DESK STUDY & GROUND INVESTIGATION REPORT

25-26 Redington Gardens
London NW3

Client: 25-26 Redington Gardens LLP

Engineer: Michael Alexander Consulting Engineers

J15031

May 2015




GEA Geotechnical & Environmental Associates

Document Control

Project title	25–26 Redington Gardens, London, NW3 7RX		**Project ref**	J15031
Report prepared by	Angela Baird BSc MSc CGeol EurGeol CSci FGS			
With input from	Martin Cooper BEng CEng MICE FGS			
Report checked and approved for issue by	Steve Branch BSc MSc CGeol FGS FRGS MIEnvSc			
Issue No	**Status**	**Date**	**Approved for Issue**	
1	Final	2 June 2015		
2	Final (amended)	3 June 2015		

This report has been issued by the GEA office indicated below. Any enquiries regarding the report should be directed to the office indicated or to Steve Branch in our Herts office.

☑ Hertfordshire tel 01727 824666 mail@gea-ltd.co.uk

☐ Nottinghamshire tel 01509 674888 midlands@gea-ltd.co.uk

CONTENTS

EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a site investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Michael Alexander Consulting Engineers, on behalf of 25-26 Redington Gardens LLP, with respect to the proposed construction of two new semi-detached houses including lower ground floor and stepped basements including pool areas, following the demolition of two existing semi-detached houses. The purpose of the investigation has been to research the history of the site with respect to possible contaminative uses, to determine the ground conditions and hydrogeology, to assess the extent of any contamination and to provide information to assist with the design of suitable foundations and retaining walls. The report also includes information required to comply with the London Borough of Camden (LBC) Planning Guidance CPG4, relating to the requirement for a Basement Impact Assessment (BIA).

SITE HISTORY

The first map studied, dated 1850, shows the site to be undeveloped. By 1871 the site is shown as a field with a stream running across the northwestern quarter with another along the southeastern boundary; the northwestern stream flows into the southern watercourse to the southwest of the site. Between 1879 and 1895 a large pond had been excavated approximately 175 m northeast of the site, close to the origins of the streams. Consequently the streams are no longer shown on the 1895 map and are assumed to have been diverted, infilled or culverted by that time. By 1915 the large pond has been infilled. Aerial photography from 1946-1949 indicates the site as part of the garden of a property on Templewood Avenue to the northwest. Between 1955 and 1966 the site was developed with the two existing semi-detached houses and the neighbouring detached house to the southwest was also constructed . The site has since remained unchanged, whilst the area immediately to the northeast of the site was developed with Conrad Court between 1996 and 2006.

GROUND CONDITIONS

The ground investigation has indicated that below a cover of made ground, Alluvium is present in the north of the site and is underlain by the Claygate Member which in turn is underlain by London Clay. In the south of the site the made ground is directly underlain by the Claygate Member. The made ground generally comprised orange-brown silty clay with brick, charcoal, pottery, glass, flint and concrete and extended to depths of between 1.20 m and 1.50 m. The Alluvium comprised soft dark grey to bluish grey very sandy silty clay with an organic odour. Bands of sand, gravel and peat were also encountered and the Alluvium extended to depths of 3.40 m and 3.00 m in Borehole Nos 2 and 3 respectively. The Claygate Member comprised initially soft or reworked firm orange-brown mottled grey silty clay with occasional gravel, becoming firm orange-brown mottled grey silty clay with occasional fine sand partings, and extended to depths of between 4.80 m and 5.50 m The London Clay comprised firm brown silty clay with occasional partings of fine sand to depths of approximately 6.00 m, underlain by stiff grey fissured silty clay to the maximum investigated depth of 20.00 m (30.00 m AD). Groundwater was encountered during drilling toward the base of the Alluvium, between 2.50 m and 3.00 m, and during subsequent monitoring it was measured at depth of approximately 1.50 m. Contamination testing has revealed elevated concentrations of lead and a single elevated concentration of mercury.

RECOMMENDATIONS

The excavation of the 5.0 m to 7.0 m deep basement will result in a formation level in the stiff London Clay. Groundwater inflows are anticipated from the Alluvium and some form of groundwater control will be required during construction of the basement and at this stage a bored pile wall is considered to be the most suitable method of supporting the excavation.

Only in proposed garden areas could end users conceivably come into direct contact with the contaminated soils. It is recommended that additional sampling and testing is carried out in these areas to determine the precautions required, once the redevelopment proposals are finalised. The identified contaminants remaining within the made ground are likely to be of low solubility and a risk to groundwater has not been identified. The proposed development is unlikely to result in any specific groundwater or land stability issues and a requirement for a flood risk assessment has not been identified.

Part 1: INVESTIGATION REPORT

This section of the report details the objectives of the investigation, the work that has been carried out to meet these objectives and the results of the investigation. Interpretation of the findings is presented in Part 2.

1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Michael Alexander Consulting Engineers, on behalf of 25-26 Redington Gardens LLP, to carry out a desk study, including hydrogeological assessment and ground investigation at 25–26 Redington Gardens, London, NW3 7RX.

The report includes information to assist in the preparation of a Basement Impact Assessment (BIA) in accordance with London Borough of Camden (LBC) Planning Guidance CPG4[1].

1.1 Proposed Development

It is understood that it is proposed to demolish the existing pair of three-storey semi-detached houses and to construct two new semi-detached houses including lower ground floor and stepped basements including pool areas. A double level basement, extending to a depth of about 6.50 m from street level, will therefore be excavated.

This report is specific to the proposed development and the advice herein should be reviewed if the proposals are amended.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to check the history of the site and surrounding areas with respect to previous contaminative uses;
- to determine the ground conditions and their engineering properties;
- to assess the possible impact of the proposed development on the local hydrogeology;
- to provide advice with respect to the design of suitable foundations and retaining walls;
- to provide an indication of the degree of soil contamination present; and
- to assess the risk that any such contamination may pose to the proposed development, its users or the wider environment.

1 London Borough of Camden Planning Guidance CPG4 *Basements and lightwells*

1.3 Scope of Work

In order to meet the above objectives, a desk study was carried out, followed by a ground investigation. The desk study comprised:

- a review of readily available geological and hydrogeological maps;
- a review of historical Ordnance Survey (OS) maps and environmental searches sourced from the Envirocheck database; and
- a walkover survey of the site carried out in conjunction with the fieldwork.

In light of the desk study, an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- a single cable percussion borehole advanced to a depth of 20.00 m;
- two drive-in window sampler boreholes advanced to depths of 6.00 m;
- installation of three groundwater monitoring standpipes, to depths of between 5.60 m and 8.00 m, and two subsequent groundwater monitoring visits;
- five hand dug trial pits excavated to depths of between 0.30 m and 0.84 m, to determine the configuration of existing foundations of the existing houses and neighbouring properties;
- laboratory testing of selected soil samples for geotechnical purposes and for the presence of contamination; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

The report includes a contaminated land assessment which has been undertaken in accordance with the methodology presented in Contaminated Land Report (CLR) 11[2] and involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. The risk assessment is thus divided into three stages comprising Preliminary Risk Assessment, Generic Quantitative Risk Assessment, and Site-Specific Risk Assessment.

1.3.1 Qualifications

The BIA elements of the work have been carried out by Martin Cooper, a BEng in Civil Engineering, a chartered engineer (CEng) and member of the Institution of Civil Engineers (MICE), who has over 20 years specialist experience in ground engineering and Steve Branch, a BSc in Engineering Geology and Geotechnics, MSc in Geotechnical Engineering, a chartered geologist (CGeol) and Fellow of the Geological Society (FGS) with 25 years' experience in geotechnical engineering, engineering geology and hydrogeology. Both assessors meet the Geotechnical Specialist criteria of the Site Investigation Steering Group and satisfy the qualification requirements of the Council guidance.

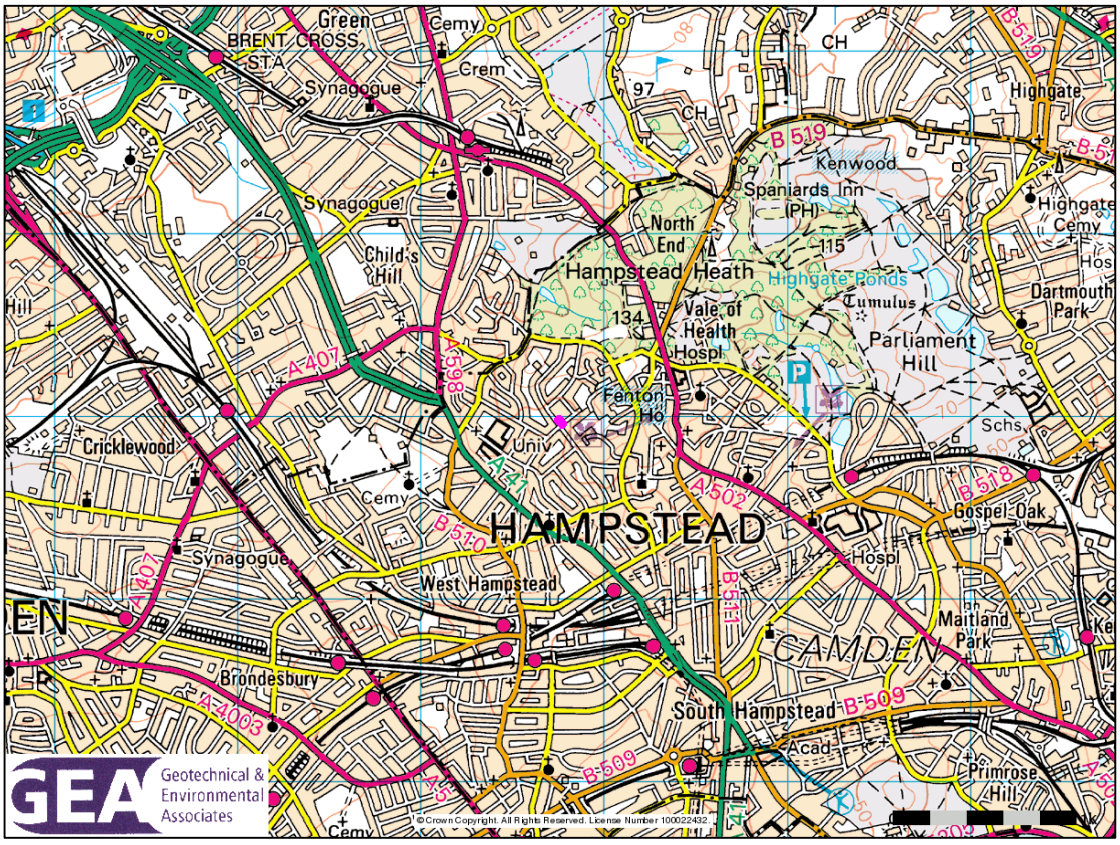
2 *Model Procedures for the Management of Land Contamination* issued jointly by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA) Sept 2004

1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted and the number of locations where the ground was sampled. No liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

2.0 THE SITE

2.1 Site Description



The site is located in a residential area in the Hampstead area of the London Borough of Camden, approximately 600 m northwest of Hampstead London Underground station. It fronts onto Redington Gardens to the southeast, is bordered to the northeast by Conrad Court, a three-storey block of flats with a lower ground level car park, to the southwest by a three-storey detached house and to the northwest by the garden of a property fronting onto Templewood Avenue. There was no evidence from the street that the neighbouring properties have basements. The site may be additionally located by National Grid Reference 525760, 185970 and is shown on the map extract above.

A walkover of the site was carried out by a geotechnical engineer from GEA at the time of the fieldwork. The site measures approximately 20 m by 50 m and is essentially level. No 26 is at a slightly higher elevation than No 25 with the boundary wall between the two properties

forming a retaining wall approximately 0.5m in height. Each house includes an integral garage with a driveway to the front and a passageway runs either side of the properties providing access to the rear gardens. The rear of No 26 has a patio area adjacent to the rear elevation, and a retaining wall approximately 0.5 m high which runs the width of the garden, with steps providing access to the lawn. Another patio is located at the northern end of the garden and raised flower beds. The rear of No 25 is essentially level comprising two patios, a lawn, walled circular pond and walled raised flower beds. Reference to a Thames Water drawing indicates the street level of Redington Gardens directly to the south of the site to be at 95.5 m OD.

A number of trees are present in the rear garden, along the perimeter of the site.

2.2 Site History

The site history has been researched by reference to internet sources and historical Ordnance Survey (OS) maps obtained from the Envirocheck database.

The first map studied, dated 1850, shows the site to be undeveloped. By 1871 the site is shown as a field with a river or stream running across the northwestern quarter with another along the southeastern boundary; the northwestern stream flows into the southern watercourse to the southwest of the site. Between 1879 and 1895 a large pond had been excavated approximately 175 m northeast of the site, close to the origins of the stream to the southeast and the stream to the northwest. Consequently the streams are no longer shown on the 1895 map and are assumed to have been diverted, infilled or culverted by that time. Redington Road has been established by this time, with some associated housing. By 1915 the large pond has been infilled and Redington Road, Templewood Gardens and Templewood Avenue had also been constructed by this time. Aerial photography from 1946-1949 indicates the site as part of the garden of a property on Templewood Avenue to the northwest. Between 1955 and 1966 the site was developed with the two existing semi-detached houses, the neighbouring detached house to the southwest has also been constructed by this time. The site has since remained unchanged, whilst the area immediately to the northeast of the site was developed with Conrad Court between 1996 and 2006.

2.3 Other Information

A search of public registers and databases has been made via the Envirocheck database and relevant extracts from the search are appended. Full results of the search can be provided if required.

The Envirocheck report has indicated no landfill sites, waste management or waste transfer sites located within 1 km of the site. In addition there have been no pollution incidents within 500 m of the site.

Reference to records compiled by the Health Protection Agency (formerly the National Radiological Protection Board) indicates that the site falls within an area where less than 1% of homes are affected by radon emissions and therefore radon protective measures will not be necessary.

The site is not located within a nitrate vulnerable zone or any other sensitive land use.

The existing property is located within the Redington Frognal Conservation Area, but is not listed.

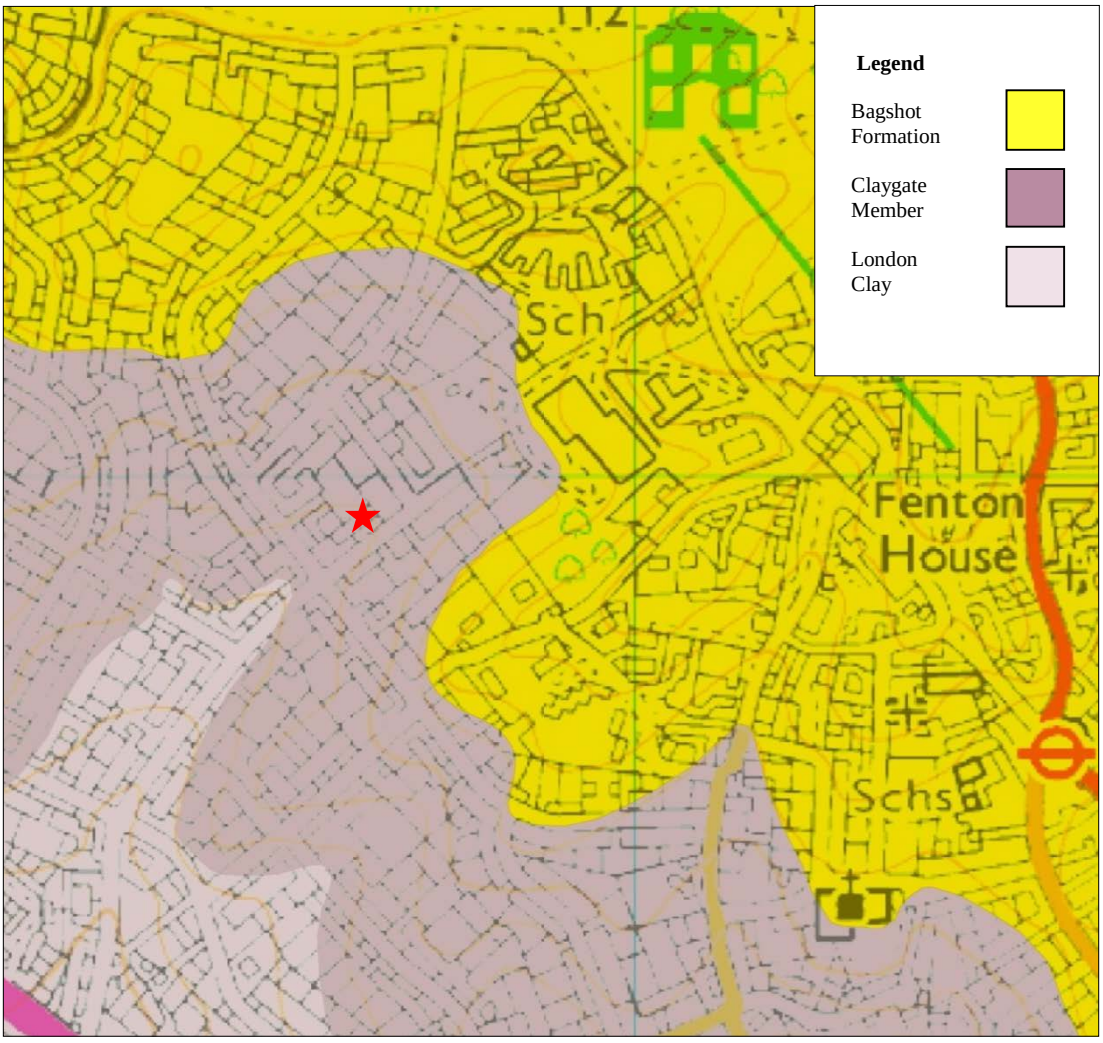
2.4 UXO Preliminary Risk Assessment

This assessment has been carried out in accordance with the guidelines provided by CIRIA[3], which state that the likelihood of encountering and detonating unexploded ordnance (UXO) below a site should be assessed along with establishing the consequences that may arise. The first phase comprises a preliminary risk assessment, which should be undertaken at an early stage of the development planning. If such an assessment identifies a high level of risk then a detailed risk assessment should be carried out by a UXO specialist, which will identify an appropriate course of action with regard to risk mitigation.

It is known that the site was fields / gardens until some time between 1955 and 1966, when it was developed with two semi-detached houses. Conrad Court appears to have been built some time between 1996 and 2006. Historical maps show no indications of bomb damage to the surrounding buildings, in terms of buildings being noted as ruins, clear or redeveloped during or shortly after the war. Hampstead in general had a lower bomb drop intensity than the City.

As there is no evidence to suggest that bombs fell directly at the site, and as the site has been developed post-war, it is considered that there is no significant risk of encountering a UXO during the proposed development.

2.5 Geology



The British Geological Survey (BGS) map of the area (Sheet 256) indicates that the site is underlain by the Claygate Member, which is in turn underlain by London Clay. As shown on the map above. The geology in this area is generally approximately horizontally bedded such that the boundary between the geological formations roughly follows the ground surface contour lines. Comparison of the geological boundary above with ground surface contours indicates that the Bagshot Formation extends to approximately 110 m OD, and the Claygate Member extends to a level of between 95 m OD and 90 m OD.

According to the British Geological Society memoir, the Claygate Member comprises alternating beds of clayey silt, very silty clay, sandy silt and glauconitic silty fine sand. The lower part of the Claygate Member is generally more bioturbated. A bed of calcareous concretions is present near the base in many places.

The London Clay Formation is homogenous, slightly calcareous silty clay to very silty clay, with some beds of clayey silt grading to silty fine grained sand. According to the BGS map, dated 2006, the Head propensity is based on the geotechnical properties of the London Clay and head may occur close to the Claygate Member / London Clay boundary.

An investigation has previously been carried out by GEA roughly 30 m to the west of the site. The investigation found a moderate thickness of made ground, underlain by clay soils of the Claygate Member over London Clay. The Claygate Member comprised soft becoming firm pale brown mottled grey and orange-brown very silty clay or very clayey sand and extended to depths of between 2.0 m and 2.7 m. The underlying London Clay initially comprised a weathered zone of firm becoming stiff brown mottled grey fissured clay that extended to a depth of 5.7 m and was underlain by unweathered stiff becoming very stiff grey fissured clay, becoming sandy towards the maximum depth of investigation at 20 m.

2.6 Hydrology and Hydrogeology

The Claygate Member is designated by the Environment Agency (EA) as a Secondary 'A' Aquifer, which refers to 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. The underlying London Clay is classified as unproductive strata.

The site is not located within a designated Groundwater Source Protection Zones (SPZs). There are no Environment Agency registered water abstraction points within 500 m of the site.

The nearest surface water feature is located 551 m southeast of the site.

Any water infiltrating the Claygate Member will generally tend to flow vertically downwards at a slow rate toward the chalk aquifer and laterally along tiny fissures within the clay. Due to the predominantly cohesive nature of the soils, the groundwater flow rate is anticipated to be very slow and published data for the permeability of the London Clay indicates the horizontal permability to generally range between 1 x 10^{-10} m/s and 1 x 10^{-8} m/s, with an even lower vertical permeability. Although the Claygate Member is sandier in composition and permeability could be expected to be marginally higher.

In the aforementioned ground investigation, groundwater was encountered during drilling of the boreholes at depths of 1.0 m and 2.2 m at the base of the Claygate Member in the majority of the boreholes. However, groundwater was not encountered in the cable percussion borehole A standpipe installed to a depth of 8.0 m in one borehole was found to be dry two days after installation but when monitored again, four weeks after installation, groundwater was present at a depth of 1.55 m. The absence of groundwater in the standpipe when first monitored suggests that groundwater flow is relatively slow.

Reference to the Lost Rivers of London[3] indicates that a tributary of the Westbourne river flowed along Redington Gardens in a southwesterly direction, along the southwestern boundary as shown on the historical maps. The Westbourne runs from Hampstead Heath, through Kilburn and Paddington, across Hyde Park to the Thames at Chelsea. It is understood that the Westbourne is now covered and culverted and forms part of the surface water sewerage system called Ranelagh Sewer. It is likely that any groundwater flow beneath the site within the Claygate Member would follow topographic contours and thus be towards the southwest.

The site lies outside the catchment of the Hampstead Heath chain of ponds.

The site is not at risk of flooding from rivers or sea, as defined by the Environment Agency. However, the Environment Agency website[4] shows that the site may have a low risk of surface water flooding. Nearby Templewood Gardens and Templewood Avenue are shown as streets flooded in 2002 on Figure 15 of the Arup document.

2.7 Preliminary Risk Assessment

Part IIA of the Environmental Protection Act 1990, which was inserted into that Act by Section 57 of the Environment Act 1995, provides the main regulatory regime for the identification and remediation of contaminated land. The determination of contaminated sites is based on a "suitable for use" approach which involves managing the risks posed by contaminated land by making risk-based decisions. This risk assessment is carried out on the basis of a source-pathway-receptor approach.

2.7.1 Source

The desk study research has indicated that the site has only been occupied by the existing residential property for its entire known developed history. The site and immediate surrounding areas are not considered to have had a contaminative history. In addition, there are no historical or existing landfill sites within 250 m and a risk of soil gas has not been identified. The potentially backfilled pond identified from historical maps, approximately 175 m northeast of the site, is unlikely to be a source of soil gas due to the length of time since its backfilling.

2.7.2 Receptor

The site will continue to have a residential end use following the excavation of the basement and no new receptors will result. However, the residential end use is considered a high sensitivity end-use. Buried services are likely to come into contact with any contaminants present within the soils through which they pass and site workers are likely to come into direct contact with any contaminants present in the soil and through inhalation of vapours during basement excavation and construction.

The site is underlain by Secondary 'A' Aquifer and therefore groundwater and adjacent sites should be considered moderately sensitive receptors. The presence of an Unproductive Stratum beneath the secondary aquifers means that the chalk aquifer at depth represents a relatively low sensitivity receptor.

2.7.3 Pathway

[3] Nicholas Barton (2000) *London's Lost Rivers.* Historical Publications Ltd
[4] http://apps.environment-agency.gov.uk/wiyby/default.aspx

End users will be largely isolated from any potential contaminants in the ground by the presence of the buildings and extent of hardstanding. However, in proposed areas of soft landscaping potential direct contaminant exposure pathways exist with respect to end users.
The presence of the Alluvium and Claygate Member may allow the migration of contaminated groundwater to adjacent sites. The negligible permeability of the underlying London Clay Formation will limit the potential for groundwater percolation into the underlying chalk, and thus a pathway is not considered likely to exist to the Principal Aquifer.

Except for the pathway of direct contact for site workers, no new pathways will be created by the basement excavation and services will come into contact with any contamination within the soils in which they are laid.

There is thus considered to be limited potential for a significant contaminant pathway to be present between any potential contaminant source and a target for the particular contaminant beneath the new building and extent of any hardstanding and a moderate potential exists within any proposed soft landscaped or garden areas.

2.7.4 Preliminary Risk Appraisal

On the basis of the above it is considered that there is a LOW risk of there being a significant contaminant linkage at this site which would result in a requirement for major remediation work. Furthermore, there is not considered to be a significant potential for hazardous soil gas to be present on or migrating towards the site: there should thus be no need to consider landfill gas exclusion systems.

3.0 EXPLORATORY WORK

In view of the limited access and in order to meet the objectives described in Section 1.2 as far as possible within these access constraints, a single borehole was advanced to a depth of 20.00 m on the front driveway by means of a standard cable percussion rig. This was supplemented by two window sampler boreholes in the rear garden to a maximum depth of 6.00 m.

Standard Penetration Tests (SPTs) were carried out at regular intervals in the cable percussion borehole to provide quantitative data on the strength of soils encountered and disturbed and undisturbed samples were obtained for subsequent laboratory examination and testing.

Groundwater monitoring standpipes were installed in three boreholes to depths of between 5.60 m and 8.00 m and have been monitored on a two occasions to date, roughly four weeks and six weeks after installation.

In addition five trial pits were manually excavated to depths of between 0.30 m and 0.84 m to investigate the foundations of the existing houses and neighbouring properties.

All of the above work was carried out under the supervision of a geotechnical engineer from GEA.

A selection of the samples recovered from the boreholes and trial pits were submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for a programme of contamination testing.

The borehole and trial pit records and results of the laboratory analyses are appended together with a site plan indicating the exploratory positions. The arbitrary datum (AD) levels shown on the borehole records have been taken from an undated, unreferenced survey drawing

provided by the consulting engineers. The levels are relative to a temporary bench mark of 50.00 m AD at a manhole cover in the front drive towards the centre of No 26. A Thames Water drawing indicates the street level of Redington Gardens, immediately to the south of the site, to be at 95.5 m OD.

3.1 Sampling Strategy

The scope of the works was specified by the consulting engineers, with input from GEA.

The boreholes were positioned on site by GEA, with due respect to the proposed development. The trial pits locations were specified by the structural engineers and positioned on site by GEA, in accessible locations, whilst avoiding areas of buried services.

Five samples of made ground were subjected to analysis for a range of common industrial contaminants and contamination indicative parameters. For this investigation the analytical suite for the soil included a range of metals, speciation of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols. The soil samples were selected to provide a general view of the chemical conditions of the soils that are likely to be involved in a human exposure or groundwater pathway and to provide advice in respect of re-use or for waste disposal classification.

The contamination analyses were carried out at a MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTS standards. Details of the MCERTs accreditation and test methods are included in the Appendix together with the analytical results.

4.0 GROUND CONDITIONS

The investigation has generally confirmed the expected ground conditions, which are summarised in the table below.

Stratum	Depth to base (m) (Level m AD)	Thickness (m)
Made Ground	1.20 to 1.50 (48.50 to 50.00)	1.20 to 1.50
Alluvium	3.40 and 3.00 (46.60 and 47.50)	1.90 and 1.50 Absent from Borehole No 1
Claygate Member	4.80 to 5.50 (44.50 to 45.50)	2.00 to 3.60
London Clay	>20.00 (below 30.00)	>15.20

4.1 Made Ground

The made ground generally comprised brown / orange-brown gravelly silty clay. Gravel comprised brick, charcoal and flint. Borehole No 2 was found to have variable made ground comprising orangish brown sandy gravelly clay, silty clay and silty sand and very sandy clay. Gravel comprised brick, charcoal, pottery, glass, concrete, flint and clinker. A rare cobble of concrete was also recorded. Fine to medium roots were also noted.

The made ground extended to depths between 1.2 m to 1.5m below ground level.
Apart from the presence of fragments of extraneous material noted above, no visual or olfactory evidence of contamination was observed during the fieldwork. Five samples of the made ground have been sent for contamination testing as a precautionary measure and the results are presented in Section 5.4.

4.2 Alluvium

Alluvium was encountered in the northwest of the site within Borehole Nos 2 and 3 only, which were closest to the former stream in that part of the site. It comprised fibrous peat, dark pinkish red slightly clayey sand, very soft to soft grey mottled orange to black slightly sandy silty clay, black silt and white sand and gravel in Borehole No 2 and extended to 3.40 m (46.60 m AD). An organic odour was noted in this stratum. Within Borehole No 3 it was found to comprise soft dark grey to bluish grey very sandy silty clay and had an organic odour and extended to 3.00 m (47.5 m AD).

Laboratory tests indicate the Alluvium to have an organic content of around 2% and 3.5% with moisture contents for the variable material ranging from 22% to 70% and a medium volume change potential.

4.3 Claygate Member

The Claygate Member comprised initially soft or reworked firm orange-brown mottled grey silty clay with occasional gravel, becoming firm orange-brown mottled grey silty clay with occasional fine sand partings, and extended to depths of between 4.80 m (45.20 m AD) and 5.50 m (45.50 m AD). Borehole No 3 encountered a slightly clayey sand layer of 0.10 m in thickness at 4.5 m which was underlain by water-softened clay extending to 5.00 m (45.50 m AD).

Seven moisture content tests were undertaken on the material and results ranged from 20% to 33%. Three plasticity results indicated the soil has medium volume change potential.

The results from the laboratory undrained triaxial compression tests, which are plotted against depth on a graph in the appendix, indicate the clay to generally increase in strength with depth within the designation of high strength, with undrained shear strength increasing from 88 kN/m^2 at a depth of 2.0 m, to 90 kN/m^2 at a depth of 4.0 m.

No evidence of contamination was noted in these soils.

4.4 London Clay

The London Clay initially comprised an upper weathered horizon of generally firm brown silty clay with occasional partings of fine sand which extended to depths of 5.9 m in Borehole No 2 and 5.95 m in Borehole No 3.

Below this depth, stiff grey fissured silty clay was encountered and proved to the maximum depth investigated of 20.00 m.

Laboratory plasticity index test results indicate the clay to be of high volume change potential

The results from the laboratory undrained triaxial compression tests, which are plotted against depth on a graph in the appendix, indicate the clay to generally increase in strength with depth from medium strength to high strength with undrained shear strength increasing from 67 kN/m^2 at a depth of 9.0 m, to 134 kN/m^2 at a depth of 18.0 m. The exception to this, is the shallowest sample at 6.00 m, which indicates high strength of 82 kN/m^2 which may be due to an increased sand content in that sample.

No evidence of contamination was noted in these soils.

4.5 Groundwater

Groundwater was encountered during drilling at a depth of 4.8m as a seepage at the base of the Claygate Member and the interface of the London Clay within Borehole No 1. Groundwater was also encountered at 2.4 m at the top of an alluvial sand layer within Borehole No 2, and at the interface of the very sandy silty clay of alluvium and silty clay of the Claygate Member within Borehole No 3. Standpipes were installed in all three boreholes and have been monitored on two occasions, over a roughly six-week period after the fieldwork. No further monitoring is planned at this time. Unfortunately there was no access to Borehole No 2 on the first visit; the results of the monitoring visits are shown in the table below.

Borehole No	Installed standpipe depth (m)	06/03/2015		20/03/2015	
		Depth to groundwater (m)	Depth to base (m)	Depth to groundwater (m)	Depth to base (m)
1	8.00	1.32	8.15	1.46	8.11
2	6.00	Unable to access	Unable to access	1.45	3.88
3	5.60	1.14	3.00	1.47	5.52

All trial pits remained dry during excavation and logging.

4.6 Soil Contamination

The table below sets out the values measured within five samples of the made ground analysed; all concentrations are in mg/kg unless otherwise stated.

Determinant	TP5 – 0.40 m to 0.80 m	BH3 - 0.50 m	BH2 – 0.45 m	BH2 – 0.61 m	TP3 – 0.4 m
pH	8.9	7.4	8.2	8.3	8.1
Arsenic	18	10	35		14
Cadmium	0.23	0.13	0.45		0.14
Chromium	32	23	45		49
Copper	100	43	100		30
Mercury	0.57	0.67	**2.2**		0.34
Nickel	27	15	45		33
Lead	**600**	**290**	**740**		150
Selenium	<0.20	0.47	0.42		0.2
Zinc	230	89	240		150
Total Cyanide	<0.50	<0.50	<0.50		<0.50
Total Phenols	<0.30	<0.30	<0.30		0.35
Sulphide	3.4	5.2	2.4	2	1.4
Total PAH	48	15	9.4		16

Determinant	TP5 – 0.40 m to 0.80 m	BH3 - 0.50 m	BH2 – 0.45 m	BH2 – 0.61 m	TP3 – 0.4 m
Benzo(a)pyrene	3.3	1.2	0.86		0.91
Naphthalene	3.2	0.24	0.21		<0.10
TPH	30	<10	C <10	10	<10
Total organic carbon %	2.3	3.2	4.9		1.4

Notes: Figure in **bold** indicates concentration in excess of risk-based soil guideline values, as discussed in Part 2 of this report

4.6.1 Generic Quantitative Risk Assessment

The use of a risk-based approach has been adopted to provide an initial screening of the test results to assess the need for subsequent site-specific risk assessments. Contaminants of concern that have values in excess of a generic human health risk based guideline values which are either that of the CLEA[5] Soil Guideline Value where available, or is a Generic Screening Value calculated using the CLEA UK Version 1.06[6] software assuming a residential end use with plant uptake, or is based on the DEFRA Category 4 Screening values[7]. The key generic assumptions for this end use are as follows:

- that groundwater will not be a critical risk receptor;
- that the critical receptor for human health will be young female children aged zero to six years old;
- that the exposure duration will be six years;
- that the critical exposure pathways will be direct soil and indoor dust ingestion, skin contact with soils and indoor dust, and inhalation of indoor and outdoor dust and vapours; and
- that the building type equates to a two-storey small terraced house.

It is considered that these assumptions are acceptable for this generic assessment of this site. The tables of generic screening values derived by GEA and an explanation of how each value has been derived are included in the Appendix.

Where contaminant concentrations are measured at concentrations below the generic screening value it is considered that they pose an acceptable level of risk and thus further consideration of these contaminant concentrations is not required. However where concentrations are measured in excess of these generic screening values there is considered to be a potential that they could pose an unacceptable risk and thus further action will be required which could include;

- additional testing to zone the extent of the contaminated material and thus reduce the uncertainty with regard to its potential risk;

5 *Updated Technical Background to the CLEA Model (Science Report SC050021/SR3) Jan 2009* and Soil Guideline Value reports for specific contaminants; all DEFRA and Environment Agency.
6 Contaminated Land Exposure Assessment (CL|EA) Software Version 1.06 Environment Agency 2009
7 CL:AIRE (2013) *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination* Final Project Report SP1010 and DEFRA (2014) *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination* Policy Companion Document SP1010

- site specific risk assessment to refine the assessment criteria and allow an assessment to be made as to whether the concentration present would pose an unacceptable risk at this site; or
- soil remediation or risk management to mitigate the risk posed by the contaminant to a degree that it poses an acceptable risk.

This assessment is based upon the potential for risk to human health, which at this site is considered to be the critical risk receptor.

The chemical analyses have revealed elevated concentrations of lead within three samples of made ground tested, along with a single elevated concentration of mercury.

These concentrations could thus pose a potentially unacceptable risk to human health through direct contact, accidental ingestion or inhalation of soil or soil derived dust.

The significance of these results is considered further in Part 2 of the report.

4.7 Existing Foundations

The findings of the trial pits are summarised in the table below. Sketches and photographs of each pit are included in the Appendix.

Trial Pit No	Structure	Foundation detail	Bearing Stratum
1	Foundations of Conrad Court	Concrete strip Top 0.12 m Base – not proved Lateral projection 140 mm, where drain was encountered	Not determined. The trial pit was terminated due to a drainage pipe.
2	Foundations of Conrad Court	Concrete strip Top 0.15 m Base 0.5 m Lateral projection 200 mm	Firm brown mottled grey/orange-brown silty CLAY Drainage pipe was broken through on instruction of Consulting Engineer.
3	House foundations of No 26	Concrete strip Top 0.09 m Base 0.65 m Lateral projection 4 mm	Soft orange-brown silty CLAY with occasional fine to medium subrounded gravel of flint.
4	Foundations of No 24	Concrete strip Top 0.00 m Base 0.73 m Lateral projection 170 mm	Soft orange-brown silty CLAY with occasional fine to medium subrounded gravel of flint.
5	Foundations of No 24	Concrete strip Top 0.15 m Base 0.76 m Lateral projection 60 mm	Soft orange-brown silty CLAY with occasional fine to medium subrounded gravel of flint.

Part 2: DESIGN BASIS REPORT

This section of the report provides an interpretation of the findings detailed in Part 1, in the form of a ground model, and then provides advice and recommendations with respect to the basement excavation and the potential impact on the hydrogeology.

5.0 INTRODUCTION

It is understood that it is proposed to demolish the existing pair of three-storey semi-detached houses and to construct two new semi-detached houses including lower ground floors and stepped basements including pool areas. The new houses will effectively share a double level basement excavation, extending to a depth of about 6.50 m from street level.

6.0 GROUND MODEL

The desk study has revealed that the site has not had a potentially contaminative historical use as it has been occupied by the existing house for its entire known developed history, and on the basis of the fieldwork, the ground conditions at this site can be characterised as follows:

- the investigation encountered a moderate thickness of made ground, over the Claygate Member which is in turn underlain by the London Clay; Alluvium is present over the Claygate in the northwest of the site close to the former watercourse;
- the made ground generally comprises brown / orange-brown gravelly silty clay with fine to medium roots with brick, charcoal, pottery, glass, flint and concrete and extends to depths of 1.20m to 1.50 m (48.50 to 50.00 m AD);
- the Alluvium comprises soft dark grey to bluish grey very sandy silty clay with an organic odour and bands of sand, gravel and peat and extends to depths of to 3.40 m (46.60 m AD) and 3.00 m (47.50 m AD);
- the Claygate Member comprises initially soft or firm orange-brown mottled grey silty clay with occasional fine sand partings and extends to depths of between 4.80 m to 5.50 m (44.50 m AD to 45.50 m AD);
- the London Clay initially comprises firm medium strength brown silty clay with occasional partings of fine sand to depths of approximately 6.00 m, underlain by stiff high strength grey fissured silty clay to the maximum investigated depth of 20.00 m;
- groundwater is present toward the base of the Alluvium and has been measured at depths of between 1.14 m and 1.47 m; the water level is likely to be subject to seasonal variation;
- contamination testing has revealed elevated concentrations of lead, along with a single elevated concentration of mercury.

7.0 ADVICE AND RECOMMENDATIONS

Formation level for the proposed 5.00 m to 7.00 m deep basement is likely to be within the London Clay. Groundwater inflows are anticipated in the basement excavation, particularly from the Alluvium. In view of the presence of shallow groundwater spread foundations constructed from basement level are unlikely to be feasible and consideration should be given to piled foundations.

Excavations for the proposed basement structure will require temporary support to maintain stability of the excavation and surrounding structures at all times.

7.1 Basement Construction

7.1.1 Basement Excavation

Groundwater was encountered during drilling within the Alluvium in the northwest of the site. In addition, groundwater seepage was encountered during drilling of Borehole No 1 at a depth of 4.8 m at the interface of the Claygate Member and London Clay. Subsequent monitoring to date measured water in the standpipes at a minimum depth of 1.14 m. Although Alluvium was not recorded in Borehole No 1, the groundwater has been measured at a similar depth in each of the standpipes. This information indicates that groundwater is likely to be encountered within the basement excavation but is not particularly informative regarding the rate of inflow. It would be prudent to carry out rising head tests within the standpipes to establish the rate of rise in groundwater and permeability of the Claygate Member and to continue monitoring.

Groundwater is likely to be present within the Claygate Member as pockets of water rather than in continuous layers. Each individual pocket may therefore be of relatively low volume and individual inflows may cease once the pocket is emptied. Similarly, the Alluvium includes pockets of sand and gravel which are likely to be more water-bearing. However, as the basement excavation will cover a much larger area than that covered by the investigation, it is possible that larger pockets or inter-connected layers of groundwater could be encountered. It would therefore be prudent, once access is available, to carry out a number of trial excavations, to depths as close to the full basement depth as possible, to provide an indication of the likely groundwater conditions. It is likely that the rate of inflow will be relatively slow within the Claygate Member and slow to moderate in the Alluvium, although it is recommended that the chosen contractor has a contingency plan in place to deal with more significant or prolonged inflows, if a watertight temporary retention scheme is not adopted.

There are a number of methods by which the sides of the basement excavation could be supported in the temporary and permanent conditions. The choice of wall may be governed to a large extent by the requirement to prevent ground water inflows and whether it is to be incorporated into the permanent works and have a load bearing function.

Once the existing properties have been demolished and the site clear, it is understood that the Client's preferred method of construction of the basement is by a perimeter secant piled retaining wall, and an open and propped construction. Props would be installed to capping beams spanning across the site or across the corners. The chosen method of construction should be essentially water-tight with any additional groundwater flows removed by sump pumping. On completion of the excavation, the basement walls would be completed with reinforced concrete liner walls. Once the lower ground floor slab is completed the props would be removed.

The ground movements associated with the basement excavation will depend on the method of excavation and support and the overall stiffness of the basement structure in the temporary condition. Thus, a suitable amount of propping will be required to provide the necessary rigidity. In this respect the timing of the provision of support to the wall will have an important effect on movements.

Consideration will need to be given to a retention system that maintains the stability at all times of the neighbouring properties and structures.

7.1.2 Basement Retaining Walls

The following parameters are suggested for the design of the permanent basement retaining walls.

Stratum	Bulk Density (kg/m^3)	Effective Cohesion (c' – kN/m^2)	Effective Friction Angle (Φ' – degrees)
Made Ground	1700	Zero	20
Alluvium	1700	Zero	23
Claygate Member	1900	Zero	24
London Clay	1950	Zero	24

Groundwater has been measured at depths of between 1.14 m and 1.47 m and further monitoring should be continued in order to establish a design water level. On this basis, groundwater might be anticipated to be encountered in the 5.00 m to 7.00 m deep basement and further monitoring should be undertaken as detailed in Section 8.1.1. Reference should be made to BS8102:2009[8] with regard to requirements for waterproofing and design with respect to groundwater pressures.

7.1.3 Basement Heave

The proposed construction of the 5.00 m to 7.00 m deep excavation will result in an approximate maximum unloading of about 140 kN/m^2, which will result in an elastic heave and long term swelling of the London Clay. The effects of the longer term swelling movement will be mitigated to some extent by the load applied by the new foundations but may need to be subject to analysis in due course. It is understood that the Client has allowed from the use of internal tension piles to mitigate the effects of heave on the basement slab.

7.2 Piled Foundations

For the ground conditions at this site some form of bored pile is likely to be the most appropriate. A conventional rotary augered pile may be appropriate but consideration will need to be given to the possible instability and water ingress in the made ground and Alluvium, and within any silty or sandy zones within the Claygate Member or London Clay. The use of bored piles installed using continuous flight auger (cfa) techniques may therefore be the most appropriate, especially as the use of a limited access rig may be required.

8 BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground*

The following table of ultimate coefficients may be used for the preliminary design of bored piles from ground floor level, based on the measured SPT and cohesion / depth graph in the appendix.

Stratum	Depths m	kN / m²
Ultimate Skin Friction		
Made Ground, Alluvium and Claygate	GL to 5.50	Ignore (Basement excavation)
London Clay (α = 0.5)	5.50 to 15.00	Increasing linearly from 27.5 to 45
London Clay (α = 0.5)	15.00 to 20.00	Increasing linearly from 45 to 87.5
Ultimate End Bearing		
London Clay	15.00 to 20.00	Increasing linearly from 810 to 1575

In the absence of pile tests, guidance from the London District Surveyors Association (LDSA)[9] suggests that a factor of safety of 2.6 should be applied to the above coefficients in the computation of safe theoretical working loads. On the basis of the above coefficients and a factor of safety of 2.6 it has been estimated that a 450 mm diameter pile extending 20.0 m below ground level, assuming a 5.5 m deep basement, should provide a safe working load of about 460 kN.

The above example is not intended to constitute any form of recommendation with regard to pile size or type, but merely serve to illustrate the use of the above coefficients. Specialist piling contractors should be consulted with regard to the design of an appropriate piling scheme and their attention should be drawn to potential groundwater inflows within the Alluvium and the potential for inflow from silt and sand partings within the Claygate Member and London Clay.

7.3 Basement Floor Slab

Following the excavation of the basement, it is likely that the floor slab for the proposed basement will need to be suspended over a void to accommodate the anticipated heave and any potential uplift forces from groundwater pressures unless the slab can be suitably reinforced to cope with these movements. This should be reviewed once the levels and loads are known.

It is understood that the Client has allowed from the use of internal tension piles to mitigate the effects of heave on the basement slab.

7.4 Shallow Excavations

On the basis of the borehole findings and trial pits, it is considered that shallow excavations for foundations and services that extend through the made ground or clay should remain generally stable in the short term, although some instability may occur. However, should deeper excavations be considered or if excavations are to remain open for prolonged periods it is recommended that provision be made for battered side slopes or lateral support. Where

[9] LDSA (2009) *Foundations No 1 – Guidance notes for the design of straight shafted bored piles in London Clay*. LDSA Publications

personnel are required to enter excavations, a risk assessment should be carried out and temporary lateral support or battering of the excavation sides considered in order to comply with normal safety requirements.

The investigation has indicated that groundwater inflows might be encountered within alluvium, particularly within the rear gardens from sand and very sandy silty clay horizons. For excavations extending below a depth of 1 m some form of groundwater control is likely to be required but these should be suitably controlled by sump pumping, although this should be confirmed by additional investigations, ideally in the form of trial excavations.

7.5 Effect of Sulphates

Chemical analyses carried out on representative samples have revealed high concentrations of soluble sulphate and near-neutral pH in accordance with Class DS-3 in the Alluvium, with low to moderate concentrations in accordance with Class DS-2 in the clay as indicated by Table C1 BRE Special Digest 1:SD Third Edition (2005). The measured pH value of the samples shows that an ACEC class of AC-3 and AC-1 applies respectively. This assumes a mobile water condition at the site. The guidelines contained in the above digest should be followed in the design of foundation concrete..

7.6 Hydrogeological Assessment

The site is currently occupied by a two semi-detached houses, which the trial pits have shown to be founded on Claygate Member at a depth of 0.65 to 0.76 m.

The proposal is to demolish the existing house and construct two new semi-detached houses including lower ground floor and stepped basement including a pool area. The basement will extend to a depth of roughly 5.00 m to 7.00 m (approximately 45.5 to 43.5 m AD). The new house will be in a similar position as the existing houses with a larger footprint incorporating the existing rear patio area and extending slightly into the driveway, the basement area will extend to two thirds of the garden length, and almost the full length of the driveway to the front.

The ground investigation indicates that the site is underlain by a moderate thickness of made ground, overlying alluvium to the rear of the property, which extends to depths of 3.40 m (46.60 m AD), the Claygate Member, which extends to a depth of 5.50 m (45.50 m AD), in turn underlain by London Clay, proved to a depth of 20.00 m (30.0 m AD). On this basis the formation level of the basement will be within the stiff London Clay.

Groundwater was encountered during drilling, towards the base of the alluvium at depths of between 2.40 m and 3.00 m (47.60 m AD and 47.50 m AD). Subsequent groundwater monitoring has measured groundwater at depths of between 1.14 m and 1.47 m (49.36 m AD and 49.03 m AD).

A watercourse once traversed the rear of the site and flowed towards the southwest, and is likely to be the source of Alluvium; this was a former tributary of the River Westbourne which was also shown on the historical maps to run along the southeastern boundary of the site. These watercourses are understood to have been diverted and culverted upstream of the site at the end of the 19th Century and are now captured within the sewer which runs along Templewood Avenue to the north. It is likely that any groundwater beneath the site within the Claygate would be controlled by local contours, thus flow would be towards the south or southwest. Today the Westbourne is entirely covered and culverted and forms part of the surface water sewerage system.

The Alluvium is a localised deposit, this and the Claygate Member are not capable of storing and transmitting water in usable amounts, and the Claygate Member receives very low levels of annual recharge due to its lowly permeable nature.

The investigation has indicated that the basement will encounter groundwater during excavation. The Claygate Member is classified as a Secondary 'A' Aquifer and the investigation carried out at the site has shown it to typically comprise clay. Consequently flow below the site within this strata is likely to be slow, with more moderate inflows from the granular layers of Alluvium. However, the persistence of the inflows will depend on the connectivity between the granular pockets and sand partings, hence inflows may not be significant in volume. Groundwater flow is likely to be toward the southwest and the alignment of the proposed basement could potentially alter the flow of groundwater.

It is assumed that the proposed basement will extend to a significant depth relative to the existing foundations of the neighbouring property of No 24 Redington Gardens and Conrad Court. No 24 Redington Gardens is understood to be founded on shallow strip foundations, with no basement, whilst Conrad Court appears to have a lower ground car park. The basement will need to be designed to ensure the stability of the site and any potentially sensitive structures that are in close proximity to the site.

It is understood that the impermeable area for the proposed scheme is slightly less than the existing condition, and hence the peak flows to the public sewer will not be increased by the proposed works.

On the basis of the results of the ground investigation, it is not considered that the proposed basement would result in a change to the groundwater flow regime or on the amount of annual recharge into Claygate Member. With regard to the groundwater within the Alluvium, provided that adequate drainage is provided within the design of the basement to provide a pathway for the groundwater around the excavation there should not therefore be a significant change to the groundwater flow.

7.7 Site Specific Risk Assessment

The desk study research has indicated that the site has not had a potentially contaminative history, having been occupied by the existing house for its entire known developed history.

The chemical analyses have revealed elevated concentrations of lead within three samples of made ground tested, along with a single elevated concentration of mercury.

The source of the lead and mercury contamination is likely to be fragments charcoal, ash and clinker. As a result they are not considered likely to be in a soluble form and as such do not present a risk to adjacent site. The site is underlain be a Secondary 'A' aquifer so there is a risk that contamination could reach this groundwater. However, given that the site is underlain by the London Clay, classified as Unproductive Strata, a risk to deeper chalk principal groundwater has not been identified.

End users will be effectively isolated from direct contact with the identified contaminants by the building and areas of external hardstanding. The contamination is likely to be removed as part of the basement excavation and only in proposed garden areas could end users conceivably come into direct contact with the contaminated soils, although this pathway is already in existence.

As only a limited number of samples have been tested, it would be prudent to carry out contamination testing on additional samples of made ground / topsoil recovered from the areas of the site that are to remain as soft landscaped gardens, in order to ensure the absence of any significant contamination.

Site workers will be protected from the contamination through adherence to normal high standards of site safety but there may be a requirement for protection of buried plastic services laid within the made ground.

7.7.1 Site Workers

Site workers should be made aware of the contamination and a programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance with guidelines set out by HSE[10] and CIRIA[11] and the requirements of the Local Authority Environmental Health Officer.

7.8 Waste Disposal

Any spoil arising from excavations or landscaping works, which is not to be re-used in accordance with the CL:AIRE guidance[12], will need to be disposed of to a licensed tip. Under the European Waste Directive, waste is classified as being either Hazardous or Non-Hazardous and landfills receiving waste are classified as accepting hazardous or non-hazardous wastes or the non-hazardous sub-category of inert waste in accordance with the Waste Directive. Waste going to landfill is subject to landfill tax at either the standard rate of £82.60 per tonne (about £145 per m^3) or at the lower rate of £2.60 per tonne (roughly £5 per m^3). However, the classification for tax purposes is not the same as that for disposal purposes. Currently all made ground and topsoil is taxable at the 'standard' rate and only naturally occurring rocks and soils which are accurately described as such in terms of the 2011 Order[13] would qualify for the 'lower rate' of landfill tax.

Based upon on the technical guidance provided by the Environment Agency[14] it is considered likely that the made ground from this site, as represented by the five chemical analyses carried out, would be classified as a NON-HAZARDOUS waste under the waste code 17 05 04 (soils and stones not containing dangerous substances) and would be taxable at the standard rate. It is likely that the natural soils, if separated out, could be classified as an INERT waste also under the waste code 17 05 04. This material would be taxable at the lower rate, if accurately described as naturally occurring sand and gravel in terms of the 2011 Order on the waste transfer note. As this site has not had a contaminative history there should be no requirement for WAC leaching analyses to confirm that this material is suitable for landfilling, although this would require confirmation from the receiving site.

Under the requirements of the European Waste Directive all waste needs to be pre-treated prior to disposal. The pre-treatment process must be physical, thermal, chemical or biological, including sorting. It must change the characteristics of the waste in order to reduce its volume, hazardous nature, facilitate handling or enhance recovery. The waste producer can carry out the treatment but they will need to provide documentation to prove that this has been carried out. Alternatively, the treatment can be carried out by an approved contractor.

---

10 HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land* HMSO

11 CIRIA (1996) *A guide for safe working on contaminated sites* Report 132, Construction Industry Research and Information Association

12 CL:AIRE (2011) *The Definition of Waste: Development Industry Code of Practice* Version 2, March 2011

13 *Landfill Tax (Qualifying Material) Order 2011*

14 Environment Agency (2013) *Hazardous Waste: Interpretation of the definition and classification of hazardous waste. Technical Guidance* WM2 Third Edition, August 2013

The Environment Agency has issued a position paper[15] which states that in certain circumstances, segregation at source may be considered as pre-treatment and thus excavated material may not have to be treated prior to landfilling if the soils can be segregated onsite prior to excavation by sufficiently characterising the soils insitu prior to excavation.
The above opinion with regard to the classification of the excavated soils and its likely landfill taxable rate is provided for guidance only and should be confirmed by the receiving landfill once the soils to be discarded have been identified.

The local waste regulation department of the Environment Agency should be contacted to obtain details of tips that are licensed to accept the soil represented by the test results. The tips will be able to provide costs for disposing of this material but may require further testing.

8.0 OUTSTANDING RISKS AND ISSUES

This section of the report aims to highlight areas where further work is required as a result of limitations on the scope of this investigation, or where issues have been identified by this investigation that warrant further consideration. The scope of risks and issues discussed in this section is by no means exhaustive, but covers the main areas where additional work is considered to be required.

The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled, but the ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model are properly assessed by a suitably qualified person.

Further groundwater monitoring should be carried out to determine groundwater levels and to assess the extent of seasonal fluctuations; ideally trial excavations should undertaken, to depths as close to the full basement depth, to determine the extent to which groundwater inflows will affect the basement excavation..

It is assumed that the basement will extend beneath the depth of any potential desiccation, but foundations should be inspected by a suitably qualified engineer.

It is recommended that ground movements are checked by further analysis once the loadings and final levels are known.

Further groundwater monitoring will be required to gain an understanding of the groundwater regime.

If during ground works any visual or olfactory evidence of contamination is identified it is recommended that further investigation be carried out and that the risk assessment is reviewed. These areas of doubt should be drawn to the attention of prospective contractors and further investigation will be required or sufficient contingency should be provided to cover the outstanding risk.

As only a limited number of samples have been tested, it would be prudent to carry out contamination testing on additional samples of made ground / topsoil recovered from the areas of the site that are to remain as soft landscaped gardens, in order to ensure the absence of any significant contamination.

15 Regulatory Position Statement (2007) *Treating non-hazardous waste for landfill - Enforcing the new requirement* Environment Agency 23 Oct 2007

APPENDIX

Borehole Records

Trial Pit Records

SPT & Cohesion/Depth Graph

Laboratory Geotechnical Test Results

Chemical Analyses (soil)

Risk-based Generic Guideline Values

Envirocheck Extracts

Historical Maps

Site Plan

Geotechnical & Environmental Associates	Widbury Barn Widbury Hill Ware,Herts SG12 7QE	**Site** 25 - 26 Redington Gardens, London, NW3 7RX	**Borehole Number** **BH1**

Boring Method	**Casing Diameter**	**Ground Level (mAD)**	**Client**	**Job Number**
Cable Percussion	150mm cased to 1.50m	50.00	25-26 Redington Gardens LLP	J15031
	Location	**Dates** 06/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mAD)	Depth (m) (Thickness)	Description	Legend	Water
					49.98	0.02 (0.13)	Tarmac		
					49.85	0.15 (0.35)	Concrete		
0.40	D1				49.50	0.50 (0.70)	Made ground: Very stiff brown sandy gravelly clay. Sand is fine to coarse. Gravel is fine to coarse sub-angular to angular brick, concrete, charcoal and flint.		
0.90	D2								
1.20-1.65 1.20	SPT(C) N60=8 B1	1.20	DRY	1,1/1,2,2,2	48.80	1.20 (2.50)	Made ground: Firm brown sandy slightly gravelly clay. Sand is fine to coarse. Gravel is fine to coarse rounded to very angular brick, concrete, slate, charcoal and flint. Pockets of grey fine sand.		
1.80	D3						Firm orangish brown mottled grey silty CLAY. Micaceous.		
2.00	U1								
2.50	D4						At 2.50 m closely fissured. Rare fine roots.		
2.80	D5								
3.00-3.45 3.00	SPT N60=12 S1	1.50	DRY	1,1/2,2,3,3					
3.70	D6				46.30	3.70 (1.10)	Stiff closely fissured orangish brown mottled grey sandy CLAY. Sand is fine. Micaceous.		
4.00	U2								
4.50	D7								
4.80	D8			Seepage. No rise.	45.20	4.80 (2.70)	Stiff dark grey mottled orange sandy CLAY. Sand is fine. Micaeous. Occasional silt partings. At 4.80 m rare medium roots.		
5.00-5.45 5.00	SPT N60=14 S2	1.50	DRY	2,2/2,3,3,4					
6.00	U3								
6.50	D9								
7.50-7.95 7.50	SPT N60=14 S3	1.50	DRY	2,2/2,3,3,4	42.50	7.50 (4.50)	Stiff very closely fissured thinly laminated dark grey CLAY. Micaceous. Occasional silt partings.		
9.00	U4						At 9.00 m medium strength and rare shell fragments.		
9.50	D10								

Remarks
Standpipe installed to 8.0 m.

Scale (approx)	**Logged By**
1:50	AB

Figure No.
J15031.BH1

GEA Geotechnical & Environmental Associates	Widbury Barn Widbury Hill Ware,Herts SG12 7QE	**Site** 25 - 26 Redington Gardens, London, NW3 7RX	**Borehole Number** **BH1**

Boring Method	**Casing Diameter**	**Ground Level (mAD)**	**Client**	**Job Number**
Cable Percussion	150mm cased to 1.50m	50.00	25-26 Redington Gardens LLP	J15031
	Location	**Dates** 06/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mAD)	Depth (m) (Thickness)	Description	Legend	Water
10.50-10.95 10.50	SPT N60=22 S4	1.50	DRY	3,3/4,4,5,6					
12.00	U5				38.00	12.00	Very stiff very closely fissured thinly laminated dark grey CLAY. Micaeous. Occasional silt partings.		
12.50	D11								
13.50-13.95 13.50	SPT N60=28 S5	1.50	DRY	4,5/5,6,6,7					
15.00	U6								
15.50	D12					(8.00)			
16.50-16.95 16.50	SPT N60=44 S6	1.50	DRY	6,6/8,9,10,10					
18.00	U7								
18.50	D13								
19.50-19.95 19.50	SPT N60=37 S7	1.50	DRY	5,6/7,7,8,9			At 19.50 m rare shell fragments.		
					30.00	20.00			

Remarks
Standpipe installed to 8.0 m.
Excavating from 12.00m.

Scale (approx)	**Logged By**
1:50	AB

Figure No.
J15031.BH1

GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware,Herts SG12 7QE	**Site** 25 - 26 Redington Gardens, London, NW3 7RX		**Number** **BH2**
Excavation Method Hand held window sampler	**Dimensions**	**Ground Level (mAD)** 50.00	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location	**Dates** 06/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mAD)	Depth (m) (Thickness)	Description	Legend	Water
				49.97	0.03	Paving slab.		
					(0.37)			
0.25	D1			49.60	0.40	Made ground: Soft orangish brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is fine to medium angular to subrounded flint, brick and charcoal with occasional fine roots.		
0.55	D2			49.50	0.50			
0.61	E2			49.40	0.60			
0.80	D3			49.25	0.75			
					(0.15)			
				49.10	0.90	Made ground: Firm brown sandy gravelly clay. Sand is fine to coarse. Gravel is fine to medium charcoal, brick, pottery and glass.		
0.95	D4				(0.35)			
				48.75	1.25	Made ground: Firm orangish brown mottled red silty clay with rare fine sand partings and rare fine fine to medium rootlets.		
					(0.25)			
1.50	D5			48.50	1.50			
1.51	D6			48.45	1.55			
1.56	D7			48.40	1.60			
1.70	D8				(0.25)			
1.86	D9			48.15	1.85	Made ground: Firm brown sandy gravelly clay. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded brick and concrete with occasional concrete cobble.		
1.95	D10			48.10	1.90			
2.20	D11			48.00	2.00			
					(0.40)			
			Water strike(1) at 2.40m.	47.60	2.40	Made ground: Soft orangish brown silty clay with occasional sand and cobbles of brick.		▽1
2.50	D12			47.50	2.50			
2.60	D13				(0.50)	Made ground: Orange silty sand with occasional fine to medium gravel of flint.		
				47.00	3.00	Made ground: Very soft brownish orange very sandy clay with frequent medium to coarse gravel of flint, brick and clinker.		
3.10	D14				(0.40)			
				46.60	3.40	Reddish black fibrous PEAT. Organic odour.		
					(0.20)			
				46.40	3.60	Dark pinkish red slightly clayey fine SAND with rare fine gravel.		
3.70	D15				(0.40)			
				46.00	4.00	Very soft pale grey mottled orange and black silty CLAY.		
						Very clayey SAND and GRAVEL. Fine is fine to coarse. Gravel is fine sub-angular to angular. Organic odour. Organic odour.		
4.50	E1							
4.75	D15				(1.50)	White clayey SAND and GRAVEL of chalk. Sand is fine to coarse. Gravel is fine to coarse angular to sub angular. Organic odour.		
						Very soft black slightly sandy silty CLAY. Saturated.		
5.50	D17			44.50	5.50	Black clayey fine to medium SAND.		
					(0.40)	Firm orangish brown silty CLAY with rare fine to medium subangular to subrounded very weathered chalk gravel.		
				44.10	5.90			
				44.00	6.00	Soft grey mottled brown silty CLAY.		
						Soft orangish brown mottled brown silty CLAY.		
						Firm orangish brown mottled grey gravelly silty CLAY. Gravel is fine to medium subrounded to rounded flint.		
						Firm brown mottled grey silty CLAY with occasional fine sand partings.		
						Firm brown silty CLAY with occasional fine sand partings.		
						Stiff grey CLAY.		
						Complete at 6.00m		

Remarks
Borehole complete at 6.0 m.
Standpipe installed to 5.6 m.

Scale (approx)	Logged By
1:50	AB

Figure No.
J15031.BH2

Geotechnical & Environmental Associates	Widbury Barn Widbury Hill Ware,Herts SG12 7QE	**Site** 25 - 26 Redington Gardens, London, NW3 7RX	**Number** **BH3**

Excavation Method	**Dimensions**	**Ground Level (mAD)**	**Client**	**Job Number**
Hand-held window sampler		50.50	25-26 Redington Gardens LLP	J15031
	Location	**Dates** 06/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mAD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	Topsoil: Soft dark brown slightly gravelly silty clay. Gravel is fine to medium flint brick and charcoal.		
0.50	E1							
0.60	D1			49.80	0.70	Made ground:Orangish brown mottled grey fine SAND.		
0.75	D2			49.70	0.80			
0.90	D3				(0.70)	Made ground:Soft orange brown gravelly silty CLAY. Gravel is fine to coarse angular to subrounded flint and brick.		
				49.00	1.50			
					(0.30)	Soft dark grey mottled black silty CLAY with rare shell fragments. Organic odour.		
1.70	D4			48.70	1.80			
1.90	D5				(0.20)	Soft bluish grey silty CLAY. Organic odour.		
				48.50	2.00			
					(1.00)	Soft bluish grey very sandy silty CLAY with occasional medium subrounded flint gravel.		
3.00	D6		Water strike(1) at 3.00m.	47.50	3.00	Firm grey mottled orange silty CLAY with occasional medium subrounded flint gravel.		▽1
3.70	D7				(1.50)	At 3.1 m becoming browish orange mottled grey with occasional sand partings.		
				46.00	4.50			
				45.90	4.60	Light brown slightly clayey fine SAND. Saturated.		
4.70	D8				(0.40)	Soft orangish brown slightly sandy silty CLAY.		
5.00	D9			45.50	5.00	Firm brown silty CLAY.		
					(0.70)			
				44.80	5.70			
5.70	D10				(0.25)	Stiff brown silty CLAY with rare fine sand partings.		
				44.55	5.95			
				44.50	6.00	Stiff grey silty CLAY.		
						Complete at 6.00m		

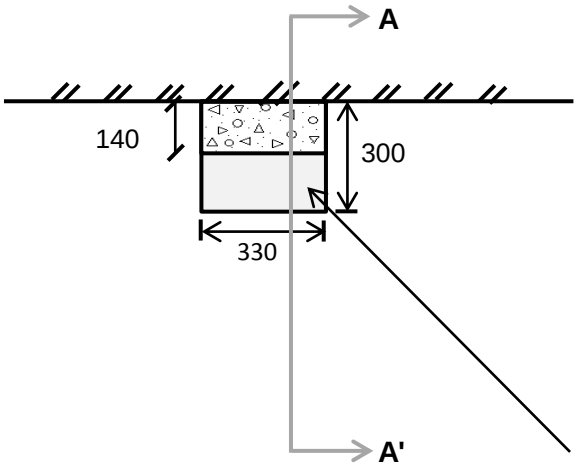
Remarks
Borehole completed at 6.0 m.
Standpipe installed to 6.0 m.

Scale (approx)	**Logged By**
1:50	AB

Figure No.
J15031.BH3

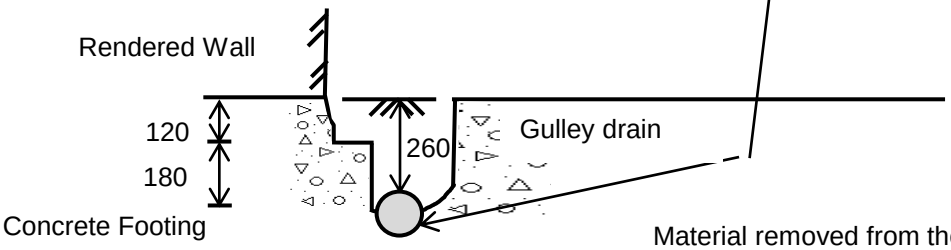
GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** 1
Excavation Method Manual	**Dimensions** 300 x 330 x 300	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location 730mm south of the side gate	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Plan: -



Black plastic pipe 120mm diameter with regular 15mm holes

Section A - A': -



Material removed from the tip:

Made Ground (Brownish yellow sand and gravel. Sand is fine to coarse. Gravel is fine to medium angular to subangular flint and shell fragments.)

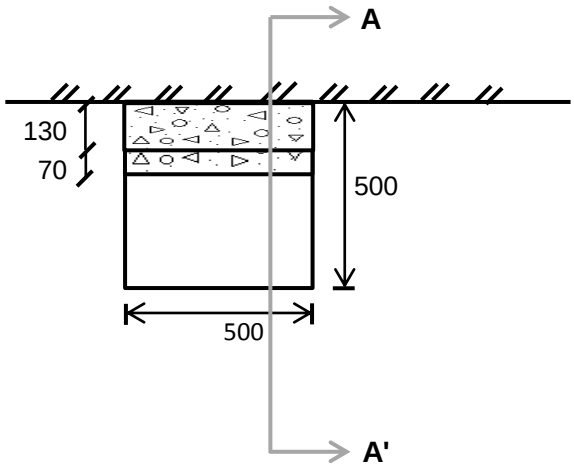
Remarks: Pit terminated at 300mm due to pipe. Unable to extend horizontally due to concrete drain to the south.	Scale: 1:20
All dimensions in millimetres	
Sides of trial pit remained stable during excavation	Logged by: AB
Groundwater: Not encountered	

GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** **1**
Excavation Method Manual	**Dimensions** 300 x 330 x 300	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location 730mm south of the side gate	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

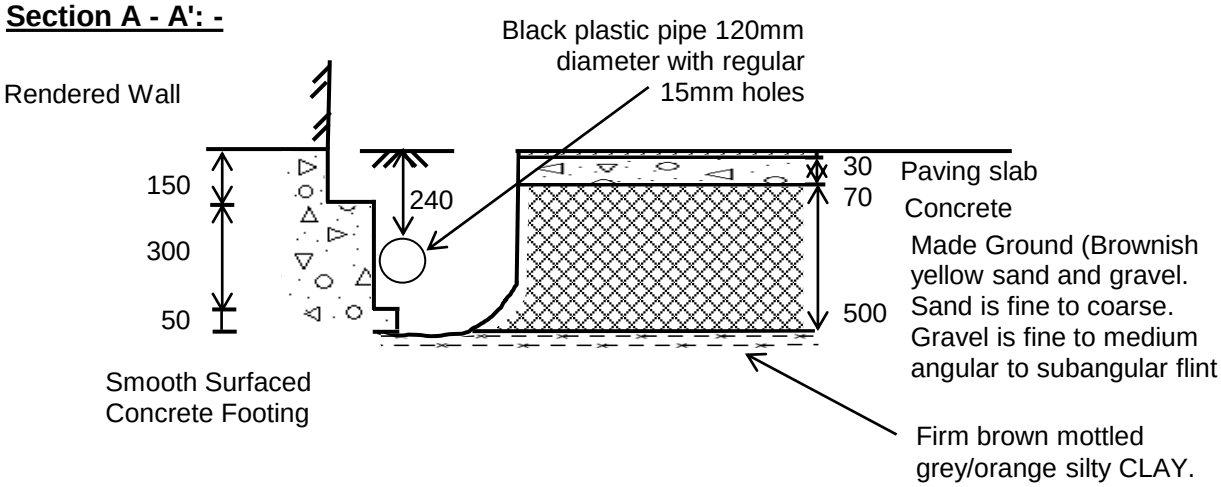
Remarks: Pit terminated at 300mm due to pipe. Unable to extend horizontally due to concrete drain to the south. All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater: Not encountered	Scale: 1:20 Logged by: AB

GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** **2**
Excavation Method Manual	**Dimensions** 500 x 500 x 510	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location 200mm south of the shed	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Plan: -



Section A - A': -



Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater: Not encountered	Scale: 1:20 Logged by: AB

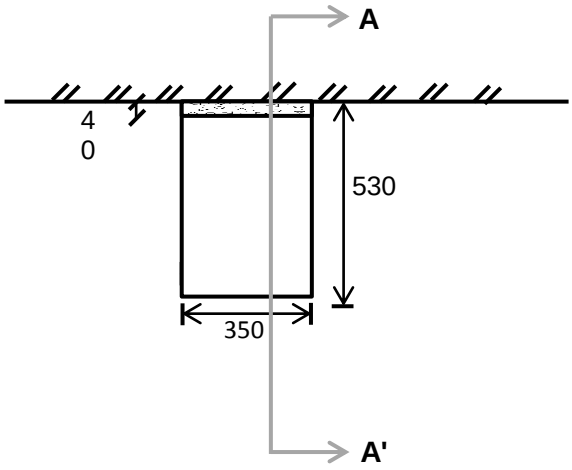
GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** **2**
Excavation Method Manual	**Dimensions** 500 x 500 x 510	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location 200mm south of the shed	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater: Not encountered	Scale: 1:20 Logged by: AB

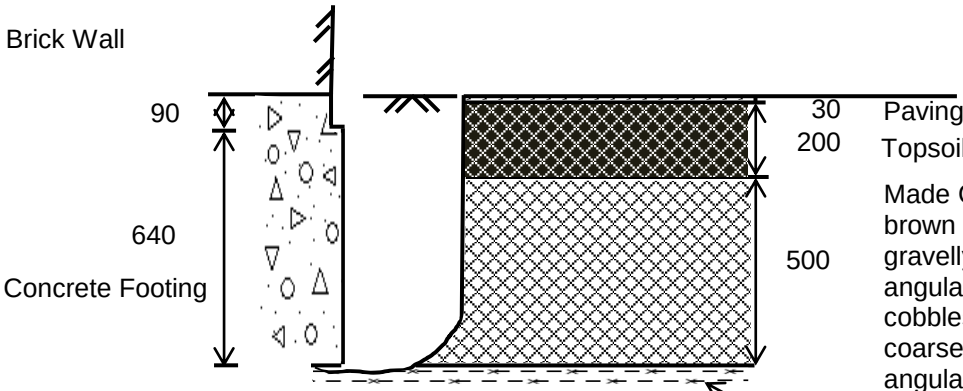
GEA Geotechnical & Environmental Associates	Widbury Barn Widbury Hill Ware Herts SG12 7QE	**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** 3

Excavation Method Manual	**Dimensions** 530 x 350 x 740	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location Under right window to the left-hand side	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Plan: -



Section A - A': -



Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater: Not encountered	Scale: 1:20 Logged by: AB

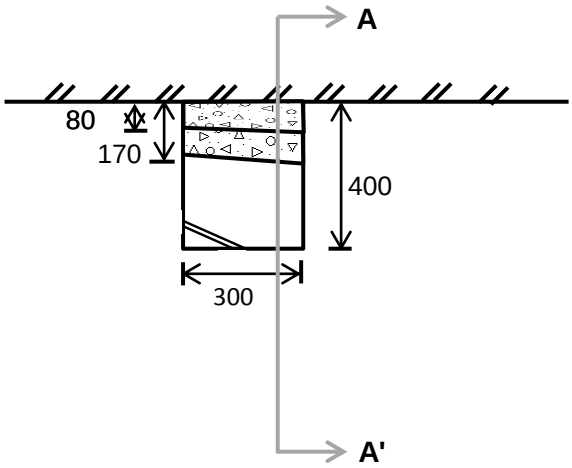
GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** **3**
Excavation Method Manual	**Dimensions** 530 x 350 x 740	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location Under right window to the left-hand side	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Remarks: All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater: Not encountered	Scale: 1:20 Logged by: AB

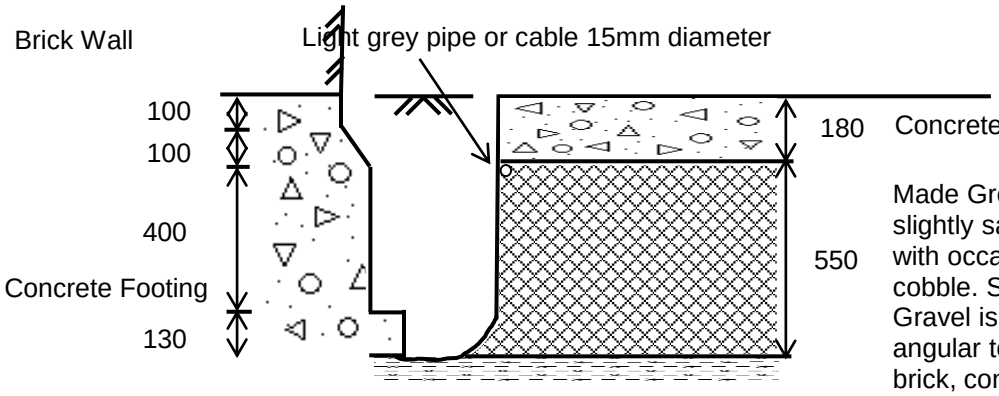
Geotechnical & Environmental Associates	Widbury Barn Widbury Hill Ware Herts SG12 7QE	**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** 4

Excavation Method Manual	**Dimensions** 400 x 300 x 740	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Plan: -



Section A - A': -



Made Ground (Soft brown slightly sandy gravelly clay with occasional angular brick cobble. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded glass, brick, concrete, coal and flint.)

Soft orangish brown silty CLAY with occasional fine to medium subrounded gravel of flint.

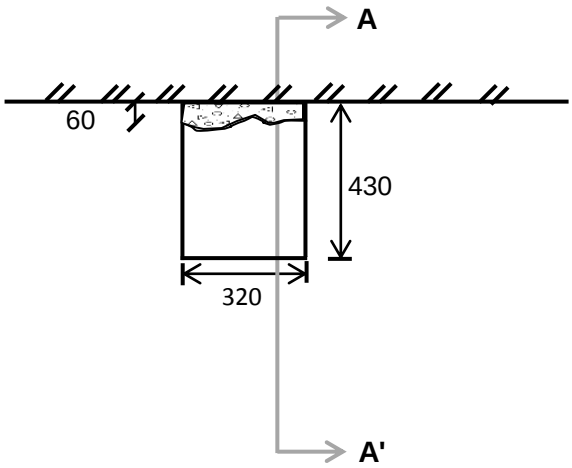
Remarks: Environmental sample taken at 0.4m	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater: Not encountered	AB

GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** 4
Excavation Method Manual	**Dimensions** 400 x 300 x 740	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

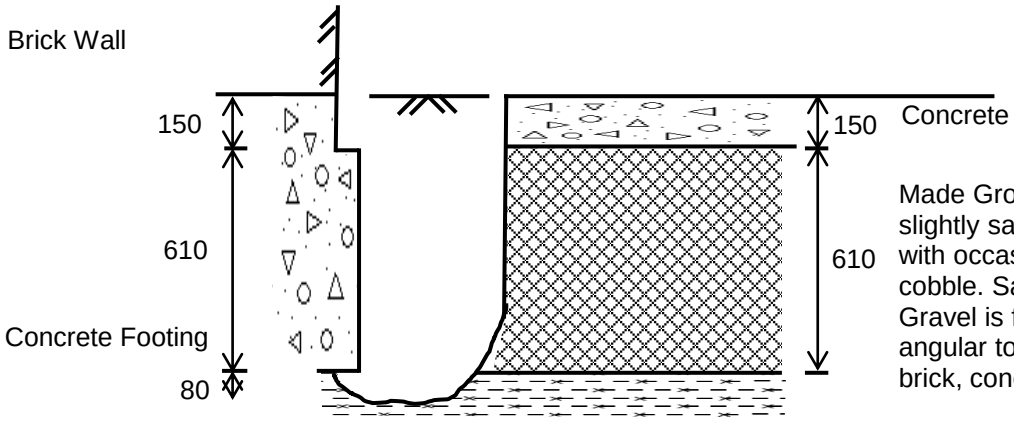
Remarks: Environmental sample taken at 0.4m All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater: Not encountered	Scale: 1:20 Logged by: AB

GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** 5
Excavation Method Manual	**Dimensions** 430 x 320 x 840	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Plan: -



Section A - A': -



Made Ground (Soft brown slightly sandy gravelly clay with occasional angular brick cobble. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded glass, brick, concrete, coal and flint.)

Soft orangish brown silty CLAY with occasional fine to medium subrounded gravel of flint.

Remarks: Environmental sample taken at 0.4m	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater: Not encountered	AB

GEA Geotechnical & Environmental Associates Widbury Barn Widbury Hill Ware Herts SG12 7QE			**Site** 25 - 26 Redington Gardens, NW3 7RX	**Trial Pit Number** **5**
Excavation Method Manual	**Dimensions** 430 x 320 x 840	**Ground Level (mOD)**	**Client** 25-26 Redington Gardens LLP	**Job Number** J15031
	Location	**Dates** 12/02/2015	**Engineer** Michael Alexander Consulting Engineers	**Sheet** 1 / 2

Remarks: Environmental sample taken at 0.4m All dimensions in millimetres Sides of trial pit remained stable during excavation Groundwater: Not encountered	Scale: 1:20 Logged by: AB

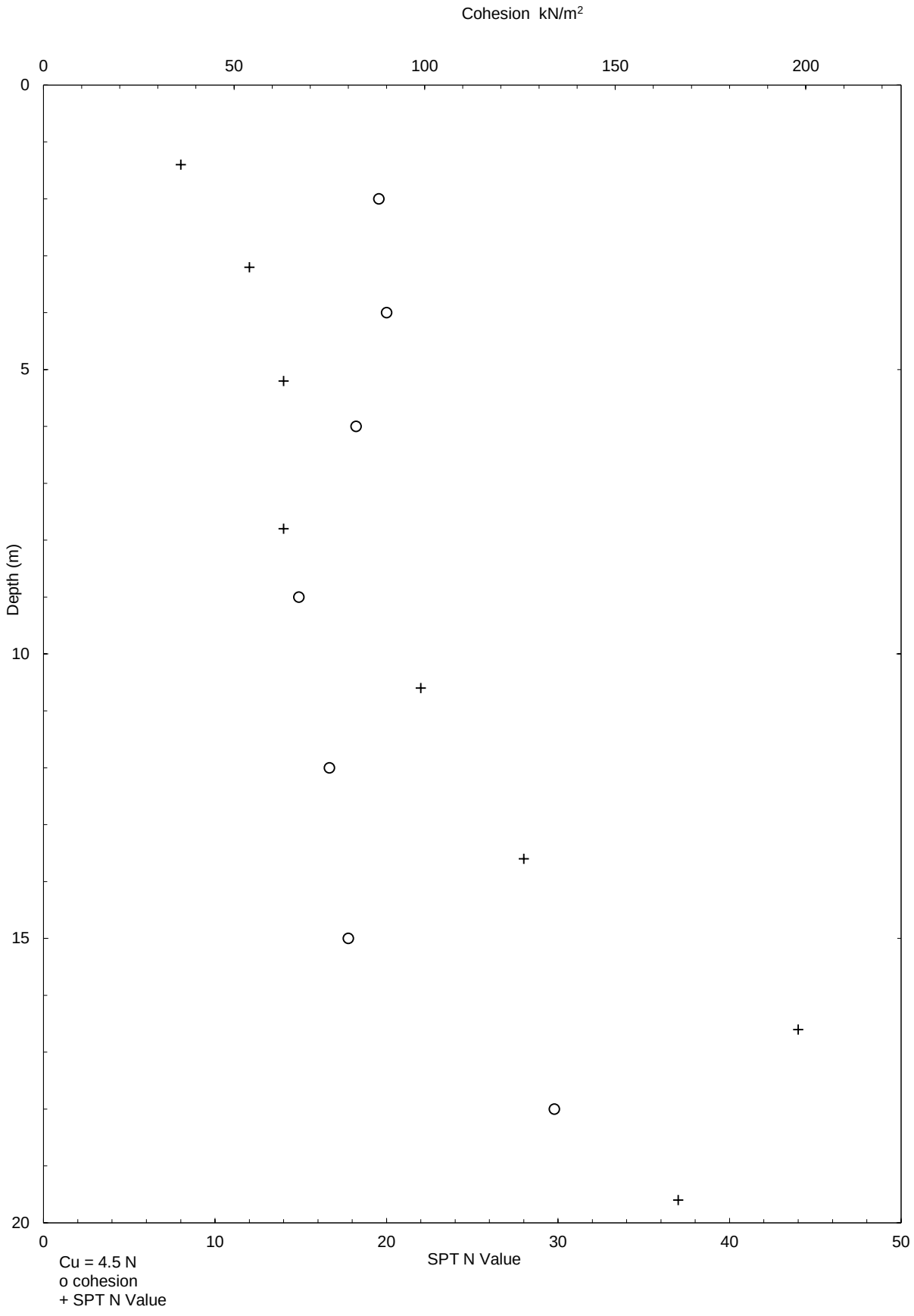
Geotechnical & Environmental Associates
Widbury Barn
Widbury Hill
Ware
Herts SG12 7QE

SPT & Cohesion / Depth Graph

Site	25 - 26 Redington Gardens, London, NW3 7RX
Client	25-26 Redington Gardens LLP
Engineer	Michael Alexander Consulting Engineers

Job Number J15031

Sheet 1/1



SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression			Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	MC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH1		1.20	B	Mottled dark brown, brown and orange gravelly sandy silty CLAY	23	48	18	30	73									
BH1		2.00	U	Firm orange brown mottled grey sandy silty CLAY	24					2.05	1.65	40	176	88				
BH1		3.00	D	Brown fine sandy silty CLAY	25	47	19	28	99									
BH1		4.00	U	Firm to stiff brown sandy silty CLAY	26					1.96	1.56	80	180	90				
BH1		4.50	D												8.5	0.04		
BH1		6.00	U	Stiff dark grey brown silty CLAY.	28					1.97	1.54	120	163	82				
BH1		6.50	D	Dark brown silty CLAY with rare shell fragments	27	63	23	40	99						8.3	0.67		
BH1		9.00	U	Stiff fissured dark grey brown silty CLAY	31					1.95	1.49	180	133	67				
BH1		9.50	D	Greyish brown silty CLAY with rare shell fragments	31	71	25	46	99									
BH1		12.00	U	Stiff fissured dark grey brown CLAY	30					1.96	1.51	240	151	75				
BH1		12.50	D	Greyish brown silty CLAY	30	66	23	43	100									
BH1		15.00	U	Stiff fissured dark brown CLAY	29					1.90	1.47	300	159	80				

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX
J15031

GEOLABS®

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression			Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	MC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
BH1		18.00	U	Stiff fissured dark grey brown silty CLAY	24					1.97	1.59	360	268	134				
BH2		1.95	D	White and grey sandy structureless chalk GRAVEL	70													Insufficient sample for atterberg
BH2		2.20	D												8.3	2.50		Organic
BH2		3.10	D	Multicoloured sandy CLAY with rare fine gravel and rootlets	20													
BH2		5.50	D	Grey brown silty CLAY	33													
BH3		1.70	D															Organic
BH3		1.90	D	Brown and grey-brown silty CLAY	28	38	17	21	99									
BH3		3.00	D	Mottled brown and grey silty CLAY with rare fine gravel and rootlets	22										8.0	0.21		
BH3		4.70	D	Mottled brown and grey silty sandy CLAY with rare rootlets	31	55	19	36	100									
BH3		5.00	D	Mottled brown and grey silty sandy CLAY with rare rootlets	33													

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX
J15031

GEOLABS®

1131 - BS1377 Chemical Suite - 22300.xls

SUMMARY OF CHEMICAL TESTS ON SOIL

Borehole / Trial Pit	Depth m	Sample Ref	Sample Type	pH Value	Total Acid Soluble Sulphate as SO4 %	Water Soluble Sulphate as SO4 2:1 Water:Soil Extract g/L	Total Sulphur %	Water Soluble Chloride mg/L	Water Soluble Nitrate mg/L	Magnesium mg/L	Organic Content %	Mass Loss on Ignition %	Carbonate Content %
BH1	4.50		D	8.5		0.04							
BH1	6.50		D	8.3		0.67							
BH2	2.20		D	8.3		2.50					2.00		
BH3	1.70		D								3.50		
BH3	3.00		D	8.0		0.21							

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

BS 1377 : Part 7 : 1990 Clause 8

Quick Undrained Triaxial Compression Test

BH/TP No	BH1
Depth (m)	2.00
Sample Type	U

Description:

Firm orange brown mottled grey sandy silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.0
Diameter	(mm)	101.8
Moisture Content	(%)	24
Bulk Density	(Mg/m³)	2.05
Dry Density	(Mg/m³)	1.65
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	1.1
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	40
Strain at failure	(%)	19.9
Maximum Deviator Stress	(kPa)	176
Shear Stress Cu	(kPa)	88

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

UKAS TESTING 1982

BS 1377 : Part 7 : 1990 Clause 8

Quick Undrained Triaxial Compression Test

BH/TP No	BH1
Depth (m)	4.00
Sample Type	U

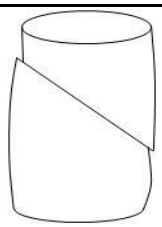
Description:

Firm to stiff brown sandy silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.9
Diameter	(mm)	102.4
Moisture Content	(%)	26
Bulk Density	(Mg/m³)	1.96
Dry Density	(Mg/m³)	1.56
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.8
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	80
Strain at failure	(%)	13.9
Maximum Deviator Stress	(kPa)	180
Shear Stress Cu	(kPa)	90

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

UKAS TESTING 1982

BS 1377 : Part 7 : 1990 Clause 8

Quick Undrained Triaxial Compression Test

BH/TP No	BH1
Depth (m)	6.00
Sample Type	U

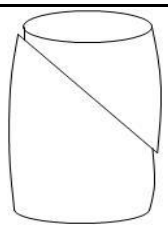
Description:

Stiff dark grey brown silty CLAY.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.2
Diameter	(mm)	102.1
Moisture Content	(%)	28
Bulk Density	(Mg/m³)	1.97
Dry Density	(Mg/m³)	1.54
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.7
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	120
Strain at failure	(%)	9.9
Maximum Deviator Stress	(kPa)	163
Shear Stress Cu	(kPa)	82

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

UKAS TESTING 1982

BS 1377 : Part 7 : 1990 Clause 8

Quick Undrained Triaxial Compression Test

BH/TP No	BH1
Depth (m)	9.00
Sample Type	U

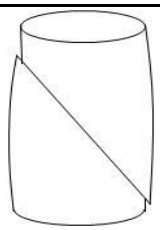
Description:

Stiff fissured dark grey brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.3
Diameter	(mm)	103.0
Moisture Content	(%)	31
Bulk Density	(Mg/m³)	1.95
Dry Density	(Mg/m³)	1.49
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.6
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	180
Strain at failure	(%)	8.9
Maximum Deviator Stress	(kPa)	133
Shear Stress Cu	(kPa)	67

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

UKAS TESTING 1982

BS 1377 : Part 7 : 1990 Clause 8

Quick Undrained Triaxial Compression Test

BH/TP No	BH1
Depth (m)	12.00
Sample Type	U

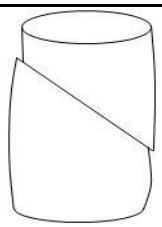
Description:

Stiff fissured dark grey brown CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.1
Diameter	(mm)	102.7
Moisture Content	(%)	30
Bulk Density	(Mg/m³)	1.96
Dry Density	(Mg/m³)	1.51
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.2
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	240
Strain at failure	(%)	3.0
Maximum Deviator Stress	(kPa)	151
Shear Stress Cu	(kPa)	75

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

UKAS TESTING 1982

BS 1377 : Part 7 : 1990 Clause 8

Quick Undrained Triaxial Compression Test

BH/TP No	BH1
Depth (m)	15.00
Sample Type	U

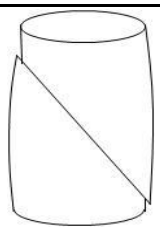
Description:

Stiff fissured dark brown CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.4
Diameter	(mm)	103.2
Moisture Content	(%)	29
Bulk Density	(Mg/m³)	1.90
Dry Density	(Mg/m³)	1.48
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.3
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	300
Strain at failure	(%)	3.5
Maximum Deviator Stress	(kPa)	159
Shear Stress Cu	(kPa)	80

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

UKAS TESTING 1982

BS 1377 : Part 7 : 1990 Clause 8

Quick Undrained Triaxial Compression Test

BH/TP No	BH1
Depth (m)	18.00
Sample Type	U

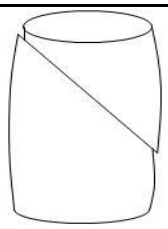
Description:

Stiff fissured dark grey brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.2
Diameter	(mm)	103.3
Moisture Content	(%)	24
Bulk Density	(Mg/m³)	1.97
Dry Density	(Mg/m³)	1.58
Test Details		
Latex membrane thickness	(mm)	0.3
Membrane correction	(kPa)	0.5
Axial displacement rate	(%/min)	2.0
Cell pressure	(kPa)	360
Strain at failure	(%)	7.5
Maximum Deviator Stress	(kPa)	268
Shear Stress Cu	(kPa)	134

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	40

Checked and Approved by:

S Burke

Senior Technician
24/03/2015

Project Number:

GEO / 22300

Project Name:

25 - 26 REDDINGTON GARDENS, NW3 7RX

J15031

GEOLABS®

UKAS TESTING 1982

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report Number:	15-03361 Issue-1
Initial Date of Issue:	18-Feb-2015
Client:	GEA
Client Address:	Widbury Barn Widbury Hill Ware Hertfordshire SG12 7QE
Contact(s):	Angela Baird
Project:	J150313 25-26 Redington Gardens, London, NW3 7RX

Quotation No.:		**Date Received:**	16-Feb-2015
Order No.:		**Date Instructed:**	16-Feb-2015
No. of Samples:	5		
Turnaround: (Wkdays)	3	**Results Due Date:**	18-Feb-2015
Date Approved:	18-Feb-2015		

Approved By:

Details: Keith Jones, Technical Manager

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: J150313 25-26 Redington Gardens, London, NW3 7RX

Client: GEA					Chemtest Job No.:	15-03361	15-03361	15-03361	15-03361	15-03361
Quotation No.:					Chemtest Sample ID.:	102768	102769	102770	102771	102772
Order No.:					Client Sample Ref.:					
					Client Sample ID.:	TP5	BH3	BH2	BH2	TP3
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.4	0.5	4.5	0.61	0.4
					Bottom Depth(m):	0.8				
					Date Sampled:	12-Feb-15	12-Feb-15	12-Feb-15	12-Feb-15	12-Feb-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Moisture	N	2030	%	0.02		22	21	19	23	23
Stones	N	2030	%	0.02		< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Soil Colour	N					Brown	Brown	Brown	Brown	Brown
Other Material	N					Stones	Stones	Stones	Stones	Stones
Soil Texture	N					Clay	Clay	Clay	Clay	Clay
pH	M	2010				8.9	7.4	8.2	8.3	8.1
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.01		0.015	< 0.010	< 0.010		< 0.010
Chloride (Extractable)	M	2220	g/l	0.01		< 0.010	< 0.010	< 0.010		< 0.010
Cyanide (Total)	M	2300	mg/kg	0.5		< 0.50	< 0.50	< 0.50		< 0.50
Sulphide (Easily Liberatable)	M	2325	mg/kg	0.5		3.4	5.2	2.4	2.0	1.4
Sulphate (Total)	M	2430	mg/kg	100		980	490	1100		190
Arsenic	M	2450	mg/kg	1		18	10	35		14
Cadmium	M	2450	mg/kg	0.1		0.23	0.13	0.45		0.14
Chromium	M	2450	mg/kg	1		32	23	45		49
Copper	M	2450	mg/kg	0.5		100	43	100		30
Mercury	M	2450	mg/kg	0.1		0.57	0.67	2.2		0.34
Nickel	M	2450	mg/kg	0.5		27	15	45		33
Lead	M	2450	mg/kg	0.5		600	290	740		150
Selenium	M	2450	mg/kg	0.2		< 0.20	0.47	0.42		0.20
Zinc	M	2450	mg/kg	0.5		230	89	240		150
Total Organic Carbon	M	2625	%	0.2		2.3	3.2	4.9		1.4
TPH >C5-C6	N	2670	mg/kg	1		< 1.0	< 1.0	C < 1.0	< 1.0	< 1.0
TPH >C6-C7	N	2670	mg/kg	1		< 1.0	< 1.0	C < 1.0	< 1.0	< 1.0
TPH >C7-C8	N	2670	mg/kg	1		< 1.0	< 1.0	C < 1.0	< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1		< 1.0	< 1.0	C < 1.0	< 1.0	< 1.0
TPH >C10-C12	N	2670	mg/kg	1		< 1.0	< 1.0	C < 1.0	< 1.0	< 1.0
TPH >C12-C16	N	2670	mg/kg	1		1.6	< 1.0	C < 1.0	< 1.0	< 1.0
TPH >C16-C21	N	2670	mg/kg	1		8.3	4.6	C 4.6	7.4	< 1.0
TPH >C21-C35	N	2670	mg/kg	1		21	2.6	C 1.2	2.8	< 1.0
Total TPH >C5-C35	N	2670	mg/kg	10		30	< 10	C < 10	10	< 10
Naphthalene	M	2700	mg/kg	0.1		3.2	0.24	0.21		< 0.10
Acenaphthylene	M	2700	mg/kg	0.1		0.37	0.15	0.10		0.12
Acenaphthene	M	2700	mg/kg	0.1		0.80	< 0.10	< 0.10		0.38

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: J150313 25-26 Redington Gardens, London, NW3 7RX

Client: GEA			**Chemtest Job No.:**		15-03361	15-03361	15-03361	15-03361	15-03361
Quotation No.:			**Chemtest Sample ID.:**		102768	102769	102770	102771	102772
Order No.:			Client Sample Ref.:						
			Client Sample ID.:		TP5	BH3	BH2	BH2	TP3
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.4	0.5	4.5	0.61	0.4
			Bottom Depth(m):		0.8				
			Date Sampled:		12-Feb-15	12-Feb-15	12-Feb-15	12-Feb-15	12-Feb-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Fluorene	M	2700	mg/kg	0.1	0.54	0.14	0.12		0.33
Phenanthrene	M	2700	mg/kg	0.1	5.7	1.0	0.83		2.1
Anthracene	M	2700	mg/kg	0.1	1.2	0.27	0.40		0.63
Fluoranthene	M	2700	mg/kg	0.1	7.3	2.4	1.5		3.0
Pyrene	M	2700	mg/kg	0.1	7.5	2.4	1.4		3.4
Benzo[a]anthracene	M	2700	mg/kg	0.1	3.3	1.2	0.61		1.2
Chrysene	M	2700	mg/kg	0.1	4.3	1.7	0.77		1.4
Benzo[b]fluoranthene	M	2700	mg/kg	0.1	4.2	1.6	0.96		0.92
Benzo[k]fluoranthene	M	2700	mg/kg	0.1	1.5	0.57	0.41		0.19
Benzo[a]pyrene	M	2700	mg/kg	0.1	3.3	1.2	0.86		0.91
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1	2.2	0.89	0.58		0.55
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1	0.60	< 0.10	< 0.10		< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1	2.1	1.3	0.68		0.58
Total Of 16 PAH's	M	2700	mg/kg	2	48	15	9.4		16
Total Phenols	M	2920	mg/kg	0.3	< 0.30	< 0.30	< 0.30		0.35

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Chemtest Sample ID:	Sample Ref:	Sample ID:	Sampled Date:	Containers Received:	Deviation Code(s):
102770		BH2	12-Feb-2015	Plastic Bag	C

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at our Coventry laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

GEA Geotechnical & Environmental Associates

Widbury Barn
Widbury Hill
Ware
Herts SG12 7QE

Generic Risk-Based Soil Screening Values

Site	25 - 26 Redington Gardens, London, NW3 7RX	**Job Number** J15031
Client	25-26 Redington Gardens LLP	**Sheet** 1 / 1
Agent	Michael Alexander Consulting Engineers	

Proposed End Use Residential with plant uptake

Soil pH 8

Soil Organic Matter content % 2.5

Contaminant	Screening Value mg/kg	Data Source
Metals		
Arsenic	37	C4SL
Cadmium	26	C4SL
Chromium (III)	3000	LQM/CIEH
Chromium (VI)	21	C4SL
Copper	2,330	LQM/CIEH
Lead	200	C4SL
Elemental Mercury	1	SGV
Inorganic Mercury	170	SGV
Nickel	130	LQM/CIEH
Selenium	350	SGV
Zinc	3,750	LQM/CIEH
Hydrocarbons		
Benzene	0.34	C4SL
Toluene	320	SGV
Ethyl Benzene	180	SGV
Xylene	120	SGV
Aliphatic C5-C6	55	LQM/CIEH
Aliphatic C6-C8	160	LQM/CIEH
Aliphatic C8-C10	46	LQM/CIEH
Aliphatic C10-C12	230	LQM/CIEH
Aliphatic C12-C16	1700	LQM/CIEH
Aliphatic C16-C35	64,000	LQM/CIEH
Aromatic C6-C7	See Benzene	LQM/CIEH
Aromatic C7-C8	See Toluene	LQM/CIEH
Aromatic C8-C10	65	LQM/CIEH
Aromatic C10-C12	160	LQM/CIEH
Aromatic C12-C16	310	LQM/CIEH
Aromatic C16-C21	480	LQM/CIEH
Aromatic C21-C35	1100	LQM/CIEH
PRO (C_5 –C_{10})	646	Calc
DRO (C_{12} –C_{28})	66,490	Calc
Lube Oil (C_{28} –C_{44})	65,100	Calc
TPH	**1000**	Trigger for speciated testing

Contaminant	Screening Value mg/kg	Data Source
Anions		
Soluble Sulphate	0.5 g/l	Structures
Sulphide	50	Structures
Chloride	400	Structures
Others		
Organic Carbon (%)	6	Methanogenic potential
Total Cyanide	140	WRAS
Total Mono Phenols	290	SGV
PAH		
Naphthalene	5.30	Rev. LQM/CIEH
Acenaphthylene	400	LQM/CIEH
Acenaphthene	480	LQM/CIEH
Fluorene	380	LQM/CIEH
Phenanthrene	200	LQM/CIEH
Anthracene	4,900	LQM/CIEH
Fluoranthene	460	LQM/CIEH
Pyrene	1,000	LQM/CIEH
Benzo(a) Anthracene	6.7	Rev. LQM/CIEH
Chrysene	11	Rev. LQM/CIEH
Benzo(b) Fluoranthene	9.5	Rev. LQM/CIEH
Benzo(k) Fluoranthene	14.1	Rev. LQM/CIEH
Benzo(a) pyrene	4.40	C4SL
Indeno(1 2 3 cd) Pyrene	5.6	Rev. LQM/CIEH
Dibenzo(a h) Anthracene	1.27	Rev. LQM/CIEH
Benzo (g h i) Perylene	69	Rev. LQM/CIEH
Screening value for PAH	**62.9**	B(a)P / 0.15
Chlorinated Solvents		
1,1,1 trichloroethane (TCA)	12.9	LQM/CIEH
tetrachloroethane (PCA)	2.1	LQM/CIEH
tetrachloroethene (PCE)	2.1	LQM/CIEH
trichloroethene (TCE)	0.22	LQM/CIEH
1,2-dichloroethane (DCA)	0.008	LQM/CIEH
vinyl chloride (Chloroethene)	0.00064	LQM/CIEH
tetrachloromethane (Carbon tetra	0.039	LQM/CIEH
trichloromethane (Chloroform)	1.3	LQM/CIEH

Notes

Concentrations measured below the above values may be considered to represent 'uncontaminated conditions' which pose 'LOW' risk to human health. Concentrations measured in excess of these valuesindicate a potential risk which require further, site specific risk assessment.

SGV - Soil Guideline Value, derived from the CLEA model and published by Environment Agency 2009

LQM/CIEH - Generic Assessment Criteria for Human Health Risk Assessment 2nd edition (2009)derived using CLEA 1.04 model 2009

C4SL - Defra Category 4 Screening value based on Low Level of Toxicological Risk

Rev LQM/CIEH calculated using C4SL revisions to exposure assessment but LQM/CIEH health croiteria values

Calc - sum of nearest available carbon range specified including BTEX for PRO fraction

B(a)P / 0.15 - GEA experince indicates that Benzo(a) pyrene (one of the most common and most carcenogenic of the PAHs) rarely exceeds 15% of the total PAH concentration, hence this Total PAH threshold is regarded as being conservative

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
64129117_1_1

Customer Reference:
J15031

National Grid Reference:
525760, 185970

Slice:
A

Site Area (Ha):
0.09

Search Buffer (m):
1000

Site Details:

25 Redington Gardens
LONDON
NW3 7RX

Client Details:

Mr S Branch
GEA Ltd
Tyttenhanger House
Coursers Road
St Albans
Herts
AL4 0PG

Contents

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

Report Version v49.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1			2	
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 1				16
Local Authority Pollution Prevention and Control Enforcements	pg 3				1
Nearest Surface Water Feature	pg 3				Yes
Pollution Incidents to Controlled Waters					
Prosecutions Relating to Authorised Processes					
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 4				(*4)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 4	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 5	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Detailed River Network Lines					n/a
Detailed River Network Offline Drainage					n/a

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Recorded Landfill Sites					
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 7	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 7	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites					
BGS Urban Soil Chemistry	pg 10		Yes	Yes	Yes
BGS Urban Soil Chemistry Averages	pg 13	Yes			
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 13	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 13	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 13	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 13	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a

Geotechnical & Environmental Associates

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 15			4	109
Fuel Station Entries	pg 24				4
Sensitive Land Use					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: Reservoir/Borehole Site Location: Kidderpore Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.0165 Permit Version: 1 Effective Date: 15th September 1989 Issued Date: 15th September 1989 Revocation Date: 5th October 2000 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A12SE (W)	349	3	525400 185900
2	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: Reservoir/Borehole Site Location: Hampstead Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.0140 Permit Version: 1 Effective Date: 15th September 1989 Issued Date: 15th September 1989 Revocation Date: 5th October 2000 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A14NW (E)	442	3	526200 186100
3	**Local Authority Pollution Prevention and Controls** Name: The London Dry Cleaning Company Location: 519a Finchley Road, London, Nw3 7bb Authority: London Borough of Camden, Pollution Projects Team Permit Reference: PPC/DC51 Dated: 1st March 2008 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A8NW (SW)	549	4	525432 185511
3	**Local Authority Pollution Prevention and Controls** Name: Cottontail Cleaners Location: 509 Finchley Road, London, Nw3 7bb Authority: London Borough of Camden, Pollution Projects Team Permit Reference: PPC/DC19 Dated: 5th February 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Located by supplier to within 10m	A8NW (SW)	557	4	525456 185484
3	**Local Authority Pollution Prevention and Controls** Name: Cottontail Cleaners Location: 509 Finchley Road, London, Nw3 7bb Authority: London Borough of Camden, Pollution Projects Team Permit Reference: PPC/DC48 Dated: 1st January 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A8NW (SW)	558	4	525454 185484
4	**Local Authority Pollution Prevention and Controls** Name: Perkins Dry Cleaners Location: 40 Heath Street, London, Nw3 6te Authority: London Borough of Camden, Pollution Projects Team Permit Reference: PPC/DC9 Dated: 12th January 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Located by supplier to within 10m	A14SW (E)	637	4	526374 185724

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: London Borough Of Camden Licence Number: Th/039/0039/087 Permit Version: 1 Location: Swiss Cottage Open Space- Borehole Authority: Environment Agency, Thames Region Abstraction: Municipal Grounds: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Swiss Cottage Open Space, Winchester Road, London Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 5th December 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(SE)	1952	3	526750 184261
	Water Abstractions Operator: London Borough Of Camden Licence Number: Th/039/0039/087 Permit Version: 1 Location: Swiss Cottage Open Space- Borehole Authority: Environment Agency, Thames Region Abstraction: Municipal Grounds: General Washing/Process Washing Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Swiss Cottage Open Space, Winchester Road, London Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 5th December 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(SE)	1952	3	526750 184261
	Water Abstractions Operator: London Borough Of Camden Licence Number: Th/039/0039/087 Permit Version: 1 Location: Swiss Cottage Open Space- Borehole Authority: Environment Agency, Thames Region Abstraction: Municipal Grounds: Lake And Pond Throughflow Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Swiss Cottage Open Space, Winchester Road, London Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 5th December 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(SE)	1952	3	526750 184261
	Water Abstractions Operator: London Borough Of Camden Licence Number: 28/39/39/0219 Permit Version: 1 Location: Swiss Cottage Open Space- Borehole Authority: Environment Agency, Thames Region Abstraction: Municipal Grounds: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Swiss Cottage Open Space, Winchester Road, London. Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(SE)	1961	3	526800 184280
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 39 West London Scale: 1:100,000	A13SW (NW)	0	3	525760 185970
	Drift Deposits None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Bedrock Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13SW (NW)	0	2	525760 185970
	Superficial Aquifer Designations No Data Available				
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
	Detailed River Network Lines None				
	Detailed River Network Offline Drainage None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: London Borough of Camden - Has no landfill data to supply		0	8	525760 185970
	Local Authority Landfill Coverage Name: London Borough of Barnet - Has supplied landfill data		411	9	525504 186320

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Barton, Bracklesham and Bagshot Beds	A13SW (NW)	0	2	525760 185970
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13SW (NW)	0	6	525760 185970
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13NW (N)	6	6	525760 186000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13SE (SE)	77	6	525845 185915
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13SW (SW)	84	6	525694 185904
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13NE (NE)	155	6	525910 186044
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13SE (E)	219	6	526000 185970

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525663, 186188 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.00 mg/kg Cadmium Measured Concentration: 0.70 mg/kg Chromium Measured Concentration: 157.00 mg/kg Lead Measured Concentration: 1131.00 mg/kg Nickel Measured Concentration: 23.00 mg/kg	A13NW (NW)	214	2	525663 186188
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525676, 185669 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 14.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 116.00 mg/kg Lead Measured Concentration: 247.00 mg/kg Nickel Measured Concentration: 23.00 mg/kg	A13SW (S)	292	2	525676 185669
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525393, 186257 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 12.00 mg/kg Cadmium Measured Concentration: 1.50 mg/kg Chromium Measured Concentration: 51.00 mg/kg Lead Measured Concentration: 269.00 mg/kg Nickel Measured Concentration: 21.00 mg/kg	A12NE (NW)	442	2	525393 186257
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525369, 185647 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.00 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 96.00 mg/kg Lead Measured Concentration: 569.00 mg/kg Nickel Measured Concentration: 32.00 mg/kg	A12SE (SW)	498	2	525369 185647
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 526223, 185630 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 20.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 127.00 mg/kg Lead Measured Concentration: 515.00 mg/kg Nickel Measured Concentration: 23.00 mg/kg	A9NW (SE)	550	2	526223 185630

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Urban Soil Chemistry Averages Source: British Geological Survey, National Geoscience Information Service Sample Area: London Count Id: 7189 Arsenic Minimum Concentration: 1.00 mg/kg Arsenic Average Concentration: 17.00 mg/kg Arsenic Maximum Concentration: 161.00 mg/kg Cadmium Minimum Concentration: 0.30 mg/kg Cadmium Average Concentration: 0.90 mg/kg Cadmium Maximum Concentration: 165.20 mg/kg Chromium Minimum Concentration: 13.00 mg/kg Chromium Average Concentration: 79.00 mg/kg Chromium Maximum Concentration: 2094.00 mg/kg Lead Minimum Concentration: 11.00 mg/kg Lead Average Concentration: 280.00 mg/kg Lead Maximum Concentration: 10000.00 mg/kg Nickel Minimum Concentration: 2.00 mg/kg Nickel Average Concentration: 28.00 mg/kg Nickel Maximum Concentration: 506.00 mg/kg	A13SW (NW)	0	2	525760 185970
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	77	2	525845 185915
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	84	2	525694 185904
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	77	2	525845 185915
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Radon Potential - Radon Affected Areas Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	2	525760 185970

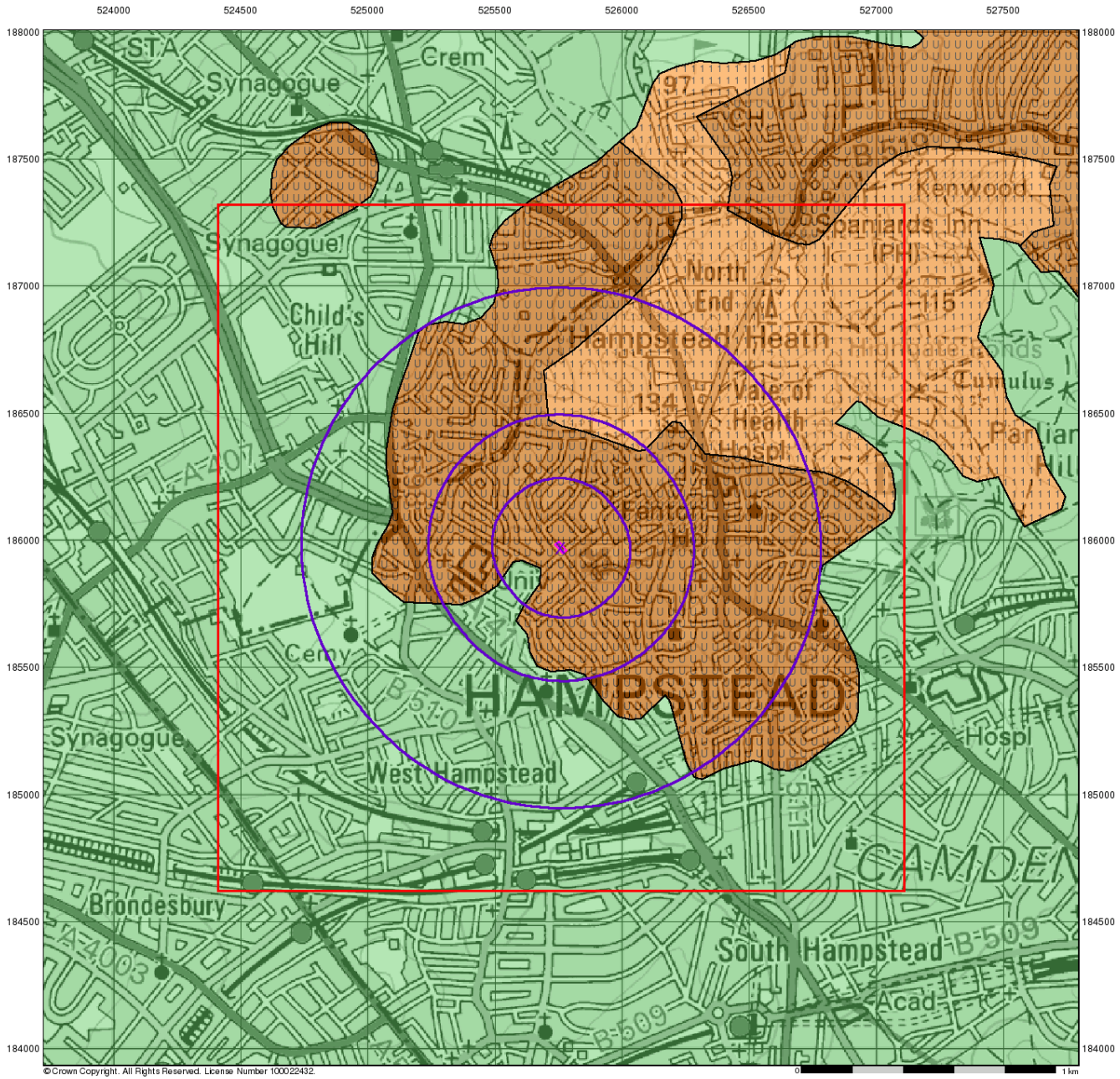
Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
16	**Contemporary Trade Directory Entries** Name: All Rubbish Cleared Location: Redington Rd, London, NW3 7QX Classification: Rubbish Clearance **Status: Active** Positional Accuracy: Manually positioned to the road within the address or location	A13SE (SE)	295	-	525919 185694
17	**Contemporary Trade Directory Entries** Name: Grand Products Ltd Location: A, 20, Hollycroft Avenue, London, NW3 7QL Classification: Furniture Manufacturers - Home & Office **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NE (W)	378	-	525381 186106
18	**Contemporary Trade Directory Entries** Name: Ravtex Location: 95 Platts La, London, NW3 7NH Classification: Packaging & Wrapping Equipment & Supplies **Status: Active** Positional Accuracy: Manually positioned to the address or location	A18SW (NW)	434	-	525464 186318
19	**Contemporary Trade Directory Entries** Name: Plumbright Services Location: 47, Studholme Court, Finchley Road, London, NW3 7AE Classification: Boilers - Servicing, Replacements & Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NW (SW)	445	-	525484 185603
20	**Contemporary Trade Directory Entries** Name: Finchley Road Audi Location: 278 Finchley Road, London, NW3 6LT Classification: Car Dealers **Status: Active** Positional Accuracy: Manually positioned to the road within the address or location	A8NW (SW)	546	-	525540 185450
21	**Contemporary Trade Directory Entries** Name: London Dry Cleaning Location: 519a, Finchley Road, London, NW3 7BB Classification: Dry Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NW (SW)	552	-	525431 185508
21	**Contemporary Trade Directory Entries** Name: Cottontail Cleaners Ltd Location: 509, Finchley Road, London, NW3 7BB Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NW (SW)	558	-	525454 185484
22	**Contemporary Trade Directory Entries** Name: Cleaning Services Hampstead Location: 529, Finchley Road, London, NW3 7BG Classification: Cleaning Services - Domestic **Status: Active** Positional Accuracy: Automatically positioned to the address	A7NE (SW)	568	-	525302 185620
23	**Contemporary Trade Directory Entries** Name: Vape Emporium Location: 87, Heath Street, London, NW3 6UG Classification: Tobacco Products - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14SW (E)	591	-	526367 185876
24	**Contemporary Trade Directory Entries** Name: Perkins Dry Cleaners Location: 6, Holly Bush Vale, London, NW3 6TX Classification: Dry Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A14SW (E)	593	-	526343 185767
25	**Contemporary Trade Directory Entries** Name: Buzy Cleaning Location: 571, Finchley Road, London, NW3 7BN Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SE (W)	596	-	525173 185793
25	**Contemporary Trade Directory Entries** Name: 24 Hour Euro Windscreen Ltd Location: 571, Finchley Road, London, NW3 7BN Classification: Garage Services **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A12SE (W)	597	-	525173 185793

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
68	**Contemporary Trade Directory Entries** Name: Printco Ltd Location: 251, West End Lane, London, NW6 1XN Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	998	-	525476 184992
69	**Contemporary Trade Directory Entries** Name: Cleanline Location: First Floor, 307, Finchley Road, London, NW3 6EH Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A9SW (S)	1000	-	526109 185007
69	**Contemporary Trade Directory Entries** Name: London Crystal Ltd Location: 307c, Finchley Road, London, NW3 6EH Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A9SW (S)	1000	-	526109 185007
69	**Contemporary Trade Directory Entries** Name: Cleanline Location: 307C, Finchley Road, London, NW3 6EH Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A9SW (S)	1000	-	526109 185007
69	**Contemporary Trade Directory Entries** Name: Clean Line Location: 307c, Finchley Road, London, NW3 6EH Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A9SW (S)	1000	-	526109 185007
70	**Fuel Station Entries** Name: The Tower Service Station Location: 617, Finchley Road, London, NW3 7BS Brand: ESSO Premises Type: Petrol Station **Status: Open** Positional Accuracy: Automatically positioned to the address	A12NW (W)	687	-	525052 186022
71	**Fuel Station Entries** Name: Fortune Green Service Station Location: 63-65 Fortune Green Road, Fortune Green, LONDON, NW6 1DR Brand: Texaco Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Manually positioned to the road within the address or location	A7NE (SW)	729	-	525113 185609
72	**Fuel Station Entries** Name: Cavendish Motors Location: West End Lane, LONDON, Greater London, NW6 1XF Brand: OBSOLETE Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Manually positioned to the road within the address or location	A7SE (SW)	829	-	525412 185197
73	**Fuel Station Entries** Name: Castle Service Centre Location: 713 Finchley Road, Cricklewood Lane, Golders Green, London, NW2 2DP Brand: Unbranded Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Located by supplier to within 10m	A17SW (NW)	844	-	525042 186458

Useful Contacts

Contact	Name and Address	Contact Details
2	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
3	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
4	**London Borough of Camden - Pollution Projects Team** Seventh Floor, Town Hall Extension, Argyle Street, London, WC1H 8EQ	Telephone: 020 7278 4444 Fax: 020 7860 5713 Website: www.camden.gov.uk
5	**London Borough of Barnet - Environmental Health Department** Building 4, North London Business Park, Oakleigh Road South, London, N11 1NP	Telephone: 020 8359 2000 Fax: 020 8359 4999 Website: www.barnet.gov.uk
6	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmark.co.uk
7	**Natural England** Suite D, Unex House, Bourges Boulevard, Peterborough, Cambridgeshire, PE1 1NG	Telephone: 0845 600 3078 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
8	**London Borough of Camden** Town Hall, Judd Street, London, WC1H 9JE	Telephone: 020 7974 4444 Fax: 020 7974 6866 Email: info@camden.gov.uk Website: www.camden.gov.uk
9	**London Borough of Barnet - Land Charges** The Town Hall, The Burroughs, Hendon, LONDON, NW4 4BQ	Telephone: 0208 3592482 Fax: 0208 3592493 Website: www.barnet.gov.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.



GEA Geotechnical & Environmental Associates

Groundwater Vulnerability

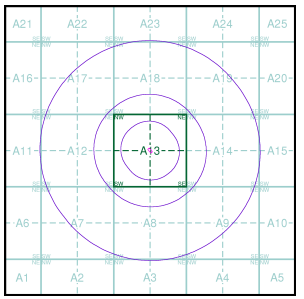
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A

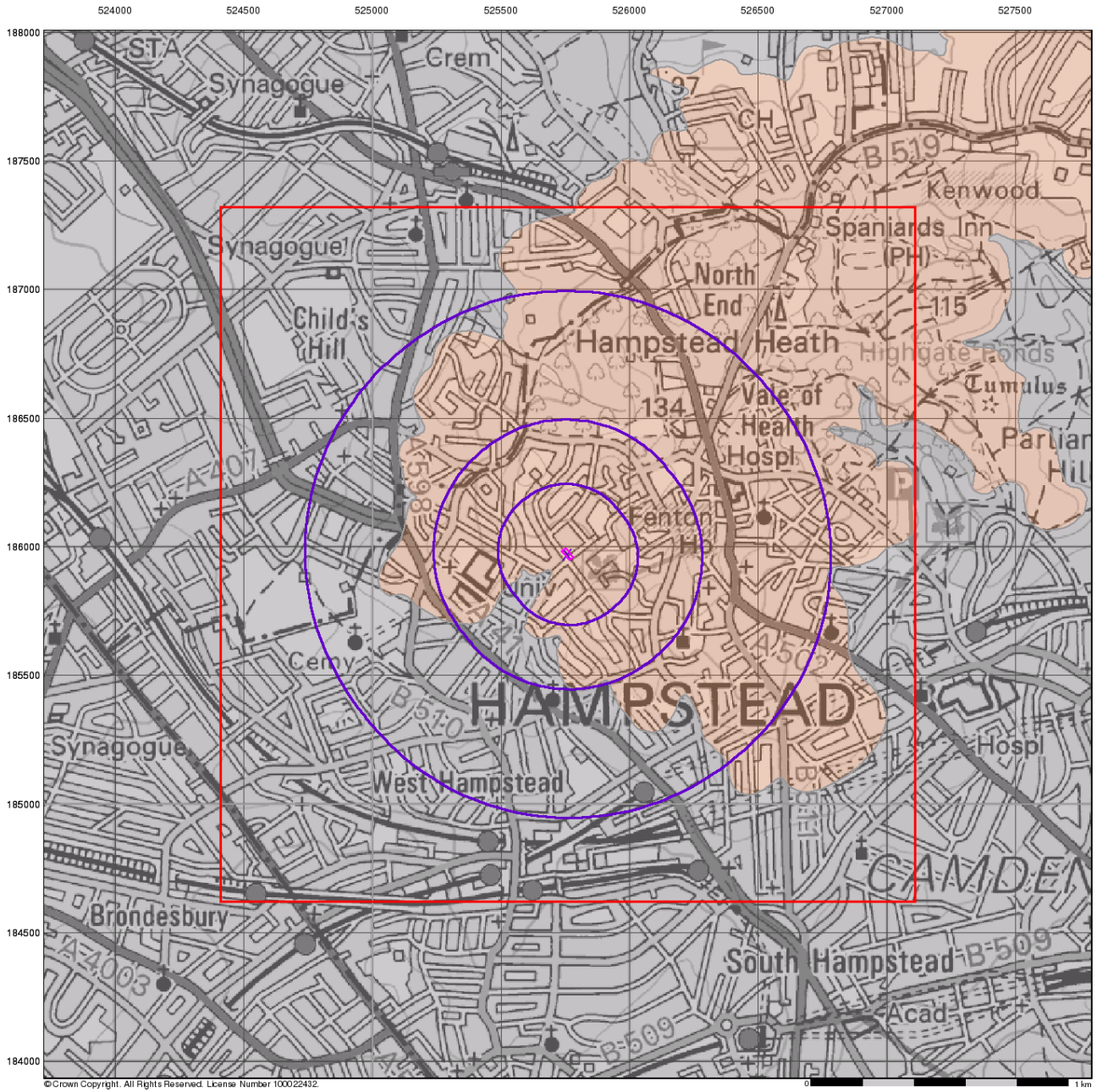


Order Details

Order Number:	64129117_1_1
Customer Ref:	J15031
National Grid Reference:	525760, 185970
Slice:	A
Site Area (Ha):	0.09
Search Buffer (m):	1000

Site Details

25 Redington Gardens, LONDON, NW3 7RX



GEA Geotechnical & Environmental Associates

Bedrock Aquifer Designation

General

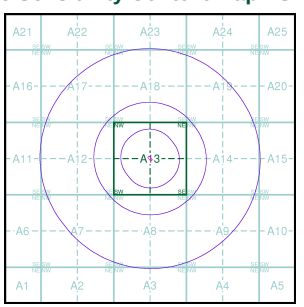
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A

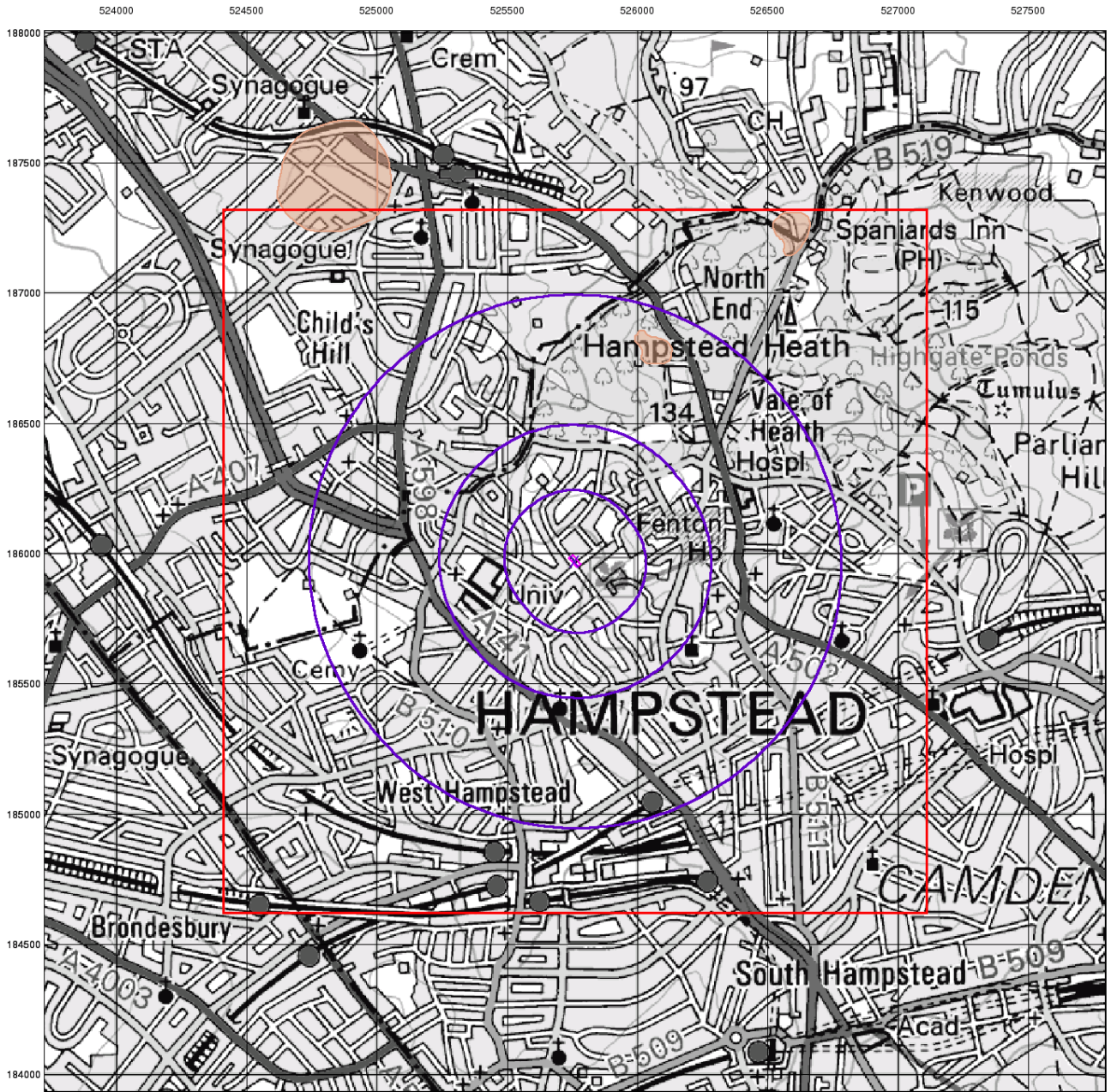


Order Details

Order Number:	64129117_1_1
Customer Ref:	J15031
National Grid Reference:	525760, 185970
Slice:	A
Site Area (Ha):	0.09
Search Buffer (m):	1000

Site Details

25 Redington Gardens, LONDON, NW3 7RX



GEA Geotechnical & Environmental Associates

Superficial Aquifer Designation

General

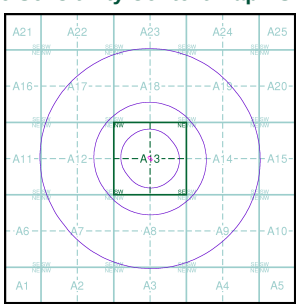
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A

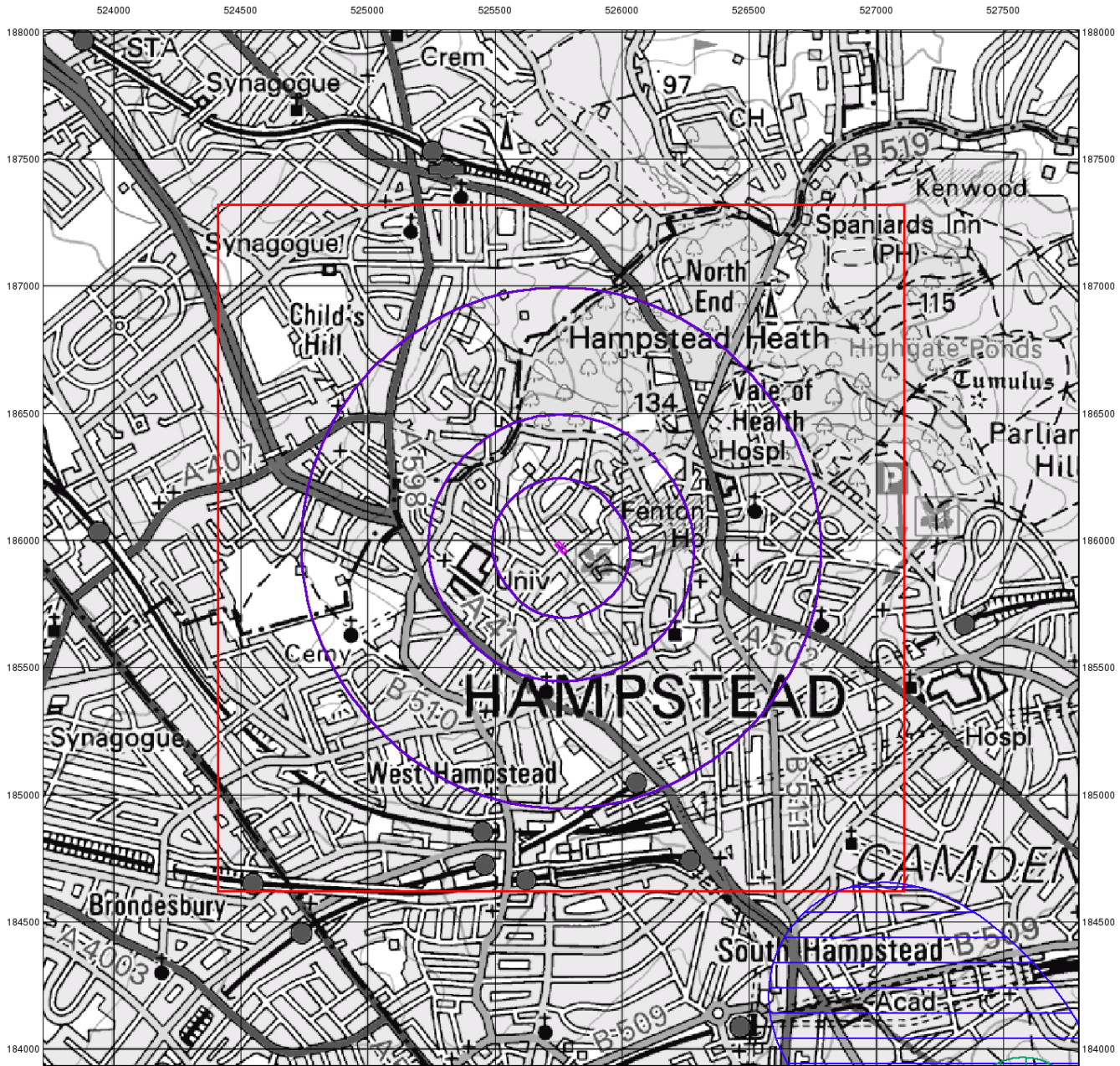


Order Details

Order Number:	64129117_1_1
Customer Ref:	J15031
National Grid Reference:	525760, 185970
Slice:	A
Site Area (Ha):	0.09
Search Buffer (m):	1000

Site Details

25 Redington Gardens, LONDON, NW3 7RX



GEA Geotechnical & Environmental Associates

Source Protection Zones

General

Specified Site | Specified Buffer(s) | Bearing Reference Point

Slice | Map ID

Agency and Hydrological

Source Protection Zone I

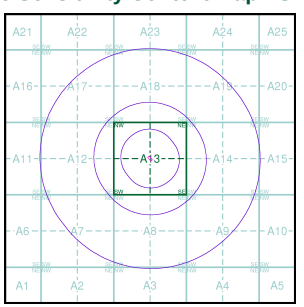
Source Protection Zone II

Source Protection Zone III

Zone of Special Interest

Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

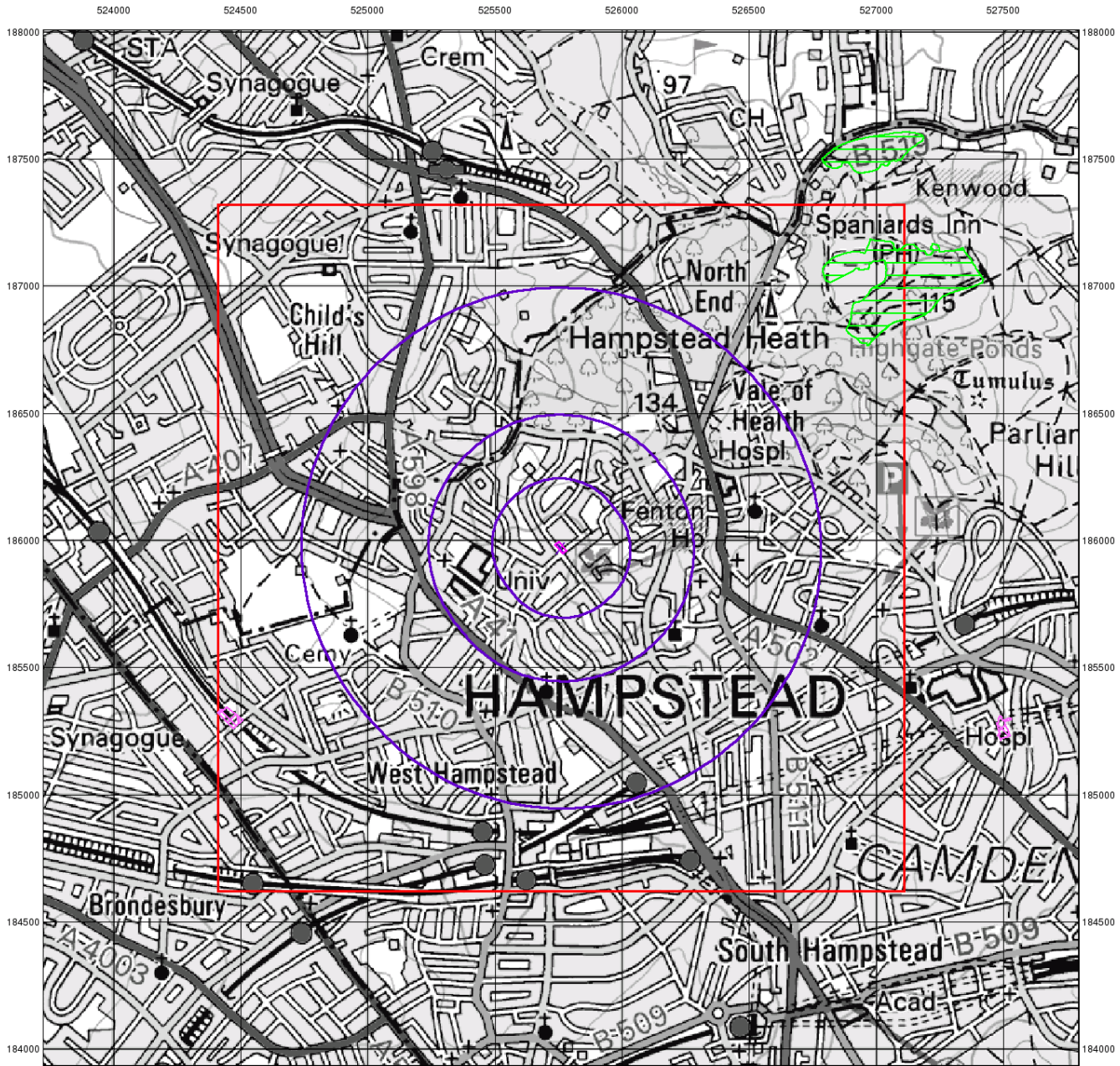
Order Number:	64129117_1_1
Customer Ref:	J15031
National Grid Reference:	525760, 185970
Slice:	A
Site Area (Ha):	0.09
Search Buffer (m):	1000

Site Details

25 Redington Gardens, LONDON, NW3 7RX

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



GEA Geotechnical & Environmental Associates

Sensitive Land Uses

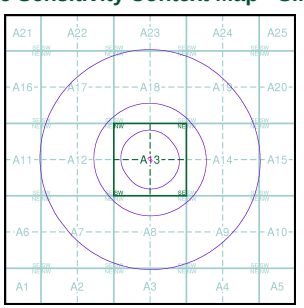
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	64129117_1_1
Customer Ref:	J15031
National Grid Reference:	525760, 185970
Slice:	A
Site Area (Ha):	0.09
Search Buffer (m):	1000

Site Details

25 Redington Gardens, LONDON, NW3 7RX