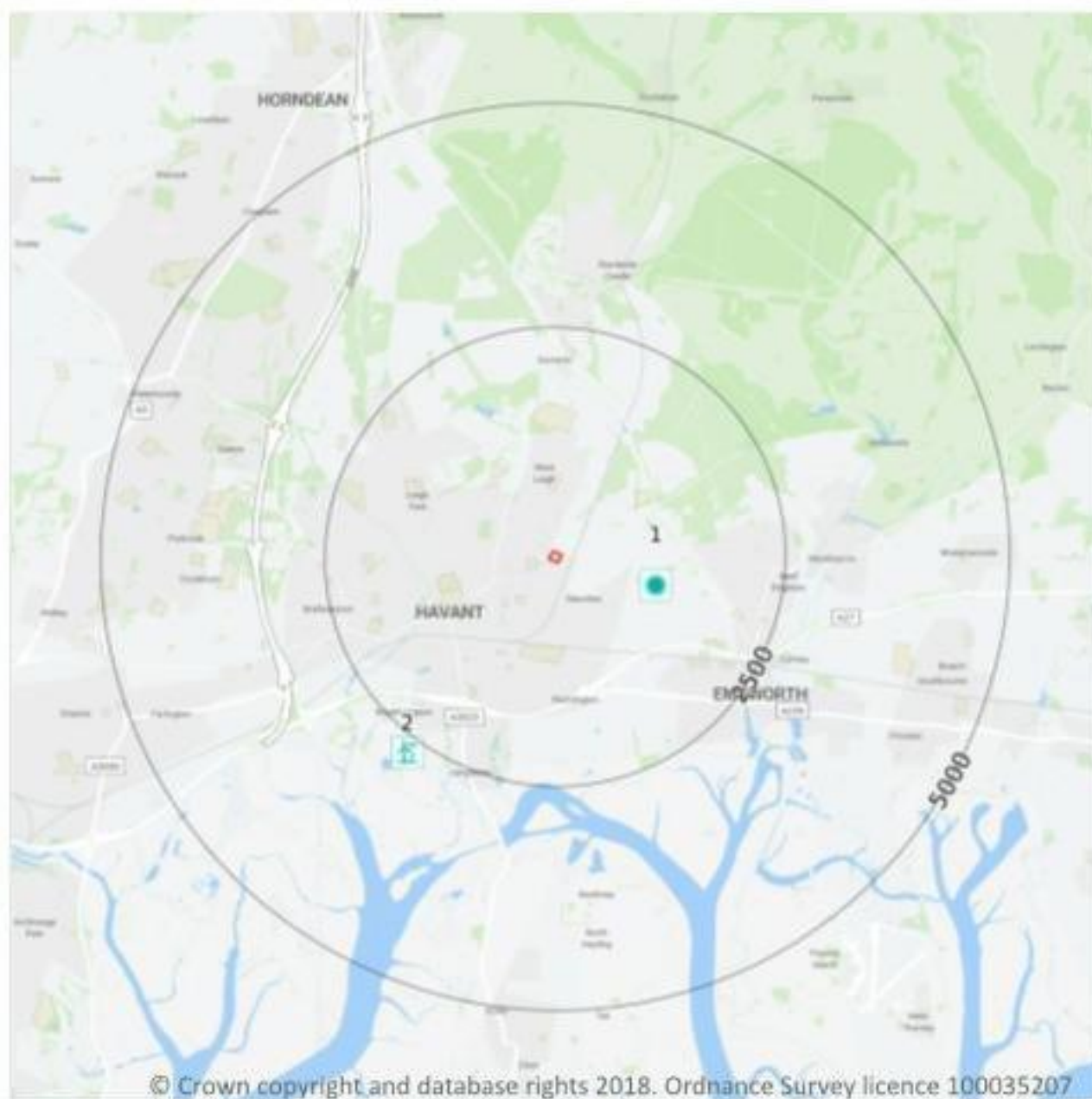


Wind and solar



- X** Site Centre
- Site Outline
- 125-
-250-** Search buffers in metres (m)
- Wind farms
- Proposed wind farms
- Proposed wind turbines
- Existing and agreed solar installations
- Proposed solar installations

Solar

Proposed solar installations

There is a planning permission application relating to a solar farm or smaller installation near to the property. Please note this will not include small domestic solar installations and that one site may have multiple applications for different aspects of their design and operation. Also note that the presence of an application for planning permission is not an indication of permission having been granted. See below for details of the proposals.

ID	Distance	Direction	Address	Details
1	1-2 km	E	Southleigh Farm House, Southleigh Road, Havant, PO9 2NX	Applicant name: M Bailey Application Status: General Enquiry - Non-Householder Pre-App Application Date: 16/10/2013 Application Number: GEN/13/00913

The data is sourced from the public register of planning information and is updated on a bi-weekly basis.

Wind

Proposed wind farms

A wind farm or group of turbines or individual wind turbine has been proposed within 5,000m of the property. See below for details of the operating company, number of turbines, project and turbine capacity.

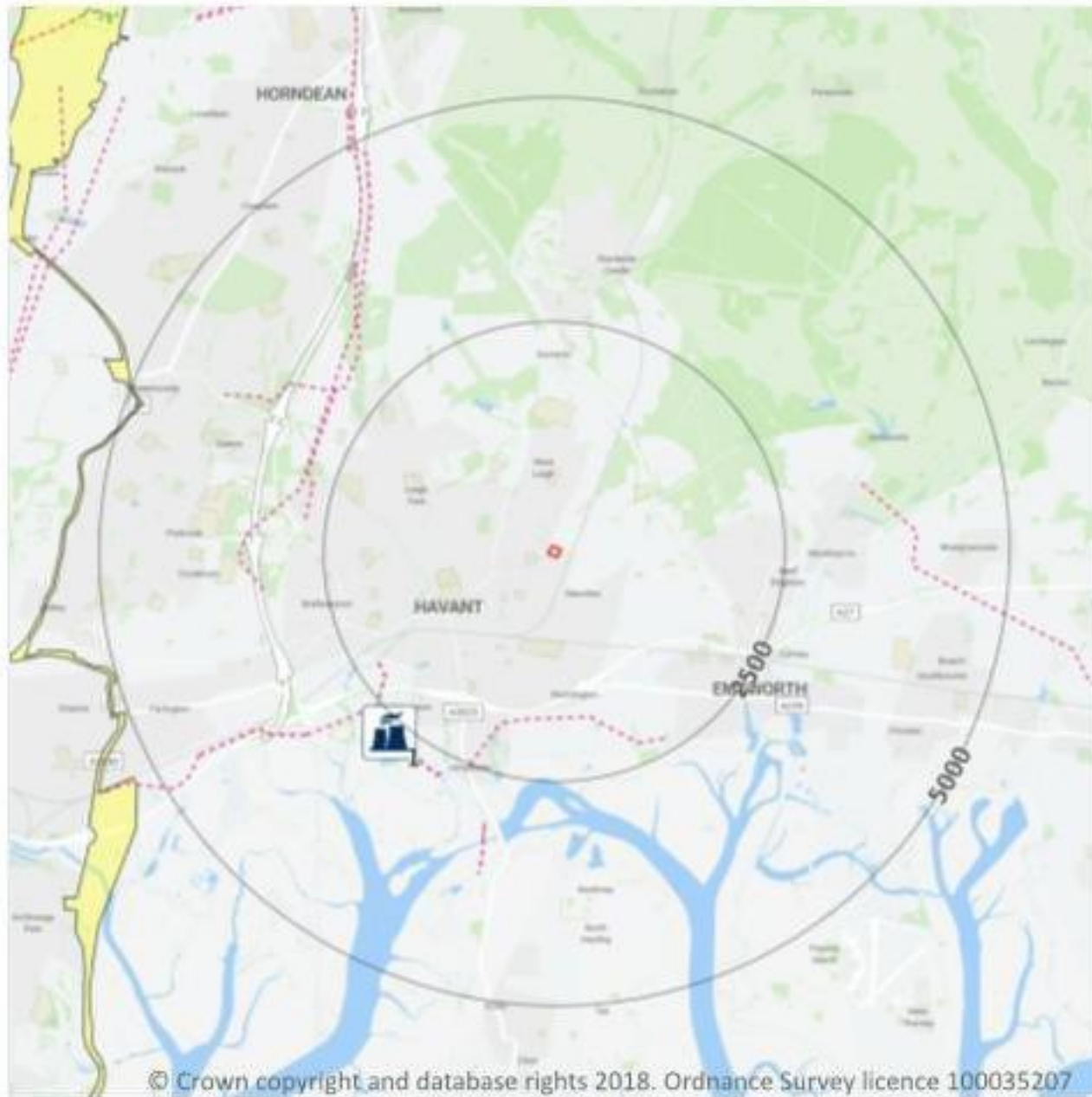
Please note some planning applications identified as having been refused, may have subsequently been granted on appeal without appearing as such within this report.

ID	Distance	Direction	Details	
2	2-3 km	SW	Site Name: 4 Penner Road, Havant, PO9 1QH Planning Application Reference: APP/16/00313 Type of Project: 4 Wind Turbines	Application Date: 2016-04-13 Planning Stage: Detail Plans Withdrawn Project Details: Scheme comprises installation of 4 18m high small scale free standing columns mounted vertical axis wind turbines. Approximate Grid Reference: 470984, 105336

This information is derived from planning data supplied by Glenigan, in some cases with further accuracy applied by Groundsure's experts. This search includes planning applications for wind farms with multiple turbines within 5,000m of the property. This data is updated on a quarterly basis.

If the existence of a planning application, passed or refused may have a material impact with regard to the decision to purchase the property, Groundsure recommends independent, thorough enquiries are made with the Local Authority. If any applications have been identified within this report, Groundsure have included the planning reference to enable further enquiries to be made.

Energy infrastructure



- X** Site Centre **—** Site Outline
- 125-
-250-** Search buffers in metres (m)
- Power stations
 - Nuclear sites
 - Gas sites
 - Electricity substations
 - Energy development projects
 - Gas pipelines
 - Electricity Lines
 - Electricity Cable
 - Electricity transmission lines and pylons

Power stations

Power stations

There is an active power station on or near to the property. Power stations can cause air pollution issues and may not be visually pleasing.

Power generation stations identified by these searches have a capacity of over 1 MW (Million Watt output) and will be one of the following types: Combined Cycle Gas Turbine (CCGT), Gas/Oil, Coal Gas, Diesel Gas, HP Oil, Poultry Litter, Coal/Oil, Coal/Gas, Meat and Bone, Pumped Storage Mine Gas, Rapeseed Oil, Straw/Gas Waste Combined Heat or Power Biomass.

Air pollution issues can be investigated further through the Air Quality team at the Local Authority. If the existence of any of a power generation station may have a material impact with regard to the decision to purchase the property, Groundsure recommends making independent enquiries with the operating company listed.

ID	Distance	Direction	Company name	Power station name	Type of power station	Total capacity (MW)	Operating since
1	2-3 km	SW	Southern Water Services	Budds Farm Wtw, Southern Water	Combined Heat and Power	1.95	No Details

This data is sourced from the Digest of United Kingdom Energy Statistics (DUKES), a database from the Department of Energy and Climate Change (DECC).

Large Energy Projects

Large scale energy generation or transmission infrastructure has been proposed on or near to the property. Plans have been submitted to the Planning Inspectorate (formerly known as the Infrastructure Planning Commission). See below for details of what is proposed.

ID	Distance	Direction	Details	Summary
	4-5 km	W	Operator: AQUIND Limited Site Name: AQUIND Interconnector Stage: Pre Application	Development of AQUIND Interconnector with a nominal net capacity of 2000MW between Great Britain and France located off the coast of Portsmouth offshore and between Portsmouth and Lovedean substation onshore.

The information for this search is taken from a range of publicly available datasets. If the existence of a large scale infrastructure project may have a material impact with regard to the decision to purchase the property, Groundsure recommends making independent, thorough enquiries, starting with the National Infrastructure Planning website - <https://infrastructure.planninginspectorate.gov.uk/projects/>.

Datasets searched but no features were found at this location

In addition to the results detailed in the maps and tables in this report, all of these datasets were also queried but did not reveal any results relevant to the site or surrounding area.

Contaminated Land

Former petrol stations
Former garages
Former military land
Former landfill (from British Geological Survey records, 1973)
Former landfill (from Local Authority and historical mapping records)
Waste site no longer in use
Active or recent landfill
Former landfill (from Environment Agency Records)
Active or recent licensed waste sites
Current or recent petrol stations
Sites designated as Contaminated Land
Historical licensed industrial activities
Current or recent licensed industrial activities
Pollutant release to surface waters
Pollutant release to public sewer
Dangerous industrial substances (D.S.I. List 1)
Dangerous industrial substances (D.S.I. List 2)

Bedrock hydrogeology

Groundwater abstraction licences

Source Protection Zones and drinking water abstractions

Source Protection Zones
Drinking water abstraction licences

Hydrology

Surface water abstractions

Flood Risk

Risk of flooding from rivers and the sea
Flood storage areas: part of floodplain
Historical flood areas
Areas benefiting from flood defences
Flood defences
Proposed flood defences
Surface water flood risk

Ground stability

Natural ground subsidence
Natural geological cavities
Coal mining
Non-coal mining
Mining cavities
Infilled land

Oil and Gas

Licensed blocks
Potential future exploration areas

Wind and solar

Existing and agreed solar installations
Wind farms

Proposed wind turbines

Energy Infrastructure

Electricity transmission lines and pylons
National Grid energy infrastructure
Nuclear installations

Planning constraints

Sites of Special Scientific Interest
Internationally important wetland sites (Ramsar Sites)
Special Areas of Conservation
Special Protection Areas (for birds)
National Nature Reserves
Local Nature Reserves
Designated Ancient Woodland
Green Belt
World Heritage Sites
Areas of Outstanding Natural Beauty
National Parks
Conservation Areas
Listed Buildings
Certificates of Immunity from Listing
Scheduled Monuments
Registered Parks and Gardens

Contaminated Land assessment methodology

Environmental risk framework

This report is designed to provide a basic environmental liability risk assessment for the purposes of transaction due diligence, financing arrangements and similar circumstances. The report comprises a basic risk assessment within the general principles of the contaminant-pathway-receptor pollutant linkage model and with due regard for relevant publications issued by the Department of Environment, Food and Rural Affairs (and predecessor government departments) the British Standards Institute and the European Union.

Explicit opinion is provided with regard to potential liability for the property to be identified as Contaminated Land in accordance with the meaning set out in Part 2A of the Environmental Protection Act 1990.

Consideration and due regard is also made of associated legislation that may lead to related statutory or third party environmental liability, including but not limited to the Water Resources Act 1991, the Water Act 2014, the Contaminated Land Regulations 2006, Environmental Permitting Regulations 2010, the Environmental Damage (Prevention and Remediation) (England) (Amendment) Regulations 2015 in England and the Environmental Damage (Prevention and Remediation) (Amendment) (Wales) Regulations 2015 in Wales.

This report does not contain a detailed Conceptual Site Model as required in the National Planning Policy Framework, however, it may prove highly effective in determining whether such further assessment is appropriate.

The report is based upon the information contained in subsequent dataset sections. Some datasets have been generated by and are unique to Groundsure, whilst others are provided by recognised bodies including Environment Agency/Natural Resources Wales, British Geological Survey, Public Health England, Local Authorities, etc. Groundsure may also have been provided with further details regarding the site by the client and / or his advisers. In the absence of such, Groundsure has made a best estimation regarding current and proposed land use. This report and the risk assessment presented is based purely upon this information.

In undertaking this report Groundsure has not, unless explicitly stated to the contrary, undertaken a site inspection, site investigation, consulted directly with the Local Authority with specific regard to the subject property or reviewed existing environmental reports. Whilst every effort is made to consider likely environmental liabilities on the basis of the information assessed, certain issues may only be readily discernible from physical site inspection and / or investigation.

Contaminant source - Pathway - Receptor definitions

Contaminant sources include (but are not limited to):

- Historical on-site and historical off-site sources (works, factories, oil tanks, landfill sites)
- Current on-site and current off-site sources (petrol stations, industrial facilities)

Pathways comprise:

- Any mechanisms facilitating 'receptor' exposure to contaminative 'sources'

Receptors include:

- Human health i.e. site users or occupiers, adjacent site users or occupiers

- Controlled Waters i.e. groundwater, surface water (rivers and streams etc)
- Habitats and biodiversity (in particular nature reserves or other designated sensitive habitats)
- Property, buildings and infrastructure

Environmental risk assessment definitions

A risk rating will be provided on the front page of the report depending on the level of environmental liability that there has been assessed to be at the site. The ratings are defined as follows:

Low: There are unlikely to be significant environmental liabilities associated with the property.

Low to Moderate: There are unlikely to be significant environmental liabilities associated with the property with regard to the proposed use. However, minor issues may require further consideration and assessment under certain circumstances e.g. redevelopment.

Moderate: Some potential environmental liabilities are likely to reside with the property as a result of historical and / or current use. Whilst unlikely to represent an immediate significant issue, if left unchecked this position may change with time. A prudent purchaser may wish to make further enquiries of the vendor / undertake limited further due diligence / seek environmental improvements. Redevelopment of the site will likely require further, more detailed assessment.

Moderate to High: Some potential significant environmental liability issues have been identified at the property requiring further assessment. Should further information be available it may be possible to re-assess the risk. In the absence of sufficient further information, further assessment might comprise consultation with the environmental regulators / review of existing environmental reports / commissioning new environmental reports / consideration of environmental insurance.

High: Significant potential environmental liabilities have been identified at the property. Further detailed environmental due diligence will likely be required and may include review of existing environmental reports / commissioning new environmental reports including site investigations / consideration of environmental insurance / transaction restructuring.

Is there a risk of statutory (e.g. Part 2A EPA 1990) or third party action being taken against the site?

This response considers the risk of legal liability arising through ownership or occupation and use of the property through statutory or other third party claims.

Does the property represent Acceptable Banking Security from an environmental risk perspective?

Consideration is given to the suitability of the property as robust financial security for the purposes of secured lending facilities. An assumption is made here that the subject property is being considered in isolation and that normal commercial lending loan to value ratios are being considered.

Groundsure may in certain circumstances be able to make a specific lender liability assessment based on a full view of financial arrangements and hence the commercial context of the environmental risks.

Is there a risk that the property value may be impacted due to environmental liability issues?

This response sets out to advise whether environmental liabilities are likely to materially impact upon a standard Royal Institution of Chartered Surveyors valuation of the property necessitating further assessment.

Environmental Damage (Prevention and Remediation) Regulations 2015

The Environmental Damage (Prevention and Remediation) (England) (Amendment) Regulations 2015, the Environmental Damage (Prevention and Remediation) (Amendment) (Wales) Regulations 2015 and the Environmental Liability (Scotland) Amendment Regulations 2015 came into force on 19th July 2015, and amend the Environmental Damage (Prevention and Remediation) Regulations 2009, which came into force in

England on 1st March 2009, in Wales on 6th May 2009 and in Scotland on 24th June 2009. These regulations implement the European Directive on Environmental Liability (2004/35/EC) and are aimed at ensuring responsible parties prevent and remedy environmental damage to the following receptors:

- Sites of Special Scientific Interest (SSSIs), other protected habitats and protected species
- Surface waters
- Groundwater
- Land, if contamination of the land results in significant risk of adverse effects on human health

The regulations are based on the 'polluter pays' principle and ensures that those responsible for causing environmental damage are those responsible for paying to prevent and remedy such damage. 'Environmental Damage' has a specific meaning within the Regulations, and covers only the most serious cases. For damage to SSSIs, EU protected species and habitats and damage to water, primary remediation, complementary remediation and compensatory remediation may be required by the enforcing authorities (Environment Agency/Natural Resources Wales, Scottish Environment Protection Agency (SEPA), Local Authorities, the Marine Fisheries Agency, Marine Scotland, Welsh Ministers and Natural England/Natural Resources Wales/Scottish Natural Heritage).

The regulations apply on land in England, Wales and Scotland, 1 nautical mile seaward from the baseline (in relation to water damage), on the seabed around the UK up to the limits set out in the Continental Shelf Act 1964, and to waters in the Renewable Energy Zone, which extends approximately 200 miles out to sea (in relation to protected species and natural habitats). These regulations are designed to work in tandem with Part 2A of the Environmental Protection Act, and only apply to environmental damage caused after the Regulations came into force. Groundsure's assessment of the site is not an assessment of the potential for Environmental Damage to occur at the site, but is an assessment of the sensitivity of the site in relation to relevant receptors.

Flood information

The Flood Risk Assessment section is based on datasets covering a variety of different flooding types. No inspection of the property or of the surrounding area has been undertaken by Groundsure or the data providers. The modelling of flood hazards is extremely complex and in creating a national dataset certain assumptions have been made and all such datasets will have limitations. These datasets should be used to give an indication of relative flood risk rather than a definitive answer. Local actions and minor variations, such as blocked drains or streams etc. can greatly alter the effect of flooding. A low or negligible modelled flood risk does not guarantee that flooding will not occur. Nor will a high risk mean that flooding definitely will occur. Groundsure's overall flood risk assessment takes account of the cumulative risk of river, coastal, surface water (pluvial), and groundwater flooding and historic flood events.

Risk of flooding from rivers and the sea

This is an assessment of flood risk for England and Wales produced using local data and expertise, provided by Environment Agency. It shows the chance of flooding from rivers or the sea presented in categories taking account of flood defences and the condition those defences are in. The model uses local water level and flood defence data to model flood risk.

Historic flood events

Over 86,000 events are recorded within this database. This data is used to understand where flooding has occurred in the past and provides details as available. Absence of a historic flood event for an area does not mean that the area has never flooded, but only that Environment Agency/Natural Resources Wales do not currently have records of flooding within the area. Equally, a record of a flood footprint in previous years does not mean that an area will flood again, and this information does not take account of flood management schemes and improved flood defences.

Surface water flooding

JBA Risk Management surface water flood map identifies areas likely to flood following extreme rainfall events, i.e. land naturally vulnerable to surface water or "pluvial" flooding. This data set was produced by simulating 1 in 75 year, 1 in 200 year and 1 in 1000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though older ones may even flood in a 1 in 5 year rainstorm event.

Proposed flood defences

The data includes all Environment Agency/Natural Resources Wales's projects over £100K that will change or sustain the standards of flood defence in England and Wales over the next 5 years. It also includes the equivalent schemes for all Local Authority and Internal Drainage Boards.

Flood storage areas

Flood Storage Areas may also act as flood defences. A flood storage area may also be referred to as a balancing reservoir, storage basin or balancing pond. Its purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval. These areas are also referred to as Zone 3b or 'the functional floodplain' and has a 5% or greater chance of flooding in any given year, or is designed to flood in the event of an extreme (0.1%) flood or another probability which may be agreed between the Local Planning Authority and Environment Agency/Natural Resources Wales, including water conveyance routes. Development within Flood Storage Areas is severely restricted.

Groundwater flooding

Groundwater flooding is flooding caused by unusually high groundwater levels. It occurs as excess water emerging at the ground surface or within underground structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and it can result in significant damage to property. This risk assessment is based on a 5m Digital Terrain Model (DTM) and a 1 in 100 year return period.

Search Code and Groundsure terms and conditions

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Groundsure Ltd, Sovereign House, Church Street, Brighton, BN1 1UJ. Tel: 08444 159 000. Email: info@groundsure.com which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints Advice

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPO's Contact Details:

The Property Ombudsman scheme, Milford House, 43-55 Milford Street, Salisbury, Wiltshire SP1 2BP. Tel: 01722 333306 Fax: 01722 332296 Email: admin@tpos.co.uk Web: <https://www.tpos.co.uk/>

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

COMPLAINTS PROCEDURE: If you want to make a complaint, we will:

- acknowledge it within 5 working days of receipt
- normally deal with it fully and provide a final response, in writing, within 20 working days of receipt
- keep you informed by letter, telephone or e-mail, as you prefer, if we need more time
- provide a final response, in writing, at the latest within 40 working days of receipt
- liaise, at your request, with anyone acting formally on your behalf

Complaints should be sent to:

Operations Director, Groundsure Ltd, Sovereign House, Church Street, Brighton, BN1 1UJ. Tel: 08444 159 000. Email:

info@groundsure.com If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk We will co-operate fully with the Ombudsman during an investigation and comply with their final decision.

Groundsure's Terms and Conditions can be viewed online at this link: <https://www.groundsure.com/terms-and-conditions-may25-2018>

Important consumer protection information

All of the advice and reports that Groundsure produces are covered by a comprehensive Remediation Contribution policy to ensure customers are protected, see <https://www.groundsure.com/remediation> for full details.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information in your Screening report. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference>.

APPENDIX D

Havant Borough Council, 23 Jan 2019, letter ref. GEN/18/01229



Ms N Fellows
30 Carlton Crescent
Southampton
SO12 2EW

Our Ref: GEN/18/01229
Direct Line: (023) 9244 6513
Ask For: Mrs D Haywood
Email: planning.development@havant.gov.uk

23 January 2019

Site Location: 38 New Lane, Havant, PO9 2ND

Re: Demolition of the existing industrial units and the erection of two commercial buildings (comprising of 10 individual units) within Use Classes B1, B2 and B8.

Dear Mr Fellows

I am writing to you further to your enquiry received on the 10 December 2018 and our meeting on the 14 January 2019 regarding the above address.

The site lies within the built up area and is an existing employment site. Its redevelopment for employment purposes is acceptable in principle.

Layout

In terms of the proposed layout as identified at the meeting there are concerns regarding the proximity of the development to the road frontages and that the current landscaped character of New Lane is not respected. The building should be set back to allow for landscaping, particularly in relation to Plot 1. In respect to the Stanbridge Road frontage the hedging in this location is supported, but the elevation will need breaking up to ensure the creation of an attractive elevation appropriate to its road frontage location. Additionally not referred to at our meeting the corner of unit 7 needs setting back from the Stanbridge Lane frontage to reduce its prominence.

The development proposes a large expanse of unbroken hardsurfacing and consideration should be given to the introduction of tree planting within this area to provide a more attractive appearance.

I am unclear from the plan as to the proposed installations beyond the parking area for units 1 to 6 and whether there is any above ground development with an associated visual impact. Could you please clarify?

Contamination and air quality.

The Environmental Health Officer has advised the following:

Contamination

A search of planning files has identified the following potential on-site sources:

- Engine Room depicted on plans under HWU3289 (new cooperate dairy depot)
- 3-Chamber Brick Built interceptor & Vehicle Storage Garage (HWU3289)
- Fuel tank compound in SE of site adjacent to former cycle store, marked on 'existing' plans (13554)
- Transformer enclosure in SE of site adjacent to former cycle store, East of oil storage, marked on 'existing' plans (13554)

- Boiler Room in SW of 1963 building footprint (13554)
 - Garage in NW corner of 1963 building footprint (13554)
 - Above Ground Storage Tank 6'0" x 4'0" x 4'0", raised on Brick Piers. Material stored is unknown (plan has poor legibility, but appears to indicate 'gas oil' for 'heater').
- Eastern Half of North facade of 1963 building footprint (13554)
- Inflammable materials store 12'8" x 8'8", brick built, independent outbuilding located NE of the 1963 building extents. (13554/1)
 - Possible Incinerator unit within 7'0" x 7'0" independent outbuilding located NE of the 1963 building extents, ~25' from Inflammable store. Poor legibility on plan, unconfirmed. (13554/1)
 - Printing & paper pattern manufacture - principal building use. Storage & handling of inks & solvents expected.

Landuse adjacent and within the vicinity of the site has the potential to cause contamination (various engineering uses / tooling, plant hire / depot / civil engineering uses, and gas storage). The Southern Gas site adjacent to the North has several references in the plans to acid bath cleaning of gas fittings & components, and the cleaning & servicing of small gas appliances. Several soakaways are also noted on the plans, which may be capable of influencing local groundwater flows (&/or contamination distributions).

In terms of the general environmental context of the site:

- The site is located within an SPZ 1c (sub-surface).
- Records show the site to be underlain by compact medium gravel with flint cobbles and sandy clay. Porous strata (noted 'highly permeable'), with groundwater levels at around 12.6m AOD. This is considered likely to represent the secondary aquifer, and continuity with the local surface water course is assumed until shown otherwise. Limestone may be encountered at around 12m below ground (around 2-3m AOD), but this does not represent the chalk aquifer. Chalk anticipated from nearest BH record to be below -29m OD.
- Site boundary is within 25m of a statutory main river (Lavant). Associated flood risk is to the West of the channel.
- Local Public Sewers discharge directly to the Lavant immediately West of the site
- Closest human receptors are >30m from site, beyond river channel. Commercial GAC are acceptable for Human Health screening. Secondary Aquifer, and local Surface Water are principle receptors of concern.

It is unlikely that piling will be required to such depths as to be likely to materially impact the principle aquifer. The EA may wish to comment due to proximity to the Lavant. The LLFA will wish to comment on SuDS / Reduction of Downstream Flooding risk.

Suds / Pollution Risk

B2/B8 loading areas are considered to be a moderate risk (of minor collisions, fuel spillage / leakage, and spillage / leakage of goods / products / materials handled in connection with the business. Given the proximity to a local main river, infiltration drainage should only be used where it is shown that there is no existing contamination risk, and care should be taken to ensure that the drainage system does not function as a vector for pollutants to become soil contaminants (capable of migrating to the river & causing harm).

Similarly, any discharge to the public sewer network (including via existing site services) should be attenuated to minimise downstream flooding risk to the satisfaction of the LLFA, and should seek to attenuate pollutants to an appropriate degree - particularly suspended solids and LNAPL.

Air Quality

I would encourage the applicant to consider an inherently sustainable design. Any technology which serves to reduce or eliminate local combustion (e.g. for space or water heating), or to minimise local combustion emissions, will serve positively influence local air quality. LZC technologies such as PV power, Direct Solar, Heat Pumps, or MVHR all have co-benefits for carbon reduction, energy efficiency and emissions reduction.

Emerging Policy E23 concerns Air Quality - seeking consideration of high quality design at the outset, so that upward pressure on local emissions, and so local air quality, can be mitigated as a matter of routine for all large scale development. This emerging policy may have some weight at the time the detailed application comes forward, and I would encourage the applicant to consider it's provisions in any event both as a matter of good practice, and falling within the purview of policies CS14 & CS16.

A transport assessment should consider the likely volume of trips associated with the development. Should this differ substantially from the trip generation associated with the existing landuse consent, it may be necessary to consider the principle trip distribution on the local highway network, and to consider a framework employee travel plan, and/or site signage and logistics planning to avoid pollution sensitive areas where possible (e.g. Park Road North & Park Road South). Again, emerging policies cover these subjects (in particular, and perhaps most relevant, including requirements for provision of EV charging facilities), and may be relevant at the time of application. If coming forward sooner, existing policies DM11-14 & DM16 are relevant to the consideration of transport impact, and the applicant is encouraged to consider including progressive technologies within proposals coming forward before replacement of the current local plan.

It is assumed that the scheme is speculative at this stage, that no specific tenants are envisaged, and that it is not known at this point whether any significant point sources (of air pollution) will be created at the new development. It is assumed that in the event that this does become a possibility, that a future application (e.g. for a flue or chimney structure) would be required, and the assessment of impact would be picked up at that time.

Highways

The Borough Engineer has identified that a Transport Statement to justify the number of car parking spaces and cycle storage is required together with a Travel Plan.

In respect to access a single point off access off New Lane should be provided with on site turning, demonstrated by tracking plans. Regarding the proposed double access layout this is not supported however, should you wish to pursue such a layout I recommend that you submit further information supporting such a scheme.

The trees potentially affected by this development are around the perimeter. In order to make a full assessment of the proposal a Tree Protection Plan and Method Statement should be submitted alongside any application

Additionally I would advise you that the site lies within the Portsmouth Water Source Protection Area and therefore you may want to discuss your proposal with Portsmouth Water.

Finally the Council meet to consider approving consultation on the pre submission Draft Local Plan on the 30th January 2019, and I would recommend that you carry out a health check in respect to the proposed policies.

Please note that the above comments are the opinion of an individual Planning Officer and are in no way binding upon the Council when determining an application for planning permission and nor will they prejudice the outcome of any application submitted.

This advice also only relates to planning matters, and does not relate to any other application that may be required under the Building Regulations or under any other Act, Regulation, Byelaw or Order where the Council's approval may be needed. For further guidance as to the need for consent under the Building Regulations please phone 023 9244 6571.

Yours sincerely
Mrs D Haywood
Principal Planner
Our Ref: GEN/18/01229

APPENDIX E

Interpretive Report on Ground Investigation, 38 New Lane, Havant; Structural Soils Ltd Project No: 734244, dated February 2019



38 New Lane, Havant

Interpretive Report on Ground Investigation

Project No: 734244

Client: Kingsbridge Estates Ltd

FEBRUARY 2019



Project No.:	734244
Report No.:	734244-1 (00)
Project Name:	38 New Lane, Havant
Document Title	Interpretive Report on Ground Investigation
Client:	Kingsbridge Estates Ltd
Engineer:	AKS Ward Ltd
Status:	Final

Author


S Stanley BSc (Hons) FGS

Approved by


A Cattell BSc PhD CGeol FGS

Report Issue Date

8 February 2019

DOCUMENT ISSUE RECORD

REVISION RECORD

Revision	Date	Description of revisions	Prepared by

STRUCTURAL SOILS LIMITED

The Old School

Stillhouse Lane

Bedminster

BRISTOL

BS3 4EB

Tel: 0117 947 1000

Email: ask@soils.co.uk
www.soils.co.uk

CONTENTS

1 INTRODUCTION.....	1
2 SITE DESCRIPTION.....	2
2.1 Location and Topography	
2.2 Geology	
2.3 Hydrogeology and Hydrology	
3 REVIEW OF EXISTING PHASE 1 ENVIRONMENTAL SITE ASSESSMENT	6
3.1 General	
3.2 Summary of Site History	
3.3 Summary of Potential Sources of Contamination	
3.4 Recommended Ground Investigation Works	
4 FIELDWORK	7
4.1 General	
4.2 Exploratory Holes	
4.3 Backfill	
5 LABORATORY TESTING.....	9
5.1 Geotechnical Laboratory Testing	
5.2 Geoenvironmental Laboratory Testing	
6 GROUND CONDITIONS	11
6.1 General	
6.2 Topsoil, Made Ground and Possible Made Ground	
6.3 Superficial Deposits – Head Deposits	
6.4 Groundwater	
7 GEOTECHNICAL ENGINEERING ASSESSMENT	13
7.1 Proposed Development	
7.2 Site Preparation and Excavation	
7.3 Foundations	
7.4 Floor Slabs	
7.5 Protection of Buried Concrete	
8 GEOENVIRONMENTAL ASSESSMENT	15
8.1 Purpose of Investigation	
8.2 Geoenvironmental Assessment of Soil	
8.3 Geoenvironmental Conclusion	
9 SUMMARY.....	17
10 REFERENCES.....	18

APPENDIX A - PLANS AND DRAWINGS	I
(i) Site Location Plan	
(ii) Exploratory Hole Location Plan	
APPENDIX B - EXPLORATORY HOLE RECORDS	II
(i) Key to Exploratory Hole Logs	
(ii) Window Sample Logs	
APPENDIX C - IN-SITU TESTING.....	III
(i) Standard Penetration Test (SPT) Summary Sheet	
(ii) SPT Calibration Record	
(iii) SPT N value versus Depth Plot	
APPENDIX D - GEOTECHNICAL LABORATORY TESTING	IV
(i) Laboratory Test Verification Sheet	
(ii) Laboratory Test Results	
APPENDIX E - GEOENVIRONMENTAL TESTING.....	V
(i) Laboratory Test Results	
(ii) Initial Waste Characterisation (Haswaste)	
(iii) Laboratory UKAS Accreditation Certificate	
APPENDIX F - BACKGROUND TO GEOENVIRONMENTAL ASSESSMENT	VI
(i) RSK Group Generic Assessment Criteria (GAC)	

1 INTRODUCTION

This investigation was carried out by Structural Soils Ltd (SSL) on the instructions of AKS Ward Ltd (the Engineer) on behalf of Kingsbridge Estates Ltd (the Client) at 38 New Lane in Havant. The purpose of the work was to obtain geotechnical and geoenvironmental information for the proposed redevelopment of the site. '

The scope of the investigation comprised window sample holes, laboratory testing and the preparation of this report. The report contains a description of the site and the works carried out, the exploratory hole logs, in-situ and laboratory testing results.

The ground investigation has been carried out in accordance with the contract specification, and the general requirements of BS 5930:2015, BS 10175:2011+A2:2017, BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant standards as identified below.

This report presents the factual records of the fieldwork and laboratory testing together with an interpretation of the findings with respect to the proposed development. The report gives recommendations relating to geotechnical aspects such as foundation design. It presents an appraisal of geoenvironmental aspects such as soil contamination and gives recommendations on risk reduction. It should not be assumed that these would meet the requirements of the local authority, whose advice should be sought regarding planning permission.

A Phase 1 Environmental Site Assessment by The Vertex Companies Inc. has been provided to SSL by the Client for use and review within this report (see References).

All information, comments and opinions given in this report are based on the ground conditions encountered during the site work, and on the results of laboratory and field tests performed during the investigation. Whilst every attempt is made to record full details of the strata encountered in the exploratory holes, techniques of hole formation and sampling will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

This report was prepared by SSL for the sole and exclusive use of Kingsbridge Estates Ltd in response to particular instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded. No liability will be accepted after a period of 6 years from the date of the report.

2 SITE DESCRIPTION

2.1 Location and Topography

The site is located east of New Lane in Havant, approximately 1.2 km north-east of Havant railway station (see Site Location Map in Appendix A). The British National Grid Reference of the site is SU 727077.

The site is approximately 100 m by 100 m in size (see Exploratory Hole Location Plan in Appendix A). A large commercial building, which is split into numerous units, is located centrally on site, with a further smaller unit present in the northern corner. Hardstanding is present to the north-east and south-west of the main building, and grassed areas to the south-east and north-west. The hardstanding to the north-east is predominantly asphalt, with gravel at the north-western end, and it slopes gently down to the north-west. This area is used for car parking. The grassed area to the south-east of site is approximately 1.00 m higher than the level of the building and is accessed via steps to the north. The level of this area is similar to that of the adjacent road to the east. The area is overgrown at the southern end. The land to the north-west of the building is predominantly grass, with an asphalt surfaced area to the north, for access to the additional unit. Asphalt surfacing dominates the area to the south-west of site, with thin strips of soft landscaping and trees along the south-eastern boundary.

A gas holder is present adjacent north of the site and is situated within an approximately 1 m deep cutting. The site is situated within an industrial estate. New Lane forms the north-west boundary, Stanbridge Road lies to the south-west and Downley Road to the south-east. Residential housing is present to the west.

The site is set at an elevation of approximately 17.00 m above Ordnance Datum (AOD) at the north-east and 16.00 m AOD at the south-west.

2.2 Geology

Information on the geology of the site was obtained from the following sources published by the British Geological Survey (BGS):

- BGS map (sheet 316, scale 1:50,000, published 1998).
- The BGS digital geology map, which utilises the most up to date names for geological units (www.bgs.ac.uk/data).
- The BGS Lexicon of Named Rock Units, which provides typical descriptions for most geological units (www.bgs.ac.uk/lexicon).

The site is shown to be underlain by the following descending sequence of strata:

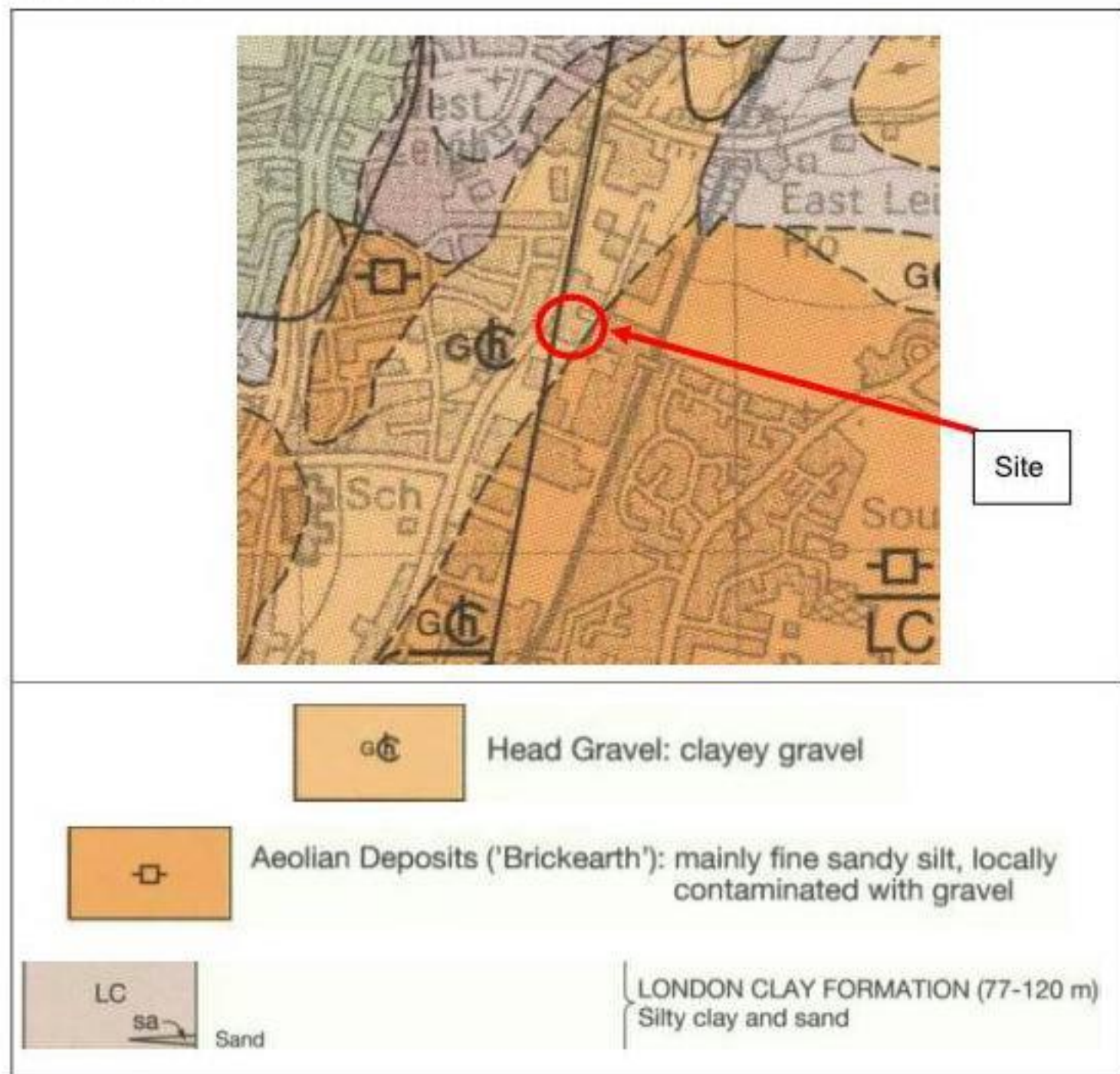
TABLE 1 : SUMMARY OF EXPECTED SITE GEOLOGY	
Geological Unit Name	Description
ANTHROPOGENIC GROUND	
Artificial ground	None shown
SUPERFICIAL DEPOSITS	
Head	Polymict deposit: comprises gravel, sand and clay depending on upslope source and distance from source. Poorly sorted and poorly stratified deposits formed mostly by solifluction and/or hillwash and soil creep. Essentially comprises sand and gravel, locally with lenses of silt, clay or peat and organic material.
River Terrace Deposits (Undifferentiated)	Sand and gravel, locally with lenses of silt, clay or peat.
SOLID GEOLOGY	
London Clay Formation	The London Clay mainly comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite.

Note: Information obtained from BGS digital records © NERC.

The site is shown to be underlain by superficial deposits recorded as Head at the west of site and River Terrace Deposits at the east. Formerly, the River Terrace Deposits were recorded as Brickearth on the 1998 mapping (as shown on the following extract). The boundary between the two deposits crosses the site north-east to south-west close to the south-east corner of the site. Bedrock beneath the site is recorded as the London Clay Formation, which is described as clayey silt or silty clay with layers of sandy clay.

Borehole scans are available from the BGS digital records for the ground investigation for the Rowlands Castle main sewer, of which the two closest borehole records are located approximately 5 m west and 15 m south-west of the site. These cable percussion boreholes were drilled to 3 m and 1 m depth, respectively. The hole closest to the site proved possible made ground to 1 m depth over *compact flint cobbles with medium gravel and dark brown sandy clay*. The hole to the south-west of site proved *very compact flint cobbles and medium gravel* to 1 m depth. Groundwater was not noted in either of these boreholes.

The BGS online maps portal provides access to scans of almost all maps produced by the BGS since 1932. An extract of the most recent available scanned map for the site is included below:



Note: Above images contain British Geological Survey materials ©NERC [2018].

2.3 Hydrogeology and Hydrology

2.3.1 Aquifer Designation

Based on Landmark information within the Phase 1 report by The Vertex Group Inc, the following aquifer designations have been given to the geological units underlying the site:

- Superficial deposits (Head and River Terrace Deposits) as a Secondary 'A' Aquifer (variably permeable).
- Bedrock (London Clay Formation) as Unproductive Strata.

'Secondary' aquifers include a wide range of rock layers or superficial deposits with an equally wide range of water permeability and storage. Secondary 'A' Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic

scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

'Unproductive Strata' are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

2.3.2 Source Protection Zones

The site is located within an Inner Source Protection Zone – subsurface activity only (Zone 1c) (ISPZ). An inner zone is defined as the 50-day travel time from any point below the water table to the potable water source and has a minimum radius of 50m.

2.3.3 Anticipated Groundwater flow / direction

Groundwater beneath the site is expected to be present within River Terrace Deposits and Head at shallow depth, and possibly perched on the top of the London Clay Formation. Based on the geological mapping this is expected to be an unconfined aquifer and it is expected to be recharged by precipitation which infiltrates at the site. Groundwater flow within this unit is expected to be dominated by intergranular flow. Flow is anticipated to be towards the south-west.

The closest down-hydraulic-gradient surface water body to the site is Lavant Stream, located approximately 20 m west. Groundwater is likely to be in continuity with this feature.

3 REVIEW OF EXISTING PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

3.1 General

A Phase 1 Environmental Site Assessment report was compiled by The Vertex Group Inc, dated October 2016. The report was for an American client, and used American rather than UK phrasing. It identified what it referred to as Recognised Environmental Conditions (RECs) in connection with the site. The report defined RECs as *the presence or likely presence of hazardous substances or petroleum products in, on, or at a property, due to the release to the environment, under conditions indicative of a release to the environment or under conditions that pose a material threat of a future release to the environment.*

3.2 Summary of Site History

The information from the Phase 1 Environmental Site Assessment, indicated that the site was originally agricultural land and was first developed between 1955 and 1960 by Butterick. The factory first occupied approximately a third of the site and was expanded by 1973 to a footprint similar to today's. From first construction to the early 1990s, originally one and then two linear structures appear to have been present along the southern boundary of the site. Butterick originally printed sewing patterns on site until 30 years ago and now lease most of the site to other businesses and only occupy 15% themselves. 15 commercial businesses operate on site and include manufacture of plastics and car turntables, testing of digital production equipment, pet supplies, woodwork workshops and further office-based activities.

The surrounding industrial estate was also developed from agricultural land in the 1960s. A gas holder is present adjacent north of the site and was first shown on historical mapping in 1960. It is known that gas holder stopped being used 5 to 6 years ago.

3.3 Summary of Potential Sources of Contamination

The Vertex Group Inc have identified RECs in connection with the site to include the historical use of the site as a printing works, industrial processes in the immediate surrounding area and the former gas holder to the north of the site. There are known asbestos containing material (ACM) at the site, which are recorded and managed using an asbestos register.

3.4 Recommended Ground Investigation Works

The Phase 1 report by the Vertex Group Inc recommended that no assessment of the ground and groundwater conditions at the site would be required, given that the use of the site remains the same. However, an intrusive ground investigation would be required to give a preliminary indication of any contamination beneath the site. An initial ground investigation has been undertaken by SSL, whilst the site was still occupied, and its findings are detailed in the following report. Further investigation should be undertaken if the buildings on site are to demolished and replaced.

4 FIELDWORK

4.1 General

The ground investigation was carried out by SSL on 11 December 2018 and 14 January 2019. The return visit was made to complete further exploratory holes close to the northern end of site in the vicinity of the gasholder on the adjoining site: this part of the site not previously being accessible. The investigation was supervised by an engineer from SSL. The scope of works and positions were selected by SSL in consultation with AKS Ward Ltd, set out by SSL and adjusted where necessary to take account of buried or overhead services, or other restrictions. The exploratory hole locations are shown on the Exploratory Hole Location Plan presented in Appendix A.

4.2 Exploratory Holes

The exploratory holes are listed in the following table.

TABLE 2 :SCOPE OF INTRUSIVE WORKS			
Quantity	Exploratory Hole Type	Maximum depth (m)	Hole / Test Numbers
1	Hand Dug Trial Pits	0.75	WS4
6	Window Sample Boreholes	3.45	WS1 to WS3 and WS5 to WS7

WS4 was commenced as an inspection pit for a window sample borehole but terminated within the pit. This was due to being unable to hand dig the pit further and the position was deemed unsafe to proceed by drilling at 0.75 m depth due to proximity to several services in the area.

The exploratory hole logs are presented in Appendix B. These provide information including the equipment and methods used, samples taken, tests carried out, water observations and descriptions of the strata encountered. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, together with other explanatory information.

The holes were logged by an engineer in general accordance with the recommendations of BS 5930:2015 (which incorporates the requirements of BS EN ISO 14688-1, 14688-2 and 14689-1). Detailed descriptions, together with relevant comments, are given on the logs.

Standard penetration tests (SPT) in the window sample holes were carried out in accordance with BS EN ISO 22476-3+A1 (2011) and are presented on the logs in Appendix B as uncorrected 'N' values. The SPT hammer energy ratio certificate, a test result summary sheet and 'N' value vs. depth plot are presented in Appendix C.

Prior to the commencement of any exploratory hole or intrusive test all positions were checked for buried services by a specialist utility surveyor using a cable avoidance tool

(CAT), signal generator ('genny'), and ground penetrating radar (GPR). The survey was carried out by RSK SafeGround and Diamond Drilling Solutions.

Inspection pits were hand dug at the window sample locations as noted on the logs.

The surveying of exploratory hole positions relative to the British National Grid and ground levels relative to Ordnance Datum has not been requested or undertaken as part of this investigation.

4.3 Backfill

On completion, the exploratory holes were backfilled with arisings and surface reinstated with existing soft landscaping or gravel.

5 LABORATORY TESTING

Samples for potential geotechnical testing were returned to one of the Company's UKAS accredited laboratories, and those for potential geoenvironmental testing were sent to a sister company Envirolab Limited, a MCERTS and UKAS accredited testing laboratory. Laboratory tests were scheduled by SSL. Tests carried out in accordance with MCERTS/UKAS standards where noted on the results sheets.

5.1 Geotechnical Laboratory Testing

Geotechnical laboratory testing was generally carried out in accordance with the relevant part of BS1377: 1990, *Methods of Test for Soils for Civil Engineering Purposes*, or, where superseded, by the relevant part of BS EN ISO 17892:2014+ *Geotechnical investigation and testing – Laboratory Testing of Soil*.

The number of tests completed and the test methods used are summarised below. Where non-standard procedures have been undertaken, this is recorded on the report sheet. The results are reported in tabular and/or graphical form and included as Appendix D of this report.

TABLE 3 : SUMMARY OF GEOTECHNICAL TESTING		
Number of tests	Test	Remarks
Classification Tests		
2	Moisture content.	
2	Liquid and plastic (Atterberg) limits.	
Chemical Tests: Soil*		
2	Water soluble sulphate content and pH value.	

Note:* Test(s) carried out to method approved in BRE Special Digest 1.

5.2 Geoenvironmental Laboratory Testing

The geoenvironmental testing carried out is summarised in the following table. The results are included as Appendix E of this report, and include details of the test method.

TABLE 4 : SUMMARY OF GEOENVIRONMENTAL LABORATORY TESTING		
Numbers of tests	Description	Notes
SOIL		
4	General soil contamination screening suite.	Comprises arsenic, cadmium, chromium (total), lead, mercury, selenium, copper, nickel, zinc, speciated polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH banded 1 with ID), soluble organic matter, soluble sulphate and pH.
5	Asbestos presence screen.	Identification was undertaken if/where asbestos fibres were detected.

6 GROUND CONDITIONS

6.1 General

Descriptions of the strata encountered are given on the exploratory holes logs presented in Appendix B. The downward succession encountered is broadly consistent with the published geology. This sequence is summarised in the table below.

TABLE 5 : SUMMARY OF GROUND CONDITIONS			
Strata Encountered	Depth to top of stratum m bgl	Range of Thicknesses (m)	Exploratory holes encountered in
Topsoil	0.00	0.20 – 0.40	WS1, WS2 and WS6
Made Ground	0.00	0.40	WS4
Possible Made Ground	0.0	0.15 – 0.25	WS4 and WS6
Head	0.00 – 0.55	0.20 – 3.08 (base not proven)	All holes

The ground conditions are summarised in more detail below.

6.2 Topsoil, Made Ground and Possible Made Ground

The topsoil was up to 0.40 m in thickness where present and consisted of friable brown slightly gravelly sandy clay or silt with frequent rootlets. The gravel comprised angular to subrounded fine to coarse flint.

The Made Ground was up to 0.40 m where present and comprised pinkish grey sandy angular to subrounded fine to medium gravel and yellowish brown sandy slightly silty angular to subrounded fine to coarse gravel. Anthropogenic (man-made) components of the Made Ground included concrete, brick and charcoal with a low cobble content. Cobbles were subangular of concrete.

6.3 Superficial Deposits – Head Deposits

The made ground was underlain by Head Deposits comprising orangish brown slightly gravelly sandy clay with a low cobble content of flint interbedded with dense orangish brown slightly sandy clayey angular to subrounded fine to coarse gravel of flint. Depth to Head Deposits varies from 0.30 – 0.55 m and thicknesses of clay varies from 0.40 m – 1.52 m. Gravel thicknesses vary from 0.3 m– 2.58 m. Depth to Head Deposits varies from 0.00 – 0.55 m.

6.4 Groundwater

No groundwater was encountered in the exploratory holes, which reached a maximum depth of 3.45 m.

7 GEOTECHNICAL ENGINEERING ASSESSMENT

7.1 Proposed Development

No details of the proposed development are available. Our understanding is that the current position is that the existing building(s) may either be retained or replaced. We were requested to give general comments on foundation design in case the buildings were to be replaced. It is assumed that any new buildings would be steel-framed requiring pad foundations.

7.2 Site Preparation and Excavation

The soils encountered at the site are considered suitable for excavation by standard mechanical plant such as a wheeled backhoe excavator. A hydraulic breaker may be required to break out any hard cover, buried foundations or other obstructions that remain following demolition.

Groundwater ingress into excavations is unlikely above depths of about 3.5 m. However, it should be noted that groundwater levels may change due to seasonal or other variations. Surface water run-off from rainfall may also enter excavations. Advice on suitable dewatering techniques is given in CIRIA Report C515 *Groundwater Control – design and practice*.

All excavations should be planned and due consideration should be given to providing temporary support or suitable battering. Excavations should be regularly inspected by a competent person to ensure continued safety. Further advice on the safety of excavations is given in *Health and Safety in Construction*.

7.3 Foundations

7.3.1 Shallow Spread Foundations

Pad foundations should be suitable for any new structure, unless the column loads are unusually high. These could be taken down onto the natural Head Deposits at a recommended minimum foundation depth of 0.90 m. The foundation soils are on the borderline between granular and cohesive at foundation level, but become coarser with depth. If they are assessed as being coarse (granular), then assuming a conservative mean SPT N value of 15 (see plot of N value versus depth in Appendix C) the allowable bearing capacity would be of the order of 200 kPa.

The allowable bearing capacity in granular soils is defined as that likely to cause a maximum settlement of 25 mm. This assumes a depth of granular soil beneath the foundation of at least twice the foundation width, which is the case here.

7.4 Floor Slabs

Ground bearing floor slabs with a suitable sub-base layer slab may be adopted for the proposed development.

All formation level soils should be proof-rolled and all topsoil and any other loose, soft, organic or otherwise unsuitable materials should be removed and replaced with a suitable, well-compacted granular fill. Hard spots such as old foundations should also be removed.

7.5 Protection of Buried Concrete

This assessment of the potential for chemical attack on buried concrete is based on current guidance contained in BRE Special Digest 1 ('SD1', 2005) *Concrete in Aggressive Ground Part 1: Assessing the aggressive chemical environment*. Third Edition.

The site is classed as *brownfield*, as it has been subject to previous industrial development and might contain chemical residues produced by or associated with industrial production. Table C2 in BRE SD1 is therefore used to assess the site.

Groundwater is assumed to be *static* above about 3.5 m. 'Static groundwater' applies to locations where the ground is either permanently dry, or contains water but has low permeability (i.e. little water movement is possible, permeability generally less than 10^{-7} m/s).

Soil pH values ranging from 7.34 to 8.63 were recorded. From these results a 'Characteristic Value' of 7.34 is derived. The groundwater sulphate (SO_4) results range from 0.01 mg/l to 0.04 mg/l. From these results a 'Characteristic Value' of 0.04 mg/l. Based on the results the Design Sulphate Class for the site is DS-1.

It is concluded that for this site the Aggressive Chemical Environment for Concrete (ACEC) class is AC-1s if there is no risk of concrete being in contact with groundwater. The designer should utilise this classification in order to produce the concrete specification.

8 GEOENVIRONMENTAL ASSESSMENT

8.1 Purpose of Investigation

The purpose of the investigation was to assess the contamination status of the site, which the Client is purchasing. As noted in section 7.1, it is possible that the site will be redeveloped, but would remain commercial. A desk study carried out previously by others had concluded that risks to the site were low, and that no intrusive investigation was required. The Client wished to carry out an investigation to confirm that the risk of contamination was low.

As well as general site coverage, the area next to the gasholder in the adjacent site was targeted, as the Client had expressed concern that this might be a source of contamination. The site was never a gasworks, and so the common gasworks contaminants such as phenols are not relevant here. The gasholder is of the spiral-guided type. The only possible contaminants are hydrocarbons used to provide a floating seal between the gas and water beneath, to prevent absorption gas by the water on which the gasometer 'floats'.

8.2 Geoenvironmental Assessment of Soil

8.2.1 General

To determine whether contaminants are present at levels that may be deemed to pose a significant hazard to human health, measured contamination levels in soil at the site are compared against derived guideline values ('Tier 2' soil screening), either directly or following statistical analysis. Where contaminants are present above the screening values it is probable that site-specific information will be required to further examine the potential risk of harm arising from such contamination.

The background to the assessment is contained in Appendix F and the findings are summarised in the following pages.

The proposed use of the site is commercial and thus the commercial guidelines have been used to assess the results.

Due to the limited number of samples tested we have compared the results directly to the GACs without the use of the statistics.

8.2.2 Results

There were no olfactory or visual indications of contamination in any of the holes.

The contaminants assessed against the GAC's are: arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, Polycyclic Aromatic Hydrocarbons (PAH) & Total Petroleum Hydrocarbons (TPH).

All of the individual results for the remaining contaminants were all below the GACs for a commercial end-use. Conclusions

The investigation has shown contaminant levels in the soil to be below the assessment criteria, which indicates that no risks to human health have been identified.

8.2.3 Gasholder

One shallow and three deeper window sample holes were drilled at the northern end of the site, closest to the gasholder. These reached a maximum depth of 3.45 m, in gravelly and clayey gravel soils (Head Deposits). Although some of the soils are gravels, all are clayey and relatively impermeable, and lateral migration of any hydrocarbon contamination that might have leaked from the gasometer is unlikely. No visual evidence or odours of hydrocarbons were noted in any of the window sample holes on the nearby part of the site – nor in those more distant from the gasholder.

8.3 Geoenvironmental Conclusion

No contamination has been recorded at the site resulting in no complete pollutant linkages being identified. It is therefore considered that the site is fit for the proposed end use without further assessment or remediation.

9 SUMMARY

- 9.1 A site at New Lane, Havant, is being purchased by the Client, who was concerned at the possibility of liabilities related to any contamination of the site that they might be taking on.
- 9.2 A desk study had previously been carried out by others, although we understand that this was not carried out for the Client. This concluded that risks at the site were low and no intrusive investigation was required. Nevertheless, the Client instructed a site investigation to be carried out to check this assessment.
- 9.3 A commentary on possible foundation design for any redevelopment of the site was also requested.
- 9.4 Sitework consisted of window sampling, to maximum depth of 3.45 m, around the outside of the existing building which fills the centre of the site.
- 9.5 The investigation proved Head Deposits of clayey gravel, locally grading into gravelly clay, and the underlying bedrock was not reached.
- 9.6 No groundwater was encountered.
- 9.7 No evidence of contamination was found, either in the forms of visible evidence such as staining or hydrocarbon odours, or in the test results. It is therefore considered that the site is fit for the proposed end use without further assessment or remediation.
- 9.8 Pad foundations taken down onto the Head Deposits at 0.90 m depth could be used for any new development, unless heavily loaded. The allowable bearing capacity would be of the order of 200 kPa.
- 9.9 Ground bearing floor slabs could be used.
- 9.10 The Aggressive Chemical Environment for Concrete (ACEC) class is AC-1s.

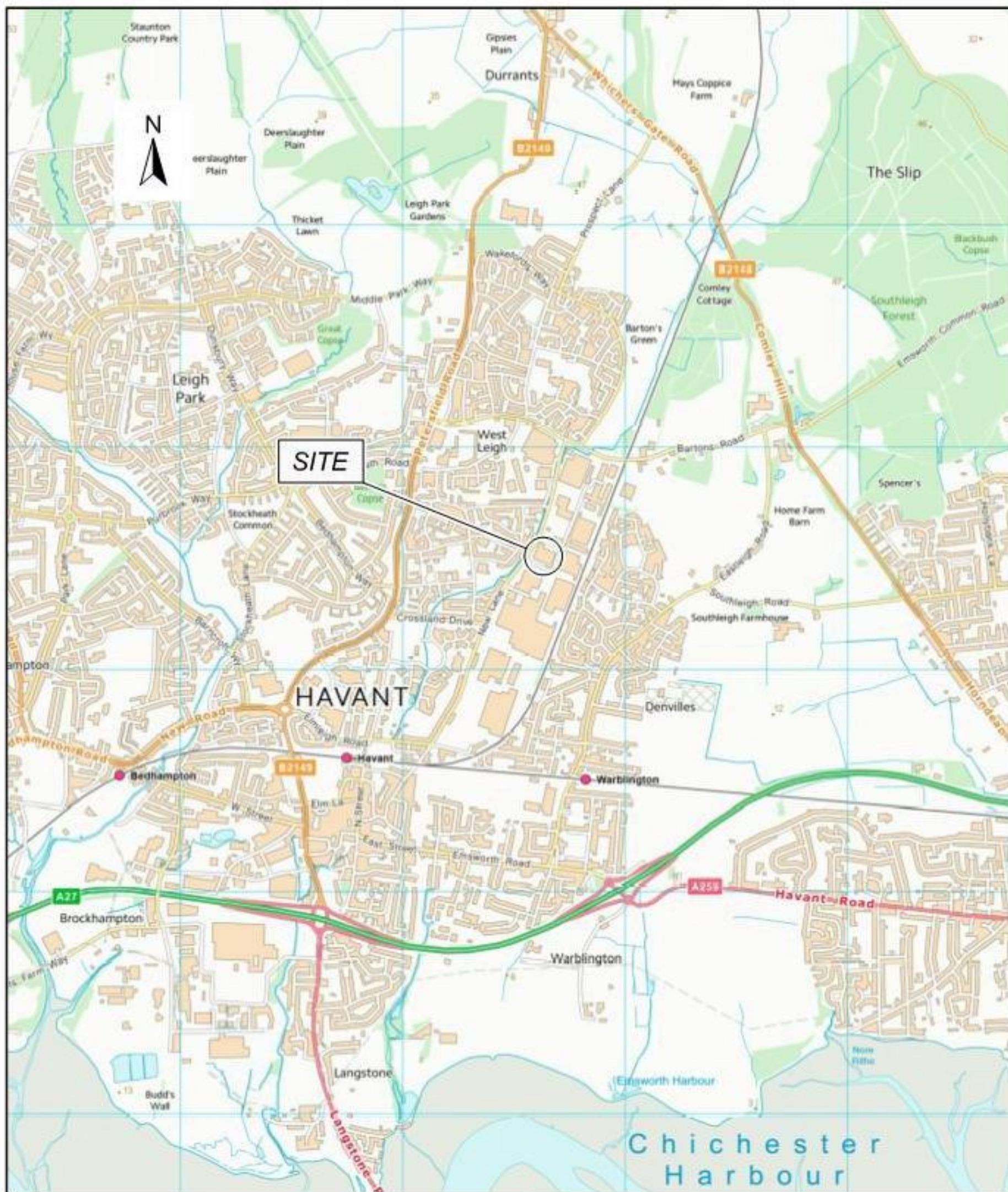
10 REFERENCES

- 10.1 BS 5930:2015 *Code of practice for ground investigations*
- 10.2 BS EN 1997-1:2004 *Eurocode 7 — Geotechnical Design Part 1 - General Rules* incorporating corrigendum Feb 2009 and Amendment A1 2013
- 10.3 BS EN 1997-2:2007 *Eurocode 7 — Geotechnical design Part 2: Ground Investigation and testing*
- 10.4 BS 10175:2011 *Investigation of potentially contaminated sites: Code of practice, including amendment A2 2017*
- 10.5 The Vertex Companies Inc. *Phase 1 Environmental Site Assessment. Butterick Group Ltd, 38 New Lane, Havant, PO9 2ND, UK. 2016.*
- 10.6 British Geological Survey sheet 316, scale 1:50,000, published 1998
- 10.7 British Geological Survey online digital geological map, www.bgs.ac.uk/data
- 10.8 British Geological Survey Lexicon of Named Rock Units, www.bgs.ac.uk/lexicon
- 10.9 BS EN ISO 14688-1:2002 *Geotechnical investigation and testing – Identification and classification of soil: Part 1: Identification and description*
- 10.10 BS EN ISO 14688-2:2004 *Geotechnical investigation and testing – Identification and classification of soil: Part 2: Principles for a classification*
- 10.11 BS EN ISO 14689-1:2003 *Geotechnical investigation and testing – Identification and classification of rock: Part 1: Identification and description*
- 10.12 BS EN ISO 22475-1:2006 *Geotechnical Investigation and Testing – Sampling methods and groundwater measurements, Part 1 Technical principals for execution*
- 10.13 BS EN ISO 22476-3:2005 (updated February 2007) *Geotechnical Investigation and Testing – Field Testing Part 3: Standard Penetration Test, including Amendment A1 (2011)*
- 10.14 CIRIA Report R143 (1995) *The Standard Penetration Test (SPT) - Methods and Use*

- 10.15** BS 1377:1990 *Method of Test for Soils for Civil Engineering Purposes*
- 10.16** BS EN ISO 17892:2014 *Geotechnical investigation and testing – Laboratory Testing of Soil*
- 10.17** Environment Agency Policy. Part IIA – Detailed Quantitative Assessment of Chronic Risks to Human Health from Contaminated Soils. Policy Number 199_04, dated 9 March 2004
- 10.18** Environment Agency Science Report SR2: *Human health toxicological assessment of contaminants in soil* (Final SC050021/SR2).
- 10.19** Environment Agency Science Report SR3: *Updated technical background to the CLEA model* (Final SC050021/SR3).
- 10.20** R & D Publication CLR 11 (September 2004). Model Procedures for the Management of Contaminated Land. Contaminated Land. Environment Agency

APPENDIX A - PLANS AND DRAWINGS

- (i) Site Location Plan
- (ii) Exploratory Hole Location Plan



Contains Ordnance Survey data © Crown copyright and database right 2013



STRUCTURAL SOILS

The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Tel: 0117 947 1000
ask@soils.co.uk
www.soils.co.uk

CLIENT

Kingsbridge Estates

PROJECT

38 New Lane, Havant

TITLE

SITE LOCATION MAP

00	24.01.2019	-	NP	DL	SS
REV.	DATE	DESCRIPTION	BY	CHD.	APR.
DIMENSION		SCALE	DRAWING STATUS		
m		1:25,000			

JOB NO

734244

GRID REF

SU 727 077

SCALE BAR

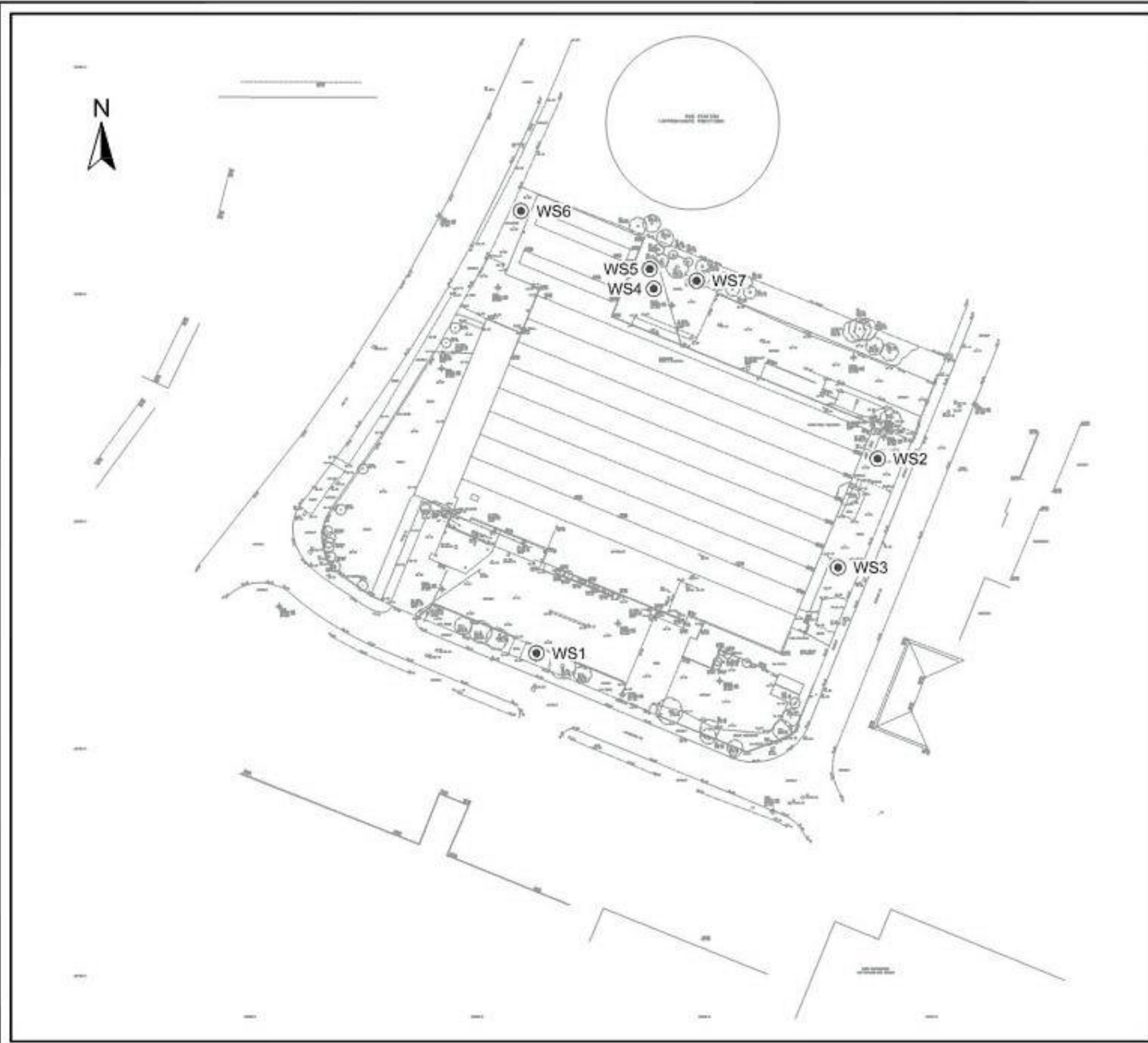


ORIGIN SIZE

A4

FIGURE

1



LEGEND

Window Sample Location

00	24.01.2019	-	NP	DL	SS
REV	DATE	DESCRIPTION	BY	CHD	APR
DIMENSION		SCALE	ORIGIN SIZE		
m		1:1250	A4		

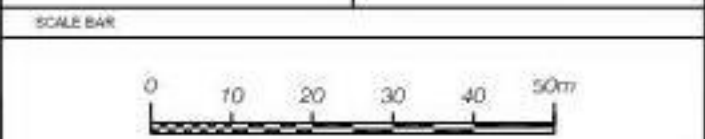


STRUCTURAL SOILS

The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB
Tel: 0117 947 1000
ask@soils.co.uk
www.soils.co.uk

CLIENT	Kingsbridge Estates
PROJECT	38 New Lane, Havant
TITLE	EXPLORATORY HOLE LOCATION PLAN

JOB NO	FIGURE
734244	2
DRAWING STATUS	REV
-	00



APPENDIX B - EXPLORATORY HOLE RECORDS

- (i) Key to Exploratory Hole Logs
- (ii) Window Sample Logs



KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF ABBREVIATIONS

SAMPLING

Sample type codes

B	=	Bulk disturbed sample.
D	=	Small disturbed sample.
ES	=	Soil sample for environmental testing.

IN-SITU TESTING

SPT _(c)	=	Standard Penetration Test using a solid 60 degree cone.
--------------------	---	---

ADDITIONAL NOTES

1. All soil and rock descriptions and legends in general accordance with BS EN ISO 14688-1, 14688-2, 14689-1, and BS5930:2015.
2. Material types divided by a broken line (- - -) indicates an unclear boundary.
3. The data on any sheet within the report showing the AGS icon is available in the AGS format.



KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF GRAPHIC SYMBOLS

MATERIAL GRAPHIC LEGENDS

	Clayey GRAVEL with COBBLES		Clayey sandy GRAVEL		Clayey sandy GRAVEL with COBBLES		Sandy clayey GRAVEL with COBBLES
	GRAVEL with COBBLES		Gravelly CLAY		Gravelly silty CLAY		Silty gravelly CLAY
	Gravelly silty CLAY with COBBLES		Gravelly SAND		MADE GROUND		Possible MADE GROUND
	Sandy gravelly CLAY		Gravelly sandy CLAY with COBBLES		Sandy gravelly CLAY with COBBLES		Sandy gravelly silty CLAY with COBBLES
	Topsoil		Silty sandy GRAVEL with COBBLES		MADE GROUND		

INSTRUMENTATION SYMBOLS

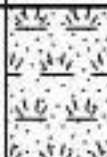
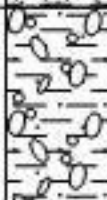
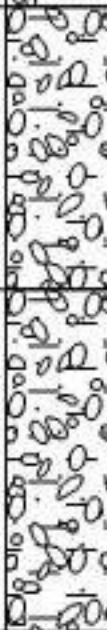
	Backfill		Bentonite seal
--	----------	--	-------------------



STRUCTURAL SOILS

WINDOW SAMPLE LOG

Contract:	38 New Lane, Havant		Client:	Kingsbridge Estates		Window Sample:	WS1
Contract Ref:	734244	Start: 11.12.18	End: 11.12.18	Ground Level:	---	Co-ordinates:	---
						Sheet:	1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
1.20 - 2.00 (77mm dia) 80% rec	0.20	1	D	N=10		Grass over friable brown slightly sandy slightly gravelly CLAY with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of flint. (TOPSOIL)	(0.40)		
	0.20	101	ES			0.40			
	0.60	2	D			Soft to firm orangish brown slightly sandy gravelly CLAY with a low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of flint. Cobbles are angular to subrounded of flint. (HEAD) ... at 0.70m becoming stiff.	(0.50)		
	1.00	3	D			0.90			
	1.20-1.65	1	SPT(c)			Loose orangish brown slightly sandy clayey angular to subrounded fine to coarse GRAVEL of flint with a low cobble content. Sand is fine to coarse. Cobbles are angular to subrounded of flint. (HEAD)	(0.70)		
	1.40	4	D			1.60			
	1.80	5	D	N=95		Medium dense light orangish brown sandy clayey angular to subangular fine to coarse GRAVEL of flint with a low cobble content. Sand is fine to coarse. Cobbles are angular to subangular of flint. (HEAD) ... at 2.00m very dense.		(0.85)	
	2.00-2.45	2	SPT(c)			2.45			
						Window sample hole refused at 2.45m depth.			

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
11/12/18	10:40	2.00	-	92	Dry	1. Location CAT, Genny and GPR scanned prior to excavation. 2. Hand dug inspection pit to 1.10m depth. 3. No groundwater encountered. 4. Backfilled with arisings upon completion. 5. SPT hammer DT15187-2018 ($E_r = 79.44\%$) used.	
						All dimensions in metres	Scale: 1:25
Method Used:	Inspection pit + Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	Jordan Evans
				Logged By:	SStanley	Checked By:	AGS



STRUCTURAL SOILS

WINDOW SAMPLE LOG

Contract:	38 New Lane, Havant		Client:	Kingsbridge Estates		Window Sample:	WS2
Contract Ref:	734244	Start: 11.12.18	End: 11.12.18	Ground Level:	---	Co-ordinates:	---
						Sheet:	1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.20	1	D				MADE GROUND: Friable brown slightly gravelly sandy CLAY with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of flint and charcoal.	(0.30)	
	0.20	101	ES				(TOPSOIL)	0.30	
	0.50	102	ES				Soft orangish brown slightly gravelly sandy CLAY with a low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of flint. Cobbles are subangular to subrounded of flint.	(0.50)	
	0.50	2	D				(HEAD)	0.80	
	0.80	3	D				Medium dense orangish brown slightly sandy clayey angular to subrounded fine to coarse GRAVEL of flint. Sand is fine to coarse.		
	0.90-1.35	1	SPT(c)	N=18			(HEAD)		
	1.50	4	D						
	2.00-2.45	2	SPT(c)	N=50			... at 2.00m depth becoming very dense.	(2.58)	
	2.50	5	D						
	3.00-3.38	3	SPT(c)	11,14/15,17,18 for 75mm					
							Window sample hole refused at 3.38m depth.	3.38	

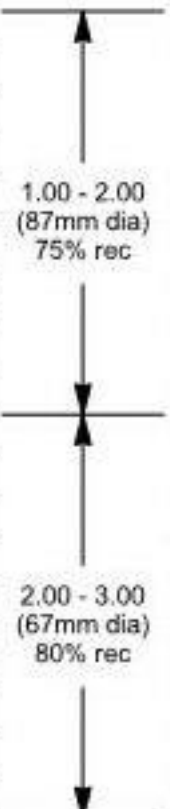
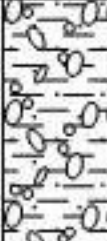
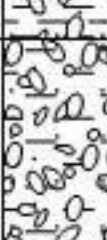
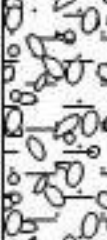
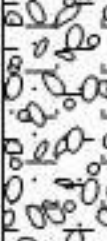
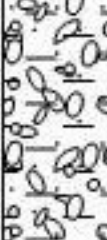
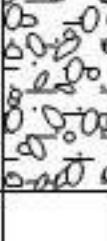
Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
11/12/18	12:00	3.00	-	79	Dry	1. Location CAT, Genny and GPR scanned prior to excavation. 2. Hand dug inspection pit to 0.90m depth. 3. No groundwater encountered. 4. Backfilled with arisings upon completion. 5. SPT hammer DT15187-2018 ($E_r = 79.44\%$) used.	
						All dimensions in metres	Scale: 1:25
Method Used:	Inspection pit + Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	Jordan Evans
						Logged By:	SStanley
						Checked By:	GS



STRUCTURAL SOILS

WINDOW SAMPLE LOG

Contract:	38 New Lane, Havant		Client:	Kingsbridge Estates		Window Sample:	WS3
Contract Ref:	734244	Start: 11.12.18	End: 11.12.18	Ground Level:	---	Co-ordinates:	---
						Sheet:	1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.40	1	D				Grass over soft to firm orangish brown slightly gravelly sandy CLAY with a low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of flint. Cobbles are angular of flint. (HEAD)	(0.70)	
	0.80	2	D					0.70	
	1.00-1.45	1	SPT(c)	N=16					
	1.80	3	D						
	2.00-2.45	2	SPT(c)	N=18			... from 2.00m light orangish brown in colour.	(2.75)	
	2.70	4	D						
	3.00-3.45	3	SPT(c)	N=145			... at 3.00m depth becoming very dense.	3.45	
							Window sample hole refused at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
11/12/18	13:20	3.00	-	79	Dry	- Location CAT, Genny and GPR scanned prior to excavation. - Hand dug inspection pit to 1.00m depth. - No groundwater encountered. - Backfilled with arisings upon completion. - SPT hammer DT15187-2018 ($E_r = 79.44\%$) used.	
						All dimensions in metres	Scale: 1:25
Method Used:	Inspection pit + Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	Jordan Evans
						Logged By:	SStanley
						Checked By:	



STRUCTURAL SOILS

WINDOW SAMPLE LOG

Contract:	38 New Lane, Havant		Client:	Kingsbridge Estates		Window Sample:	WS5
Contract Ref:	734244	Start: 14.01.19	End: 14.01.19	Ground Level:	---	Co-ordinates:	---
						Sheet:	1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thick ness)	Material Graphic Legend	
Window Run	Depth	No	Type	Results						
	0.00-0.15	101	ES	N=33		Grey subangular to subrounded fine to medium GRAVEL of limestone. (MADE GROUND)	0.02/0.15			
	0.15-0.50	1	B			MADE GROUND: Firm slightly sandy slightly gravelly silty CLAY with low cobble content and frequent rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of flint. Cobbles are angular to subrounded of flint. (MADE GROUND)	(0.35)			
	0.15-0.50	102	ES				0.50			
	0.50-1.20	103	ES			MADE GROUND: Greyish brown slightly gravelly silty CLAY with low cobble content and frequent rootlets. Gravel is angular to subrounded fine to coarse of flint, brick, limestone. Cobbles are angular to subrounded of flint. (MADE GROUND)	(0.70)			
	0.50-1.20	2	B				1.20			
	1.20-1.65	1	SPT(c)			Firm to stiff orangish brown gravelly silty CLAY with low cobble content and occasional rootlets. Gravel is fine to coarse angular to subrounded fine to coarse of flint. (HEAD)	(1.10)			
	1.20-2.30	104	ES							
	1.20-2.30	3	B							
	2.00-2.45	2	SPT(c)			N=38		Firm to stiff orangish brown gravelly silty CLAY with low cobble content. Gravel is fine to coarse angular to subrounded fine to coarse of flint. Cobbles are angular to subrounded of flint. (HEAD)	2.30	
	2.30-3.00	4	B			Dense orangish brown clayey angular to subrounded fine to coarse GRAVEL of flint with low cobble content. Cobbles are angular to subrounded of flint. (HEAD)		(1.15)		
3.00-3.45	3	SPT(c)	N=40		Window sample hole terminated at 3.45m depth.	3.45				

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
14/01/19	13:05	3.45	-	65	Dry	1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Inspection pit hand dug to 1.2m depth. 3. No groundwater encountered. 4. On completion, borehole backfilled with arisings. 5. SPT hammer DT15187-2018 ($E_r = 79.44\%$) used.	
						All dimensions in metres	Scale: 1:25
Method Used:	Inspection pit + Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	Phil
						Logged By:	DLightfoot
						Check By:	AGS



STRUCTURAL SOILS

WINDOW SAMPLE LOG

Contract:	38 New Lane, Havant		Client:	Kingsbridge Estates		Window Sample:	WS6
Contract Ref:	734244	Start: 14.01.19	End: 14.01.19	Ground Level:	---	Co-ordinates:	---
						Sheet:	1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.00-0.20	1	B				Grass over friable brown slightly gravelly sandy SILT with occasional rootlets. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of flint (Topsoil).	0.20	
	0.20-0.45	101	ES				(TOPSOIL)	0.45	
	0.45-1.20	102	ES				POSSIBLE MADE GROUND: Brown locally yellowish cream slightly gravelly silty fine to coarse SAND with frequent rootlets. Gravel is subangular to subrounded fine to medium of flint.	(0.75)	
	0.45-1.20	2	B				(MADE GROUND)	1.20	
	1.20-1.65	103	ES				Firm brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to medium of flint.	(0.50)	
	1.20-1.70	3	B				(HEAD)	1.70	
	1.70-2.00	104	ES	N=16			Stiff brown mottled black slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of flint.	(0.30)	
	2.00-2.45	4	B				(HEAD)	2.56	
	2.00-2.56	5	B				Orangish brown slightly sandy slightly clayey angular to subrounded fine to coarse GRAVEL of flint with a low cobble content. Sand is fine to coarse. Cobbles are angular to subrounded of flint.	(0.56)	
	2.56-2.90	6	B				(HEAD)	2.90	
	3.00-3.45	105	ES	N=32 1xT+1xJ			Stiff orangish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of flint.	(0.55)	
	3.00-3.45	3	SPT(c)	N=39			(HEAD)	3.45	
							Window sample hole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
14/01/19	10:53	3.45	-	75	Dry	1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Inspection pit hand dug to 1.2m depth. 3. No groundwater encountered. 4. On completion, borehole backfilled with arisings. 5. SPT hammer DT15187-2018 ($E_r = 79.44\%$) used.	
						All dimensions in metres	Scale: 1:25
Method Used:	Tracked window sampling		Plant Used:	Dando Terrier		Drilled By:	Phil Guinness
						Logged By:	DLightfoot
						Checked By:	GS



STRUCTURAL SOILS

WINDOW SAMPLE LOG

Contract:	38 New Lane, Havant		Client:	Kingsbridge Estates		Window Sample:	WS7
Contract Ref:	734244	Start: 14.01.19	End: 14.01.19	Ground Level:	---	Co-ordinates:	---
						Sheet:	1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.08-0.30	1	B				Grey subangular to subrounded fine to medium GRAVEL of limestone. (MADE GROUND)	0.02	
	0.08-0.30	101	ES					0.08	
	0.30-1.20	102	ES				Reddish brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of limestone and flint. (MADE GROUND)	0.30	
	0.30-1.20	2	B				MADE GROUND: Firm light brown gravelly sandy SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of concrete, flint and brick. (MADE GROUND)		
							Stiff orangish brown slightly sandy gravelly CLAY with low cobble content and occasional rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of flint. Cobbles are angular to subrounded of flint. (HEAD)	(1.50)	
							... Geotextile membrane at 0.4m.		
	1.20-1.65	1	SPT(c)	N=38					
	1.20-1.80	103	ES						
	1.20 - 2.00 (85mm dia) 90% rec								
	1.80-3.00	3	B				Dense becoming very dense orangish cream slightly sandy clayey angular to subangular fine to coarse GRAVEL of flint with low cobble content. Cobbles are angular to subrounded of flint. (HEAD)	1.80	
	2.00-2.45	2	SPT(c)	N=43				(1.52)	
	2.00 - 3.00 (65mm dia) 70% rec								
	3.00-3.32	3	SPT(c)	9,11/13,18,19 for 20mm				3.32	
							Window sample hole terminated at 3.32m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
14/01/19	14:30	3.32	-	65	Dry	- Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. - Inspection pit hand dug to 1.2m depth. - No groundwater encountered. - On completion, borehole backfilled with arisings. - SPT hammer DT15187-2018 ($E_r = 79.44\%$) used.	
						All dimensions in metres	Scale: 1:25
Method Used:	Inspection pit + Tracked window		Plant Used:	Dando Terrier		Drilled By:	Phil Guinness
						Logged By:	DLightfoot
						Checked By:	GS



Contract: 38 New Lane, Havant		Client: Kingsbridge Estates		Trial Pit: WS4
Contract Ref: 734244	Start: 11.12.18 End: 11.12.18	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.00	1	D				MADE GROUND: Pinkish grey sandy angular to subangular fine to medium GRAVEL of limestone. Sand is fine to coarse.	0.10	
0.00	101	ES						
0.10	102	ES				MADE GROUND: Yellowish brown sandy slightly silty angular to subrounded fine to coarse GRAVEL of limestone, concrete, brick, charcoal with a low cobble content. Sand is fine to coarse. Cobbles are subangular of concrete.	(0.30)	
0.10	2	D				... at 0.20m geotextile membrane.	0.40	
0.40	3	D					0.55	
0.60	4	D				POSSIBLE MADE GROUND: Stiff/friable orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of flint.	0.75	
						Orangish brown sandy slightly silty angular to subrounded fine to coarse GRAVEL of flint with a medium cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of flint.		
						(HEAD)		
						Trial pit terminated at 0.75m depth. Could not progress pit with hand tools.		

Plan (Not to Scale)



General Remarks

1. Location CAT, Genny and GPR scanned prior to excavation.
2. Position commenced as inspection pit for window sample hole but terminated in pit as unsafe to proceed with drilling.
3. No groundwater encountered.
4. Backfilled with arisings upon completion.

All dimensions in metres

Scale: **1:25**

Method Used: Hand dug	Plant Used: Hand tools	Logged By: SStanley	Checked By: [Signature]	AGS
------------------------------	-------------------------------	----------------------------	--------------------------------	------------

APPENDIX C - IN-SITU TESTING

- (i) Standard Penetration Test (SPT) Summary Sheet
- (ii) SPT Calibration Record
- (iii) SPT N value versus Depth Plot

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N ₆₀	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
WS1	1.20	77		DRY	1,1	150	2,3,3,2		N=10	DT15187-2018	23/01/2018	79.44	13	SPT(c)
	2.00	77		DRY	10,15	150	18,16,16,45		N=95	DT15187-2018	23/01/2018	79.44	126	SPT(c)
WS2	0.90	87		DRY	4,5	150	5,5,4,4		N=18	DT15187-2018	23/01/2018	79.44	24	SPT(c)
	2.00	67		DRY	6,8	150	10,13,14,13		N=50	DT15187-2018	23/01/2018	79.44	66	SPT(c)
	3.00	67		DRY	11,14	150	15,17,18	225	11,14/15,17,18 for 75mm	DT15187-2018	23/01/2018	79.44		SPT(c)
WS3	1.00	87		DRY	2,3	150	3,4,4,5		N=16	DT15187-2018	23/01/2018	79.44	21	SPT(c)
	2.00	67		DRY	5,5	150	4,5,5,4		N=18	DT15187-2018	23/01/2018	79.44	24	SPT(c)
	3.00	67		DRY	12,13	150	13,16,21,95		N=145	DT15187-2018	23/01/2018	79.44	192	SPT(c)
WS5	1.20				11,10	150	10,8,7,8		N=33	DT15187-2018	23/01/2018	79.44	44	SPT(c)
	2.00				8,10	150	9,10,8,11		N=38	DT15187-2018	23/01/2018	79.44	50	SPT(c)
	3.00				9,9	150	12,10,9,9		N=40	DT15187-2018	23/01/2018	79.44	53	SPT(c)
WS6	1.20		0.00	0.00	4,3	150	5,4,4,3		N=16	DT15187-2018	23/01/2018	79.44	21	SPT(c)
	2.00		0.00	0.00	6,9	150	9,8,6,9		N=32	DT15187-2018	23/01/2018	79.44	42	SPT(c)
WS6	3.00		0.00	0.00	8,10	150	8,10,9,12		N=39	DT15187-2018	23/01/2018	79.44	52	SPT(c)

Notes:

1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and total test drive blows are reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

$$N_{60} = (\text{Measured hammer energy ratio} / 60) \times N \text{ value}$$

 STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By		Date	Contract Ref:
	[REDACTED]		04.02.19	734244
	Contract: [REDACTED]		Page: 1 of 2	

38 New Lane, Havant



STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N ₆₀	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
WS7	1.20		0.00	0.00	13,10	150	10,9,9,10		N=38	DT15187-2018	23/01/2018	79.44	50	SPT(c)
	2.00		0.00	0.00	6,9	150	7,12,13,11		N=43	DT15187-2018	23/01/2018	79.44	57	SPT(c)
	3.00		0.00	0.00	9,11	150	13,18,19+	170	9,11/13,18,19	DT15187-2018	23/01/2018	79.44		SPT(c)
									for 20mm					

Notes:

1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and total test drive blows are reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

$$N_{60} = (\text{Measured hammer energy ratio} / 60) \times N \text{ value}$$

 STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By		Date	Contract Ref: 734244
	[REDACTED]		04.02.19	
	Contract: [REDACTED] 38 New Lane, Havant			Page: 2 of 2 

SPT Calibration Report

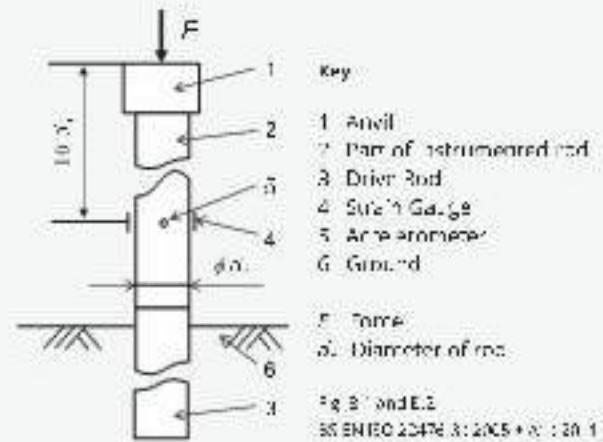
Hammer Energy Measurement Report

Type of Hammer: TERRIER
Client: STRUCTURAL SOILS
Test No: EQL2028

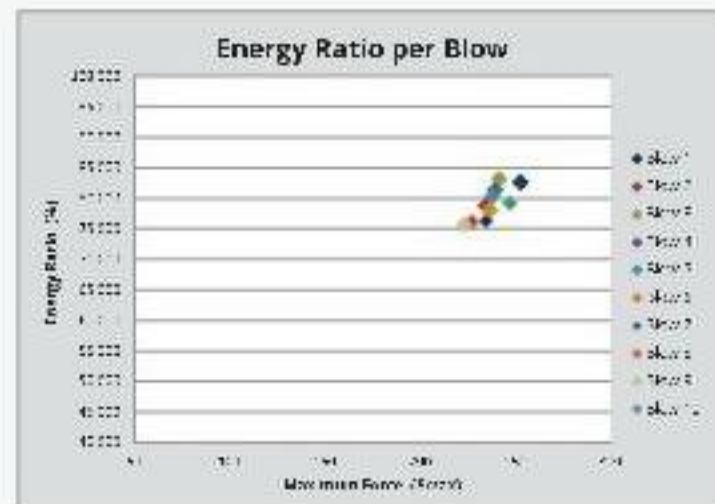
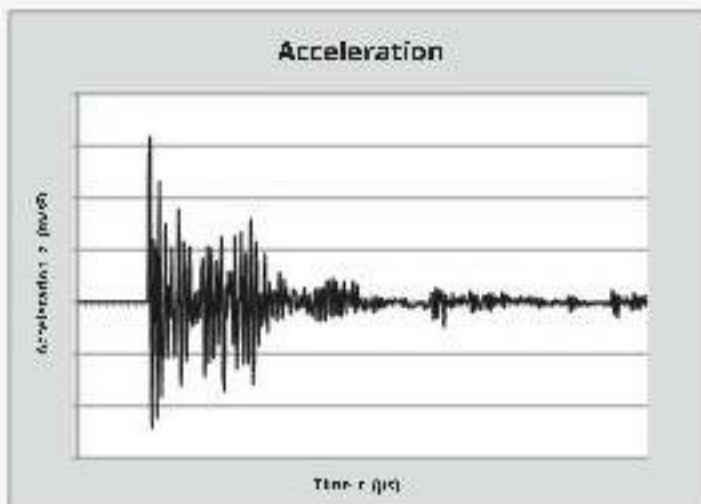
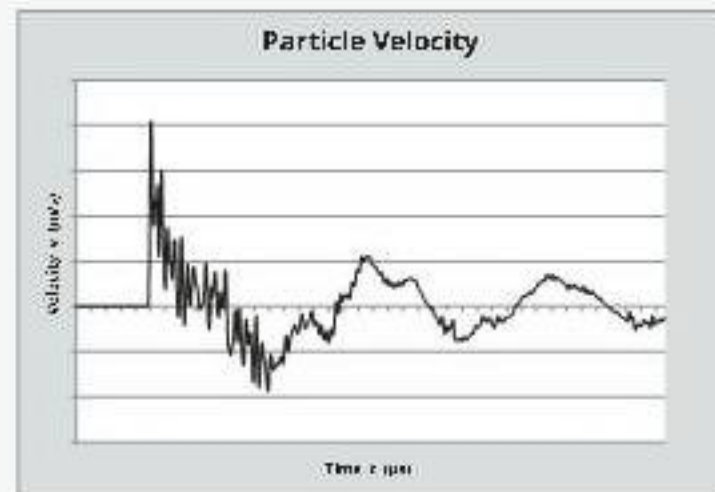
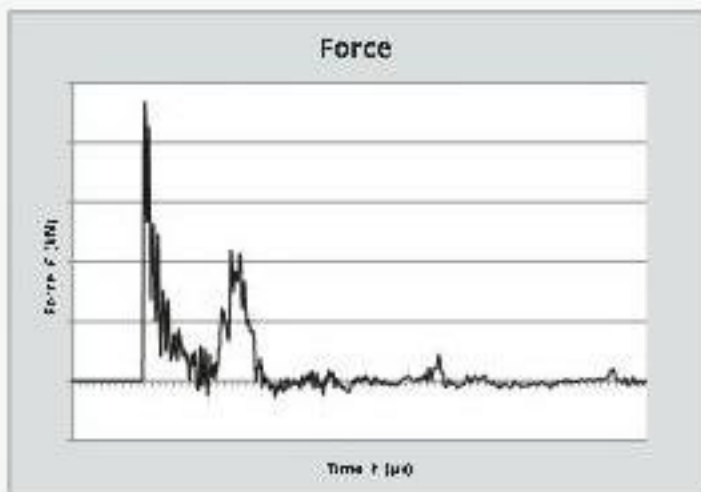
Test Depth (m): 8.70
Mass of hammer: $m = 63.5\text{kg}$
Falling height: $h = 0.70\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter: $d_r = 0.052\text{ m}$
Length of Instrumented rod: $l = 0.558\text{ m}$
Area: $A = 11.61\text{ cm}^2$
Modulus: $E_r = 206843\text{ MPa}$



DATE OF TEST	VALID UNTIL	HAMMER ID
23/01/2018	23/01/2019	DT15187



Observations:

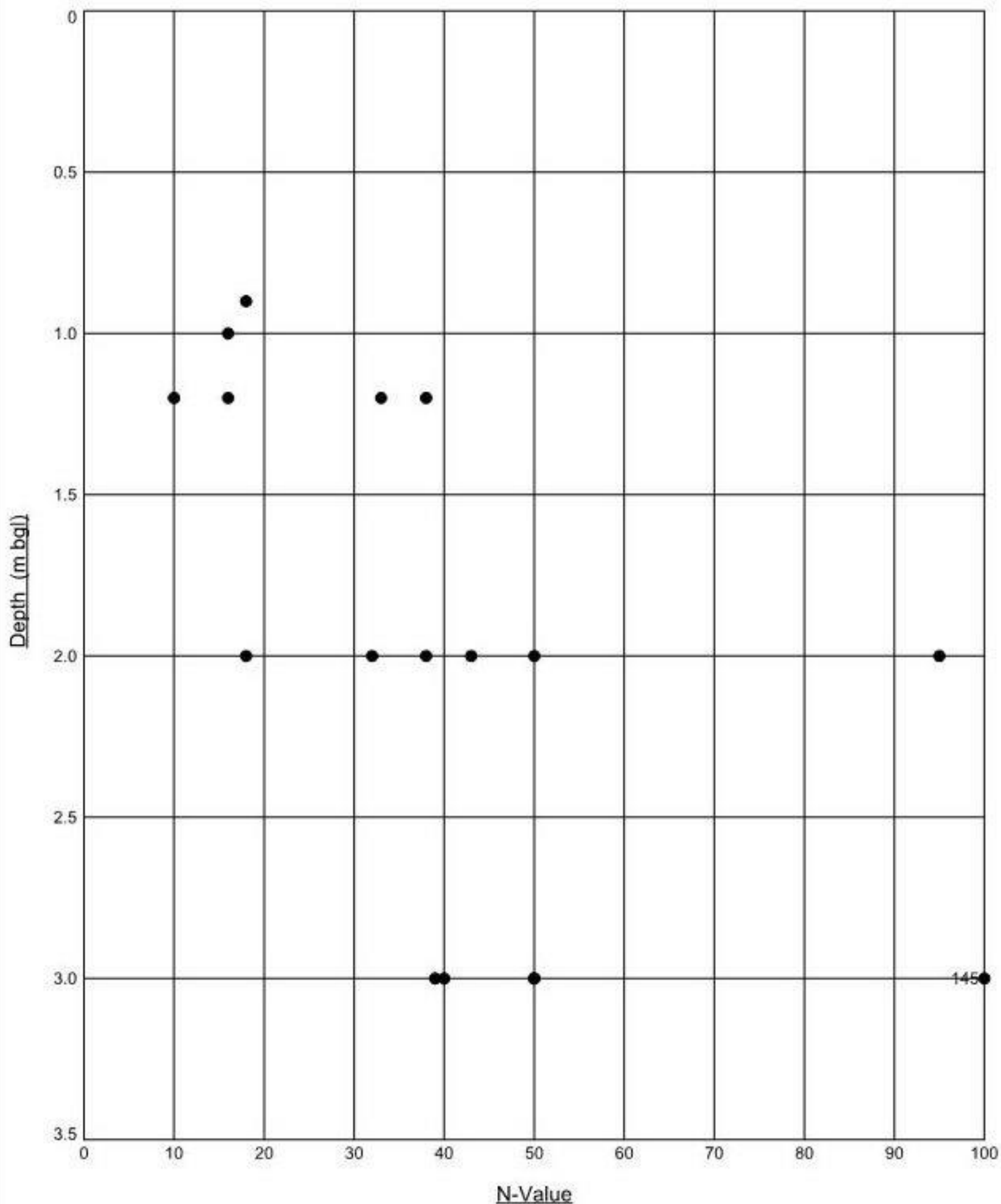
$E_{\text{meas}} = 0.376\text{ kN-m}$
 $E_{\text{theor}} = 0.473\text{ kN-m}$

Energy Ratio = $\frac{E_{\text{meas}}}{E_{\text{theor}}}$ = **79.44%**
© Copyright 2018

Equipe SPT Analyzer Operators: JML

Prepared by: [Redacted] Checked by: [Redacted] Date: 23/01/2018

STANDARD PENETRATION TEST (SPT N-Value) VS DEPTH



STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Contract

38 New Lane, Havant

Client

Kingsbridge Estates

Date

04.02.19

Compiled By



Contract Ref:

734244



APPENDIX D - GEOTECHNICAL LABORATORY TESTING

- (i) Laboratory Test Verification Sheet
- (ii) Laboratory Test Results

TESTING VERIFICATION CERTIFICATE



1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **08/02/2019 06:19:19**.

Testing reported after this date is not covered by this Verification Certificate.



Approved Signatory
Alan Frost (Deputy Laboratory Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU



**STRUCTURAL
SOILS LTD**

Contract:

38 New Lane, Havant

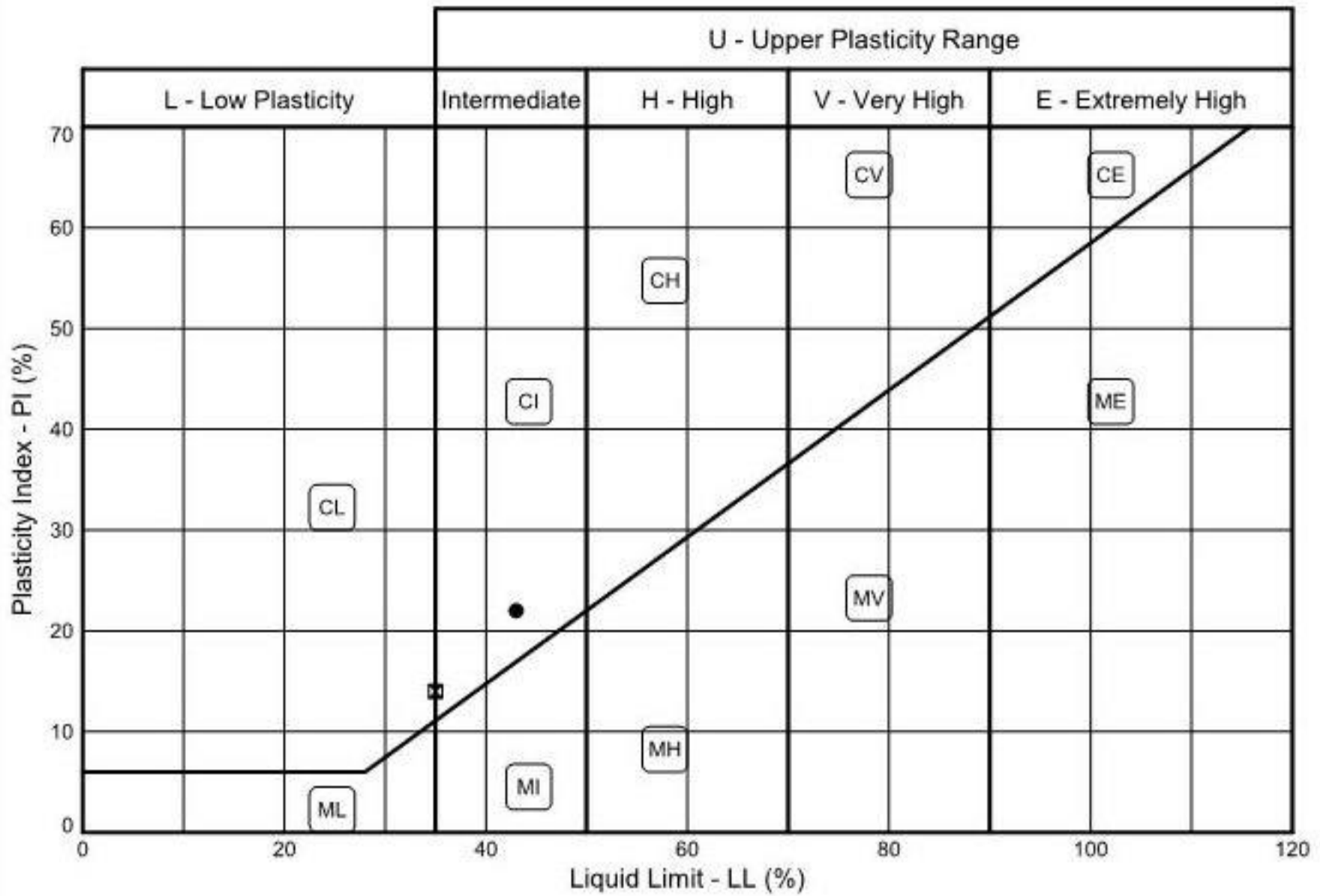
Job No:

734244



PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425um %	Lab location
Exploratory Position ID	Sample	Depth (m)									
●	WS1	2D	0.60	3.2/4.4/5.3/5.4	4.2.4	17	43	21	22	48	B
☒	WS3	1D	0.40	3.2/4.4/5.3/5.4	4.2.4	19	35	21	14	55	B

# Tested in accordance with the following clauses of BS1377-2:1990. 3.2 - Moisture Content 4.3 - Cone Penetrometer Method 4.4 - One Point Cone Penetrometer Method 4.6 - One Point Casagrande Method 5.3 - Plastic Limit Method 5.4 - Plasticity Index	+ Tested in accordance with the following clauses of BS1377-2:1990. 4.2.3 - Natural State 4.2.4 - Wet Sieved Key: * = Non-standard test, NP = Non plastic.
--	---

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
			08/02/19
	Contract		Contract Ref: 734244
38 New Lane, Havant			

SUMMARY OF CHEMICAL ANALYSES

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Aqueous Extract Sulphate (mg/l SO ₄)	pH	Description
WS2	2	D	0.50	11	7.67	Orangish brown sandy slightly gravelly CLAY
WS3	2	D	0.80	13	7.65	Orangish brown very clayey sandy GRAVEL

NOTES:- Chemical tests were undertaken by Envirolab

 STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date	Contract Ref: 734244 
			08.02.19	
	Contract: 38 New Lane, Havant			

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
WS1	2	D	0.60	17	43	21	22	48	Orangish brown slightly sandy gravelly CLAY
WS3	1	D	0.40	19	35	21	14	55	Orangish brown sandy slightly gravelly CLAY



**STRUCTURAL
SOILS LTD**

Contract:

38 New Lane, Havant

Contract Ref:

734244



APPENDIX E - GEOENVIRONMENTAL TESTING

- (i) Laboratory Test Results
- (ii) Initial Waste Characterisation (Haswaste)
- (iii) Laboratory UKAS Accreditation Certificate

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/10624
Issue Number: 1
Date: 07 January, 2019

Client: Structural Soils Limited (Bristol)
The Old School
Stillhouse Lane
Bedminster
Bristol
UK
BS3 4EB

Project Manager: enviro@soils.co.uk/Stephanie Stanley
Project Name: 38 New Lane, Havant
Project Ref: 734244
Order No: N/A
Date Samples Received: 14/12/18
Date Instructions Received: 14/12/18
Date Analysis Completed: 07/01/19

Prepared by:



Richard Wong
Client Manager

Approved by:



Admin & Client Services Supervisor

Envirolab Job Number: 18/10624

Client Project Name: 38 New Lane, Havant

Client Project Ref: 734244

Lab Sample ID	18/10624/1	18/10624/2	18/10624/3	18/10624/4	18/10624/5				Units	Method ref
Client Sample No	101	101	102	101	102					
Client Sample ID	WS1	WS2	WS2	WS4	WS4					
Depth to Top	0.20	0.20	0.50	0.00	0.10					
Depth To Bottom										
Date Sampled	11-Dec-18	11-Dec-18	11-Dec-18	11-Dec-18	11-Dec-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6AE	4AE	4AE	4A	4AE					
% Moisture at <40C _A	17.5	16.3	15.1	-	5.8				% w/w	A-T-044
% Stones >10mm _A	11.3	22.7	20.5	-	33.5				% w/w	A-T-044
pH ₀ ^{MS}	7.35	7.34	7.53	-	8.63				pH	A-T-031s
Sulphate (water sol 2:1) ₀ ^{MS}	0.04	<0.01	<0.01	-	0.04				g/l	A-T-028s
Organic matter ₀ ^{MS}	1.7	3.2	0.9	-	1.0				% w/w	A-T-030 OM
Arsenic ₀ ^{MS}	<1	3	3	-	11				mg/kg	A-T-024s
Cadmium ₀ ^{MS}	0.6	0.9	0.6	-	0.8				mg/kg	A-T-024s
Copper ₀ ^{MS}	11	12	10	-	10				mg/kg	A-T-024s
Chromium ₀ ^{MS}	16	20	24	-	11				mg/kg	A-T-024s
Lead ₀ ^{MS}	29	31	17	-	146				mg/kg	A-T-024s
Mercury ₀	<0.17	<0.17	<0.17	-	<0.17				mg/kg	A-T-024s
Nickel ₀ ^{MS}	12	10	17	-	8				mg/kg	A-T-024s
Selenium ₀ ^F	<1	<1	<1	-	<1				mg/kg	A-T-024s
Zinc ₀ ^{MS}	52	363	66	-	163				mg/kg	A-T-024s

Envirolab Job Number: 18/10624

Client Project Name: 38 New Lane, Havant

Client Project Ref: 734244

Lab Sample ID	18/10624/1	18/10624/2	18/10624/3	18/10624/4	18/10624/5				Units	Method ref
Client Sample No	101	101	102	101	102					
Client Sample ID	WS1	WS2	WS2	WS4	WS4					
Depth to Top	0.20	0.20	0.50	0.00	0.10					
Depth To Bottom										
Date Sampled	11-Dec-18	11-Dec-18	11-Dec-18	11-Dec-18	11-Dec-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6AE	4AE	4AE	4A	4AE					
Asbestos in Soil (inc. matrix)										
Asbestos in soil ^a	NAD	NAD	-	NAD	NAD					A-T-085
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	-	N/A	N/A					

Envirolab Job Number: 18/10624

Client Project Name: 38 New Lane, Havant

Client Project Ref: 734244

Lab Sample ID	18/10624/1	18/10624/2	18/10624/3	18/10624/4	18/10624/5				Units	Method ref
Client Sample No	101	101	102	101	102					
Client Sample ID	WS1	WS2	WS2	WS4	WS4					
Depth to Top	0.20	0.20	0.50	0.00	0.10					
Depth To Bottom										
Date Sampled	11-Dec-18	11-Dec-18	11-Dec-18	11-Dec-18	11-Dec-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6AE	4AE	4AE	4A	4AE					
PAH-16MS										
Acenaphthene _A ^{MS}	<0.01	<0.01	<0.01	-	<0.01				mg/kg	A-T-019s
Acenaphthylene _A ^{MS}	<0.01	<0.01	<0.01	-	0.01				mg/kg	A-T-019s
Anthracene _A ^{MS}	<0.02	<0.02	<0.02	-	0.03				mg/kg	A-T-019s
Benzo(a)anthracene _A ^{MS}	<0.04	<0.04	<0.04	-	0.18				mg/kg	A-T-019s
Benzo(a)pyrene _A ^{MS}	<0.04	<0.04	<0.04	-	0.19				mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{MS}	<0.05	<0.05	<0.05	-	0.23				mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{MS}	<0.05	<0.05	<0.05	-	0.16				mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{MS}	<0.07	<0.07	<0.07	-	0.08				mg/kg	A-T-019s
Chrysene _A ^{MS}	<0.06	<0.06	<0.06	-	0.22				mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{MS}	<0.04	<0.04	<0.04	-	<0.04				mg/kg	A-T-019s
Fluoranthene _A ^{MS}	<0.08	<0.08	<0.08	-	0.26				mg/kg	A-T-019s
Fluorene _A ^{MS}	<0.01	<0.01	<0.01	-	<0.01				mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{MS}	<0.03	<0.03	<0.03	-	0.17				mg/kg	A-T-019s
Naphthalene _A ^{MS}	<0.03	<0.03	<0.03	-	<0.03				mg/kg	A-T-019s
Phenanthrene _A ^{MS}	<0.03	<0.03	<0.03	-	0.08				mg/kg	A-T-019s
Pyrene _A ^{MS}	<0.07	<0.07	<0.07	-	0.25				mg/kg	A-T-019s
Total PAH-16MS _A ^{MS}	<0.08	<0.08	<0.08	-	1.86				mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8 _A ^{MS}	<5	<5	<5	-	<5				mg/kg	A-T-007s
>C8-C10 _A ^{MS}	<1	<1	<1	-	<1				mg/kg	A-T-007s
>C10-C12 _A ^{MS}	<1	<1	<1	-	<1				mg/kg	A-T-007s
>C12-C16 _A ^{MS}	<2	<2	<2	-	<2				mg/kg	A-T-007s
>C16-C21 _A ^{MS}	<2	4	<2	-	5				mg/kg	A-T-007s
>C21-C40 _A ^F	<5	60	<5	-	51				mg/kg	A-T-007s
TPH ID (for FID characterisations) _A	NDP	Unknown profile	NDP	-	Possible PAHs + other unknown heavier hydrocarbons					A-T-007s
Total TPH Banded 1 with ID _A	<5	64	<5	-	56				mg/kg	A-T-007s

REPORT NOTES

General:

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

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

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

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

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

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

Soil chemical analysis:

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

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

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

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

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

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

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

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

Asbestos:

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

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

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

Predominant Matrix Codes:

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

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

Secondary Matrix Codes:

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

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

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

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

Please contact us if you need any further information.



Haswaste, developed by Dr. Iain Haslock.

Site Code and Name	734244 38 New Lane, Hayward
TP/WS/BH	
Depth (m)	
Envirolab reference	

Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

POPs Dioxins and Furans Input Total Dioxins and Furans
OR Individual Dioxin and Furan results.

2,3,7,8-TeCDD	mg/kg								
1,2,3,7,8-PeCDD	mg/kg								
1,2,3,4,7,8-HxCDD	mg/kg								
1,2,3,6,7,8-HxCDD	mg/kg								
1,2,3,7,8,9-HxCDD	mg/kg								
1,2,3,4,6,7,8-HpCDD	mg/kg								
OCDD	mg/kg								
2,3,7,8-TeCDF	mg/kg								
1,2,3,7,8-PeCDF	mg/kg								
2,3,4,7,8-PeCDF	mg/kg								
1,2,3,4,7,8-HxCDF	mg/kg								
1,2,3,6,7,8-HxCDF	mg/kg								
2,3,4,6,7,8-HxCDF	mg/kg								
1,2,3,7,8,9-HxCDF	mg/kg								
1,2,3,4,6,7,8-HpCDF	mg/kg								
1,2,3,4,7,8,9-HpCDF	mg/kg								
OCDF	mg/kg								
Total Dioxins and Furans	mg/kg								

Some Pesticides (POPs unless otherwise stated)

Aldrin	mg/kg								
α Hexachlorocyclohexane (alpha-HCH) (leave empty if total HCH results used)	mg/kg								
β Hexachlorocyclohexane (beta-HCH) (leave empty if total HCH results used)	mg/kg								
α Cis-Chlordane (alpha) OR Total Chlordane	mg/kg								
δ Hexachlorocyclohexane (delta-HCH) (leave empty if total HCH results used)	mg/kg								
Dieldrin	mg/kg								
Endrin	mg/kg								
γ Hexachlorocyclohexane (gamma-HCH) (lindane) OR Total HCH	mg/kg								
Heptachlor	mg/kg								
Hexachlorobenzene	mg/kg								
o,p'-DDT (leave empty if total DDT results used)	mg/kg								
p,p'-DDT OR Total DDT	mg/kg								
γ Trans-Chlordane (gamma) (leave empty if total Chlordane results used)	mg/kg								
Chlordecone (kepone)	mg/kg								
Pentachlorobenzene	mg/kg								
Mirex	mg/kg								
Toxaphene (camphechlor)	mg/kg								
Tin									
Tin (leave empty if Organotin and Tin excl Organotin results used)	mg/kg								
Organotin									
Dibutyltin: DiBT	mg/kg								
Tributyltin: TriBT	mg/kg								
Triphenyltin: TriPT	mg/kg								
Tetrabutyltin: TeBT	mg/kg								
Tin excluding Organotin									
Tin excl Organotin	mg/kg								



Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.00000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name	734244 38 New Lane, Hayward
TP/WS/BH	
Depth (m)	
Envirolab reference	

Asbestos in Soil	Thresholds
Asbestos detected in Soil (enter Y or N)	Y

Asbestos % Composition in Soil (Matrix Loose Fibres or Microscopic Identifiable Pieces only)	see "Calc HP7 % Asbestos in Soil (Fibres)" below	%
Carcinogenic HP7 % Asbestos in Soil (fibres or micro pieces)	25.1%	
Please be advised, if the calculation cell is "0.00000" DOES NOT MEAN asbestos testing has been undertaken and the result is zero		

Asbestos Identifiable Pieces visible with the naked eye detected in the Soil (enter Y or N)	Y
--	---

WS1	WS2	WS3	WS4	WS4				
0.20	0.20	0.50	0.00	0.10				
18/10624/1	18/10624/2	18/10624/3	18/10624/4	18/10624/5				

N	N		N	N				
If Asbestos in Soil above is "Y", the soil is Hazardous Waste HP5 and HP7								
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
If Asbestos in Soil above is "Y", but Asbestos % above is "<0.1%", the soil is Non Hazardous Waste. You can only use Asbestos % results where loose fibres or micro pieces are only present. You cannot use Asbestos % results when visual identifiable pieces are present.								

If visual identifiable pieces of asbestos are present, you cannot use Asbestos % results and the whole soil sample is Hazardous Waste HP5 and HP7 Construction material containing Asbestos 17 06 05. Therefore, if Asbestos in Soil above is "Y", the Asbestos % above is "<0.1%", but the Asbestos Identifiable Pieces visible with the naked eye is "Y", the soil is Hazardous Waste.

Identifiable Pieces are Cement, Fragments, Board, Rope etc. ie anything ACM that is not Loose Fibres.

All visual asbestos pieces need to be removed leaving only fibres (or micro pieces) with an Asbestos % Composition in Soil result of <0.1% for the soil to become non-hazardous waste

Hazardous Property	Thresholds	Cut Off Value
Corrosive HP8	>5%	<1%
Irritant HP4	>10%	<1%
Irritant HP4	>20%	<1%
Specific Target Organ Toxicity HP5	>1%	
Specific Target Organ Toxicity HP5	>20%	
Specific Target Organ Toxicity HP5	>1%	
Specific Target Organ Toxicity HP5	>10%	
Aspiration Toxicity HP5	>10%	
Acute Toxicity HP6	>5.1%	<0.1%
Acute Toxicity HP6	>20.25%	<0.1%
Acute Toxicity HP6	>5%	<0.1%
Acute Toxicity HP6	>25%	<1%
Acute Toxicity HP6	>20.25%	<0.1%
Acute Toxicity HP6	>2.5%	<0.1%
Acute Toxicity HP6	>15%	<0.1%
Acute Toxicity HP6	>55%	<1%
Acute Toxicity HP6	>0.1%	<0.1%
Acute Toxicity HP6	>5.5%	<0.1%
Acute Toxicity HP6	>3.5%	<0.1%
Acute Toxicity HP6	>22.5%	<1%
Carcinogenic HP7	>0.1%	
Carcinogenic HP7	>0.1%	
Carcinogenic HP7	>1%	
Carcinogenic HP7 Unknown TPH with ID	>1,000mg/kg	
Carcinogenic HP7 (a/p marker test) (Unknown TPH with ID only) Cell only applicable if TPH > 1,000mg/kg	>0.01%	
pH Corrosive HP8 pH (soil or leachate)	HS >11.5	
pH Corrosive HP8 pH (soil or leachate)	HS <2	
Toxic for Reproduction HP10	>0.3%	
Toxic for Reproduction HP10	>3%	
Mutagenic HP11	>0.1%	
Mutagenic HP11 Unknown TPH with ID	>1,000mg/kg	
Mutagenic HP11 (a/p marker test) (Unknown TPH with ID only) Cell only applicable if TPH > 1,000mg/kg	>0.01%	
Mutagenic HP11	>1%	
Produces Toxic Gases HP12 Sulphide	>1,400mg/kg	
Produces Toxic Gases HP12 Cyanide	>1,200mg/kg	
Produces Toxic Gases HP12 Thiocyanate	>2,400mg/kg	
HP13 Sensitising	>10%	

If cells below turn yellow and the text turns red, the samples should be classified as Hazardous Waste.								
0.00284	0.00355	0.00425	0.00000	0.00336	0.00000	0.00000	0.00000	0.00000
0.00113	0.00147	0.00130	0.00000	0.00243	0.00000	0.00000	0.00000	0.00000
0.00304	0.00284	0.00385	0.00000	0.00262	0.00000	0.00000	0.00000	0.00000
0.00050	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000
0.00253	0.00321	0.00391	0.00000	0.00199	0.00000	0.00000	0.00000	0.00000
0.00239	0.00536	0.00144	0.00000	0.01375	0.00000	0.00000	0.00000	0.00000
0.00041	0.00536	0.00042	0.00000	0.00528	0.00000	0.00000	0.00000	0.00000
0.00050	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00012	0.00005	0.00035	0.00000	0.00138	0.00000	0.00000	0.00000	0.00000
0.00265	0.00333	0.00403	0.00000	0.00212	0.00000	0.00000	0.00000	0.00000
0.00048	0.00001	0.00035	0.00000	0.01646	0.00000	0.00000	0.00000	0.00000
0.00001	0.00001	0.00001	0.00000	0.00002	0.00000	0.00000	0.00000	0.00000
0.00253	0.00321	0.00391	0.00000	0.00199	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00005	0.00005	0.00005	0.00000	0.00008	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00260	0.00330	0.00398	0.00000	0.00208	0.00000	0.00000	0.00000	0.00000
0.00012	0.00012	0.00012	0.00000	0.00013	0.00000	0.00000	0.00000	0.00000
0.00642	0.00642	0.00632	0.00000	0.01634	0.00000	0.00000	0.00000	0.00000
0.00253	0.00321	0.00391	0.00000	0.01375	0.00000	0.00000	0.00000	0.00000
0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000
0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00000	0.00000	0.00000
4.13	53.57	4.25	0.00	52.75	0.00	0.00	0.00	0.00
0.66000	0.05291	0.67800	#DIV/0!	0.31961	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7.35	7.34	7.53	0.00	6.63	0.00	0.00	0.00	0.00
7.35	7.34	7.53	0.00	6.63	0.00	0.00	0.00	0.00
0.00239	0.00259	0.00292	0.00000	0.01375	0.00000	0.00000	0.00000	0.00000
0.00253	0.00536	0.00391	0.00000	0.00528	0.00000	0.00000	0.00000	0.00000
0.00253	0.00321	0.00391	0.00000	0.00199	0.00000	0.00000	0.00000	0.00000
4.13	53.57	4.25	0.00	52.75	0.00	0.00	0.00	0.00
0.66000	0.05291	0.67800	#DIV/0!	0.31961	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.00200	0.00169	0.00292	0.00000	0.00152	0.00000	0.00000	0.00000	0.00000
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.00253	0.00321	0.00391	0.00000	0.00199	0.00000	0.00000	0.00000	0.00000

Ecotoxic HP14	>25%	<0.1%	0.01365	0.04720	0.01681	0.00000	0.03928	0.00000	0.00000	0.00000	0.00000
amended v6											



Please enter available data in the rows associated with the test (grey) cells. Calculation cells initially display either "0.0000" or "#DIV/0!".
If any calculation cells below state "0.00000", testing has NOT been undertaken that contributes to that Hazardous Property.

Haswaste, developed by Dr. Iain Haslock.

Site Code and Name		734244 38 New Lane, Hayport								
TP/WS/BH		WS1	WS2	WS3	WS4	WS4				
Depth (m)		0.20	0.20	0.50	0.00	0.10				
Envirolab reference		18/10624/1	18/10624/2	18/10624/3	18/10624/4	18/10624/5				

Ecotoxic HP14 amended v6	≥25%	(except Bo, V, Te, TL, Petrol, Diesel, Crude Oil, Kerosene, White Spirit, Cresols, TPH, TPHCWG, Phenol, Cresols, Xylenols, T-Phenols, CompCN, Thiocyanate, Toluene, Ethylbenzene, Xylene + BTEX 1%)	0.01407	0.05256	0.01723	0.00000	0.04456	0.00000	0.00000	0.00000	0.00000
Ecotoxic HP14 amended v6	≥25%	(except Bo, V, Te, TL, Petrol, Diesel, Crude Oil, Kerosene, White Spirit, Cresols, TPH, TPHCWG, Phenol, Cresols, Xylenols, T-Phenols, CompCN, Thiocyanate, Toluene, Ethylbenzene, Xylene + BTEX 1%)	1.36942	4.77383	1.68493	0.00000	3.98089	0.00000	0.00000	0.00000	0.00000
Persistent Organic Pollutant (PCB, PBB or POP Pesticides)	≥0.006%		0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000
Persistent Organic Pollutant (Total Dioxins+Furans)	≥0.0000015%		0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000
Persistent Organic Pollutant (Individual Dioxins+Furans)	≥0.0000015%		0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000	0.000000000

If other contaminants need adding to Haswaste, please contact Envirolab.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR

Tel. 0161 368 4921

email. ask@envlab.co.uk

Client: Structural Soils Limited (Bristol), The Old School , Stillhouse Lane, Bedminster,
Bristol, UK, BS3 4EB

Project No: 18/10624

Project: 38 New Lane, Havant

Date Instructions Received: 14/12/2018 (am)

Clients Project No: 734244

Cool Box Temperatures (°C): 4.1

Lab Sample ID	18/10624/1	18/10624/2	18/10624/3	18/10624/5
Client Sample No	101	101	102	102
Client Sample ID/Depth	WS1 0.20m	WS2 0.20m	WS2 0.50m	WS4 0.10m
Date Sampled	11/12/18	11/12/18	11/12/18	11/12/18
Deviation Code				
F	✓	✓	✓	✓

Key

F

Maximum holding time exceeded between sampling date and analysis for analytes listed below

HOLDING TIME EXCEEDANCES

Lab Sample ID	18/10624/1	18/10624/2	18/10624/3	18/10624/5
Client Sample No	101	101	102	102
Client Sample ID/Depth	WS1 0.20m	WS2 0.20m	WS2 0.50m	WS4 0.10m
Date Sampled	11/12/18	11/12/18	11/12/18	11/12/18
TPH Banded 1 with ID	✓	✓	✓	✓

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

United Kingdom Accreditation Service

ACCREDITATION CERTIFICATE



TESTING LABORATORY
No. 1247

Envirolab

is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005
General Requirements for the competence of testing and calibration laboratories.

This accreditation demonstrates technical competence for a defined scope as detailed in and at the locations specified in the schedule to this certificate, and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated 18 June 2005).

The schedule to this certificate is an essential accreditation document and from time to time may be revised and reissued by the United Kingdom Accreditation Service. The most recent issue of the schedule of accreditation, which bears the same accreditation number as this certificate, is available from the UKAS website www.ukas.org.

This accreditation is subject to continuing conformity with United Kingdom Accreditation Service requirements. The absence of a schedule on the UKAS website indicates that the accreditation is no longer in force.

Accreditation M [REDACTED] tation Service

Initial Accreditation date
02 December 1992

This certificate issued on
11 August 2006

The Department of Trade and Industry (DTI) has entered into a memorandum of understanding with the United Kingdom Accreditation Service (UKAS) through which UKAS is recognised as the national body responsible for assessing and accrediting the competence of organisations in the fields of calibration, testing, inspection and certification of systems, products and persons

APPENDIX F - BACKGROUND TO GEOENVIRONMENTAL ASSESSMENT

(i) RSK Group Generic Assessment Criteria (GAC)

Generic assessment criteria for human health: commercial scenario

Background

RSK's generic assessment criteria (GAC) were initially prepared following the publication by the Environment Agency (EA) of soil guideline value (SGV) and toxicological (TOX) reports, and associated publications in 2009⁽¹⁾. RSK GAC were updated following the publication of GAC by LQM/CIEH in 2009⁽²⁾. RSK GAC are periodically revised when updated information on toxicological, land use or receptor parameters is published.

Updates to the RSK GAC

In 2014, the publication of Category 4 Screening Levels (C4SL)^(3,4), as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3)⁽⁵⁾ used in the generation of SGVs.

C4SL were published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010⁽³⁾). Where a C4SL has been published, the RSK GAC duplicates the C4SL published values using all input parameters within the SP1010 final project report⁽³⁾ and associated appendices⁽⁶⁾, and adopts them as GAC for these six substances.

For all other substances the only C4SL exposure modification relevant to a commercial end use are daily inhalation rates.

The RSK GAC have also been revised with updated toxicology published by LQM/CIEH in 2015⁽⁷⁾ or by the USEPA⁽¹⁴⁾, where a C4SL has not been published.

RSK GAC derivation for metals and organic compounds

Model selection

Soil assessment criteria (SAC) were calculated using the Contaminated Land Exposure Assessment (CLEA) tool v1.071, supporting EA guidance^(5,8,9) and revised exposure scenarios published for the C4SL⁽³⁾. The SAC are also termed GAC.

Pathway selection

In accordance with SR3⁽⁵⁾ the commercial scenario considers risks to a female worker who works from the age of 16 to 65 years. It should be noted that this end use is not suitable for a workplace nursery but may be appropriate for a sports centre or shopping centre where children are present. In accordance with Box 3.5, SR3⁽⁵⁾ the pathways considered for production of the SAC in the commercial scenario are

- direct soil and dust ingestion
- dermal contact with soil both indoors and outdoors
- indoor air inhalation from soil and vapour and outdoor inhalation of soil and vapour.

With respect to volatilisation, the CLEA model assumes a simple linear partitioning of a chemical in the soil between the sorbed, dissolved and vapour phase⁽⁹⁾. The upper boundaries of this partitioning are represented by the maximum aqueous solubility and pure saturated vapour concentration of the chemical. The CLEA model estimates saturated soil concentrations where these limits are reached⁽⁹⁾. The CLEA software uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous- or vapour-based soil saturation limits. Model output cells are flagged red where the saturated soil concentration has been exceeded and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10%. In this case, further consideration of the following is required⁽⁹⁾:

- Free phase contamination may be present.
- Exposure from the vapour pathways will be over-predicted by the model, as in reality the vapour phase concentration will not increase at concentrations above saturation limits
- Where the vapour pathway contribution is greater than 90%, it is unlikely the relevant health criteria value (HCV) will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV.

Where the vapour pathway is the predominant pathway (contributes greater than 90% of exposure) or the only exposure route considered and the cell is highlighted red (SAC exceeds saturation limit), the risk based on the assumed conceptual model is likely to be negligible as the vapour risk is assumed to be tolerable at maximum possible soil concentrations. In such circumstances, the vapour pathway exposure should be considered based on the presence of free phase or non-aqueous phase liquid sources and the measured concentrations of volatile organic compounds (VOC) in the vapour phase. Screening could be considered based on setting the SAC as the modelled soil saturation limits. However, as stated within the CLEA handbook⁽⁹⁾, this is likely to not be practical in many cases because of the very low saturation limits and, in any case, is highly conservative.

It should also be noted that for mixtures of compounds, free phase may be present where soil (or groundwater) concentrations are well below saturation limits for individual compounds.

Where the vapour pathway is only one of the exposure pathways considered, an additional approach can then be utilised as detailed within Section 4.12 of the CLEA model handbook⁽⁹⁾, which explains how to calculate an effective assessment criterion manually.

SR3⁽⁵⁾ states that, as a general rule of thumb, it is recognised that estimating vapour phase concentrations from dissolved and sorbed phase contamination by petroleum hydrocarbons are at least a factor of ten higher than those likely to be measured on-site. RSK has therefore applied an empirical subsurface to indoor air correction factor of 10 into the CLEA model chemical database for all petroleum hydrocarbon fractions (including BTEX, trimethylbenzenes and the polycyclic aromatic hydrocarbons (PAH) naphthalene, acenaphthene and acenaphthylene) to reduce this conservatism.

Input selection

The most up-to-date published chemical and toxicological data was obtained from EA Report SC050021/SR7⁽¹⁰⁾, the EA TOX⁽¹⁾ reports, the C4SL SP1010 project report and associated appendices^(3,6), the 2015 LQM/CIEH report⁽⁷⁾ or the USEPA IRIS database⁽¹⁴⁾. Where a C4SL has been published, the RSK GAC have duplicated the C4SL published values using all input parameters within the SP1010 final project report⁽³⁾ and associated appendices⁽⁶⁾, and has

adopted them as GAC for these six substances. Toxicological and specific chemical parameters for 1,2,4-trimethylbenzene and methyl tertiary-butyl ether (MTBE) were obtained from the CL:AIRE Soil Generic Assessment Criteria report⁽¹¹⁾.

For TPH, aromatic hydrocarbons C₅–C₈ were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the commercial end use, the CLEA default pre-1970s three-storey office building was used. SR3⁽⁵⁾ notes this commercial building type to be the most conservative in terms of protection from vapour intrusion. The default input building parameters presented in Table 3.10 of SR3⁽⁵⁾ have been used.

The parameters for a sandy loam soil type were used in line with Table 4.4 of SR3⁽⁵⁾. This includes a value of 6% for the percentage of soil organic matter (SOM) within the soil. In RSK's experience, this is rather high for many sites. To avoid undertaking site-specific risk assessments for this SOM, RSK has produced an additional set of GAC for SOM of 1% and 2.5% for all substances using the CLEA tool.

Summary of modifications to the default CLEA SR3⁽⁵⁾ input parameters for a commercial land use

In summary, the RSK commercial GAC were produced using the default input parameters for soil properties, the air dispersion model, building properties and the vapour model detailed in SR3⁽⁵⁾. Modifications to the default SR3⁽⁵⁾ exposure scenarios based on the C4SL exposure scenarios⁽³⁾ are presented in Table 2 below. The sole modification to the default commercial input parameters is the updated inhalation rate.

The final selected GAC are presented by pathway in Table 3 with the combined GAC in Table 4.

Figure 1: Conceptual model for CLEA commercial scenario

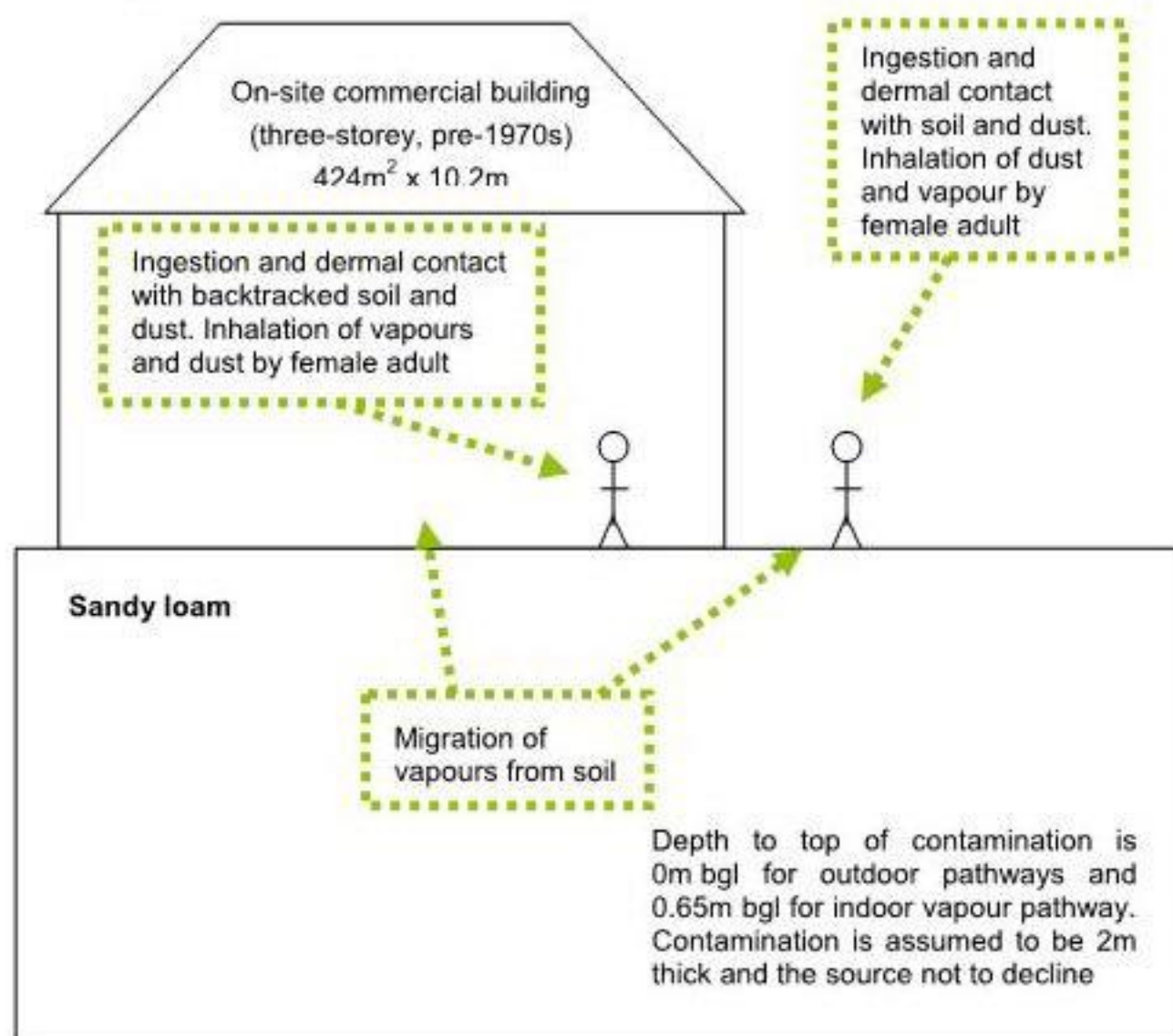


Table 1: Exposure assessment parameters for commercial scenario – inputs for CLEA model

Parameter	Value	Justification
Land use	Commercial	Chosen land use
Receptor	Female worker	Taken as female adult exposed over 49 years from age 16 to 65 years, Box 3.5, SR3 ⁽⁵⁾
Building	Office (pre-1970)	Key generic assumption given in Box 3.5, SR3 ⁽⁵⁾ . Pre-1970s three-storey office building chosen as it is the most conservative in terms of protection from vapour intrusion (Section 3.4.6, SR3 ⁽⁵⁾)
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, Table 4.4, SR3 ⁽⁵⁾)
Start age class (AC)	17	AC corresponding to key generic assumption that the critical receptor is a working female adult exposed over a 49-year period from age 16 to 65 years. Assumption given in Box 3.5, SR3 ⁽⁵⁾
End AC	17	
SOM (%)	6	Representative of sandy loam according to EA guidance note dated January 2009 entitled 'Changes We Have Made to the CLEA Framework Documents' ⁽¹³⁾
	1	To provide SAC for sites where SOM < 6% as often observed by RSK
	2.5	
pH	7	Model default

Table 2: Commercial – modified receptor inputs

Parameter	Unit	Value	Justification
Inhalation rate (AC17)	m ³ day ⁻¹	15.7	Mean value USEPA, 2011 ⁽¹²⁾ ; Table 3.2, SP1010 ⁽³⁾

References

1. Environment Agency (2009), 'Science Reports SC050021 - SGV and TOX reports for: benzene, toluene, ethylbenzene, xylene, mercury, selenium, nickel, arsenic, cadmium, phenol, dioxins, furans and dioxin-like PCBs'; 'Supplementary information for the derivation of SGV for: benzene, toluene, ethylbenzene, xylene, mercury, selenium, nickel, arsenic, cadmium, phenol, dioxins, furans and dioxin-like PCBs', and 'Contaminants in soil: updated collation of toxicological data and intake values for humans: benzene, toluene, ethylbenzene, xylene, mercury, selenium, nickel, arsenic, cadmium, phenol, dioxins, furans and dioxin-like PCBs'. Available at: <https://www.gov.uk/government/publications/contaminants-in-soil-updated-collation-of-toxicological-data-and-intake-values-for-humans> and <https://www.gov.uk/government/publications/land-contamination-soil-guideline-values-sgvs> (accessed 4 February 2015)
2. Nathanial, C. P., McCaffrey, C., Ashmore, M., Cheng, Y., Gillet, A. G., Ogden, R. C. and Scott, D. (2009), *LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment*, second edition (Nottingham: Land Quality Press).
3. Contaminated Land: Applications in Real Environment (CL:AIRE) (2014). 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination', Revision 2, DEFRA research project SP1010.
4. Department for Environment, Food and Rural Affairs (Defra) (2014), 'SP1010: Development of Category 4 Screening Levels for assessment of land affected by contamination – Policy Companion Document', Revision 2.
5. Environment Agency (2009), *Science Report – SC050021/SR3. Updated technical background to the CLEA model* (Bristol: Environment Agency).
6. Contaminated Land: Applications in Real Environment (CL:AIRE) (2014). 'Appendices C to H). DEFRA research project SP1010'.
7. Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C. and Nathanial, J. F. (2015), *The LQM/CIEH S4ULs for Human Health Risk Assessment* (Nottingham: Land Quality Press).
8. Environment Agency (2009), *Human health toxicological assessment of contaminants in soil. Science Report – Final SC050021/SR2* (Bristol: Environment Agency).
9. Environment Agency (2009), *Science Report – SC050021/SR4 CLEA Software (version 1.05) Handbook* (Bristol: Environment Agency).
10. Environment Agency (2008), *Science Report SC050021/SR7. Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values* (Bristol: Environment Agency).
11. CL:AIRE (2009), *Soil Generic Assessment Criteria for Human Health Risk Assessment* (London: CL:AIRE).
12. USEPA (2011), *Exposure factors handbook*, EPA/600/R-090/052F (Washington, DC: Office of Research and Development).
13. Environment Agency (2009), 'Changes made to the CLEA framework documents after the three-month evaluation period in 2008', released January 2009.
14. USEPA (2010). Hydrogen cyanide and cyanide salts. Integrated Risk Information Systems (IRIS) Chemical Assessment Summary. September 2010. <https://www.epa.gov/iris> (accessed 9 December 2015)

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 3

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Metals													
Arsenic	(a,b)	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR
Cadmium	(a)	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR
Chromium (III) - trivalent	(c)	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR
Chromium (VI) - hexavalent	(a,d)	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR
Copper		1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR
Lead	(a)	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR
Elemental Mercury (Hg ⁰)	(d)	NR	1.54E+01	NR	4.31E+00	NR	3.26E+01	NR	1.07E+01	NR	5.80E+01	NR	2.58E+01
Inorganic Mercury (Hg ²⁺)		1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR
Methyl Mercury (Hg ^{Me})		3.38E+02	2.13E+03	2.92E+02	7.33E+01	3.38E+02	3.87E+03	3.11E+02	1.42E+02	3.38E+02	7.33E+03	3.23E+02	3.04E+02
Nickel	(d)	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR
Selenium	(b)	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR
Zinc	(b)	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR
Cyanide (free)		6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR
Volatile Organic Compounds													
Benzene	(a)	1.09E+03	2.79E+01	2.72E+01	1.22E+03	1.09E+03	5.19E+01	4.96E+01	2.26E+03	1.09E+03	1.08E+02	9.80E+01	4.71E+03
Toluene		4.24E+05	8.49E+04	5.83E+04	8.69E+02	4.24E+05	1.43E+05	1.07E+05	1.92E+03	4.24E+05	3.24E+05	1.84E+05	4.36E+03
Ethylbenzene		1.81E+05	5.89E+03	5.71E+03	5.18E+02	1.81E+05	1.38E+04	1.26E+04	1.22E+03	1.81E+05	3.21E+04	2.75E+04	2.84E+03
Xylene - m		3.43E+05	6.20E+03	6.15E+03	6.25E+02	3.43E+05	1.47E+04	1.41E+04	1.47E+03	3.43E+05	3.44E+04	3.12E+04	3.46E+03
Xylene - o		3.43E+05	6.73E+03	6.60E+03	4.78E+02	3.43E+05	1.57E+04	1.50E+04	1.12E+03	3.43E+05	3.65E+04	3.30E+04	2.62E+03
Xylene - p		3.43E+05	6.03E+03	5.92E+03	5.76E+02	3.43E+05	1.41E+04	1.36E+04	1.35E+03	3.43E+05	3.28E+04	3.00E+04	3.17E+03
Total xylene		3.43E+05	6.03E+03	5.92E+03	6.25E+02	3.43E+05	1.41E+04	1.36E+04	1.47E+03	3.43E+05	3.28E+04	3.00E+04	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		5.72E+05	7.56E+03	7.46E+03	2.04E+04	5.72E+05	1.23E+04	1.21E+04	3.31E+04	5.72E+05	2.94E+04	2.24E+04	6.27E+04
Trichloroethane		9.53E+02	1.23E+00	1.23E+00	1.54E+03	9.53E+02	2.58E+00	2.57E+00	3.22E+03	9.53E+02	5.72E+00	5.69E+00	7.14E+03
Tetrachloroethane		1.12E+04	1.86E+01	1.86E+01	4.24E+02	1.12E+04	4.17E+01	4.16E+01	9.51E+02	1.12E+04	9.57E+01	9.49E+01	2.18E+03
1,1,1-Trichloroethane		1.14E+06	6.60E+02	6.60E+02	1.43E+03	1.14E+06	1.35E+03	1.35E+03	2.92E+03	1.14E+06	2.96E+03	2.95E+03	6.39E+03
1,1,1,2-Tetrachloroethane		1.10E+04	1.09E+02	1.09E+02	2.60E+03	1.10E+04	2.53E+02	2.47E+02	6.02E+03	1.10E+04	5.88E+02	5.59E+02	1.40E+04
1,1,2,2-Tetrachloroethane		1.10E+04	2.81E+02	2.74E+02	2.67E+03	1.10E+04	5.75E+02	5.46E+02	5.46E+03	1.10E+04	1.26E+03	1.13E+03	1.20E+04
Carbon Tetrachloride		7.62E+03	2.87E+00	2.87E+00	1.52E+03	7.62E+03	6.29E+00	6.28E+00	3.32E+03	7.62E+03	1.43E+01	1.42E+01	7.54E+03
1,2-Dichloroethane		2.29E+02	6.73E-01	6.71E-01	3.41E+03	2.29E+02	9.71E-01	9.67E-01	4.91E+03	2.29E+02	1.67E+00	1.65E+00	8.43E+03
Vinyl Chloride		2.67E+01	5.95E-02	5.94E-02	1.36E+03	2.67E+01	7.70E-02	7.67E-02	1.76E+03	2.67E+01	1.16E-01	1.17E-01	2.69E+03
1,2,4-Trimethylbenzene		NR	3.29E+02	NR	4.74E+02	NR	6.41E+02	NR	1.16E+03	NR	1.04E+03	NR	2.76E+03
1,3,5-Trimethylbenzene	(c)	NR	NR	NR	2.30E+02	NR	NR	NR	5.52E+02	NR	NR	NR	1.30E+03
Semi-Volatile Organic Compounds													
Acenaphthene		1.10E+05	2.75E+05	1.06E+05	5.70E+01	1.10E+05	5.36E+05	1.08E+05	1.41E+02	1.10E+05	8.83E+05	1.08E+05	3.36E+02
Acenaphthylene		1.10E+05	2.68E+05	1.05E+05	8.61E+01	1.10E+05	5.23E+05	1.07E+05	2.12E+02	1.10E+05	8.65E+05	1.08E+05	5.06E+02
Anthracene		5.49E+05	1.13E+07	5.23E+05	1.17E+00	5.49E+05	2.35E+07	5.36E+05	2.91E+00	5.49E+05	4.13E+07	5.42E+05	6.96E+00
Benzo(a)anthracene		2.84E+02	4.08E+02	1.87E+02	1.71E+00	2.84E+02	4.47E+02	1.74E+02	4.28E+00	2.84E+02	4.87E+02	1.76E+02	1.03E+01
Benzo(a)pyrene	(a)	7.68E+01	2.04E+02	5.58E+01	9.11E-01	7.68E+01	2.09E+02	5.61E+01	2.28E+00	7.68E+01	2.11E+02	5.63E+01	5.46E+00
Benzo(b)fluoranthene		7.13E+01	1.17E+02	4.43E+01	1.22E+00	7.13E+01	1.20E+02	4.47E+01	3.04E+00	7.13E+01	1.21E+02	4.48E+01	7.29E+00
Benzo(g,h,i)perylene		6.29E+03	1.05E+04	3.93E+03	1.54E-02	6.29E+03	1.06E+04	3.95E+03	3.85E-02	6.29E+03	1.07E+04	3.96E+03	9.23E-02
Benzo(k)fluoranthene		1.88E+03	3.11E+03	1.17E+03	6.87E-01	1.88E+03	3.17E+03	1.18E+03	1.72E+00	1.88E+03	3.21E+03	1.19E+03	4.12E+00
Chrysene		5.67E+02	8.89E+02	3.46E+02	4.40E-01	5.67E+02	9.25E+02	3.52E+02	1.10E+00	5.67E+02	9.47E+02	3.55E+02	2.64E+00
Dibenzo(a,h)anthracene		5.67E+00	9.32E+00	3.53E+00	3.93E-03	5.67E+00	9.52E+00	3.55E+00	9.82E-03	5.67E+00	9.64E+00	3.57E+00	2.36E-02
Fluoranthene		2.29E+04	1.89E+06	2.26E+04	1.89E+01	2.29E+04	2.72E+06	2.27E+04	4.73E+01	2.29E+04	3.32E+06	2.27E+04	1.13E+02
Fluorene		7.31E+04	4.58E+05	6.30E+04	3.09E+01	7.31E+04	1.06E+06	6.84E+04	7.65E+01	7.31E+04	2.24E+06	7.08E+04	1.83E+02
Indeno(1,2,3-cd)pyrene		8.10E+02	1.31E+03	5.01E+02	6.13E-02	8.10E+02	1.35E+03	5.06E+02	1.53E-01	8.10E+02	1.37E+03	5.09E+02	3.68E-01
Naphthalene		3.64E+04	1.87E+03	1.78E+03	7.64E+01	3.64E+04	4.39E+03	3.92E+03	1.83E+02	3.64E+04	9.94E+03	7.81E+03	4.32E+02
Phenanthrene		2.28E+04	5.35E+05	2.19E+04	3.60E+01	2.28E+04	1.09E+06	2.24E+04	8.96E+01	2.28E+04	1.86E+06	2.25E+04	2.14E+02
Pyrene		5.49E+04	4.47E+06	5.42E+04	2.20E+00	5.49E+04	6.46E+06	5.44E+04	5.49E+00	5.49E+04	7.91E+06	5.45E+04	1.32E+01
Phenol		1.10E+06	2.65E+04	2.59E+04	2.42E+04	1.10E+06	3.04E+04	2.96E+04	3.81E+04	1.10E+06	3.46E+04	3.35E+04	7.03E+04

Table 3

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Total petroleum hydrocarbons													
Aliphatic hydrocarbons EC5-EC8		4.77E+06	3.19E+03	3.19E+03	3.04E+02	4.77E+06	5.86E+03	5.86E+03	5.58E+02	4.77E+06	1.21E+04	1.21E+04	1.15E+03
Aliphatic hydrocarbons >EC8-EC8		4.77E+06	7.79E+03	7.79E+03	1.44E+02	4.77E+06	1.74E+04	1.74E+04	3.22E+02	4.77E+06	3.97E+04	3.96E+04	7.36E+02
Aliphatic hydrocarbons >EC8-EC10		9.53E+04	2.02E+03	2.02E+03	7.77E+01	9.53E+04	4.91E+03	4.91E+03	1.90E+02	9.53E+04	1.17E+04	1.13E+04	4.51E+02
Aliphatic hydrocarbons >EC10-EC12		9.53E+04	9.97E+03	9.97E+03	4.75E+01	9.53E+04	2.47E+04	2.29E+04	1.18E+02	9.53E+04	5.89E+04	4.73E+04	2.83E+02
Aliphatic hydrocarbons >EC12-EC16		9.53E+04	8.26E+04	5.88E+04	2.37E+01	9.53E+04	2.04E+05	8.17E+04	5.91E+01	9.53E+04	4.81E+05	8.02E+04	1.42E+02
Aliphatic hydrocarbons >EC16-EC35	(b)	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC35-EC44	(b)	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aromatic hydrocarbons >EC8-EC10		3.81E+04	3.58E+03	3.46E+03	6.13E+02	3.81E+04	8.69E+03	8.11E+03	1.50E+03	3.81E+04	2.05E+04	1.70E+04	3.58E+03
Aromatic hydrocarbons >EC10-EC12		3.81E+04	1.92E+04	1.62E+04	3.64E+02	3.81E+04	4.69E+04	2.79E+04	8.99E+02	3.81E+04	1.10E+05	3.42E+04	2.15E+03
Aromatic hydrocarbons >EC12-EC16		3.81E+04	2.02E+05	3.62E+04	1.69E+02	3.81E+04	4.76E+05	3.73E+04	4.19E+02	3.81E+04	1.03E+06	3.78E+04	1.00E+03
Aromatic hydrocarbons >EC16-EC21	(b)	2.84E+04	NR	NR	5.37E+01	2.83E+04	NR	NR	1.34E+02	2.84E+04	NR	NR	3.21E+02
Aromatic hydrocarbons >EC21-EC35	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01
Aromatic hydrocarbons >EC35-EC44	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01

Notes:

EC - equivalent carbon, GrAC - groundwater screening value, SAC - soil screening value.

The CLEA model output is colour coded depending upon whether the soil saturation limit has been exceeded.

	Calculated SAC exceeds soil saturation limit and may significantly affect the interpretation of any exceedances as the contribution of the indoor and outdoor vapour pathway to total exposure is >10%.
	Calculated SAC exceeds soil saturation limit but the exceedance will not affect the SAC significantly as the contribution of the indoor and outdoor vapour pathway to total exposure is <10%.
	Calculated SAC does not exceed the soil saturation limit.

The SAC for organic compounds are dependant upon soil organic matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway (Section 10.1.1, SR3)

(a) SAC for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead are derived using the C4SL toxicology data.

(b) SAC for selenium should not include the inhalation pathway as no expert group HCV has been derived; aliphatic and aromatic hydrocarbons >EC16 should not include inhalation pathway due to their non-volatile nature and inhalation exposure being minimal (oral, dermal and inhalation exposure is compared to the oral HCV); arsenic should only be based on oral contribution (rather than combined) owing to the relative small contribution from inhalation in accordance with the SGV report. The Oral SAC should be adopted for zinc and benzo(a)pyrene.

(c) SAC for CrIII should be based on the lower of the oral and inhalation SAC (see LQM/CIEH 2015 Section 6.8)

(d) SAC for elemental mercury, chromium VI and nickel should be based on the inhalation pathway only.

(e) SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used.



Table 4
Human Health Generic Assessment Criteria for Commercial Scenario

Compound	SAC for Soil SOM 1% (mg/kg)	SAC for Soil SOM 2.5% (mg/kg)	SAC for Soil SOM 6% (mg/kg)
Metals			
Arsenic	640	640	640
Cadmium	410	410	410
Chromium (III) - trivalent	8,600	8,600	8,600
Chromium (VI) - hexavalent	49	49	49
Copper	68,000	68,000	68,000
Lead	2,300	2,300	2,300
Elemental Mercury (Hg ⁰)	15 (4)	33 (10)	58 (26)
Inorganic Mercury (Hg ²⁺)	1,120	1,120	1,120
Methyl Mercury (Hg ^{CH₃})	230 (73)	310 (142)	320
Nickel	980	980	980
Selenium	12,000	12,000	12,000
Zinc	740,000	740,000	740,000
Cyanide (free)	650	650	650
Volatile Organic Compounds			
Benzene	27	50	98
Toluene	56,000 (869)	107,000 (1,916)	194,000 (4,357)
Ethylbenzene	6,000 (518)	13,000 (1,216)	27,000 (2,844)
Xylene - m	6,200 (625)	14,100 (1,474)	31,200 (3,457)
Xylene - o	6,600 (478)	15,000 (1,120)	33,000 (2,618)
Xylene - p	5,900 (576)	13,600 (1,353)	30,000 (3,167)
Total xylene	6,900 (625)	13,600 (1,474)	30,000 (3,457)
Methyl tertiary-Butyl ether (MTBE)	7,500	12,100	22,400
Trichloroethene	1	3	6
Tetrachloroethene	20	40	90
1,1,1-Trichloroethane	700	1,300	3,000
1,1,1,2-Tetrachloroethane	110	250	560
1,1,2,2-Tetrachloroethane	270	550	1,130
Carbon Tetrachloride	2.9	6.3	14.2
1,2-Dichloroethane	0.67	0.97	1.65
Vinyl Chloride	0.06	0.08	0.12
1,2,4-Trimethylbenzene	330	640	1,040
1,3,5-Trimethylbenzene	NR	NR	NR
Semi-Volatile Organic Compounds			
Acenaphthene	110,000	110,000	110,000
Acenaphthylene	110,000	110,000	110,000
Anthracene	520,000	540,000	540,000
Benzo(a)anthracene	170	170	180
Benzo(a)pyrene	77	77	77
Benzo(b)fluoranthene	44	45	45
Benzo(g,h,i)perylene	3,900	3,900	4,000
Benzo(k)fluoranthene	1,200	1,200	1,200
Chrysene	350	350	350
Dibenzo(a,h)anthracene	3.5	3.6	3.6
Fluoranthene	23,000	23,000	23,000
Fluorene	63,000 (31)	68,000	71,000
Indeno(1,2,3-cd)pyrene	500	510	510
Naphthalene	1,800 (76)	3,900 (183)	7,800 (432)
Phenanthrene	22,000	22,000	23,000
Pyrene	54,000	54,000	54,000
Phenol	440*	690*	1,300*
Total Petroleum Hydrocarbons			
Aliphatic hydrocarbons EC ₅ -EC ₄	3,200 (304)	5,900 (558)	12,100 (1,150)
Aliphatic hydrocarbons >EC ₄ -EC ₃	7,800 (144)	17,400 (322)	35,600 (736)
Aliphatic hydrocarbons >EC ₃ -EC ₁₀	2,000 (78)	4,800 (190)	11,300 (453)
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₂	9,700 (48)	22,900 (118)	47,300 (283)
Aliphatic hydrocarbons >EC ₁₂ -EC ₁₅	59,000 (24)	82,000 (59)	90,000 (142)
Aliphatic hydrocarbons >EC ₁₅ -EC ₂₅	1,000,000**	1,000,000**	1,000,000**
Aliphatic hydrocarbons >EC ₂₅ -EC ₄₄	1,000,000**	1,000,000**	1,000,000**
Aromatic hydrocarbons >EC ₃ -EC ₁₃	3,600 (613)	8,100 (1,503)	17,000 (3,580)
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂	16,000 (364)	28,000 (899)	34,000 (2,150)
Aromatic hydrocarbons >EC ₁₂ -EC ₁₈	36,000 (169)	37,000	38,000
Aromatic hydrocarbons >EC ₁₈ -EC ₂₁	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₃₅ -EC ₄₄	28,000	28,000	28,000
Minerals			
Asbestos	No asbestos detected with ID or <0.001% dry weight [†]		
Notes:			
** Generic assessment criteria not calculated owing to low volatility of substance and therefore no pathway, or an absence of toxicological data.			
NR - SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data. SAC for 1,2,4-trimethylbenzene may be used.			
EC - equivalent carbon. GrAC - groundwater assessment criteria. SAC - soil assessment criteria.			
* The GrAC for Phenol is based on a threshold which is protective of direct contact (SC050021/Phenol SGV report)			
** Denoted SAC calculated exceeds 100% contaminant, hence 100% (1,000,000mg/kg) has been taken as SAC.			
The SAC for organic compounds are dependent on Soil Organic Matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.			
SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor of 10 to reduce conservatism associated with the vapour inhalation pathway, section 10.1.1, SR3.			
FOOTNOTES: VALUE IN BRACKETS			
RSK has adopted an approach for petroleum hydrocarbons in accordance with LQM/CIH whereby the concentration modelled for each petroleum hydrocarbon fraction has been tabulated as the SAC with the corresponding solubility or vapour saturation limits given in brackets.			