Geo-Environmental

GROUND INVESTIGATION REPORT

for the site at

LAND OFF STANE STREET, BILLINGSHURST,

WEST SUSSEX, RH14 9HN

on behalf of

DUNMOORE (WEST LONDON) LIMITED

and

EG GROUP



Report:	**GROUND INVESTIGATION REPORT**
Site:	**LAND OFF STANE STREET, BILLINGSHURST, WEST SUSSEX, RH14 9HN**
Client:	**DUNMOORE (WEST LONDON) LIMITED** **and** **EG GROUP**
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EXECUTIVE SUMMARY		
Site Details	Site Address	Land at Stane Street, Billingshurst, West Sussex, RH14 9HN
	National Grid Reference	509230, 126730.
	Site Area	8.28Ha
	Form of Development	Proposed to be developed for a commercial usage including a petrol filling station, hotel and other commercial units with associated infrastructure. Amenity space and areas of soft landscaping are also proposed.
Encountered Conditions	Scope of works	An intrusive investigation to clarify the ground and groundwater conditions and support the development of geotechnical and geo-environmental assessments of the site in relation to the proposed development.
	Ground Conditions	The ground conditions encountered comprised Topsoil overlying clayey soils of Weald Clay Formation. Sandstone, siltstone and mudstone were also encountered within the Weald Clay Formation.
	Groundwater	Shallow groundwater was encountered within two of the exploratory holes during the site investigation at depths ranging from 2.90m bgl to 4.90m bgl. Monitoring wells were installed within WS01, WS04 and WS05. Return groundwater monitoring visits to date encountered groundwater levels between 1.40m and 2.15m bgl within WS04. WS01 and WS05 were reported as dry during all four monitoring visits. The water encountered during the intrusive investigation and subsequent monitoring is considered to be perched, or discontinuous water and thus whilst construction activities may need to include water control measures, the water is not considered a receptor of concern in the context of potential contamination.
Geotechnical Considerations	Foundations	Based on the ground and groundwater conditions encountered within the exploratory holes and the proposed commercial development, it is considered that conventional foundations could be suitable subject to clarification of structural loads. Foundations should be taken below any Made Ground or disturbed ground and terminate within the stiff clay of the Weald Clay. A net allowable bearing capacity of 125kPa is recommended for the stiff clay of the Weald Clay. Total settlement should remain within tolerable limits for this bearing capacity assuming that foundations terminate in a uniform soil type. Geotechnical laboratory testing has shown the soils of the Weald Clay to be of high volume change potential. As such, a minimum founding depth of 1.0m bgl is recommended for conventional foundations on this site. Heave precautions may be required for foundations in excess of 1.5m deep. Desiccation was visually identified in clay soils in BH02 to 1.6m bgl and localised deepening to account for desiccation may be required. Alternative foundation options, e.g. for high structural loads, could include pad and beam, or piled foundations.
	Floor Slabs	Given the presence of shrinkable soils, it is recommended that suspended floor slabs are constructed throughout the site. Preliminary modelling indicates a minimum void height of 300mm due to the presence of high volume change potential soils. If ground bearing floor slabs are required then their design and construction should account for the presence of shrinkable soils and may require replacement of clay soils with granular fill and/or sufficient reinforcement to mitigate slab deformation due to settlement, heave or the like.

	Excavations	Shallow excavations within the topsoil, and clayey Weald Clay deposits are likely be stable in the short to medium term above the groundwater table. Excavations within the more sandy and gravelly Weald Clay strata are likely to be marginally stable in the short term above the water table but may require support in the medium term. Excavations taken below any water ingress are likely to collapse and will require shoring and dewatering to maintain stability.
	Buried Concrete	Buried concrete should be designed to Class DS-1 (AC-1s).
	Soakaways	Soakaways are not considered viable on this site based on the results of soakage testing which was conducted during a previous phase of works during August 2018. Alternative disposal such as to the existing drainage network should be considered.
	Earthworks	Site won clay soils may be suitable for re-use as earthworks fill subject to testing in due course and may require treatment to bring them within acceptability limits for placement and compaction.
Environmental Considerations	Human Health	As assessment of the soils has not identified any contaminant concentrations of concern that would require further assessment, or would require remediation works. As such it is considered that remedial action would not be warranted to protect end users of the proposed commercial development.
	Soft Landscaping	The assessment did not show any exceedances on the site above the respective generic assessment criteria for a proposed commercial land use.
	Groundwater	It is considered that no risk mitigation measures are required with respect to groundwater
	Ground Gas	Based on ground gas monitoring undertaken to date, no ground gas or vapour risks have been identified which would require remedial action.
	Radon Gas	No radon protection measures are required.
	Built Environment	On the basis of the analytical results, it is considered that standard pipe material would be suitable for potable water supply, together with backfilling trenches with clean, inert granular fill (shingle).
	Waste Disposal	Soil analysis was run through CATWASTE and no soils categorised as potentially hazardous waste were identified. In addition, all samples of soil submitted for asbestos screens were returned with no asbestos fibres identified.

Further Action:

- If abnormal conditions are encountered, Geotechnical/Geo-Environmental advice should be sought to determine a suitable source of action.
- If earthworks are proposed then further testing would be required to inform an earthworks specification, with compliance testing undertaken during any such earthworks construction.
- A discovery strategy should be maintained during development such that any abnormal conditions (geotechnical or potential contamination) are identified and their potential impact on the proposed development assessed prior to determining any potential mitigation measures.

This Executive Summary is intended to provide a brief summary of the main findings and conclusions of the investigation. For detailed information, the reader is referred to the main report ref. GE18159-GIR-JUN19.

1.0 INTRODUCTION

Geo-Environmental Services Limited was instructed by Motion on behalf of Dunmoore (West London) Limited & EG Group, to undertake an investigation of the geotechnical and geo-environmental factors pertaining to the Land off Stane Street, Billingshurst, West Sussex, RH14 9HN herein referred to as 'the site' (National Grid Reference at centre: 509230, 126730.). The site's location is presented in Figure 1.

It is understood that the site is proposed to be developed for a commercial usage including a petrol filling station, hotel and other commercial units with associated infrastructure. Amenity space and areas of soft landscaping are also proposed.

A Desk Study Report (ref: GE17451-DSR-AUG18v2.0) was prepared by Geo-Environmental. Subsequent to the findings of the desk study, an intrusive Phase II investigation was undertaken into the geo-environmental and geotechnical conditions pertaining to the portion of the site occupied by the land off Stane Street, Billingshurst and its redevelopment.

The data from the intrusive investigation was to form the basis of an interpretation with respect to foundation design, concrete specification, pavements and excavation stability and to clarify the site's status with regards to soil, gas and groundwater contamination and any requirement for remedial action.

1.2 Standards

Where practicable, the investigation was undertaken in accordance with the following documents and guidance:

- National Planning Policy Framework – March 2012;
- Planning Policy Statement 23 – Planning and Pollution Control;
- Model Procedures for the Management of Contaminated Land, CLR11, DEFRA and Environment Agency 2004;
- Environment Agency Guidance on Requirements for Land Contamination Reports, Version 1 dated July 2005;
- BS10175:2011+A1:2013 - Investigation of Potentially Contaminated Sites - Code of Practice, BSI 2013;
- BS5930: 2015 - Code of Practice for Site Investigations, BSI 2015;
- EN ISO 14688 Geotechnical Investigation and Testing Part 1-2002 and Part 2-2004;
- BS1377: 1990 - Soils for Civil Engineering Purposes, BSI1990;
- NHBC Standards Chapter 4.1 Land Quality - Managing Ground Conditions;
- NHBC Standards Chapter 4.2 Building Near Trees;
- CIRIA C665 – Assessing risks posed by hazardous ground gases to buildings (2007);
- NHBC 10627-R01(04)- Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present (2007);
- BS8485:2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings;
- Department of Environment - Industry Profiles (1995 - 1996).

2.0 SITE CONTEXT

2.1 Site Description

At the time of the intrusive investigation works (April/May 2019) the site was occupied by two open fields which were being used for agriculture. A ditch ran north to south through the site separating the two fields with two mature trees along the ditch line. A pylon was located in the western area of the site and was carrying overhead electricity lines in a north-west to south-east direction through the site.

The site boundary comprised a number of mature trees along the western boundary, mature trees and a wooden fence to the south and hedges and shrubs to the west and north. A high voltage power line was identified below ground in the southern portion of the site running beneath the transmission tower pylon between two wooden pylons. The ground surface within the site was generally flat.

The site was bounded by Stane Street to the immediate west with agricultural land beyond; New Rad to the north with agricultural land, woodland and residential land beyond; a residential property and agricultural land east and a residential property; and farm buildings and agricultural land to the south. The site was accessed via a private access road off Stane Street to the south-west of the site.

2.2 Anticipated Geology

British Geological Survey (BGS) mapping indicated the site to be underlain by Weald Clay. No superficial deposits were indicated to be present. No borehole records were identified in the vicinity of the site.

The **Weald Clay** consists of shales and mudstones with occasional thin beds of siltstones, sandstone, shelly limestone and clay ironstone. When fresh, the beds are normally dark grey weathering to mottled yellow and brown near the surface or at outcrop. Bands of red clay occur within the bed, usually in association with the sandstone.

Published mapping indicated the majority of the site to be underlain by mudstone, albeit with sandstone potentially present along the western and north-western fringes of the site.

The desk study identified the potential for Made Ground soils to overlie thee Weald Clay in or close to the southern portion of the site.

BS5930:2015 defines **Made Ground** as anthropogenic ground in which the material has been placed without engineering control and/or manufactured by man in some way, such as through crushing or washing, or arising from an industrial process. Great variations in material type, thickness and degree of compaction invariably occur and there can be deleterious or harmful matter, as well as potentially methanogenic organic material. In addition, on sites which have undergone several phases of historic development it is not uncommon for asbestos to be present within Made Ground soils.

3.0 PRELIMINARY RISK ASSESSMENT SUMMARY

The Preliminary Risk Assessment (PRA) and Conceptual Site Model (CSM) developed from the information gathered as part of the desk study (GE17451-DSR-AUG18v2.0) process identified plausible potential pollutant linkages that exist in relation to the proposed redevelopment of the site. The preliminary risk rating for each potential linkage was classified as moderate, moderate to low, low or very low largely in relation to potential Made Ground within near surface soils and an orchard located just off site to the north of the site.

The potential pollutant linkages established within the desk study were not considered to prevent development on the subject site, but could require investigation and assessment to support further characterisation, calibration of the CSM and where/if necessary determine a remedial strategy to reduce, remove or otherwise control any risk within the site to key receptors.

In order to progress the assessment in line with best practice guidance and to provide further characterisation of the site and refinement of the PRA and CSM, it was recommended that an intrusive investigation and associated testing was to be undertaken to confirm the findings of the desk study report and to provide a robust risk assessment for the site and proposed redevelopment. As such it was recommended that a geochemical and geotechnical investigation be carried out on the site to include analysis of soil samples for the range of potential contaminants identified within the desk study.

3.1 Geotechnical Condition

The following factors that might impact the geotechnical condition of the site were identified as part of the desk study:

- The possible presence of Made Ground (e.g. varying depth and/or composition) which if encountered may affect the foundation design and construction.
- The presence of laterally and vertically variable strata and the impact these could have on further construction.
- The suitability of shallow soils as a bearing stratum for conventional foundations.
- Consideration of the volume change potential of any cohesive soils and the affect this could have on foundations.
- The possible presence of aggressive ground conditions (sulphates) which may affect the foundation design and construction.
- The possible presence of perched and shallow groundwater beneath the site.
- The presence of any trees on the site, which may have a significant impact on foundation design and construction if/where shrinkable soils are present.

3.2 Investigation Strategy

The positioning of exploratory holes was determined on site to provide general site coverage as no particular areas of concern had been identified by the desk study. Table 3.1 sets out the investigation strategy adopted.

Area of Concern	Investigation	Positions
General ground conditions	Exploratory holes located across the site, coupled with sampling and laboratory analysis.	All
Potential contamination of near surface soils	Exploratory holes located to provide coverage of the site, coupled with sampling and laboratory analysis.	All
Gas and groundwater monitoring	Standpipes installed to accommodate gas and groundwater monitoring.	WS01, WS04 and WS05

Table 3.1 Summary of the Investigation Strategy

Soil and groundwater samples were collected and placed into amber jars and cool boxes on site for transit to the office, where they were stored under chilled conditions (<4°C) prior to final transportation in cool boxes to the laboratory by their in-house courier. Both the geotechnical and contamination testing were undertaken by UKAS accredited laboratories. Contamination testing of soil samples was also undertaken in accordance with accredited MCERTs protocols. Samples were stored in temperature controlled conditions from sampling until receipt at the laboratory from which time sample preparation and storage was determined by testing requirements and in line with laboratory's protocols.

3.3 Scope of Works

The investigation strategy comprised construction of exploratory holes across the site to assess ground and groundwater conditions and to support the geotechnical and geo-environmental assessment. The investigation included:

- The construction of up to 12No. machine dug trial pits to provisional depths of 3m bgl. Trial pitting would be undertaken over a single day of site works.
- Undertake Mexecone CBR probing at c. 0.5m bgl in trial pits.
- Construction of 6No. window sampler boreholes to depths of up to 4m bgl depending on drilling conditions, using a self-propelled track mounted rig.
- Cable percussive boreholes at 2No. locations to depths of up to 10m bgl depending on drilling conditions to inform the geotechnical assessment.
- Installation of combined ground gas and groundwater monitoring wells within three window sampler boreholes to facilitate return monitoring and sampling. The wells would be completed with a lockable cover fitted flush with adjacent ground.
- Ground gas and vapour monitoring (spot monitoring) of well installations on 4No. occasions over a two month period. Wherever possible, the monitoring would target periods of low or rapidly falling atmospheric pressure.
- Geotechnical laboratory testing to support the geotechnical assessment for foundations, ground floor construction and buried concrete design.
- Geochemical laboratory testing of soils and groundwater samples for a suite of commonly occurring brownfield contaminants, as identified from the desk study.
- Provision of a Ground Investigation Report detailing the ground and groundwater conditions encountered; the results of in-situ and laboratory testing; a geotechnical assessment for foundations, drainage, pavement and buried concrete; contamination assessment and recommendations for further action (if required).

4.0 ENCOUNTERED CONDITIONS

A factual record of the conditions encountered during the physical investigation of the site is presented in the following sections. For further details of the ground conditions, reference should be made to the exploratory hole logs and in situ testing presented in Appendix A, the geotechnical testing results in Appendix B and geochemical testing results in Appendix C.

The physical ground investigation works were undertaken from the 29th April to the 22nd May 2019, with monitoring throughout May 2019.

Unless stated otherwise, all depths are reported as metres below ground level (m bgl).

4.1 Soils

The ground conditions encountered comprised a mantle of Topsoil overlying clay and mudstone of the Weald Clay formation. A summary of the encountered soil conditions is presented in Table 4.1.

Top (m bgl)	Base (m bgl)	Description
0	0.30 – 0.40	**TOPSOIL:** Light brown and brown/brown/dark brown/reddish brown silty CLAY; silty slightly gravelly CLAY; silty slightly sandy CLAY with frequent rootlets; brown silty CLAY with frequent rootlets.
0.30 – 0.40	2.10 – 7.50	**WEALD CLAY FORMATION:** Firm becoming stiff to very stiff brown, orange/reddish brown and bluish grey mottled silty CLAY with black ferruginous fragments, shaley zones, siltstone and mudstone inclusions. Rare crystals, possibly selenite, sporadically.
7.20 – 7.50	10.0	**WEALD CLAY FORMATION:** Weak dark grey SILTSTONE

Table 4.1 Summary of Encountered Ground Conditions

No visual or olfactory evidence of potential contamination was identified during the intrusive investigation.

For more detailed descriptions at specific locations, reference should be made to the exploratory hole logs presented in Appendix A.

4.2 Groundwater

Groundwater was encountered during the intrusive investigation works within two of the exploratory hole positions on site, details of which are presented in Table 4.2.

Hole ID	Depth to strike (m bgl)	Depth to water after 20 mins (m bgl)	Remarks (Logger's comments)
BH02	5.20	4.90	Moderate flow
TP03	3.00	2.90	Very slow flow

Table 4.2 Groundwater Strikes within Exploratory Hole Positions

Combined ground gas and groundwater monitoring wells were installed within WS01, WS04 and WS05 on site. These locations were chosen to provide general coverage of the site. At the time of writing, the proposed four return groundwater monitoring visits to site have been completed. Details of water encountered within the monitoring wells are presented in Table 4.3.

Hole ID	Depth to water (m bgl)			
	03/05/19	10/05/19	16/05/19	23/05/19
WS01	Dry	Dry	Dry	Dry
WS04	2.15	1.40	1.50	1.55
WS05	Dry	Dry	Dry	Dry

Table 4.3 Groundwater Monitoring Results

Given the absence of water within the majority of exploratory holes during the intrusive investigation and also within two of the three monitoring wells, it is considered likely that the water encountered in BH02, TP03 and WS04 was perched or discontinuous water. Nonetheless the potential to encounter water during construction and possible requirement for mitigation/control measures to be required at least locally should not be overlooked.

It should also be noted that changes in groundwater levels do occur for a number of reasons including seasonal effects and variations in drainage. Such fluctuations may only be recorded by the measurement of the groundwater level within a series of standpipes or piezometers installed with appropriate response zones.

4.3 Ground Gases and Vapours

The initial desk study report (ref: GE17451-DSR-AUG18v2.0) did not identify any potential sources of hazardous ground gases associated with the site other than the potential for possible organic rich Made Ground if encountered in the south-west area of the site (in the vicinity of the adjacent residential property and farmland).

At the time of writing four ground gas monitoring visits had been conducted on the subject site, i.e. in line with current good practice for spot monitoring on sites where commercial development is proposed. The objective of the ground gas monitoring was to assess the potential risk identified from the desk study and also to determine a pre-development baseline condition given that the proposed development has the potential to introduce vapour hazards albeit that this would require failure of containment systems which would be required as part of construction.

The spot monitoring undertaken to date has detected the presence of methane at concentrations of up to 0.2%. Carbon dioxide has been detected at concentrations in the range of 0.0% to 2.4% and oxygen in the range of 18.4% to 21.0%. Borehole flows were measured at 0.0l/hr to 0.1l/hr and VOCs up to 1.0ppm during the monitoring. Atmospheric pressure was recorded in the range of 1006mb to 1016mb during the visits undertaken.

The implications of the gas monitoring data are considered in Section 6 of this report.

Should any previously undetected source of hazardous ground gases be identified during construction by the ground workers, this should be reported to the site manager immediately in order that any necessary gas monitoring be implicated.

4.4 Obstructions

No obstructions were encountered within the intrusive investigation works undertaken on the site with the exception of a land drain struck at 0.8m bgl in TP02 and the refusal on rock in TP05 and very stiff clay in WS01, WS03 and WS04. The presence of obstructions elsewhere on site cannot be completely discounted and any ground works could encounter hard bands or rock layers.

4.5 Chemical Analysis

In order to assess the general chemical quality of the strata encountered, samples of soils recovered from the exploratory holes were submitted for analysis for a range of potential contaminants selected on the basis of the findings of the desk study and supported by CLR publication CLR8 and Environment Agency R&D66 publication.

The testing rationale included sampling and analysis to provide a general coverage of the subject site. Testing was undertaken for a broad range of commonly occurring contaminants including metals, metalloids, inorganic compounds, phenols, speciated TPH, PAH, pesticides and asbestos as identified from the information presented within the desk study for the site.

4.6 Geotechnical Testing

In-situ Standard Penetration Testing (SPT) was undertaken within BH01 and BH02. These results indicated SPT 'N' values of N=10 to N=88 within the Weald Clay with a general trend of SPT values increasing with depth.

Geotechnical laboratory tests were undertaken on selected samples of the key strata encountered on this site. The results are summarised in Table 4.4 below. In addition, in-situ CBR testing was undertaken using a Mexecone CBR probe in trial pits. CBR values at c. 0.3-1.0m bgl, the presumed approximate sub-grade formation depth, are summarised in Table 4.5.

Parameter	Weald Clay Formation
Natural Water content (%)	16 – 29
Liquid Limit (%)	40 – 75
Plastic Limit (%)	21 – 30
Plasticity Index Ip (%)	17 – 51
Modified Plasticity Index Ip' (%)	15 – 51
Soil grading	Silty CLAY; sandy silty CLAY; sandy silty CLAY with mudstone fragments
pH	5.1 – 8.2
Water soluble sulphate (g/l)	<0.02 – 0.15
Total Sulphur (%)	<0.01 – 0.04
Acid Soluble Sulphate (SO4, %)	<0.02 – 0.07
CBR (%) [lab soaked CBR]	2.4 – 3.7
Bulk Density (Mg/m^3)	1.90 – 2.08
Dry Density (Mg/m^3)	1.46 – 1.72

Table 4.4 Summary of Geotechnical Laboratory Test Results

Depth of test (m bgl)	CBR value (%) at depth											
	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP10	TP11	TP12
0.3-0.4	4	4	3	4	3	4	5	3	5	5	4	5
0.4-0.5	4	4	4	4	4	4	5	4	5	5	4	4
0.5-0.6	3	3	3	3	3	3	2	3	2	2	3	3
0.6-0.7	3	3	3	3	3	3	2	3	2	2	3	3
0.7-0.8	3	3	2	2	2	3	2	2	2	2	3	3
0.8-0.9	2	2	2	2	2	2	2	2	2	2	2	2
0.9-1.0	2	2	2	2	2	2	2	2	2	2	2	2

Table 4.5 Summary of CBR values recorded at trial pit locations

5.0 ENGINEERING CONSIDERATIONS

Subsequent to intrusive investigation of the site and receipt of the laboratory test results, the following geotechnical assessments have been made.

5.1 Foundations

On the basis of the ground and groundwater conditions encountered in the exploratory holes, it is considered that conventional shallow foundations may be suitable for the development at the site, subject to clarification of applied structural loads.

It is considered that the cohesive soils of the Weald Clay Formation should be classified 'en-masse' as high volume change potential. Although not strictly applicable for the intended commercial site use, it is recommended that the foundations are designed according to NHBC Standards. Therefore, in line with NHBC Standards Chapter 4.2 a minimum founding depth of 1.0m bgl is recommended. Heave protection should be installed for any foundations extending deeper than 1.5m bgl.

Foundations should be taken below any Made Ground, root zones, disturbed ground and desiccated soils and terminate within the natural soils of the Weald Clay Formation. Potential desiccation was visually identified during the intrusive investigation within BH02 to depths of up to 1.6m bgl. This desiccation is considered likely associated with the hedgerow along the site boundary. Foundations for the proposed building(s) in this portion of the site should be dug to below any identified desiccated soils.

Based on the ground conditions encountered and assuming strip foundations, a net allowable bearing capacity of 125kPa is recommended for the stiff clay of the Weald Clay. Total settlement should remain within tolerable limits for the recommended allowable bearing capacity.

If localised high structural loads are proposed, conventional strip foundations are unlikely to be suitable and an alternative such as pad and beam, or piled foundation may be required. Determination of allowable bearing capacity for a pad foundation would be dependent on the size of pad proposed.

It is recommended that foundation excavations be concreted or blinded as soon after excavation as possible. Where concreting could take place the following day it is recommended that excavations are not taken to full depth overnight and that the final 0.5m of cover is only removed immediately prior to concreting. Long, deep excavations should be avoided in order to mitigate the risk of trench side collapse prior to concrete pour. Any abutting sections of foundation which are formed as separate pours should be reinforced, e.g. with mesh, rods, dowels or the like, to tie-in the adjoining sections.

The foundation designer should also take account of constructability of conventional foundations and additional measures which may be required to support excavations and/or control groundwater ingress into foundation excavations during construction.

Should the structural loads or proposed building types not be suitable for conventional strip foundations, an alternative form of foundation construction would be required, such as piles with reinforced concrete ground beams pas and beam solution, or the like.

5.2 Floor Slabs

Given the presence of shrinkable soils encountered at shallow depth across the site within the Weald Clay Formation, it is recommended that suspended floor slabs are constructed throughout the site. Preliminary modelling indicates a minimum void height of 300mm due to the presence of high volume change potential soils. Consideration of heave associated with the presence of any seasonal desiccation and ongoing influence of trees should also be considered.

However, if ground bearing floor slabs are required due to the type of building use proposed, then it may be possible to contract a ground bearing floor slab, albeit possibly requiring a reduced dig and replacement of clay with non-shrinkable granular fill, reinforcement of the slab and the like. Reinforcement should be designed to accommodate potential deformation of the slab due settlement and potential heave.

5.3 Excavations

Shallow excavations within the Topsoil and clay soils of the Weald Clay are likely be stable in the short to medium term above any water ingress. Excavations within the more gravelly or sandy deposits are likely to be marginally stable in the short term above any water ingress but may require support. Large scale excavations and those taken below any water ingress are likely to collapse and will require shoring and dewatering to maintain stability.

Ground works should be designed in such a manner to avoid any requirement for construction or maintenance personnel to enter into or work within excavations. If such work cannot be avoided, then it should only be permitted once a safe system of work, supported by a robust risk assessment, has been determined and implemented.

5.4 Sulphates

The results of the water soluble sulphate and pH analyses of soil and groundwater samples indicate that buried concrete, i.e. shallow foundations within the Weald Clay Formation, should be designed in accordance with Class DS-1 of BRE Special Digest 1, with an ACEC class of AC-1s.

5.5 Soakaways

Soakage testing was conducted on site during a previous phase of works during August 2018. All seven tests failed to complete a full drainage cycle and thus permeability values could not be derived from the soakage test results. For further details regarding the soakage testing undertaken on site, reference should be made to the Soakage Letter Report (GE17451/KOD01/180810). Alternative disposal such as to the existing drainage network should be considered.

5.6 Earthworks

It is anticipated that any development on this site could include the reprofiling of site levels to accommodate the proposed development.

On the basis of the ground conditions encountered, it is anticipated that site won clay soils might be suitable for retention and re-use as earthworks fill, subject to meeting likely acceptability requirements. At this stage, it is anticipated that the clay soils could be classified as Class 2A wet cohesive soil for use as general bulk fill, i.e. not specialist fill to structures or the like. The suitability of clay fill is often governed by factors such as moisture content and shear strength. BS6031 Code of Practice for Earthworks states that a Moisture Condition Value (MCV) range of 8-12 is common for wet cohesive fill such as may be generated from this site.

Many clay soils have moisture contents which are outside of the acceptability range for immediate use as earthworks fill, i.e. based on MCV, or optimum moisture content (OMC) as derived from compaction tests. As such, if site won clay soils are proposed to be re-used for earthworks fill on this site, further testing for classification, acceptability and compliance would be required in due course. In addition, treatment may be required to bring clay fill into the required acceptability range, e.g. setting aside to dry out, wetting if dry, additional of lime:cement to dry out or stabilise the fill, or the like.

Any earthworks should be undertaken in accordance with an earthworks specification prepared for the proposed development and to reflect the required end use of the earthworks construction.

6.0 ENVIRONMENTAL RISK ASSESSMENT

The desk study has shown the site to comprise open fields which were being used for agriculture. Farm buildings and a residential property were located immediately to the south of the site. Given the age of the buildings adjacent to the site it was considered possible that asbestos or asbestos containing materials may be present within the fabric of these buildings and within near surface soils in the south-western portion of the site.

Exploratory hole locations were selected to investigate potential contamination from on-site and off-site sources as well as to provide general site coverage. Soil samples recovered from the exploratory holes were submitted for analysis of a suite of commonly occurring contaminants including metals, metalloids, inorganic compounds, speciated TPH, PAH and asbestos. Selected samples were also analysed for pesticides.

6.1 Soil Contamination vs. End Users

The presence of a possible contaminant does not necessarily imply that a site or area is contaminated or that there is any unacceptable risk to human health. A Preliminary Quantitative Risk Assessment has been undertaken in order to evaluate any unacceptable risks posed to human health with respect to the proposed redevelopment. It should be noted that this assessment is protective of the chronic long-term effects of contaminants, which is also likely to be protective of any possible immediate acute effects.

Based on the findings of the desk study and a visual assessment of the soils encountered, in conjunction with the proposed end use, twelve soil samples, Topsoil and natural soils, were submitted for general chemical contamination analysis. Additionally, three samples were analysed for pesticides.

A quantitative risk assessment has been undertaken by comparing the results of the laboratory chemical testing of shallow soils against Tier 1 screening criteria in the first instance. These criteria comprise the Atkins ATRISK soil screening values (SSVs), the Suitable for Use Levels (S4ULs) published by LQM (Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3453. All rights reserved) and the Category 4 Screening Levels (C4SLs) published by DEFRA. Although the C4SLs were released for Part 2A use, the associated policy companion document for the C4SLs indicated that they may also be used for planning. Although the C4SLs represent a marginally higher risk level than the SSACs (low risk rather than minimal risk) it is considered that the risk levels remain very low. Therefore, the final C4SLs are considered to be suitable to assess soils under the planning regime.

Where exceedances of the Tier 1 screening criteria are identified Site Specific Assessment Criteria (SSAC) have been generated using the Contaminated Land Exposure Assessment (CLEA) model v1.07 published by the Environment Agency to undertake further assessment.

The assessment did not identify any exceedances on the site above the respective generic assessment criteria for a proposed commercial land use.

Three samples analysed for pesticides returned with no pesticides recorded above the laboratory limit of detection.

In addition, twelve samples were submitted for asbestos screening and returned with no asbestos fibres identified.

Based on the above contamination assessment it is considered that remedial action would not be warranted to protect end users of the proposed commercial development on this site.

It should be noted that if proposals for the site include the export and re-use of excess near surface soils for soft landscaping on a residential site, further testing would be required given that a number of samples have exceeded the Tier 1 screening criteria for a residential end use. Furthermore, in order to comply with the Code of Practice, a Materials Management Plan would be required for the movement of any site won materials off site. Further details regarding materials management and removal of soils from site are provided within Section 7.0 of this report.

6.2 Soil Contamination vs. Adjacent land Users

Surrounding land uses were identified to comprise a mixture of agricultural with some commercial and residential properties to the south. On the basis of the testing undertaken to date, it is considered that no significant risks to adjacent land users exist.

Notwithstanding the above, it is recommended that exposed soils are kept damp to avoid the release of soil particles to the air during development.

6.3 Soil Contamination vs. Soft Landscaping

British Standard BS3882:2015 *Specification for topsoil and requirements for use* provides assessment criteria for a number of potentially phytotoxic contaminants in terms of new planting.

The results of the chemical analysis for determinants known to pose a potential phytotoxic risk to plant growth are summarised in Table 6.1, together with the respective adopted Generic Assessment Criteria (GAC) for plant growth. The compliance criteria set out in BS3882:2015 are pH dependent and thus the GAC used relate to the pH range measured on samples recovered from the site.

Determinand	Phytotoxicity GAC (mg/kg)			GAC Exceedances
	pH <6.0	pH 6.0-7.0	pH >7.0	
Zinc	200	200	300	No
Copper	100	135	200	No
Nickel	60	75	110	No

Table 6.1 Summary of Plant Phytotoxicity Assessment

The phytotoxicity assessment did not identify any exceedance against the relevant phytotoxicity criteria. As such it is considered that no specific measures are required in this respect.

6.4 Soil Contamination vs. Building Materials

The current guidance on selection of materials for water supply pipes to be laid in contaminated land is contained in UK Water Industry Research's (UKWIR) report reference 10/WM/03/21 (re-issued 2010). However, the guidance is not mandatory and there have been concerns raised by various industry technical associations regarding the document and the methodologies proposed. Although there are concerns regarding the document, in lieu of any further guidance in the first instance the results of this investigation have been compared with the proposed thresholds published in UKWIR Table 3.1. Based on a review of the tests results against UKWIR guidance, it is considered that standard water supply pipe would be suitable.

As a matter of good practice, and to maximise the protection to utilities, it is recommended that clean, granular backfill is used in service runs and that marker tapes are used for all buried services.

6.5 Soil Contamination vs. Groundwater

The laboratory analysis of the soil samples taken during the intrusive investigation did not identify any potential sources of highly mobile contamination on the site. Furthermore, there was no visual or olfactory evidence of contamination on the near surface soils. Groundwater was encountered at depths ranging from 1.40 m bgl to 2.15m bgl Weald Clay Formation albeit that it was considered to be perched, or discontinuous water and thus not a receptor of concern.

6.6 Ground Gases vs End Users

The updated preliminary risk assessment for the site has not indicated any additional potential sources of ground gases on the subject site.

Spot monitoring was undertaken within wells installed within window sampler boreholes WS01, WS04 and WS05. These locations were selected to provide general coverage of the site. Four return 'spot' ground gas monitoring visits have been completed. The monitoring visits were undertaken between 3rd May and 23rd May 2019.

Based on the gas monitoring undertaken to date, it was considered that the site's gassing regime was representative Characteristic Situation 1 under British Standard guidance based on both hazardous gas flow and limiting concentrations. Based on the monitoring undertaken to date, no gas protection measures will be required for the proposed development.

Monitoring for volatile organic compounds (VOCs) using a photoionisation detector (PID) was also undertaken during the spot monitoring recording a maximum VOCs concentration of 1.0ppm. Based on the monitoring to date no specific action is required in terms of VOCs.

6.7 Ground Gases vs Soft Landscaping

In the absence of any plausible pollutant linkage for the proposed development areas, it is considered that no specific action is warranted in this respect.

6.8 Ground Gases vs Adjacent Land Users

In the absence of any plausible pollutant linkage for the proposed development areas, it is considered that no specific action is warranted in this respect.

7.0 WASTE DISPOSAL

The geochemical test results have been assessed for potential waste characterisation using the CatWasteSoil screening tool, which indicated that all samples would be characterised as non-hazardous waste. However, these soils would only be considered as waste following excavation and thus characterisation at this stage is for indicative purposes. Further sampling and testing (waste categorisation suite and Waste Acceptance Criteria) should be undertaken on soils which will require removal from site once these soils are identified. The CatWasteSoil results are included as Appendix D.

Natural soils at the site (Weald Clay Formation) are likely be classified as Inert Waste (under the respective EWC codes for naturally occurring soils), suitable for disposal at an inert landfill facility.

Once soils for disposal have been identified it is recommended that further testing of these specific soils be undertaken in order to confirm the above assessment.

In accordance with the CL:AIRE Definition of Waste Code of Practice (2011) materials are only considered waste if 'they are discarded, intended to be discarded or required to be discarded by the holder'.

The Code of Practice therefore allows soils to be reused on site where the following criteria are met:

- The soils are required to be used;
- The soils are suitable both in terms of chemical and geotechnical properties for the intended use;
- Only the required volume is used.

In order to comply with the Code of Practice, a material management plan that confirms the above criteria are met has to be prepared. The material management plan must be reviewed by a 'Qualified Person' who then issues a declaration to the Environment Agency. Geo-Environmental can provide this service should it be required.

Where materials do not meet the required criteria, it may be possible to treat them under an environmental permit so that they may be re-used on site. In addition, where material is discarded as waste, it may still be possible to reuse the waste on site under a standard rules environmental permit or a U1 waste exemption. However, strict limits on the volumes that can be reused apply in these cases.

Under current legislation, where wastes are to be disposed of to landfill they may, depending on their classification, require pre-treatment. Pre-treatment shall comprise a chemical, physical (including sorting), thermal or biological process. The pre-treatment is required to change the characteristics of the waste, reduce its volume, reduce its hazardous nature, and facilitate its handling and enhance its recovery.

Other materials disposed of from site as part of the demolition or remediation process may require disposal separately. All materials containing dangerous substances e.g. tar or bitumen, asbestos, mercury, hydrocarbons and PCBs are likely to be classified as Hazardous Waste and therefore susceptible to the relevant legislative controls.

8.0 DISCOVERY STRATEGY

Whilst an intrusive investigation has been undertaken on the site, it remains possible that unexpected soil conditions may be encountered during the process of construction.

Should previously undiscovered contamination be encountered during construction by the ground workers, this should be reported to the site manager immediately in order that any necessary inspection may be made. Records should be kept, and samples submitted for analysis where conditions encountered are not as anticipated. The results of any such testing should be sent to the authorities for consultation.

A copy of the discovery strategy should be lodged on site, and provisions made to ensure that all workers are made aware of their responsibility to observe, report, and act on any potentially suspicious or contaminated materials they may encounter.

Depending on the type, nature and extent of any such 'discovery', it may be necessary to halt works in that location until such time as the assessment has been completed. This should be reviewed on a 'discovery' specific basis and in conjunction with regulatory consultation.

As a general guide, where such unexpected conditions are encountered the following approach is recommended:

- All discoveries are to be reported to the Site Manager immediately and works at that location are to halt until further notice;
- The Site Manager is to report any such discoveries to the Client and the Environmental Consultant;
- Following notification from the Site Manager, the Environmental Consultant shall discuss the discovery with the Local Authority and if considered necessary, arrange to meet an Officer on site to view the discovery;
- The Environmental Consultant shall attend the site to record the location, extent and nature of the discovery and implement an appropriate sampling and analysis regime, taking due account of the type and nature of the discovery, known and probable land uses in that area of the site;
- Where remedial action is required, regulatory consultation and approval will be sought;
- A record will be produced by the Environmental Consultant and held on site (with copies held by the Environmental Consultant, Client and Local Authority), detailing the discovery, assessment works undertaken, findings thereof, confirmation either of no action required or detailing the remedial action taken and validation thereof.

The process is shown in Chart 1 below.

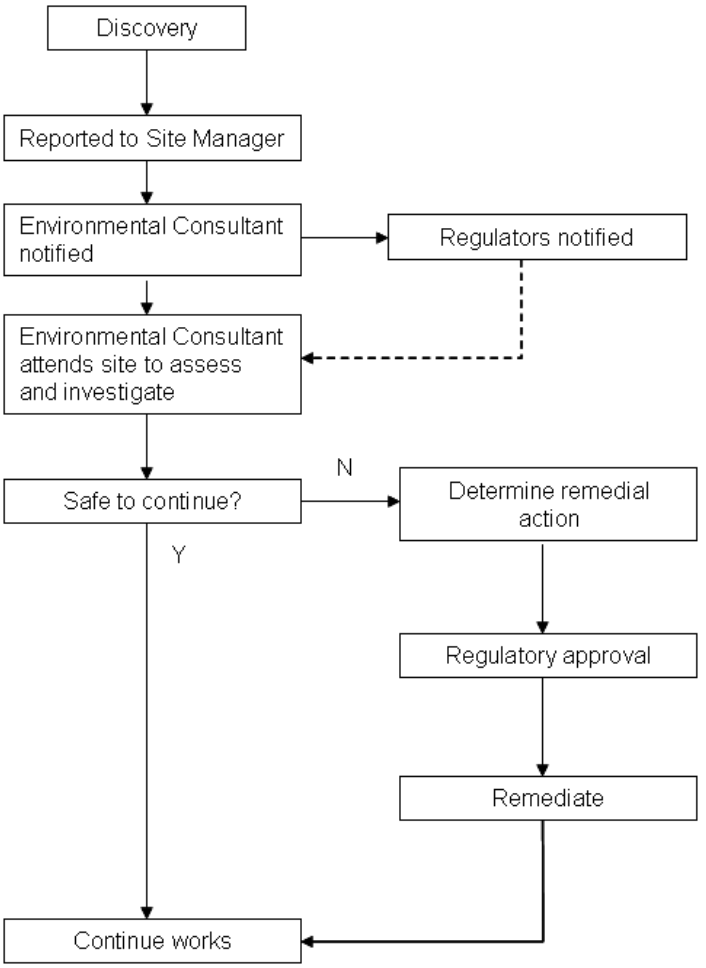


Chart 1: Discovery Strategy Process

Caveat

The data collected from the investigations have been used to provide an interpretation of the geo-environmental conditions pertaining to the site. The recommendations and opinions expressed in this report are based on the data obtained.

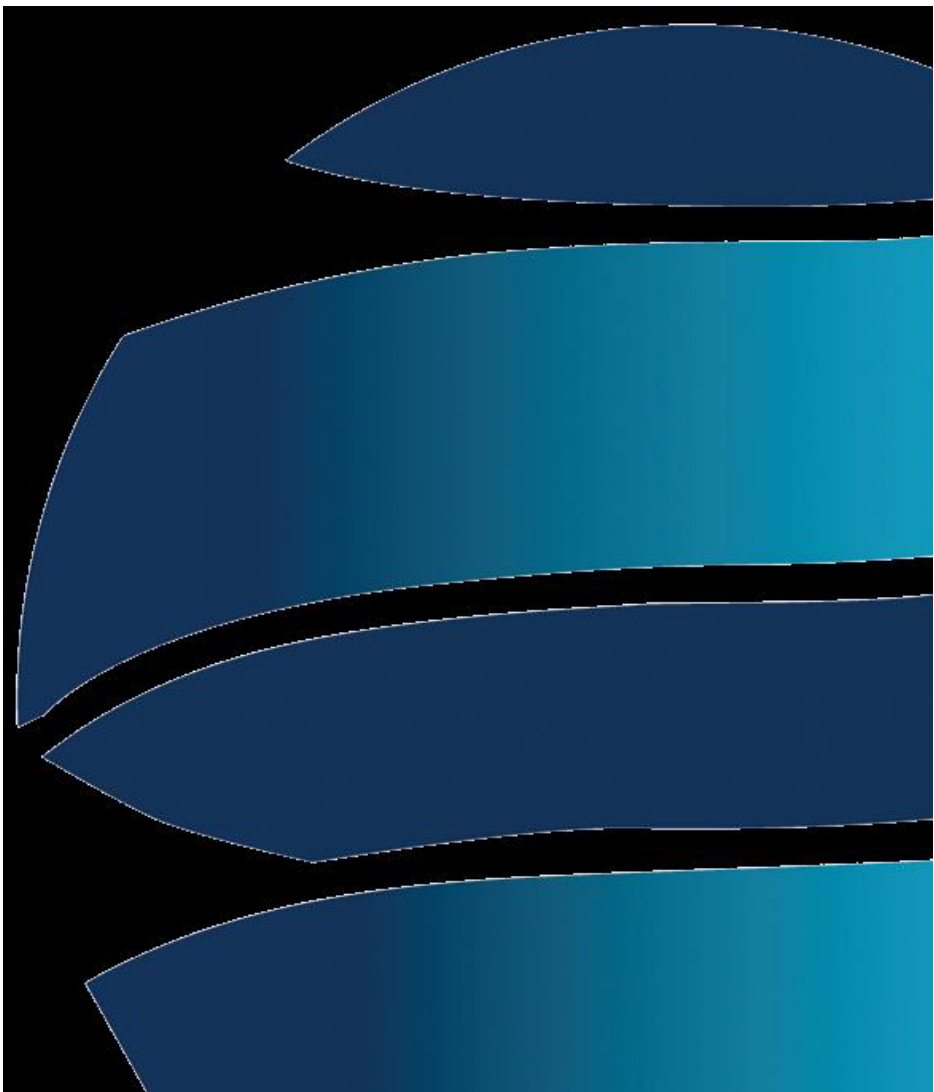
Geo-Environmental Services Limited takes no responsibility for conditions that either have not been revealed in the available records, or that occurs between or under points of physical investigation. Whilst every effort has been made to interpret the conditions, such information is only indicative and liability cannot be accepted for its accuracy.

Information contained in this report is intended for the use of the client and their agents, and Geo-Environmental Services Limited can take no responsibility for the use of this information by any third party for uses other than that described in this report.

It should be noted that in particular the concentrations and levels of mobile liquid and gaseous materials are likely to vary with time. The results obtained may therefore only be representative of the conditions at the time of sampling. Such reservations have been indicated in the text where such conditions are considered to apply.

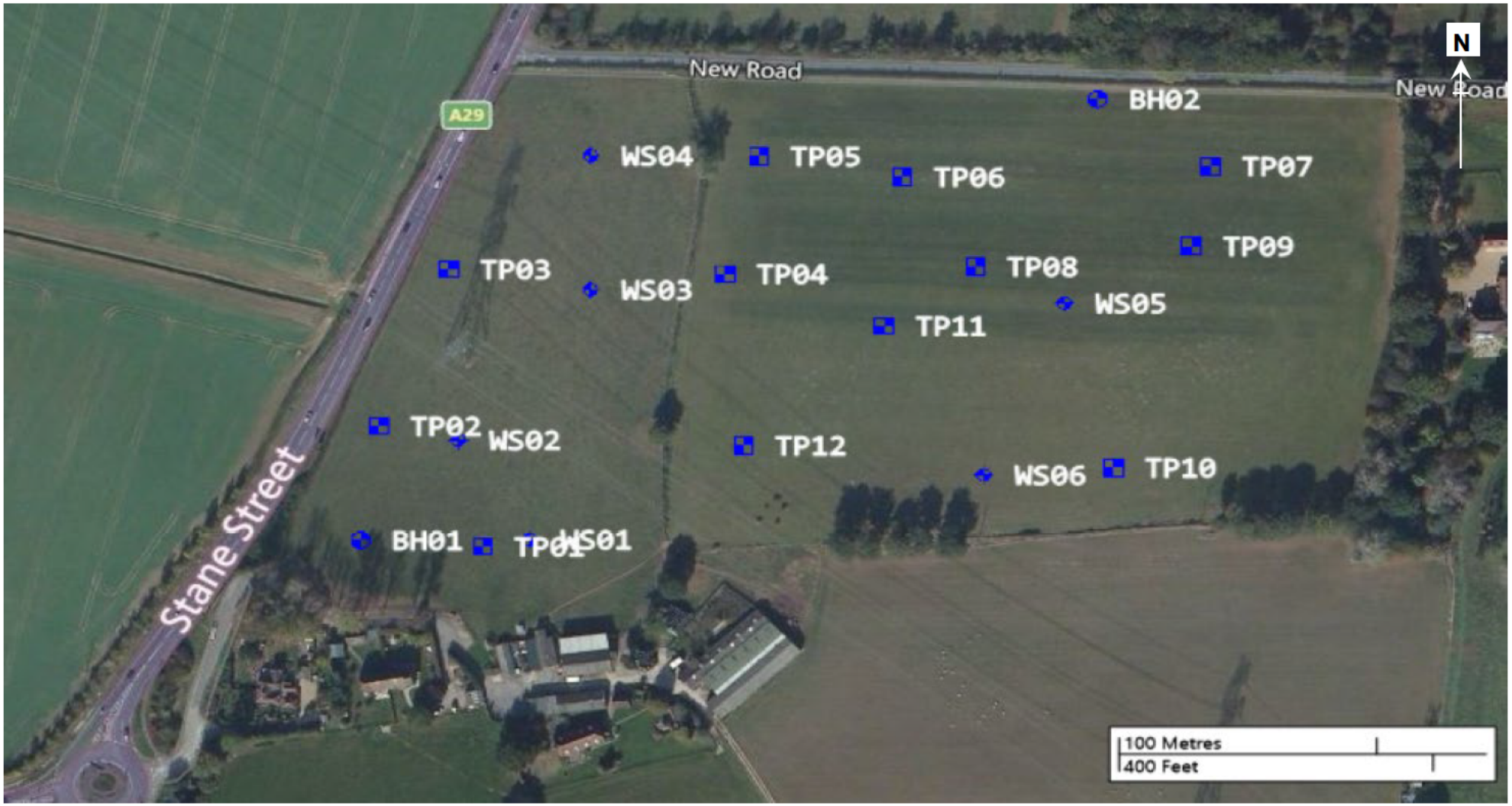
Geo-Environmental Services Limited does not indemnify any third parties such as the vendor against any dispute or claim arising from any finding or result of this investigation or any claim or dispute arising as a result of any decisions made thereof.

Figures





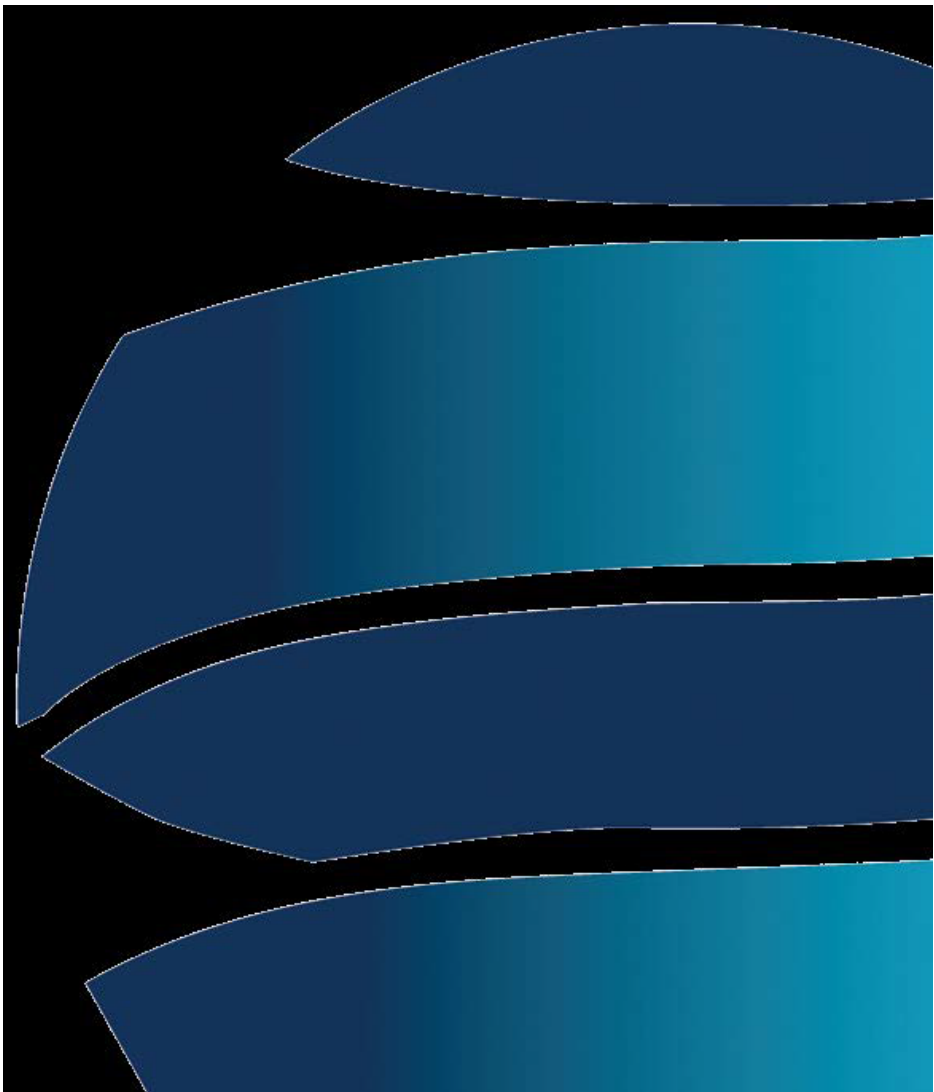
Project:	Land off Stane Street, Billingshurst			**Title**	Site Location Plan
Client:	Dunmoore (West London) Limited & EG Group			**Geo-Environmental Services Ltd** **Unit 7 Danworth Farm, Cuckfield Road** **Hurstpierpoint, West Sussex BN6 9GL** **+44(0)1273 832972 www.gesl.net**	Geo-Environmental
Ref No:	GE18159	**Revision:**	0		
Drawn:	KOD	**Date:**	07/06/2019		
Figure:	1	**Scale:**	Not To Scale		



Project:	Land off Stane Street, Billingshurst			**Title**	Exploratorty Hole Location Plan
Client:	Dunmoore (West London) Limited & EG Group			**Geo-Environmental Services Ltd** **Unit 7 Danworth Farm, Cuckfield Road** **Hurstpierpoint, West Sussex BN6 9GL** **+44(0)1273 832972 www.gesl.net**	Geo-Environmental
Ref No:	GE18159	**Revision:**	0		
Drawn:	KOD	**Date:**	07/06/2019		
Figure:	2	**Scale:**	Not To Scale		

APPENDIX A

Exploratory Hole Logs



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Trial Pit Log

TrialPit No: TP01
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509087.16 - 126642.04 Level: 47.29
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 3.00	2.00 × 0.50
Client:	Dumoore (West London) Limited		

Date: 01/05/2019
Scale: 1:25
Logged: RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	46.99		Grass over firm light brown and brown mottled silty CLAY with occasional rootlets.
	0.50	B					Firm becoming stiff light orangish brown and bluish grey mottled CLAY.
	0.50	D					
	0.50	PP	PP=1.5kg/cm2				
	0.60	ES					
	1.00	D					
	1.00	PP	PP=1.5kg/cm2				
				1.20	46.09		Stiff bluish grey and light orangish brown mottled CLAY.
	1.50	D					
	1.50	PP	PP=2kg/cm2				
				1.70	45.59		Stiff to very stiff dark reddish brown, bluish grey and yellowish brown mottled CLAY.
	2.00	D					
	2.00	PP	PP=2.5kg/cm2				
	2.50	D					
	2.50	PP	PP=4kg/cm2				
	3.00	D		3.00	44.29		End of Pit at 3.00m
	3.00	PP	PP=4kg/cm2				

1
2
3
4
5

Water Strikes: Depth Strike | Rose to (mbgl)

Remarks

Stability: Sides stable

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Trial Pit Log

TrialPit No: TP02
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509045.67 - 126693.69 Level: 45.22	Date 01/05/2019
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 3.00	2.00 × 0.50	Scale 1:25
Client:	Dumoore (West London) Limited			Logged RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES					Grass over soft to firm brown silty slightly gravelly CLAY with frequent rootlets. Gravel is fine subangular
				0.40	44.82		
	0.50	B					Stiff light brown and bluish grey mottled CLAY with rare rootlets.
	0.50	D					
	0.50	PP	PP=2kg/cm2				
	0.60	ES					
	1.00	D					
	1.00	PP	PP=2kg/cm2				
				1.10	44.12		
							Stiff to very stiff bluish grey and orangish brown mottled CLAY.
	1.50	D					
	1.50	PP	PP=3kg/cm2				
	2.00	D					
	2.00	PP	PP=3kg/cm2				
				2.30	42.92		
							Very stiff brown and grey mottled sligh ly gravelly CLAY with rare selenite crystals up to 15mm. Gravel is fine to medium subangular shale.
	2.50	D					
	2.50	PP	PP=4.5kg/cm2				
	3.00	D		3.00	42.22		End of Pit at 3.00m
	3.00	PP	PP=5kg/cm2				

Water Strikes: Depth Strike | Rose to (mbgl)

Remarks: Land drain struck at 0.8m

Stability: Sides stable

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Trial Pit Log

TrialPit No: TP03
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509071.40 - 126762.56 Level: 44.93
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 3.00	2.00 × 0.50
Client:	Dumoore (West London) Limited		Date: 01/05/2019 Scale: 1:25 Logged: RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	44.63		Grass over firm brown silty slightly sandy CLAY with frequent rootlets. Sand is coarse angular to subangular
	0.50	B					Firm becoming stiff light brown and bluish grey mottled CLAY.
	0.50	D					
	0.50	PP	PP=1kg/cm2				
	0.60	ES					
	1.00	B					
	1.00	D					
	1.00	PP	PP=1.25kg/cm2				
	1.50	D					
	1.50	PP	PP=3kg/cm2	1.60	43.33		Stiff brown and grey mottled fissured shaley CLAY. Shale appears in seams up to 10mm thick throughout layer
	2.00	D					
	2.00	PP	PP=4kg/cm2				
				2.30	42.63		Light brown, reddish brown and black clayey MUDSTONE recovered as cobble and medium to coarse subangular gravel sized clasts.
	2.50	D					
	2.50	PP	PP=5kg/cm2				
▼	3.00	D		3.00	41.93		End of Pit at 3.00m
▽	3.00	PP	PP=5kg/cm2				

1
2
3
4
5

Water Strikes: Depth Strike	Rose to (mbgl)
3.00	2.90

Remarks

Stability: Sides stable

AGS

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Trial Pit Log

TrialPit No: TP04
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509179.05 - 126762.81 Level: 46.94
Date	01/05/2019		
Location:	Billingshurst, RH14 9HN	Dimensions (m):	2.00 × 0.50, Depth 3.00
Scale	1:25		
Client:	Dumoore (West London) Limited	Logged	RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES					Grass over firm brown silty slightly gravelly CLAY with frequent rootlets. Gravel is fmc subangular.
				0.40	46.54		
	0.50	B					Firm becoming stiff light orangish brown and bluish grey mottled CLAY.
	0.50	D					
	0.50	PP	PP=1.25kg/cm2				
	0.60	ES					
	1.00	D					
	1.00	PP	PP=1.5kg/cm2				
				1.40	45.54		
	1.50	D					Stiff brown, dark reddish brown and black fissured slightly shaley CLAY.
	1.50	PP	PP=2kg/cm2				
	2.00	D					
	2.00	PP	PP=2.5kg/cm2				
				2.40	44.54		
	2.50	D					Reddish brown, orangish brown and black SHALE. (recovered as clayey medium to coarse subangular GRAVEL of shale.)
	2.50	PP	PP=4kg/cm2	2.60	44.34		Very stiff light purplish grey silty CLAY.
	3.00	D		3.00	43.94		End of Pit at 3.00m
	3.00	PP	PP=4kg/cm2				

Depth Strike | Rose to (mbgl)

Remarks

Stability: Sides stable

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Trial Pit Log

TrialPit No: TP05
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509191.09 - 126814.41 Level: 46.47	Date 01/05/2019
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 2.10	2.00 × 0.50	Scale 1:25
Client:	Dumoore (West London) Limited			Logged RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	46.17		Grass over soft to firm brown silty CLAY with frequent rootlets
	0.50	D					Stiff light brown and bluish grey mottled slightly shaley CLAY with frequent black calcareous nodules.
	0.50	PP	PP=2kg/cm2				
	0.60	ES					
	1.00	B					
	1.00	D					
	1.00	PP	PP=2kg/cm2	1.20	45.27		Stiff bluish grey, black and light orangish brown mottled silty shaley CLAY.
	1.50	D					
	1.50	PP	PP=3.5kg/cm2				
	2.00	D		2.00	44.47		Dark reddish brown and light yellowish brown SILTSTONE.
	2.00	PP	PP=5kg/cm2	2.10	44.37		End of Pit at 2.10m

Remarks: Refused on Rock at 2.1m

Stability: Sides stable

AGS

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Trial Pit Log

TrialPit No: TP06
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509247.15 - 126806.56 Level: 48.27
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 3.00	2.00 × 0.50
Client:	Dumoore (West London) Limited		

Date: 01/05/2019
Scale: 1:25
Logged: RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	47.97		Grass over firm brown silty CLAY with frequent rootlets.
	0.50	D					Stiff orangish brown, light brown and bluish grey mottled CLAY.
	0.50	PP	PP=1.75kg/cm2				
	0.60	ES					
	1.00	B					
	1.00	D					
	1.00	PP	PP=1.5kg/cm2	1.20	47.07		Stiff light orangish brown and bluish grey mottled silty CLAY.
	1.50	D					
	1.50	PP	PP=2.5kg/cm2	1.60	46.67		Stiff to very stiff brown and grey mottled fissured slightly shaley CLAY.
	2.00	D					
	2.00	PP	PP=2.5kg/cm2				
	2.50	D					
	2.50	PP	PP=2.5kg/cm2				
	3.00	D		3.00	45.27		End of Pit at 3.00m
	3.00	PP	PP=4kg/cm2				

Water Strikes: Depth Strike | Rose to (mbgl)

Remarks: Damp at 3.0m

Stability: Sides stable

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Trial Pit Log

TrialPit No: TP07
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509367.03 - 126813.73 Level: 54.88	Date 01/05/2019
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 3.00	2.00 × 0.50	Scale 1:25
Client:	Dumoore (West London) Limited			Logged RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES					Grass over firm brown and orangish brown mottled silty CLAY with frequent rootlets.
				0.40	54.48		
	0.50	D					Stiff light brown and bluish grey mottled CLAY with rare rootlets and calcareous nodules up to 2mm
	0.50	PP	PP=1.5kg/cm2				
	0.60	ES					
				0.80	54.08		
	1.00	B					Very stiff dark reddish brown fissured CLAY.
	1.00	D					
	1.00	PP	PP=2kg/cm2				
	1.50	D					
	1.50	PP	PP=3.5kg/cm2				
	2.00	D					
	2.00	PP	PP=3.5kg/cm2				
				2.30	52.58		Very stiff bluish grey, yellowish brown and reddish brown mottled fissured silty CLAY.
	2.50	D					
	2.50	PP	PP=3kg/cm2				
	3.00	D		3.00	51.88		End of Pit at 3.00m
	3.00	PP	PP=3kg/cm2				

We er Strikes	
Depth Strike	Rose to (mbgl)

Remarks

Stability Sides stable

AGS

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Trial Pit Log

TrialPit No: TP08
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509276.49 - 126768.08 Level: 49.85	Date 01/05/2019
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 3.00	2.00 × 0.50	Scale 1:25
Client:	Dumoore (West London) Limited			Logged RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	49.55		Grass over firm brown silty CLAY with frequent rootlets.
	0.50	D					Stiff brown and bluish grey mottled CLAY.
	0.50	PP	PP=2kg/cm2 HVP=84				
	0.50						
	0.60	ES					
	1.00	B					
	1.00	D					
	1.00	PP	PP=3kg/cm2 HVP=140				
	1.00						
	1.50	D					
	1.50	PP	PP=3kg/cm2 HVP=140	1.60	48.25		Stiff black, brown and bluish grey mottled fissured slightly shaley CLAY.
	1.50						
	2.00	D					
	2.00	PP	PP=1.5kg/cm2 HVP=105				
	2.00						
	2.50	D		2.40	47.45		Stiff brown and purplish brown gravelly shaley CLAY. Gravel is medium subangular shale and claystone.
	2.50	PP	PP=1.5kg/cm2 HVP=105				
	2.50						
	3.00	D		3.00	46.85		End of Pit at 3.00m
	3.00	PP	PP=1.5kg/cm2 HVP=105				
	3.00						

1
2
3
4
5

Water Strikes: Depth Strike | Rose to (mbgl)

Remarks

Stability Sides stable

AGS

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Trial Pit Log

TrialPit No: TP09
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509360.40 - 126778.75 Level: 54.19	Date 01/05/2019
Location:	Billingshurst, RH14 9HN	Dimensions (m): 2.00 x 0.50 Depth 3.00		Scale 1:25
Client:	Dumoore (West London) Limited			Logged RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	53.89		Grass over firm brown silty CLAY with frequent rootlets.
	0.50	D					Stiff light yellowish brown and bluish grey mottled CLAY.
	0.50	PP	PP=2kg/cm2				
	0.60	ES					
				0.80	53.39		Stiff becoming very stiff dark reddish brown fissured CLAY.
	1.00	B					
	1.00	D					
	1.00	PP	PP=2.5kg/cm2				
	1.50	D					
	1.50	PP	PP=3kg/cm2				
				1.80	52.39		Stiff to very stiff purplish brown and yellowish brown mottled silty fissured CLAY.
				1.90	52.29		Stiff yellowish brown gravelly fissured CLAY. Gravel is fine to medium subangular siltstone.
	2.00	D					
	2.50	D					
				2.60	51.59		Very stiff light bluish grey, light orangish brown and black slightly shaley fissured CLAY.
	3.00	D		3.00	51.19		End of Pit at 3.00m
	3.00	PP	PP=3.5kg/cm2				

Depth Strike | Rose to (mbgl)

Remarks

Stability: Sides stable

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	# Trial Pit Log	TrialPit No TP10 Sheet 1 of 1

Project Name: Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509332.07 - 126681.61 Level: 52.38	Date 01/05/2019
Location: Billingshurst, RH14 9HN		Dimensions (m): 2.00 × 0.50 Depth 3.10	Scale 1:25
Client: Dumoore (West London) Limited			Logged RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Grass over firm brown silty CLAY with frequent rootlets
	0.20	ES					
				0.30	52.08		Stiff light brown and bluish grey mottled CLAY
	0.50	D					
	0.50	PP	PP=2kg/cm2				
	0.50		HVP=112				
	0.60	ES					
	1.00	B					
	1.00	D					
	1.00	PP	PP=2kg/cm2				
	1.00		HVP=103				
	1.50	D					
	1.50	PP	PP=2.5kg/cm2				
	1.50		HVP=154				
				1.80	50.58		Stiff dark reddish brown fissured CLAY.
	2.00	D					
	2.00	PP	PP=3.5kg/cm2				
	2.50	D					
	2.50	PP	PP=3kg/cm2	2.60	49.78		Stiff dark reddish brown and dark yellowish brown mottled silty fissured CLAY.
				2.70	49.68		Stiff dark yellowish brown, bluish grey and purple mottled silty fissured CLAY.
	3.00	D					
				3.10	49.28		End of Pit at 3.10m

Water Strikes: Depth Strike | Rose to (mbgl)

Remarks

Stability Sides stable

AGS

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Trial Pit Log

TrialPit No: TP11
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509241.41 - 126741.51 Level: 49.33
Date	01/05/2019		
Location:	Billingshurst, RH14 9HN	Dimensions (m):	2.00 × 0.50, Depth 3.00
Scale	1:25		
Client:	Dumoore (West London) Limited	Logged	RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	49.03		Grass over firm light reddish brown silty CLAY with frequent rootlets.
	0.50	D					Stiff reddish brown CLAY
	0.50	PP	PP=2kg/cm2 HVP=84				
	0.50						
	0.60	ES					
	1.00	B					
	1.00	D					
	1.00	PP	PP=2kg/cm2 HVP=98				
	1.00						
	1.50	D					
	1.50	PP	PP=2kg/cm2 HVP=84				
	1.50						
				1.80	47.53		Stiff to very stiff bluish grey, black and light orangish brown mottled sligh ly gravelly shaley fissured CLAY. Gravel is medium subangular siltstone and shale.
	2.00	D					
	2.00	PP	PP=3.5kg/cm2 HVP=168				
	2.00						
	2.50	D					
	2.50	PP	PP=4kg/cm2 HVP=168				
	2.50						
	3.00	D		3.00	46.33		End of Pit at 3.00m
	3.00	PP	PP=4kg/cm2 HVP=181				
	3.00						

Water Strikes: Depth Strike | Rose to (mbgl)

Remarks

Stability: Sides stable

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Trial Pit Log

TrialPit No: TP12
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509187.90 - 126688.24 Level: 47.85	Date 01/05/2019
Location:	Billingshurst, RH14 9HN	Dimensions (m): Depth 3.00	2.00 × 0.50	Scale 1:25
Client:	Dumoore (West London) Limited			Logged RG

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.30	47.55		Grass over firm brown silty CLAY with frequent rootlets
	0.50	D					Stiff dark reddish brown CLAY with rare rootlets
	0.50	PP	PP=2kg/cm2 HVP=87				
	0.50						
	0.60	ES					
	1.00	B					
	1.00	D		1.10	46.75		
	1.00	PP	PP=2kg/cm2 HVP=84				Stiff bluish grey and reddish brown CLAY
	1.00						
	1.50	D					
	1.50	PP	PP=2kg/cm2 HVP=91	1.60	46.25		
	1.50						Stiff bluish grey, dark yellowish brown and brown silty fissured CLAY.
	2.00	D					
	2.00	PP	PP=2.5kg/cm2				
				2.40	45.45		
	2.50	D					Very stiff light bluish grey and light brown mottled CLAY with rare rootlets and selenite crystals up to 2mm.
	2.50	PP	PP=2.5kg/cm2 HVP=126				
	2.50						
	3.00	D		3.00	44.85		End of Pit at 3.00m
	3.00	PP	PP=4.5kg/cm2 HVP=181				
	3.00						

Water Strikes: Depth Strike | Rose to (mbgl)

Remarks

Stability: Sides stable

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Borehole Log

Borehole No. **WS01**
Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords:	509105E - 126645N	Hole Type WLS
Location:	Billingshurst, RH14 9HN		Level:	46.98	Scale 1:25
Client:	Dumoore (West London) Limited		Dates:	29/04/2019	Logged By RG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.40	46.58		Soft light brown and brown mottled silty CLAY with frequent rootlets.
		0.50	D					
		0.50	PP	2.0kg/cm2	0.60	46.38		Firm to stiff light brown CLAY with occasional rootlets and rare calcareous nodules up to 5mm.
		0.70	ES					Stiff to very stiff reddish brown and greenish grey mot led CLAY.
		1.00	D		1.00	45.98		
		1.00	PP	2.2kg/cm2				Stiff to very stiff reddish brown CLAY.
		1.50	D					
		1.50	PP	1.6kg/cm2				
		2.00	D					
		2.00	PP	2.8kg/cm2				
					2.20	44.78		Stiff to very stiff yellowish brown, bluish grey and reddish brown mottled CLAY.
		2.50	D					
		2.50	PP	4.0kg/cm2				
		3.00	D					
		3.00	PP	3.5kg/cm2	3.10	43.88		Very stiff bluish grey and light brown mottled CLAY.
		3.50	D					
		3.50	PP	5.0kg/cm2				
		3.70	D		3.70	43.28		End of Borehole at 3.70m
		3.70	PP	5.0kg/cm2				

Casing		Water Strikes (mbgl)		Chiselling (mbgl)	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to

Remarks
Refused on very stiff clay.

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	**Borehole Log**	Borehole No. **WS02** Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords:	509077E - 126688N	Hole Type WLS
Location:	Billingshurst, RH14 9HN		Level:	45.25	Scale 1:25
Client:	Dumoore (West London) Limited		Dates:	29/04/2019	Logged By RG

Well	Water Str kes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.40	44.85		Grass over firm brown slightly gravelly silty CLAY with frequent rootlets. Gravel is fine to medium subangular to subrounded chert and siltstone.
		0.50	D					Firm to stiff light brown CLAY with rare calcareous nodules up to 5mm.
		0.50	PP	3.0kg/cm2	0.60	44.65		
		0.70	ES					Soft becoming firm yellowish brown, bluish grey and light brown mottled CLAY.
		1.00	D					
		1.00	PP	1.2kg/cm2				
		1.50	D		1.40	43.85		Stiff to very stiff brown and grey mottled CLAY.
		1.50	PP	3.2kg/cm2				
		2.00	D					
		2.00	PP	4.5kg/cm2				
		2.50	D					
		2.50	PP	5.0kg/cm2	2.60	42.65		Stiff to very stiff light brown and bluish grey mottled CLAY.
		3.00	D					
		3.00	PP	5.0kg/cm2				
		3.50	D					
		3.50	PP	5.0kg/cm2				
		4.00	D		4.00	41.25		End of Borehole at 4.00m
		4.00	PP	5.0kg/cm2				

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	**Borehole Log**	Borehole No. **WS03** Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords:	509127E - 126755N	Hole Type WLS
Location:	Billingshurst, RH14 9HN		Level:	46.10	Scale 1:25
Client:	Dumoore (West London) Limited		Dates:	29/04/2019	Logged By RG

Well	Water Str kes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES					Grass over soft to firm dark brown silty CLAY with frequent rootlets.
					0.40	45.70		
		0.50	D					Firm to stiff light brown and bluish grey mottled CLAY.
		0.50	PP	1.5kg/cm2				
		0.60	ES					
					0.90	45.20		
		1.00	D					Stiff light brown and bluish grey mottled CLAY.
		1.00	PP	2.5kg/cm2				
					1.40	44.70		
		1.50	D					Very stiff dark orangish brown, orangish brown and black mot led CLAY.
		1.50	PP	5.0kg/cm2				
		2.00	D		2.00	44.10		Very stiff brown and orangish brown mottled CLAY.
		2.00	PP	5.0kg/cm2				
					2.40	43.70		
		2.50	D					Very stiff light brown, orangish brown, black and reddish brown CLAY with occasional calcareous nodules up to 5mm.
		2.50	PP	5.0kg/cm2				
		3.00	D		3.00	43.10		End of Borehole at 3.00m
		3.00	PP	5.0kg/cm2				

Casing		Water Strikes (mbgl)		Chiselling (mbgl)	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to

Remarks

Refused on very stiff clay at 3m

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	**Borehole Log**	Borehole No. **WS04** Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509126E - 126813N	Hole Type WLS
Location:	Billingshurst, RH14 9HN		Level: 45.54	Scale 1:25
Client:	Dumoore (West London) Limited		Dates: 29/04/2019	Logged By RG

Well	Water Str kes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.30	45.24		Grass over firm brown silty CLAY with frequent rootlets.
		0.40	ES					Firm becoming stiff brown and orangish brown mottled silty slightly gravelly CLAY. Gravel is medium subangular siltstone.
		0.50	D					
		0.50	PP	2.0kg/cm2	0.70	44.84		Stiff light brown and bluish grey mottled CLAY.
		1.00	D					
		1.00	PP	2.0kg/cm2	1.10	44.44		Stiff to very stiff slightly silty slightly gravelly CLAY. Gravel is fine to medium subangular siltstone.
		1.50	D					
		1.50	PP	4.5kg/cm2	1.60	43.94		Stiff to very stiff brown and grey mottled slightly gravelly CLAY. Gravel is fine to coarse subangular siltstone.
		2.00	D					
		2.00	PP	4.0kg/cm2	2.20	43.34		Very stiff light greyish brown and blackish brown mot led slightly gravelly CLAY. Gravel is fine to coarse subangular siltstone.
		2.50	D					
		2.50	PP	5.0kg/cm2				
		3.00	D		3.00	42.54		End of Borehole at 3.00m
		3.00	PP	5.0kg/cm2				

Casing		Water Strikes (mbgl)		Chiselling (mbgl)	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to

Remarks

Refused on very stiff clay

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	**Borehole Log**	Borehole No. **WS05** Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords:	509311E - 126753N	Hole Type WLS
Location:	Billingshurst, RH14 9HN		Level:	52.52	Scale 1:25
Client:	Dumoore (West London) Limited		Dates:	29/04/2019	Logged By RG

Well	Water Str kes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES					Grass over firm to stiff brown slightly silty CLAY with frequent rootlets.
					0.40	52.12		
		0.50	D					Firm becoming stiff light brown and bluish grey mottled CLAY
		0.50	PP	1.5kg/cm2				
		0.60	ES					
					0.90	51.62		
		1.00	D					Stiff reddish brown and orangish brown mottled CLAY.
		1.00	PP	1.5kg/cm2				
					1.40	51.12		
		1.50	D					Stiff to very stiff dark greyish brown, reddish brown and bluish grey mottled slightly shaley and closely fissured CLAY.
		1.50	PP	2.5kg/cm2				
		2.00	D					
		2.00	PP	2.8kg/cm2				
					2.30	50.22		
		2.50	D					Very stiff light bluish grey and light brown mottled CLAY.
		2.50	PP	5.0kg/cm2				
					2.70	49.82		
		3.00	D					Very stiff yellowish brown and bluish grey mottled CLAY.
		3.00	PP	5.0kg/cm2				
					3.20	49.32		
		3.50	D					Very stiff brown, greenish grey and blackish brown mot led CLAY
		3.50	PP	5.0kg/cm2				
		4.00	D		4.00	48.52		End of Borehole at 4.00m
		4.00	PP	5.0kg/cm2				

Casing		Water Strikes (mbgl)		Chiselling (mbgl)	
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to

Remarks

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	**Borehole Log**	Borehole No. **WS06** Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords:	509282E - 126677N	Hole Type WLS
Location:	Billingshurst, RH14 9HN		Level:	50.84	Scale 1:25
Client:	Dumoore (West London) Limited		Dates:	29/04/2019	Logged By RG

Well	Water Str kes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES					Grass over firm brown silty CLAY with frequent rootlets.
					0.40	50.44		
		0.50	D					Stiff brown and grey mot led CLAY with rare calcareous nodules up to 5mm.
		0.50	PP	2.5kg/cm2				
		0.60	ES					
		1.00	D		1.00	49.84		Stiff light brown and bluish grey mottled CLAY with rare calcareous nodules up to 3mm
		1.00	PP	1.5kg/cm2				
		1.50	D					
		1.50	PP	2.0kg/cm2				
					1.90	48.94		Stiff to very stiff reddish brown CLAY
		2.00	D					
		2.00	PP	5.0kg/cm2	2.10	48.74		Very stiff reddish brown, greyish brown and grey mot led CLAY
		2.50	D					
		2.50	PP	4.5kg/cm2				
		3.00	D		3.00	47.84		Very stiff greyish brown and brown mottled CLAY.
		3.00	PP	5.0kg/cm2				
		3.50	D					
		3.50	PP	5.0kg/cm2				
		4.00	D		4.00	46.84		End of Borehole at 4.00m
		4.00	PP	5.0kg/cm2				

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	**Borehole Log**	Borehole No. **BH01** Sheet 1 of 1
Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509040E - 126644N Hole Type CP
Location:	Billingshurst, RH14 9HN		Level: 47.16 Scale 1:50
Client:	Dumoore (West London) Limited		Dates: 22/05/2019 Logged By RG

Well	Water Str kes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.40	46.76		Turf over soft becoming firm brown silty CLAY with frequent rootlets.
		0.50 - 1.00	B					Soft becoming firm slightly silty CLAY.
		1.00		N=10 (3,/2,3,2,3)	1.00	46.16		Firm becoming stiff brown slightly gravelly CLAY. Gravel is fine subangular ironstone.
		1.45	D		1.50	45.66		
		1.50 - 2.00	B					Stiff brown, yellowish brown and bluish grey mottled CLAY.
		2.00		N=22 (5,/4,5,7,6)				
		2.45	D		2.40	44.76		
		2.50 - 3.00	B					Stiff reddish brown, brown, greenish brown and bluish grey mottled silty slightly gravelly CLAY. Gravel is fine to medium subangular siltstone.
		3.00		N=30 (8,/6,8,8,8)				
		3.45	D		3.70	43.46		
		4.00		N=31 (7,/8,7,8,8)				Stiff reddish brown, brown and bluish grey mottled silty slightly gravelly CLAY. Gravel is fine to medium subangular siltstone.
		4.45	D		4.20	42.96		Stiff reddish brown, brown, greenish brown and bluish grey mottled silty slightly gravelly CLAY. Gravel is fine to medium subangular siltstone.
		5.00		N=32 (11,/8,7,9,8)				
		5.45	D					
		6.00	D		6.00	41.16		Stiff dark grey silty very gravelly CLAY. Gravel is fmc subangular siltstone.
		6.50		N=46 (12,/9,10,12,15)				
		6.95	D					
		7.50	D		7.50	39.66		Dark grey SILTSTONE.
		8.00		N=76 (20,/12,18,21,25)				
		8.45	D					
		9.00	D					
		9.50		N=88 (22,/18,20,23,27)				
		9.95	D		10 00	37.16		End of Borehole at 10 00m

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	

AGS

Geo-Environmental	Unit 7, Danworth Farm Hurstpierpoint BN6 9GL www.gesl.net	**Borehole Log**	Borehole No. **BH02** Sheet 1 of 1

Project Name:	Stane Street, Billingshurst	Project No. GE18159	Co-ords: 509323E - 126842N	Hole Type CP
Location:	Billingshurst, RH14 9HN		Level: 45.22	Scale 1:50
Client:	Dumoore (West London) Limited		Dates: 22/05/2019	Logged By RG

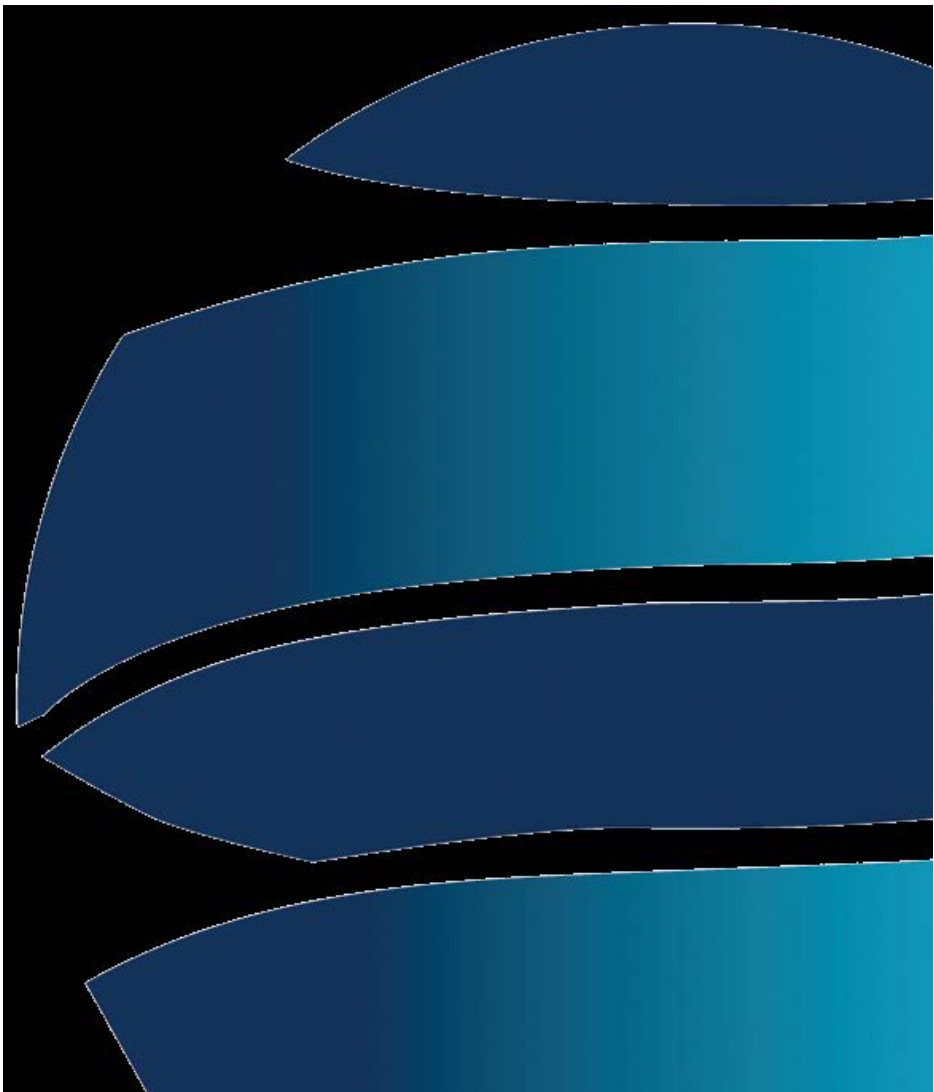
Well	Water Str kes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.30	44.92		Turf over firm becoming stiff brown silty CLAY with frequent rootlets.
		0.50 - 1.00	B					Stiff brown and orangish brown mottled silty slightly sandy CLAY. Sand is fine.
		1.00		N=10 (3,/2,3,2,3)	0.80	44.42		Firm becoming stiff brown, orangish brown and bluish grey mottled dessicated CLAY with frequent decomposing organic matter and occasional roo lets.
		1.45	D					
		1.50 - 2.00	B		1.60	43.62		Very stiff reddish brown, orangish brown, yellowish brown and black mot led slightly sandy CLAY. Sand is fmc of subangular ironstone.
		2.00		N=18 (6,/4,5,4,5)				
		2.45	D					
		2.50 - 3.00	B					
		3.00		N=35 (9,/7,8,9,11)	2.90	42.32		Very stiff brown, orangish brown, yellowish brown and black sandy gravelly fissured CLAY. Sand is fmc. Gravel is fmc of angular subangular ironstone.
		3.45	D					
		4.00		N=29 (7,/6,7,8,8)	3.60	41.62		Stiff to very stiff orangish brown, greenish brown and light brown mottled slightly silty gravelly CLAY. Gravel is fine to medium subangular siltstone.
		4.45	D					
		5.00		N=30 (7,/7,8,7,8)	5.10	40.12		Stiff to very stiff dark grey and greenish grey mottled silty very gravelly CLAY. Gravel is fmc subangular siltstone.
		5.45	D		5.40	39.82		Greenish brown clayey sandy medium to coarse subangular to subrounded sandstone GRAVEL. Sand is fine.
		6.00	D		5.80	39.42		Very soft to soft greenish brown and blueish grey mot led very sandy gravelly CLAY. Sand is fine. Gravel is fine to medium subangular siltstone.
		6.50		N=32 (8,/6,8,8,10)				
		6.95	D					
		7.50	D		7.30	37.92		Weak dark bluish grey SILTSTONE.
		8.00		N=43 (15,/13,8,10,12)				
		8.45	D					
		9.00	D					
		9.50		N=64 (18,/12,15,17,20)				
		9.95	D		10 00	35.22		End of Borehole at 10 00m

Casing		Water Strikes (mbgl)		Chiselling (mbgl)		Remarks
Diameter	Depth (m)	Depth Strike	Rose to	Depth from	Depth to	
		5 20	4 90			

Geo-Environmental

APPENDIX B

Geotechnical Laboratory Results



Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No.	Project Name	Programme	
26428	Land off Stane Street. Billingshurst	Samples received	07/05/2019
		Schedule received	07/05/2019
Project No.	Client	Project started	08/05/2019
GE18159	GESL	Testing Started	22/05/2019

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type		%	%	%	%	%	
WS01	-	1.00	-	D	Reddish brown slightly mottled bluish grey silty CLAY with traces of fine rootlets	22	100	57	24	33	
WS02	-	1.00	-	D	Light brown and light grey mottled silty CLAY with traces of fine rootlets	29	100	75	24	51	
WS03	-	1.00	-	D	Light grey slightly mottled yellowish brown slightly fine sandy silty CLAY with traces of fine rootlets	19	100	53	22	31	
WS04	-	1.50	-	D	Light grey mottled light brown slightly fine sandy silty CLAY with pockets of black carbonaceous deposits	16	100	48	22	26	
WS05	-	1.00	-	D	Dark reddish brown slightly mottled brown slightly sandy silty CLAY with occasional fine rootlets	21	100	56	25	31	
WS06	-	1.50	-	D	Light grey and light brown mottled silty CLAY with traces of fine rootlets and scattered black flecks	22	100	55	21	34	
TP01	-	1.50	-	D	Light grey and light brown mottled silty CLAY with traces of calcareous deposits	19	100	51	25	26	
TP02	-	1.00	-	D	Dark reddish brown mottled light grey silty CLAY with occasional fine rootlets, rare roots and traces of fine brick fragments	29	100	70	24	46	
TP03	-	1.00	-	D	Light grey slightly mottled orange silty CLAY with traces of fine rootlets	27	100	70	22	48	
TP03	-	2.00	-	D	Dark orangish brown and light grey slightly fine sandy silty CLAY with occasional black carbonaceous deposits and decayed rootlets	18	100	47	22	25	
TP04	-	1.00	-	D	Light grey and light orangish brown mottled silty CLAY with occasional fine rootlets	25	100	68	22	46	
TP05	-	1.50	-	D	Light grey, yellowish brown slightly sandy silty CLAY with dark grey carbonaceous deposits and stains	20	100	44	22	22	

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits: clause 4.3 and 5.0

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288

Checked and Approved
Initials J.P
Date: 24/05/2019

UKAS TESTING
2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No.	Project Name	Programme	
26428	Land off Stane Street. Billingshurst	Samples received	07/05/2019
		Schedule received	07/05/2019
Project No.	Client	Project started	08/05/2019
GE18159	GESL	Testing Started	22/05/2019

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type		%	%	%	%	%	
TP06	-	0.50	-	D	Orangish brown and light grey mottled silty CLAY with frequent fine rootlets	25	100	71	24	47	
TP07	-	1.00	-	D	Dark reddish brown and brown sandy silty CLAY	20	100	50	23	27	
TP08	-	0.50	-	D	Light reddish brown and light grey mottled silty CLAY with occasional fine rootlets	28	100	67	30	37	
TP09	-	1.00	-	B	Light greenish brown slightly mottled light grey sandy silty CLAY with traces of fine rootlets	17	100	44	24	20	
TP09	-	2.00	-	D	Dark reddish brown sandy silty CLAY	18	100	44	21	23	
TP10	-	2.50	-	D	Dark reddish brown slightly sandy silty CLAY with fm mudstone fragments	17	90	40	23	17	
TP11	-	1.00	-	D	Dark reddish brown and light grey mottled silty CLAY with occasional fine rootlets	27	100	70	29	41	
TP12	-	0.50	-	D	Reddish brown slightly mottled light brown silty CLAY with occasional fine rootlets	28	100	71	25	46	

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits. clause 4.3 and 5.0

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288

Checked and Approved
Initials J.P
Date: 24/05/2019

UKAS TESTING
2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

California Bearing Ratio (CBR)

Job Ref	26428				
Borehole/Pit No.	TP01				
Site Name	Land off Stane Street. Billingshurst			Sample No.	-
Project No.	GE18159	Client	GESL	Depth Top	0.50 m
Soil Description	Brown slightly mottled grey silty CLAY			Depth Base	- m
				Sample Type	B
				Samples received	07/05/2019
				Schedules received	07/05/2019
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	08/05/2019
				Date Tested	21/05/2019

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0.0 %

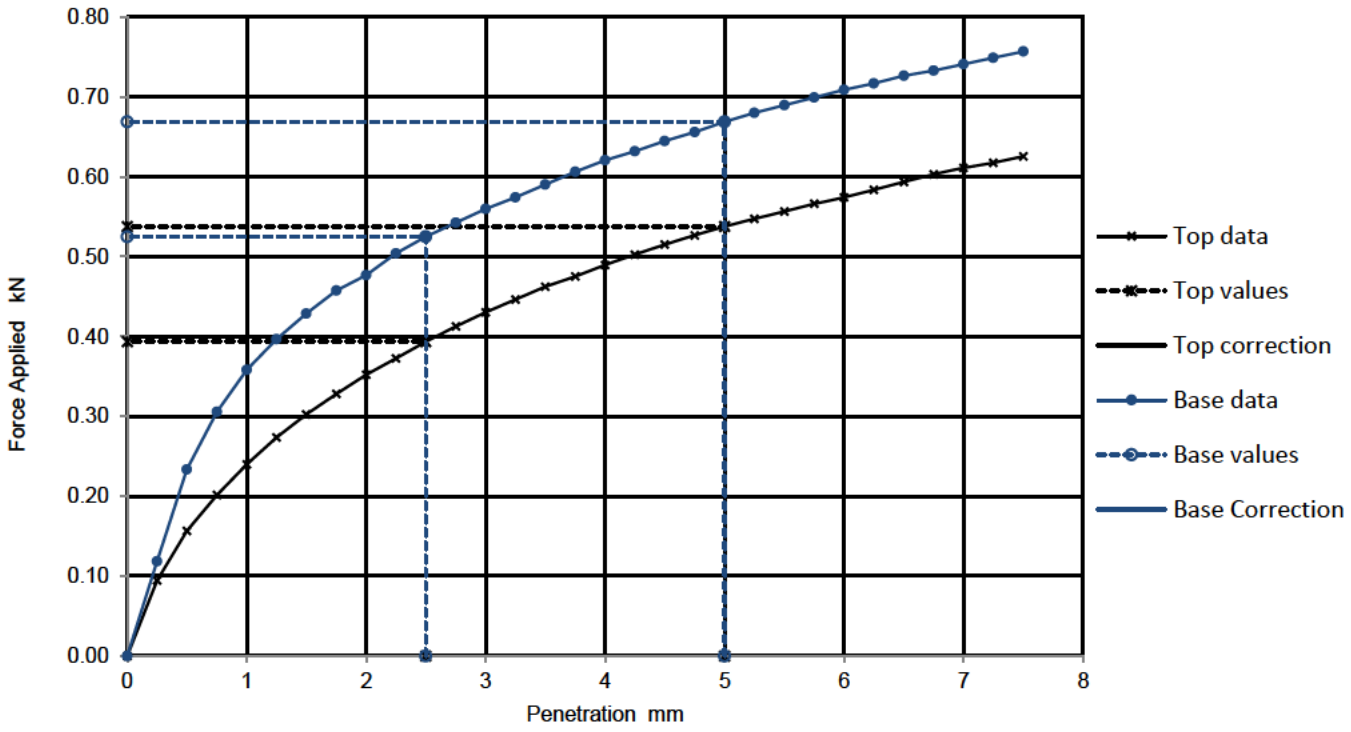
Initial Specimen details

Bulk density	1.98	Mg/m3
Dry density	1.59	Mg/m3
Moisture content	25	%

Soaking details

Period of soaking	7	days
Time to surface	7	days
Amount of swell recorded	1.27	mm
Surcharge applied	6	kg
	4	kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	3.0	2.7	3.0	N/A	26
BASE	No	4.0	3.3	4.0		26

Remarks

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288

Checked and Approved

Initials: J.P

Date: 29/05/2019

California Bearing Ratio (CBR)

Job Ref	26428				
Borehole/Pit No.	TP03				
Site Name	Land off Stane Street. Billingshurst			Sample No.	-
Project No.	GE18159	Client	GESL	Depth Top	0.50 m
Soil Description	Grey and light brown silty CLAY			Depth Base	- m
				Sample Type	B
				Samples received	07/05/2019
				Schedules received	07/05/2019
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	08/05/2019
				Date Tested	21/05/2019

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0.0 %

Initial Specimen details

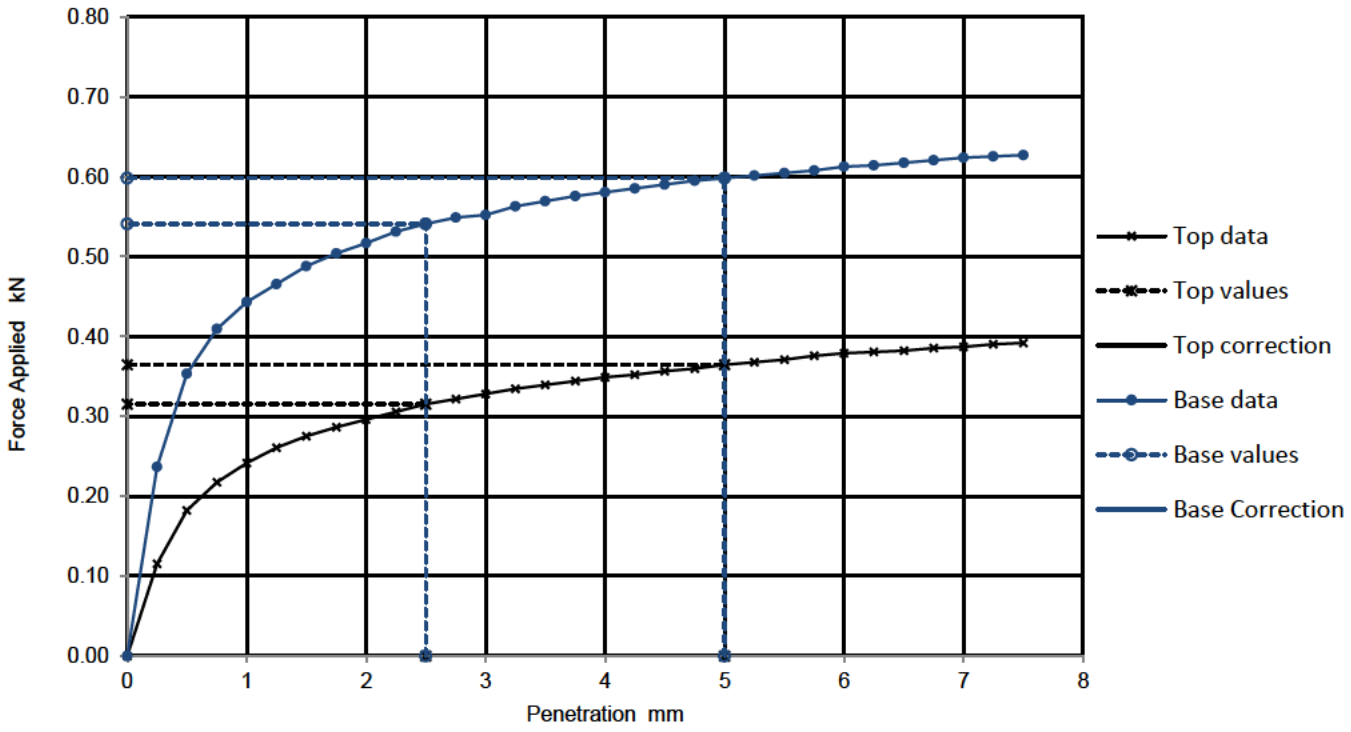
Bulk density	1.90	Mg/m3
Dry density	1.46	Mg/m3
Moisture content	30	%

Soaking details

Period of soaking	7	days
Time to surface	7	days
Amount of swell recorded	0.58	mm

Surcharge applied: 6 kg, 4 kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	2.4	1.8	2.4	N/A	32
BASE	No	4.1	3.0	4.1		30

Remarks

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288

Checked and Approved

Initials: J.P

Date: 29/05/2019

California Bearing Ratio (CBR)

Job Ref	26428				
Borehole/Pit No.	TP05				
Site Name	Land off Stane Street. Billingshurst			Sample No.	-
Project No.	GE18159	Client	GESL	Depth Top	1.00 m
Soil Description	Brown and grey mottled slightly sandy silty CLAY			Depth Base	- m
				Sample Type	B
				Samples received	07/05/2019
				Schedules received	07/05/2019
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	08/05/2019
				Date Tested	21/05/2019

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0.0 %

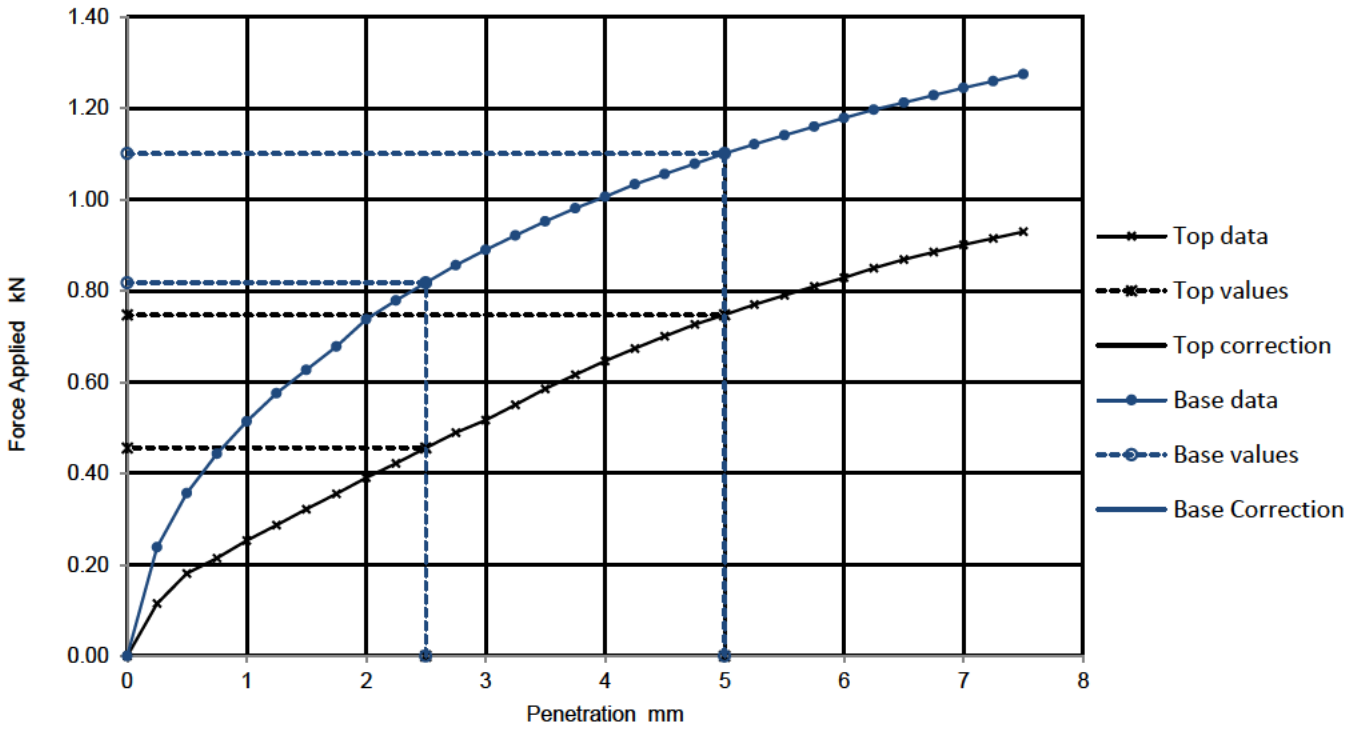
Initial Specimen details

Bulk density	2.04	Mg/m3
Dry density	1.70	Mg/m3
Moisture content	20	%

Soaking details

Period of soaking	7	days
Time to surface	7	days
Amount of swell recorded	0.46	mm
Surcharge applied	6	kg
	4	kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	3.5	3.7	3.7	N/A	22
BASE	No	6.2	5.5	6.2		20

Remarks

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288

Checked and Approved

Initials: J.P

Date: 29/05/2019

California Bearing Ratio (CBR)

Job Ref	26428				
Borehole/Pit No.	TP07				
Site Name	Land off Stane Street. Billingshurst			Sample No.	-
Project No.	GE18159	Client	GESL	Depth Top	1.00 m
Soil Description	Reddish brown and orangish brown mottled slightly sandy silty CLAY			Depth Base	- m
				Sample Type	B
				Samples received	07/05/2019
				Schedules received	07/05/2019
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	08/05/2019
				Date Tested	21/05/2019

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0.0 %

Initial Specimen details

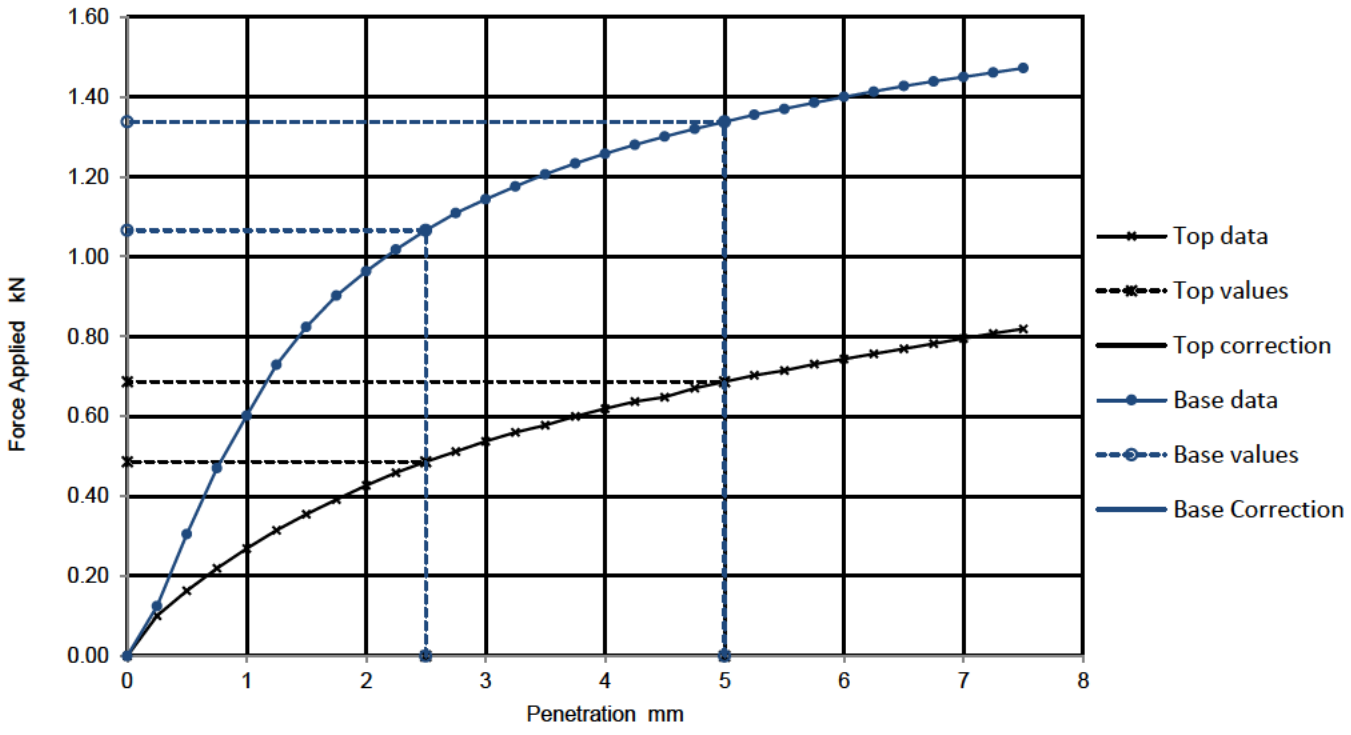
Bulk density	2.08	Mg/m3
Dry density	1.72	Mg/m3
Moisture content	21	%

Soaking details

Period of soaking	7	days
Time to surface	7	days
Amount of swell recorded	2.10	mm

Surcharge applied: 6 kg, 4 kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	3.7	3.4	3.7	N/A	24
BASE	No	8.1	6.7	8.1		21

Remarks

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288

Checked and Approved

Initials: J.P

Date: 29/05/2019

California Bearing Ratio (CBR)

Job Ref	26428				
Borehole/Pit No.	TP08				
Site Name	Land off Stane Street. Billingshurst			Sample No.	-
Project No.	GE18159	Client	GESL	Depth Top	1.00 m
Soil Description	Grey slightly mottled brown slightly sandy silty CLAY			Depth Base	- m
				Sample Type	B
				Samples received	07/05/2019
				Schedules received	07/05/2019
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	08/05/2019
				Date Tested	21/05/2019

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0.0 %

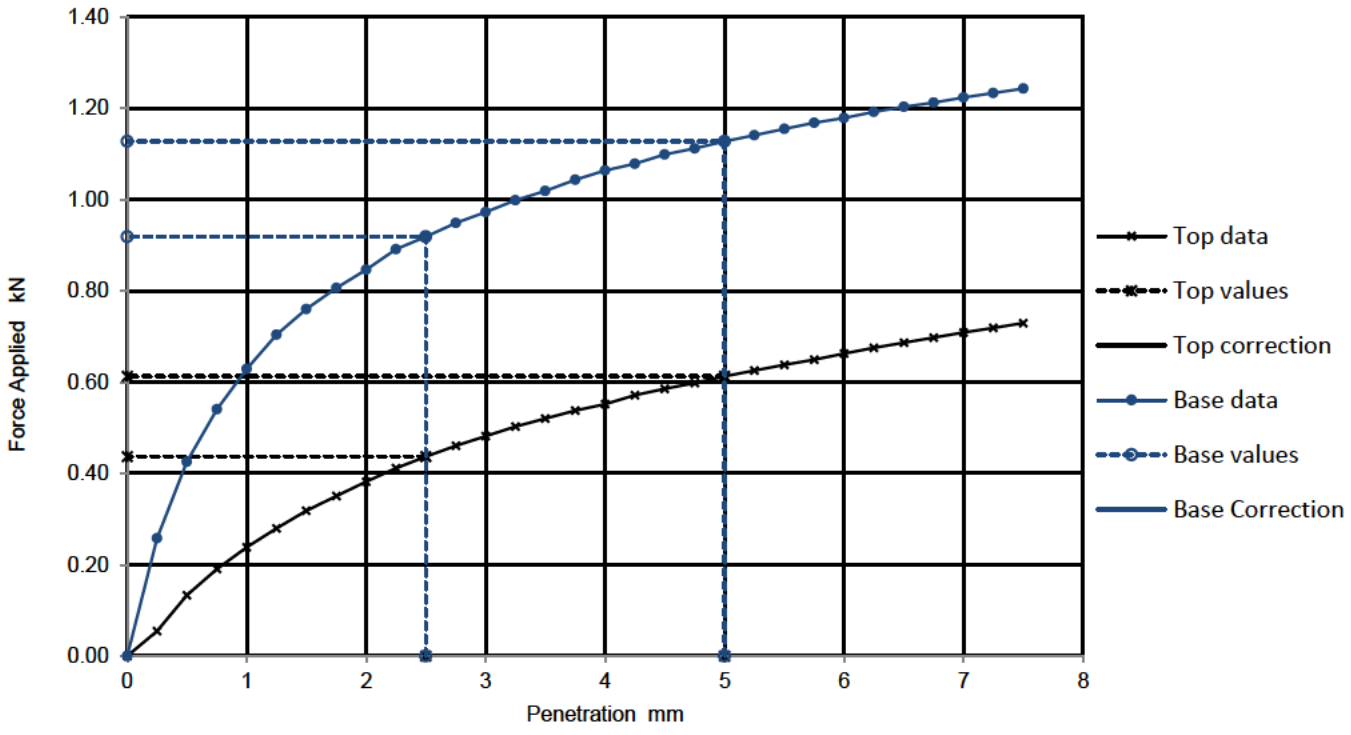
Initial Specimen details

Bulk density	2.06	Mg/m3
Dry density	1.72	Mg/m3
Moisture content	20	%

Soaking details

Period of soaking	7	days
Time to surface	7	days
Amount of swell recorded	1.53	mm
Surcharge applied	6	kg
	4	kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	3.3	3.1	3.3	N/A	23
BASE	No	7.0	5.6	7.0		20

Remarks

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288

Checked and Approved

Initials: J.P

Date: 29/05/2019

California Bearing Ratio (CBR)

Job Ref	26428				
Borehole/Pit No.	TP10				
Site Name	Land off Stane Street. Billingshurst			Sample No.	-
Project No.	GE18159	Client	GESL	Depth Top	1.00 m
Soil Description	Brown and grey mottled slightly sandy silty CLAY			Depth Base	- m
				Sample Type	B
				Samples received	07/05/2019
				Schedules received	07/05/2019
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	08/05/2019
				Date Tested	21/05/2019

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0.0 %

Initial Specimen details

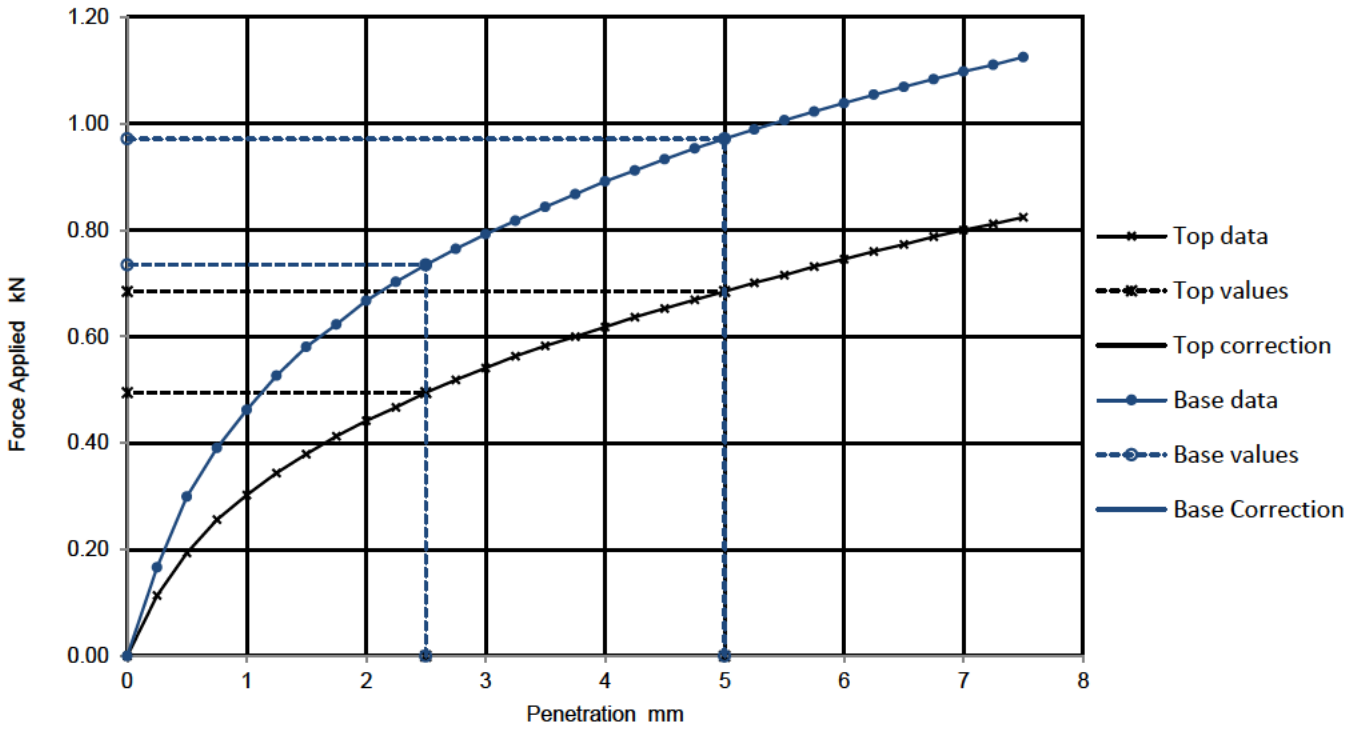
Bulk density	2.02	Mg/m3
Dry density	1.65	Mg/m3
Moisture content	23	%

Soaking details

Period of soaking	7	days
Time to surface	7	days
Amount of swell recorded	0.57	mm

Surcharge applied	6	kg
	4	kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	3.7	3.4	3.7	N/A	24
BASE	No	5.6	4.9	5.6		22

Remarks

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288
Email: [redacted]

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Checked and Approved

Initials: J.P

Date: 29/05/2019

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2683

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	19-23050
Issue:	1
Date of Issue:	16/05/2019
Contact:	James Phaure
Customer Details:	K4 Soils Laboratory Ltd Unit 8 Watford HertfordshireWD18 9RU
Quotation No:	Q16-00568
Order No:	26428
Customer Reference:	GE18159
Date Received:	13/05/2019
Date Approved:	16/05/2019
Details:	Land off Stane Street, Billingshurst
Approved by:	[redacted]

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683

Sample Summary

Report No.: 19-23050, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
173179	TP07 D 1.50	Not Provided	13/05/2019	Silty clayey loam	a
173180	TP10 D 1.00	Not Provided	13/05/2019	Silty clayey loam	a
173181	TP11 B 1.00	Not Provided	13/05/2019	Clayey loam	a
173182	WS01 D 1.50	Not Provided	13/05/2019	Silty clayey loam	a
173183	WS04 D 1.00	Not Provided	13/05/2019	Silty clayey loam	a
173184	WS05 D 1.50	Not Provided	13/05/2019	Silty loam	a

Results Summary

Report No.: 19-23050, issue number 1

				ELAB Reference	173179	173180	173181	173182	173183
				Customer Reference	D	D	B	D	D
				Sample ID					
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Location	TP07	TP10	TP11	WS01	WS04
				Sample Depth (m)	1.50	1.00	1.00	1.50	1.00
				Sampling Date	Not Provided	Not Provided	Not Provided	Not Provided	Not Provided
Determinand	**Codes**	**Units**	**LOD**						
Soil sample preparation parameters									
Material removed	N	%	0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0		None	None	None	None	None
Anions									
Water Soluble Sulphate	M	g/l	0.02		0.02	0.04	0.15	0.13	< 0.02
Inorganics									
Total Sulphur	N	%	0.01		0.01	0.02	0.04	0.02	< 0.01
Acid Soluble Sulphate (SO4)	U	%	0.02		< 0.02	< 0.02	0.07	0.03	< 0.02
Miscellaneous									
pH	M	pH units	0.1		7.8	8.1	5.1	8.2	7.7

Results Summary

Report No.: 19-23050, issue number 1

ELAB Reference	173184
Customer Reference	D
Sample ID	
Sample Type	SOIL
Sample Location	WS05
Sample Depth (m)	1.50
Sampling Date	Not Provided

Determinand	Codes	Units	LOD	
Soil sample preparation parameters				
Material removed	N	%	0.1	< 0.1
Description of Inert material removed	N		0	None
Anions				
Water Soluble Sulphate	M	g/l	0.02	0.03
Inorganics				
Total Sulphur	N	%	0.01	0.01
Acid Soluble Sulphate (SO4)	U	%	0.02	< 0.02
Miscellaneous				
pH	M	pH units	0.1	7.7

Method Summary

Report No.: 19-23050, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
pH	M	Air dried sample	16/05/2019	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	16/05/2019	115	Ion Chromatography
Water soluble anions	M	Air dried sample	15/05/2019	172	Ion Chromatography
Total organic carbon/Total sulphur	N	Air dried sample	15/05/2019	216	IR

Tests marked N are not UKAS accredited

Report Information

Report No.: 19-23050, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
ELAB are unable to provide an interpretation or opinion on the content of this report.
The results relate only to the sample received.
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request
Unless otherwise stated, sample information has been provided by the client

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

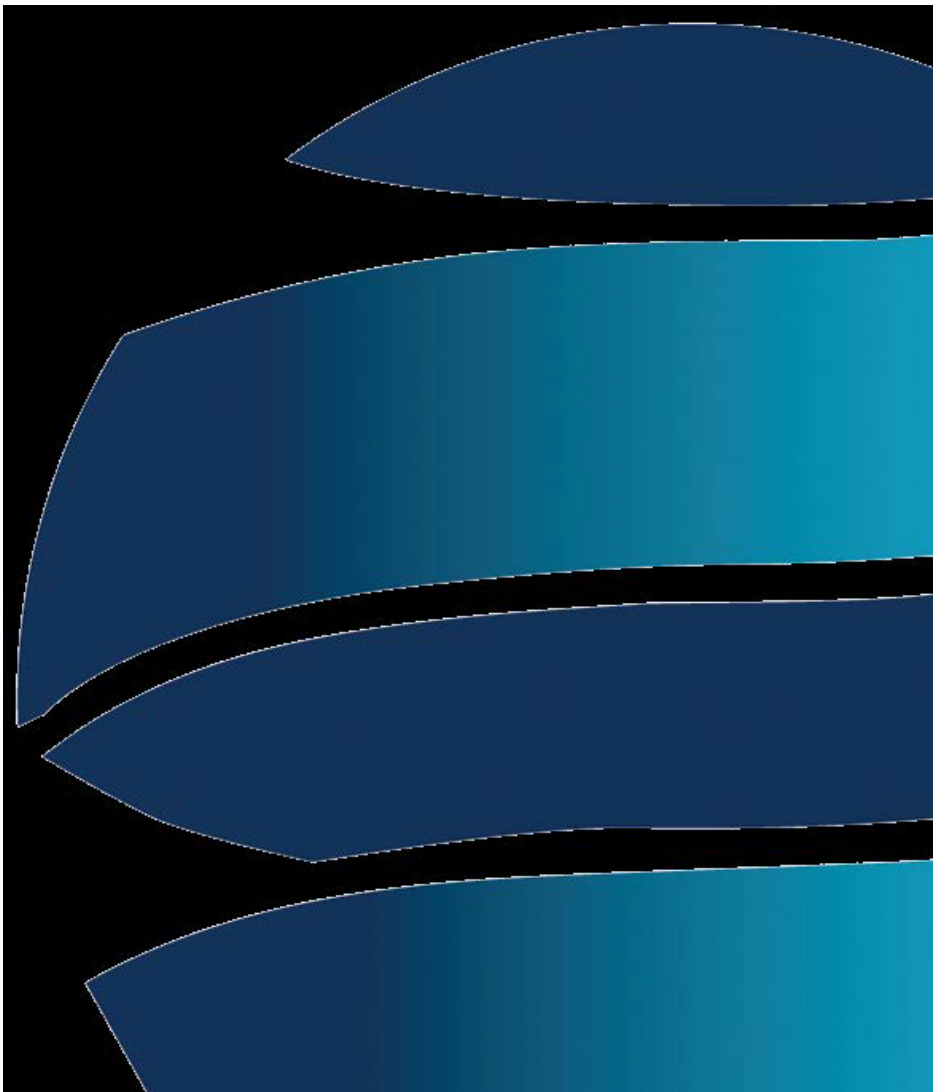
Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

APPENDIX C

Geochemical Laboratory Results



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UKAS TESTING 2683

mCERTS

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	19-22975
Issue:	1
Date of Issue:	20/05/2019
Contact:	Robert Gardner
Customer Details:	GESL Unit 7 Danworth Farm Hurstpierpoint West SussexBN6 9GL
Quotation No:	Q19-01488
Order No:	1558
Customer Reference:	GE18159
Date Received:	02/05/2019
Date Approved:	20/05/2019
Details:	Land off Stane Street, Billingshurst
Approved by:	[redacted]

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683

Sample Summary

Report No.: 19-22975, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
172595	WS01 ES 0.30	29/04/2019	07/05/2019		
172596	WS01 ES 0.70	29/04/2019	07/05/2019		
172597	WS02 ES 0.30	29/04/2019	07/05/2019		
172598	WS02 ES 0.70	29/04/2019	07/05/2019		
172599	WS03 ES 0.20	29/04/2019	07/05/2019		
172600	WS03 ES 0.60	29/04/2019	07/05/2019		
172601	WS04 ES 0.20	29/04/2019	07/05/2019		
172602	WS04 ES 0.40	29/04/2019	07/05/2019	Silty loam	
172603	WS05 ES 0.20	29/04/2019	07/05/2019		
172604	WS05 ES 0.60	29/04/2019	07/05/2019		
172605	WS06 ES 0.20	29/04/2019	07/05/2019		
172606	WS06 ES 0.60	29/04/2019	07/05/2019		
172607	TP02 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172608	TP02 ES 0.60	01/05/2019	07/05/2019		
172609	TP03 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172610	TP03 ES 0.60	01/05/2019	07/05/2019		
172611	TP01 ES 0.20	01/05/2019	07/05/2019		
172612	TP01 ES 0.60	01/05/2019	07/05/2019	Silty clayey loam	c
172613	TP04 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172614	TP04 ES 0.60	01/05/2019	07/05/2019		
172615	TP05 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172616	TP05 ES 0.60	01/05/2019	07/05/2019	Silty loam	
172617	TP06 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172618	TP06 ES 0.60	01/05/2019	07/05/2019		
172619	TP07 ES 0.20	01/05/2019	07/05/2019	Silty clayey loam	
172620	TP07 ES 0.60	01/05/2019	07/05/2019		
172621	TP09 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172622	TP09 ES 0.60	01/05/2019	07/05/2019		
172623	TP10 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172624	TP10 ES 0.60	01/05/2019	07/05/2019	Silty clayey loam	
172625	TP11 ES 0.20	01/05/2019	07/05/2019		
172626	TP11 ES 0.60	01/05/2019	07/05/2019		
172627	TP08 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172628	TP08 ES 0.60	01/05/2019	07/05/2019		
172629	TP12 ES 0.20	01/05/2019	07/05/2019	Silty loam	
172630	TP12 ES 0.60	01/05/2019	07/05/2019	Silty clayey loam	

Results Summary

Report No.: 19-22975, issue number 1

				ELAB Reference	172602	172607	172609	172612	172613
				Customer Reference	ES	ES	ES	ES	ES
				Sample ID					
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Location	WS04	TP02	TP03	TP01	TP04
				Sample Depth (m)	0.40	0.20	0.20	0.60	0.20
				Sampling Date	29/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**						
Soil sample preparation parameters									
Material removed	N	%	0.1		< 0.1	< 0.1	n/t	< 0.1	< 0.1
Description of Inert material removed	N		0		None	None	n/t	None	None
Metals									
Arsenic	M	mg/kg	1		20.0	10.2	n/t	20.4	16.2
Barium	U	mg/kg	10		57.8	41.7	n/t	98.5	41.6
Beryllium	U	mg/kg	1		< 1.0	< 1.0	n/t	1.4	< 1.0
Cadmium	M	mg/kg	0.5		< 0.5	< 0.5	n/t	< 0.5	< 0.5
Chromium	M	mg/kg	5		34.1	18.7	n/t	29.1	18.6
Copper	M	mg/kg	5		30.4	14.9	n/t	29.2	15.5
Lead	M	mg/kg	5		22.8	24.5	n/t	22.7	25.8
Mercury	M	mg/kg	0.5		< 0.5	< 0.5	n/t	< 0.5	< 0.5
Nickel	M	mg/kg	5		15.9	9.9	n/t	26.2	8.2
Selenium	M	mg/kg	1		< 1.0	< 1.0	n/t	< 1.0	< 1.0
Vanadium	M	mg/kg	5		49.5	31.2	n/t	48.0	31.6
Zinc	M	mg/kg	5		68.0	44.0	n/t	69.4	47.0
Anions									
Water Soluble Chloride	M	mg/kg	40		< 40	< 40	n/t	< 40	< 40
Water Soluble Sulphate	M	g/l	0.02		0.03	< 0.02	n/t	0.06	< 0.02
Inorganics									
Elemental Sulphur	M	mg/kg	20		< 20	< 20	n/t	< 20	< 20
Hexavalent Chromium	N	mg/kg	0.8		< 0.8	< 0.8	n/t	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2		< 2	< 2	n/t	< 2	< 2
Total Cyanide	M	mg/kg	1		< 1.0	< 1.0	n/t	< 1.0	< 1.0
Acid Soluble Sulphate (SO4)	U	%	0.02		< 0.02	< 0.02	n/t	0.02	0.02
Water Soluble Boron	N	mg/kg	0.5		0.8	0.7	n/t	< 0.5	< 0.5
Miscellaneous									
pH	M	pH units	0.1		7.7	7.4	n/t	8.1	6.8
Total Organic Carbon	N	%	0.01		0.28	1.3	n/t	0.23	1.4
Phenols									
Total Phenols	N	mg/kg	6		< 6	< 6	n/t	c < 6	< 6

Tests marked N are not UKAS accredited.

Results Summary

Report No.: 19-22975, issue number 1

				ELAB Reference	172602	172607	172609	172612	172613
				Customer Reference	ES	ES	ES	ES	ES
				Sample ID					
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Location	WS04	TP02	TP03	TP01	TP04
				Sample Depth (m)	0.40	0.20	0.20	0.60	0.20
				Sampling Date	29/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**						
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Fluorene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Anthracene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1		0.2	< 0.1	n/t	c < 0.1	0.1
Pyrene	M	mg/kg	0.1		0.2	< 0.1	n/t	c < 0.1	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1		0.2	< 0.1	n/t	c < 0.1	< 0.1
Chrysene	M	mg/kg	0.1		0.2	< 0.1	n/t	c < 0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1		0.3	< 0.1	n/t	c < 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1		0.3	< 0.1	n/t	c < 0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1		0.4	< 0.1	n/t	c < 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1		< 0.1	< 0.1	n/t	c < 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4		1.8	< 0.4	n/t	c < 0.4	< 0.4
BTEX									
Benzene	M	ug/kg	10		< 10.0	< 10.0	n/t	c < 10.0	< 10.0
Toluene	M	ug/kg	10		< 10.0	< 10.0	n/t	c < 10.0	< 10.0
Ethylbenzene	M	ug/kg	10		< 10.0	< 10.0	n/t	c < 10.0	< 10.0
Xylenes	M	ug/kg	10		< 10.0	< 10.0	n/t	c < 10.0	< 10.0
MTBE	N	ug/kg	10		< 10.0	< 10.0	n/t	c < 10.0	< 10.0
TPH CWG									
>C5-C6 Aliphatic	N	mg/kg	0.01		< 0.01	< 0.01	n/t	c < 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01		< 0.01	< 0.01	n/t	c < 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C10-C12 Aliphatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C12-C16 Aliphatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C16-C21 Aliphatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C21-C35 Aliphatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C35-C40 Aliphatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
Total aliphatic hydrocarbons (>C5 - C40)	N	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C5-C7 Aromatic	N	mg/kg	0.01		< 0.01	< 0.01	n/t	c < 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01		< 0.01	< 0.01	n/t	c < 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C10-C12 Aromatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C12-C16 Aromatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C16-C21 Aromatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C21-C35 Aromatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
>C35-C40 Aromatic	M	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
Total aromatic hydrocarbons (>C5 - C40)	N	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0
Total petroleum hydrocarbons (>C5 - C40)	N	mg/kg	1		< 1.0	< 1.0	n/t	c < 1.0	< 1.0

Results Summary

Report No.: 19-22975, issue number 1

			ELAB Reference	172602	172607	172609	172612	172613
			Customer Reference	ES	ES	ES	ES	ES
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	WS04	TP02	TP03	TP01	TP04
			Sample Depth (m)	0.40	0.20	0.20	0.60	0.20
			Sampling Date	29/04/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**					
OrganoChlorine Pesticides								
alpha-HCH	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
beta_HCH	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
gamma-HCH	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
delta-HCH	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Heptachlor	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Aldrin	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Heptachlor expoxide	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
trans-Chlordane	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
alpha cis-Chlordane	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
p,p-DDE	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Dieldrin	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Endrin	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
p,p-DDD	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Endosulfan II	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Endrin aldehyde	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
p,p-DDT	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Endosulphan sulphate	M	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Methoxychlor	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
Endrin ketone	N	ug/kg	10	n/t	n/t	< 10	n/t	n/t
OrganoPhosphorus Pesticides								
Acephate	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Aziniphos-methyl	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Chlorpyrifos	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Demeton-s-methyl	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Dichlorvos	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Dimethoate	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Ethion	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Malathion	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Mathidathion	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Methamidophos	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Omethoate	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Pirimifos-methyl	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Profenofos	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Pyrazophos	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Tokuthion	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t
Tolclofos-methyl	N	ug/kg	100	n/t	n/t	< 100	n/t	n/t

Results Summary

Report No.: 19-22975, issue number 1

			ELAB Reference	172615	172616	172617	172619	172621
			Customer Reference	ES	ES	ES	ES	ES
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP05	TP05	TP06	TP07	TP09
			Sample Depth (m)	0.20	0.60	0.20	0.20	0.20
			Sampling Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**					
Soil sample preparation parameters								
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Description of Inert material removed	N		0	None	None	None	None	n/t
Metals								
Arsenic	M	mg/kg	1	10.0	16.7	11.4	10.4	n/t
Barium	U	mg/kg	10	42.8	126	51.6	41.6	n/t
Beryllium	U	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	n/t
Chromium	M	mg/kg	5	21.4	21.4	27.6	25.6	n/t
Copper	M	mg/kg	5	15.6	13.7	17.8	18.5	n/t
Lead	M	mg/kg	5	24.6	23.8	25.1	18.8	n/t
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	n/t
Nickel	M	mg/kg	5	9.5	12.8	11.3	10.4	n/t
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
Vanadium	M	mg/kg	5	36.1	39.7	48.4	41.1	n/t
Zinc	M	mg/kg	5	48.2	52.9	55.7	42.5	n/t
Anions								
Water Soluble Chloride	M	mg/kg	40	< 40	< 40	< 40	< 40	n/t
Water Soluble Sulphate	M	g/l	0.02	< 0.02	< 0.02	0.02	< 0.02	n/t
Inorganics								
Elemental Sulphur	M	mg/kg	20	< 20	< 20	< 20	< 20	n/t
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	n/t
Total Sulphide	N	mg/kg	2	< 2	< 2	< 2	< 2	n/t
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
Acid Soluble Sulphate (SO4)	U	%	0.02	0.03	< 0.02	0.02	< 0.02	n/t
Water Soluble Boron	N	mg/kg	0.5	0.7	< 0.5	0.8	< 0.5	n/t
Miscellaneous								
pH	M	pH units	0.1	6.8	7.2	6.6	7.2	n/t
Total Organic Carbon	N	%	0.01	1.4	0.63	1.5	0.62	n/t
Phenols								
Total Phenols	N	mg/kg	6	< 6	< 6	< 6	< 6	n/t

Tests marked N are not UKAS accredited.

Results Summary

Report No.: 19-22975, issue number 1

			ELAB Reference	172615	172616	172617	172619	172621
			Customer Reference	ES	ES	ES	ES	ES
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP05	TP05	TP06	TP07	TP09
			Sample Depth (m)	0.20	0.60	0.20	0.20	0.20
			Sampling Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**					
Polyaromatic hydrocarbons								
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	n/t
Total PAH(16)	M	mg/kg	0.4	< 0.4	< 0.4	< 0.4	< 0.4	n/t
BTEX								
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	n/t
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	n/t
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	n/t
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	n/t
MTBE	N	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	n/t
TPH CWG								
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C12-C16 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C21-C35 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C35-C40 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
Total aliphatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	n/t
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C10-C12 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C12-C16 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C16-C21 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C21-C35 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C35-C40 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
Total aromatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t
Total petroleum hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	n/t

Results Summary

Report No.: 19-22975, issue number 1

			ELAB Reference	172615	172616	172617	172619	172621
			Customer Reference	ES	ES	ES	ES	ES
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP05	TP05	TP06	TP07	TP09
			Sample Depth (m)	0.20	0.60	0.20	0.20	0.20
			Sampling Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**					
OrganoChlorine Pesticides								
alpha-HCH	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
beta_HCH	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
gamma-HCH	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
delta-HCH	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Heptachlor	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Aldrin	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Heptachlor expoxide	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
trans-Chlordane	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
alpha cis-Chlordane	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
p,p-DDE	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Dieldrin	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Endrin	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
p,p-DDD	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Endosulfan II	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Endrin aldehyde	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
p,p-DDT	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Endosulphan sulphate	M	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Methoxychlor	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
Endrin ketone	N	ug/kg	10	n/t	< 10	n/t	n/t	< 10
OrganoPhosphorus Pesticides								
Acephate	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Aziniphos-methyl	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Chlorpyrifos	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Demeton-s-methyl	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Dichlorvos	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Dimethoate	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Ethion	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Malathion	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Mathidathion	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Methamidophos	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Omethoate	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Pirimifos-methyl	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Profenofos	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Pyrazophos	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Tokuthion	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100
Tolclofos-methyl	N	ug/kg	100	n/t	< 100	n/t	n/t	< 100

Results Summary

Report No.: 19-22975, issue number 1

				ELAB Reference	172623	172624	172627	172629	172630
				Customer Reference	ES	ES	ES	ES	ES
				Sample ID					
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Location	TP10	TP10	TP08	TP12	TP12
				Sample Depth (m)	0.20	0.60	0.20	0.20	0.60
				Sampling Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**						
Soil sample preparation parameters									
Material removed	N	%	0.1		< 0.1	< 0.1	< 0.1	n/t	< 0.1
Description of Inert material removed	N		0		None	None	None	n/t	None
Metals									
Arsenic	M	mg/kg	1		9.3	14.3	8.2	n/t	24.5
Barium	U	mg/kg	10		55.3	61.0	46.7	n/t	68.0
Beryllium	U	mg/kg	1		< 1.0	< 1.0	< 1.0	n/t	1.1
Cadmium	M	mg/kg	0.5		< 0.5	< 0.5	< 0.5	n/t	< 0.5
Chromium	M	mg/kg	5		19.5	32.2	20.0	n/t	33.0
Copper	M	mg/kg	5		14.7	21.9	15.9	n/t	27.0
Lead	M	mg/kg	5		22.3	18.2	18.9	n/t	15.2
Mercury	M	mg/kg	0.5		< 0.5	< 0.5	< 0.5	n/t	< 0.5
Nickel	M	mg/kg	5		9.6	12.6	8.8	n/t	17.4
Selenium	M	mg/kg	1		< 1.0	< 1.0	< 1.0	n/t	< 1.0
Vanadium	M	mg/kg	5		32.1	51.6	34.5	n/t	58.1
Zinc	M	mg/kg	5		45.5	54.2	42.0	n/t	50.8
Anions									
Water Soluble Chloride	M	mg/kg	40		< 40	< 40	< 40	n/t	< 40
Water Soluble Sulphate	M	g/l	0.02		< 0.02	< 0.02	< 0.02	n/t	< 0.02
Inorganics									
Elemental Sulphur	M	mg/kg	20		< 20	< 20	< 20	n/t	< 20
Hexavalent Chromium	N	mg/kg	0.8		< 0.8	< 0.8	< 0.8	n/t	< 0.8
Total Sulphide	N	mg/kg	2		< 2	< 2	< 2	n/t	< 2
Total Cyanide	M	mg/kg	1		< 1.0	< 1.0	< 1.0	n/t	1.3
Acid Soluble Sulphate (SO4)	U	%	0.02		0.02	< 0.02	< 0.02	n/t	< 0.02
Water Soluble Boron	N	mg/kg	0.5		1.6	0.9	0.7	n/t	< 0.5
Miscellaneous									
pH	M	pH units	0.1		6.6	7.8	6.8	n/t	7.8
Total Organic Carbon	N	%	0.01		1.1	0.35	1.4	n/t	0.31
Phenols									
Total Phenols	N	mg/kg	6		< 6	< 6	< 6	n/t	< 6

Tests marked N are not UKAS accredited.

Results Summary

Report No.: 19-22975, issue number 1

			ELAB Reference	172623	172624	172627	172629	172630
			Customer Reference	ES	ES	ES	ES	ES
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP10	TP10	TP08	TP12	TP12
			Sample Depth (m)	0.20	0.60	0.20	0.20	0.60
			Sampling Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**					
Polyaromatic hydrocarbons								
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	n/t	< 0.1
Total PAH(16)	M	mg/kg	0.4	< 0.4	< 0.4	< 0.4	n/t	< 0.4
BTEX								
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	n/t	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	n/t	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	n/t	< 10.0
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	n/t	< 10.0
MTBE	N	ug/kg	10	< 10.0	< 10.0	< 10.0	n/t	< 10.0
TPH CWG								
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	n/t	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	n/t	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C12-C16 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C21-C35 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C35-C40 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
Total aliphatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	n/t	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	n/t	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C10-C12 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C12-C16 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C16-C21 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C21-C35 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
>C35-C40 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
Total aromatic hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0
Total petroleum hydrocarbons (>C5 - C40)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	n/t	< 1.0

Results Summary

Report No.: 19-22975, issue number 1

			ELAB Reference	172623	172624	172627	172629	172630
			Customer Reference	ES	ES	ES	ES	ES
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	TP10	TP10	TP08	TP12	TP12
			Sample Depth (m)	0.20	0.60	0.20	0.20	0.60
			Sampling Date	01/05/2019	01/05/2019	01/05/2019	01/05/2019	01/05/2019
Determinand	**Codes**	**Units**	**LOD**					
OrganoChlorine Pesticides								
alpha-HCH	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
beta_HCH	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
gamma-HCH	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
delta-HCH	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Heptachlor	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Aldrin	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Heptachlor expoxide	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
trans-Chlordane	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
alpha cis-Chlordane	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
p,p-DDE	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Dieldrin	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Endrin	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
p,p-DDD	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Endosulfan II	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Endrin aldehyde	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
p,p-DDT	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Endosulphan sulphate	M	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Methoxychlor	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
Endrin ketone	N	ug/kg	10	n/t	n/t	n/t	< 10	n/t
OrganoPhosphorus Pesticides								
Acephate	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Aziniphos-methyl	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Chlorpyrifos	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Demeton-s-methyl	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Dichlorvos	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Dimethoate	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Ethion	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Malathion	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Mathidathion	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Methamidophos	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Omethoate	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Pirimifos-methyl	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Profenofos	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Pyrazophos	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Tokuthion	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t
Tolclofos-methyl	N	ug/kg	100	n/t	n/t	n/t	< 100	n/t

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Results Summary

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Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
172602	0.40	WS04 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172607	0.20	TP02 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172612	0.60	TP01 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172613	0.20	TP04 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172615	0.20	TP05 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172616	0.60	TP05 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172617	0.20	TP06 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172619	0.20	TP07 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172623	0.20	TP10 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172624	0.60	TP10 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172627	0.20	TP08 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
172630	0.60	TP12 ES	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 19-22975, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Sulphide	N	As submitted sample	09/05/2019	109	Colorimetry
Hexavalent chromium	N	As submitted sample	09/05/2019	110	Colorimetry
pH	M	Air dried sample	14/05/2019	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	10/05/2019	115	Ion Chromatography
Aqua regia extractable metals	M	Air dried sample	09/05/2019	118	ICPMS
Phenols in solids	N	As submitted sample	09/05/2019	121	HPLC
Elemental Sulphur	M	Air dried sample	10/05/2019	122	HPLC
PAH (GC-FID)	M	As submitted sample	10/05/2019	133	GC-FID
Water soluble anions	M	Air dried sample	10/05/2019	172	Ion Chromatography
Organochlorine Pesticides in solids	M	As submitted sample	10/05/2019	173	GC-MS
Organophosphorus Pesticides in solids	N	As submitted sample	10/05/2019	173	GC-MS
Low range Aliphatic hydrocarbons soil	N	As submitted sample	09/05/2019	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	09/05/2019	181	GC-MS
BTEX in solids	M	As submitted sample	09/05/2019	181A	GC-MS
Water soluble boron	N	Air dried sample	10/05/2019	202	Colorimetry
Total cyanide	M	As submitted sample	09/05/2019	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	10/05/2019	210	IR
TPH CWG soil by gc-gc	M	As submitted sample	10/05/2019	214	
Asbestos identification	U	Air dried sample	15/05/2019	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 19-22975, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
ELAB are unable to provide an interpretation or opinion on the content of this report.
The results relate only to the sample received.
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request
Unless otherwise stated, sample information has been provided by the client

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

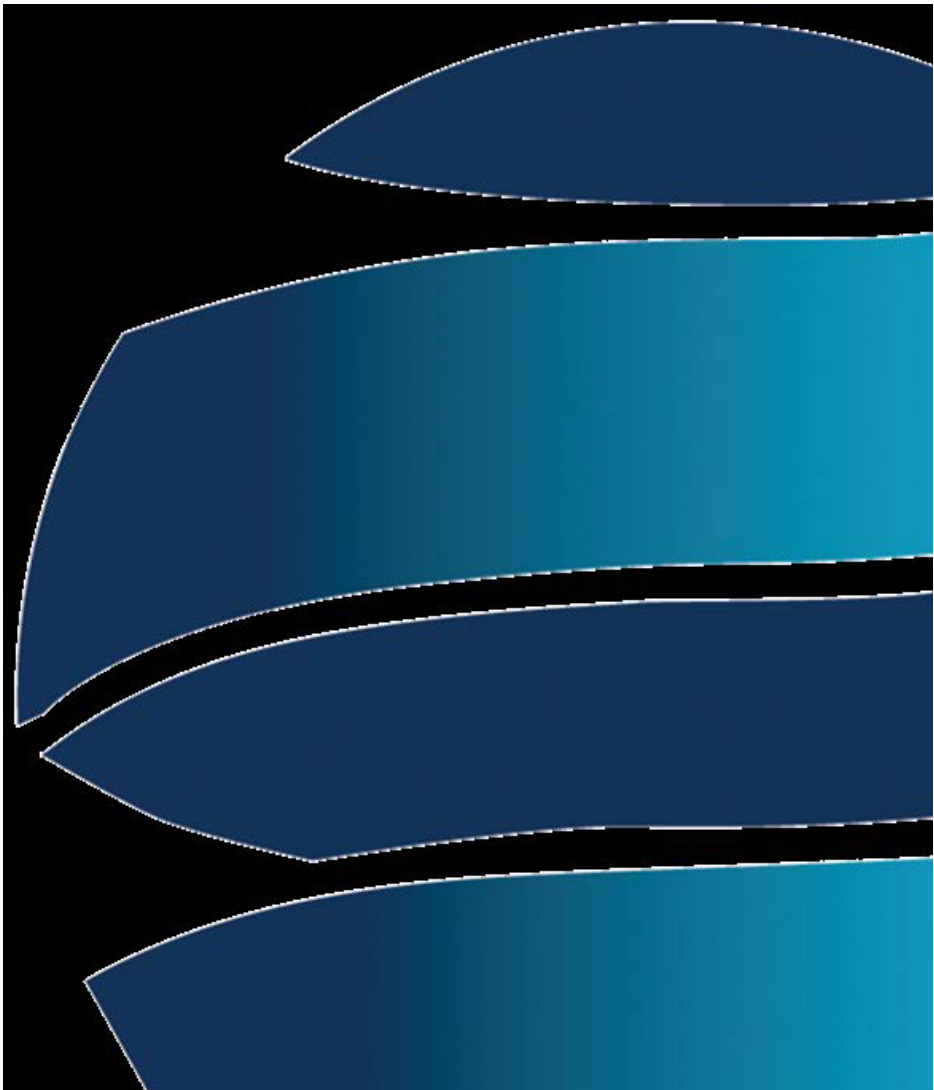
Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

Geo-Environmental

APPENDIX D

CATWASTE Output



ATKINS CatWasteSoil

Classification Assessment Tool of Soil Wastes - Hazard Summary Sheet

Site Name	Land at Stane Street, Billingshurst
Location	Billingshurst
Site ID	GE18159
Job Number	GE18159
Date	6/3/2019
User Name	[redacted]
Company Name	Geo-Environmental Services Limited

Hole ID	Sample Depth	Hazardous Waste Y/N	HP1	HP2	HP3	HP4	HP5	HP6	HP7	HP8	HP9
WS04	0.40	N	No	No	No	No	No	No	No	No	No
TP02	0.20	N	No	No	No	No	No	No	No	No	No
TP01	0.60	N	No	No	No	No	No	No	No	No	No
TP04	0.20	N	No	No	No	No	No	No	No	No	No
TP05	0.20	N	No	No	No	No	No	No	No	No	No
TP05	0.60	N	No	No	No	No	No	No	No	No	No
TP06	0.20	N	No	No	No	No	No	No	No	No	No
TP07	0.20	N	No	No	No	No	No	No	No	No	No
TP10	0.20	N	No	No	No	No	No	No	No	No	No
TP10	0.60	N	No	No	No	No	No	No	No	No	No
TP08	0.20	N	No	No	No	No	No	No	No	No	No
TP12	0.60	N	No	No	No	No	No	No	No	No	No

This output data has been generated by the CAT-Waste Soil waste classification tool provided by Atkins Consultants Ltd and J.McArdle Contracts and should be read in conjuntion with the standard Terms and Conditions

15:42 07/06/2019

ATKINS CatWasteSoil

Site Name	Land at Stane Street, Billingshurst
Location	Billingshurst
Site ID	GE18159
Job Number	GE18159
Date	6/3/2019
User Name	[redacted]
Company Name	Geo-Environmental Services Limited

Hole ID	Sample Depth	Hazardous Waste Y/N	HP10	HP11	HP12	HP13	HP14	HP15	HP16
WS04	0.40	N	No	No	No	No	No	No	No
TP02	0.20	N	No	No	No	No	No	No	No
TP01	0.60	N	No	No	No	No	No	No	No
TP04	0.20	N	No	No	No	No	No	No	No
TP05	0.20	N	No	No	No	No	No	No	No
TP05	0.60	N	No	No	No	No	No	No	No
TP06	0.20	N	No	No	No	No	No	No	No
TP07	0.20	N	No	No	No	No	No	No	No
TP10	0.20	N	No	No	No	No	No	No	No
TP10	0.60	N	No	No	No	No	No	No	No
TP08	0.20	N	No	No	No	No	No	No	No
TP12	0.60	N	No	No	No	No	No	No	No