.2	50		
0.15	39		
0.063	27		

Dry Mass of sample, g

1037

Sample Proportions	% dry mass
Very coarse	0
Gravel	12
Sand	61
Fines <0.063mm	27

Grading Analysis		
D100	mm	37.5
D60	mm	0.266
D30	mm	0.0793
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Method of Preparation: BS EN 17892:Part4:2016, clause 5.2.2 Preparation of samples for wet sieving test

Method of Test: BS EN 17892:Part4:2016, clause 5.2.3 Determination of particle size distribution by wet sieving method



Site: Salesbury View, Wiltshire, Lancashire, BB1 9PL

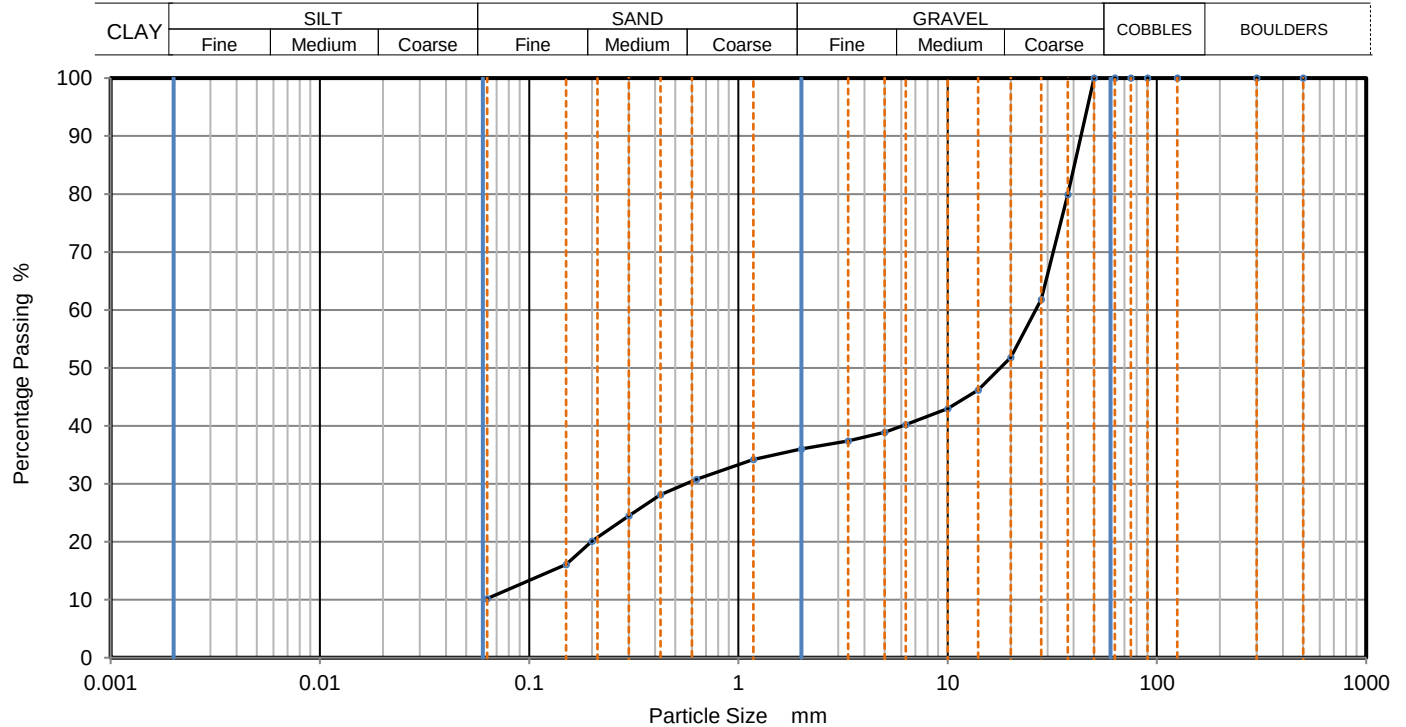
Job Number: 2280082

Client: Geol Consultants Limited

Page: 8

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH14	0.45	B	Wet Sieve	Brown clayey, sandy GRAVEL



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	80		
28	62		
20	52		
14	46		
10	43		
6.3	40		
5	39		
3.35	37		
2	36		
1.18	34		
0.63	31		
0.425	28		
0.3	25		
0.2	20		
0.15	16		
0.063	10		

Dry Mass of sample, g

1814

Sample Proportions	% dry mass
Very coarse	0
Gravel	64
Sand	26
Fines <0.063mm	10

Grading Analysis		
D100	mm	50
D60	mm	26.3
D30	mm	0.559
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS17892 unless noted below

Method of Preparation: BS EN 17892:Part4:2016, clause 5.2.2 Preparation of samples for wet sieving test

Method of Test: BS EN 17892:Part4:2016, clause 5.2.3 Determination of particle size distribution by wet sieving method



Final Test Report - 2280082 / 1

Site: Salesbury View, Wilpshire, Lancashire, BB1 9PL
Job Number: 2280082
Originating Client: Geol Consultants Limited

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

This test report shall not be reproduced, except in full and only with the written permission of Ian Farmer Associates Ltd.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report Issue Date: 07/01/2020

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/12077
Issue Number: 1
Date: 02 January, 2020

Client: Ian Farmer Associates (Newcastle)
Unit 4, Faraday Close
Pattinson North Industrial Estate
Washington
Tyne and Wear
NE38 8QJ

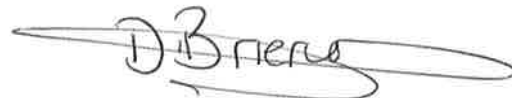
Project Manager: Paul Cathcart; washington@ianfarmer.co.uk
Project Name: Salesbury View, Wilpshire, Lancashire, BB1 9PL
Project Ref: 2280082
Order No: P7520895
Date Samples Received: 19/12/19
Date Instructions Received: 19/12/19
Date Analysis Completed: 02/01/20

Prepared by:



Sophie France
Admin Assistant

Approved by:



Danielle Brierley
Client Manager

Envirolab Job Number: 19/12077

Client Project Name: Salesbury View, Wilpshire,
Lancashire, BB1 9PL

Client Project Ref: 2280082

Lab Sample ID	19/12077/1	19/12077/2						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH08	BH10								
Depth to Top	0.40	2.50								
Depth To Bottom										
Date Sampled										
Sample Type	Soil - B	Soil - B								
Sample Matrix Code	4AE	5A								
% Stones >10mm _A	<0.1	17.1						% w/w	0.1	A-T-044
pH BRE _D ^{M#}	7.18	7.02						pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1) _D ^{M#}	24	15						mg/l	10	A-T-026s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Ian Farmer Associates (Newcastle), Unit 4, Faraday Close, Pattinson North
Industrial Estate, Washington, Tyne and Wear, NE38 8QJ

Project: Salesbury View, Wilpshire, Lancashire, BB1 9PL

Clients Project No: 2280082

Project No: 19/12077

Date Received: 19/12/2019 (am)

Cool Box Temperatures (°C): 8.9

Lab Sample ID	19/12077/1	19/12077/2
Client Sample No		
Client Sample ID/Depth	BH08 0.40m	BH10 2.50m
Date Sampled		
Deviation Code		
E (no date)	✓	✓

Key

E (no date)

No sampling date provided (all results affected if not provided)

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.



DETS

Certificate of Analysis

Certificate Number 19-25707

23-Dec-19

Client Geol-Consultants Ltd.
3, Gladstone Terrace
Gateshead
Tyne & Wear
NE8 4DY

Our Reference 19-25707

Client Reference GEOL19-9938

Order No GEOL19-9938

Contract Title Salesbury View, Wilpshire, Lancashire, BB1 9PL

Description 21 Soil samples.

Date Received 16-Dec-19

Date Started 16-Dec-19

Date Completed 23-Dec-19

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

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 19-25707

Client Ref GEOL19-9938

Contract Title Salesbury View, Wilpshire, Lancashire, BB1 9PL

Lab No	1613773	1613774	1613775	1613776	1613777	1613778
Sample ID	BH01	BH02	BH05	BH06	BH08	BH09
Depth	0.00-0.15	0.90	0.00-0.25	0.65-0.80	0.00-0.15	0.00-0.10
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/12/19	03/12/19	04/12/19	04/12/19	05/12/19	02/12/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	11		11		10	11
Cadmium	DETSC 2301#	0.1	mg/kg	0.3		0.2		< 0.1	0.4
Chromium	DETSC 2301#	0.15	mg/kg	12		12		7.8	11
Chromium III	DETSC 2301*	0.15	mg/kg	12		12		7.8	11
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0		< 1.0		< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	42		31		27	25
Lead	DETSC 2301#	0.3	mg/kg	50		47		51	66
Mercury	DETSC 2325#	0.05	mg/kg	0.10		0.10		0.06	0.10
Nickel	DETSC 2301#	1	mg/kg	11		9.3		4.8	12
Selenium	DETSC 2301#	0.5	mg/kg	0.6		< 0.5		< 0.5	0.7
Zinc	DETSC 2301#	1	mg/kg	49		52		25	56
Inorganics									
pH	DETSC 2008#		pH	6.5	6.1	6.5	7.2	5.8	6.0
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1		< 0.1		< 0.1	< 0.1
Total Organic Carbon	DETSC 2002	0.1	%	3.6		4.8		2.4	5.0
Organic matter	DETSC 2002#	0.1	%						
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	21	27	26	< 10	10	19
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.2
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		0.2	0.5
Pyrene	DETSC 3301	0.1	mg/kg	0.2		0.2		0.3	0.5
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.5
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.4
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.2
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.4
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.4
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1		< 0.1	0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6		< 1.6		< 1.6	3.5

Summary of Chemical Analysis

Soil Samples

Our Ref 19-25707

Client Ref GEOL19-9938

Contract Title Salesbury View, Wilpshire, Lancashire, BB1 9

Lab No	1613779	1613780	1613781	1613782	1613783	1613784
Sample ID	BH10	BH11	BH11	BH13	BH13	BH14
Depth	0.00-0.10	0.00-0.25	0.60-1.00	0.00-0.15	0.40-0.80	0.00-0.25
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	02/12/19	04/12/19	04/12/19	05/12/19	05/12/19	04/12/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	10	14		9.3		7.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3		0.1		0.2
Chromium	DETSC 2301#	0.15	mg/kg	16	12		14		11
Chromium III	DETSC 2301*	0.15	mg/kg	16	12		14		11
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0		< 1.0		< 1.0
Copper	DETSC 2301#	0.2	mg/kg	22	32		26		20
Lead	DETSC 2301#	0.3	mg/kg	38	63		47		35
Mercury	DETSC 2325#	0.05	mg/kg	0.05	0.10		0.05		< 0.05
Nickel	DETSC 2301#	1	mg/kg	13	9.1		6.9		7.6
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	0.8		0.9		0.7
Zinc	DETSC 2301#	1	mg/kg	49	54		60		48
Inorganics									
pH	DETSC 2008#		pH	6.3	6.3	6.6	6.0	5.7	8.4
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Total Organic Carbon	DETSC 2002	0.1	%	3.1	4.7		2.4		4.1
Organic matter	DETSC 2002#	0.1	%						
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	20	13	< 10	25	< 10	14
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.2		< 0.1		< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.2		< 0.1		< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1		< 0.1		< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6		< 1.6		< 1.6

Summary of Chemical Analysis

Soil Samples

Our Ref 19-25707

Client Ref GEOL19-9938

Contract Title Salesbury View, Wilpshire, Lancashire, BB1 9

Lab No	1613785	1613786	1613787	1613788	1613789	1613790
Sample ID	BH15	BH15	BH16	BH17	BH17	BH18
Depth	0.00-0.30	0.73-1.00	0.00-0.18	0.00-0.15	0.50-0.90	0.30-0.50
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/12/19	05/12/19	04/12/19	05/12/19	05/12/19	04/12/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	9.5		7.0	8.8		
Cadmium	DETSC 2301#	0.1	mg/kg	0.2		0.1	0.2		
Chromium	DETSC 2301#	0.15	mg/kg	15		9.5	11		
Chromium III	DETSC 2301*	0.15	mg/kg	15		9.5	11		
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0		< 1.0	< 1.0		
Copper	DETSC 2301#	0.2	mg/kg	25		18	23		
Lead	DETSC 2301#	0.3	mg/kg	65		36	42		
Mercury	DETSC 2325#	0.05	mg/kg	0.10		< 0.05	< 0.05		
Nickel	DETSC 2301#	1	mg/kg	7.1		4.0	9.8		
Selenium	DETSC 2301#	0.5	mg/kg	1.2		1.4	1.2		
Zinc	DETSC 2301#	1	mg/kg	53		34	46		
Inorganics									
pH	DETSC 2008#		pH	6.0	8.2	6.6	6.3	6.7	
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Total Organic Carbon	DETSC 2002	0.1	%	6.1		3.8	2.7		
Organic matter	DETSC 2002#	0.1	%						21
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	16	< 10	16	< 10	< 10	
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Fluoranthene	DETSC 3301	0.1	mg/kg	0.2		< 0.1	< 0.1		
Pyrene	DETSC 3301	0.1	mg/kg	0.2		< 0.1	< 0.1		
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1		< 0.1	< 0.1		
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6		< 1.6	< 1.6		

Summary of Chemical Analysis

Soil Samples

Our Ref 19-25707

Client Ref GEOL19-9938

Contract Title Salesbury View, Wilpshire, Lancashire, BB1 9

Lab No	1613791	1613792	1613793
Sample ID	BH18	BH19	BH19
Depth	1.30-1.80	0.00-0.20	0.60-0.90
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	04/12/19	05/12/19	05/12/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg		8.1	
Cadmium	DETSC 2301#	0.1	mg/kg		0.2	
Chromium	DETSC 2301#	0.15	mg/kg		11	
Chromium III	DETSC 2301*	0.15	mg/kg		11	
Chromium, Hexavalent	DETSC 2204*	1	mg/kg		< 1.0	
Copper	DETSC 2301#	0.2	mg/kg		23	
Lead	DETSC 2301#	0.3	mg/kg		41	
Mercury	DETSC 2325#	0.05	mg/kg		< 0.05	
Nickel	DETSC 2301#	1	mg/kg		6.7	
Selenium	DETSC 2301#	0.5	mg/kg		0.9	
Zinc	DETSC 2301#	1	mg/kg		60	
Inorganics						
pH	DETSC 2008#		pH		5.9	6.2
Cyanide, Free	DETSC 2130#	0.1	mg/kg		< 0.1	
Total Organic Carbon	DETSC 2002	0.1	%		7.1	
Organic matter	DETSC 2002#	0.1	%	0.4		
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l		33	< 10
PAHs						
Naphthalene	DETSC 3301	0.1	mg/kg		< 0.1	
Acenaphthylene	DETSC 3301	0.1	mg/kg		< 0.1	
Acenaphthene	DETSC 3301	0.1	mg/kg		< 0.1	
Fluorene	DETSC 3301	0.1	mg/kg		< 0.1	
Phenanthrene	DETSC 3301	0.1	mg/kg		< 0.1	
Anthracene	DETSC 3301	0.1	mg/kg		< 0.1	
Fluoranthene	DETSC 3301	0.1	mg/kg		< 0.1	
Pyrene	DETSC 3301	0.1	mg/kg		< 0.1	
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg		< 0.1	
Chrysene	DETSC 3301	0.1	mg/kg		< 0.1	
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg		< 0.1	
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg		< 0.1	
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg		< 0.1	
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg		< 0.1	
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg		< 0.1	
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg		< 0.1	
PAH Total	DETSC 3301	1.6	mg/kg		< 1.6	

Summary of Asbestos Analysis

Soil Samples

Our Ref 19-25707

Client Ref GEOL19-9938

Contract Title Salesbury View, Wilpshire, Lancashire, BB1 9PL

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1613773	BH01 0.00-0.15	SOIL	NAD	none	Colin Patrick
1613775	BH05 0.00-0.25	SOIL	NAD	none	Colin Patrick
1613777	BH08 0.00-0.15	SOIL	NAD	none	Colin Patrick
1613778	BH09 0.00-0.10	SOIL	NAD	none	Colin Patrick
1613779	BH10 0.00-0.10	SOIL	NAD	none	Colin Patrick
1613780	BH11 0.00-0.25	SOIL	NAD	none	Colin Patrick
1613782	BH13 0.00-0.15	SOIL	NAD	none	Colin Patrick
1613784	BH14 0.00-0.25	SOIL	NAD	none	Colin Patrick
1613785	BH15 0.00-0.30	SOIL	NAD	none	Colin Patrick
1613787	BH16 0.00-0.18	SOIL	NAD	none	Colin Patrick
1613788	BH17 0.00-0.15	SOIL	NAD	none	Colin Patrick
1613792	BH19 0.00-0.20	SOIL	NAD	none	Colin Patrick

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



APPENDIX IV

GROUND GAS & GROUNDWATER MONITORING SHEET

Ground Gas and Groundwater Monitoring Record Sheet



Visit	Date	Time	Equipment	Weather	Site Engineer	Comments	Borehole Position	Gas Flow (l/hr)	Atmospheric Pressure (mb)	Atmospheric Pressure Trend	Methane (% v/v)		Methane (% LEL)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Hydrocarbons (GFM 435 only)		Other Gases (PPM)			Depth to Water (m bgl)	Depth to Base (m bgl)
											Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Hex %	PID Cf	PID (Isobutylene)	H ₂ S	CO		
1	17/12/2019	10.30am	GFM436		LP		BH05	<0.1	986	Rising 976-999		0.0		0.0		2.2		18.8				0	0	1.52	1.60
							BH06	0.1	986			0.0		0.0		3.7		17.4				0	0	1.27	3.00
							BH08	0.1	988			0.0		0.0		3.1		18.1				0	0	0.75	1.85
							BH18	1.2	987			0.0		0.0		3.9		17.1				0	0	1.01	1.90
							BH19	0.1	988			0.0		0.0		4.4		15.3				0	0	Dry	1.00
2	29/01/2020	13.30pm	GFM436	Drizzle, cloudy, strong breeze	RS	BH08 flooded. All boreholes bailed of water after monitoring.	BH05	<0.1	981	Falling 1045-1004		0.0		0.0		6.9		10.4				0	0	1.50	1.60
							BH06	<0.1	983			0.0		0.0		4.4		18.3				0	0	0.70	3.00
							BH08		981														0.10	1.85	
							BH18	-1.5	980			0.0		0.0		3.4		17.9				0	0	1.00	1.90
							BH19	<0.1	979			0.0		0.0		7.9		7.3				0	0	Dry	1.00
3	13/02/2020	14.00pm	GFM436	Sunny, partly cloudy, slight breeze	RS	BH08 flooded. All boreholes bailed of water after monitoring.	BH05	<0.1	970	Falling 1010-994		0.0		0.0		5.8		14.0				0	0	1.40	1.60
							BH06	0.2	971			0.0		0.0		3.5		18.7				0	0	0.95	3.00
							BH08	0.1	971			0.0		0.0		8.8		15.5				0	0	0.50	1.85
							BH18	-3.0	969			0.0		0.0		4.4		17.7				0	0	1.10	1.90
							BH19	0.1	968			0.0		0.0		0.8		19.2				0	0	Dry	1.00
4	02/05/2020	10.00am	GFM436	Sunny, partly cloudy, slight breeze	RS	All boreholes bailed of water after monitoring. BH19 vandalised	BH05	<0.1	986	Falling 1023-999		0.0		0.0		3.4		18.8				0	0	1.55	1.60
							BH06	<0.1	987			0.0		0.0		7.5		16.4				0	0	1.20	3.00
							BH08	-0.9	984			0.0		0.0		1.1		19.1				0	0	0.96	1.85
							BH18	<0.1	984			0.0		0.0		3.2		13.9				0	0	0.90	1.90
							BH19																	1.00	
5	05/06/2020	9.00am	GFM436	Sunny, partly cloudy, slight breeze	RS	BH19 vandalised	BH05	<0.1	974	Falling 1020-996		0.0		0.0		2.1		19.6				0	0	1.55	1.60
							BH06	<0.1	974			0.0		0.0		2.1		18.6				0	0	1.60	3.00
							BH08	<0.1	972			0.0		0.0		2.1		19.2				0	0	1.15	1.85
							BH18	<0.1	971			0.0		0.0		5.4		17.9				0	0	1.10	1.90
							BH19																		
6	25/06/2020	9.45am	GFM436	Sunny, hot, slight breeze	CA	BH19 vandalised	BH05	<0.1	994	Falling 1022-1016		0.0		0.0		3.7		17.3				0	0	1.60	1.60
							BH06	<0.1	994			0.0		0.0		5.8		15.1				0	0	1.88	3.00
							BH08	0.6	996			0.0		0.0		2.8		18.4				0	0	1.04	1.85
							BH18	1.0	994			0.0		0.0		4.6		18.1				0	0	0.96	1.90
							BH19																	1.00	



APPENDIX V

FOUNDATION ZONE LOCATION PLAN

