# 14a Keats Grove
# London
# NW3 2RN

## Ground Investigation &
## Basement Impact Assessment

Naomi Testler and Alex Ziff

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Appendix

# 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

A site investigation was carried out at this site by Geotechnical and Environmental Associates Limited (GEA) in 2020 with respect to a previous development proposal. The proposed scheme has now been revised to comprise the construction of a new basement level below the footprint of the existing building with new lightwells at the front and rear. GEA has been instructed by Perry and Bell Ltd, on behalf of Naomi Testler and Alex Ziff, to prepare this report with respect to the revised proposal; the purpose of this report is to detail the ground conditions and hydrogeology, to carry out an assessment of ground movements resulting from excavation of the proposed basement, to assess the extent of any contamination and to provide information to assist with the design of the basement structure and suitable foundations. The report also includes information required to comply with London Borough of Camden Planning Guidance (CPG) Basements, relating to the requirement for a Basement Impact Assessment (BIA).

## Site history

The earliest map studied, dated 1850, shows that the existing road network around the site had been established, although Keats Grove was then known as John Street. The next map, dated 1871, shows the site within the footprint of a large property fronting onto the main road, with a house partially covering the existing driveway and a small structure at the end of the garden. The surrounding area was predominantly residential, much as it is today, with Hampstead Heath Railway Station 150 m to the southeast and two of the Hampstead Ponds approximately 110 m to the east and 130 m to the northeast. At some time between 1879 and 1895, the closer of the two ponds was drained and infilled, later to be occupied by an orchard and various footpaths, while John Street had been renamed as Keats Grove. Also, by the same time, two houses on either side of the site were demolished along with the small building at the end of the garden leaving a large open plot of land. This plot was split into four separate properties and developed with the existing houses by 1934. Opposite the site to the south, the Keats Museum and later, Keats Library had been established by the same time. The site and surrounding area remained essentially unchanged until some time between 1996 and 1999, when an extension was built to the rear of the existing property.

## Ground conditions

The ground investigation has confirmed the expected ground conditions in that, beneath a moderate thickness of made ground and a superficial layer of Head Deposits, London Clay was encountered and proved to the full depth of the investigation. The made ground comprised dark brown sandy gravelly clay with fragments of extraneous material and extended to depths of between 1.00 m and 1.30 m. The Head Deposits comprised soft becoming firm brown silty sandy gravelly clay with rootlets, sandy lenses and localised pockets of gravel, to depths of between 1.30 m and 3.20 m. The underlying London Clay comprised stiff fissured brown becoming greyish brown silty clay with sandy lenses and selenite crystals to the full depth investigated, of 12.00 m. Nearby boreholes from the BGS archive indicate the London Clay is likely to extend to a depth of at least 80 m.

Groundwater was not encountered during drilling. Groundwater monitoring standpipes were installed in three of the boreholes to depths of 4.10 m and 5.10 m. Two monitoring visits have been carried out, measuring groundwater at depths of 0.66 m and 0.81 m to the rear of the house and at 4.53 m at the front of the house. The higher water levels recorded at the rear are thought to be associated with water perched within the made ground following significant recent rainfall infiltrating through the grass covered garden.

Contamination testing has revealed elevated concentrations of lead within two samples of the made ground.

## Recommendations

Formation level for the proposed basement will be within the stiff clay of the London Clay. Excavations for the proposed basement structure will require temporary support to maintain stability and to prevent any excessive ground movements. The basement will be formed by underpinning below the footprint and the construction of cast in situ retaining walls in sections in a method similar to that of underpinning in the proposed lightwells.

Significant inflows of groundwater are not anticipated, although seepages may be encountered from localised perched water within the made ground or underlying Head Deposits. Following the excavation, the floor slab for the proposed basement will need to be suspended over a void or layer of compressible material to accommodate the anticipated heave unless the slab can be suitably reinforced to cope with these movements.

Site workers should adopt suitable precautions when handling soil and areas of new soft landscaping / planting may need to be formed with a cover thickness of imported soils.

## Basement Impact Assessment

The BIA has not indicated any concerns with regard to the effects of the proposed basement on the site and surrounding area. It has been concluded that the impacts identified can be mitigated by appropriate design and standard construction practice.

# 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 Limited (GEA) has been commissioned by Perry and Bell Ltd, on behalf of Naomi Testler and Alex Ziff, to provide a report on a desk study, ground investigation and ground movements assessment at 14A Keats Grove, London NW3 2RN. The ground investigation field work and desk study research were carried out in 2020, with regard to a previous proposal for the site, which did not proceed.

This report also forms part of a Basement Impact Assessment (BIA), which has been carried out in accordance with guidelines from the London Borough of Camden (LBC) in support of a planning application.

### 1.1 Proposed Development

It is understood that it is proposed to construct a new single level basement below the footprint of the existing building with new lightwells at the front and rear. The new basement will extend to a depth of roughly 3.50 m below ground level.

This report is specific to the proposed development and the advice herein should be reviewed if the development 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 with respect to previous contaminative uses;
- to provide an assessment of the risk of encountering unexploded ordnance (UXO);
- to determine the ground conditions and their engineering properties;
- to use the above information to provide recommendations with respect to the design of suitable foundations and retaining walls;
- to assess the impact of the proposed basement on the local hydrogeology, hydrology and stability of the surrounding natural and build environment;
- 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.

### 1.3 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 historical Ordnance Survey (OS) maps and environmental searches sourced from the Envirocheck database;
- a review of readily available geology maps;
- a walkover survey of the site carried out in conjunction with the fieldwork; and
- commissioning of 1st Line Defence to undertake a preliminary UXO risk assessment.

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

- four boreholes advanced to depths of between 5.00 m and 12.00 m below ground level using a dismantlable opendrive sampling rig;
- standard penetration tests (SPTs) carried out at regular intervals within the boreholes to provide quantitative data on the strength of the soils;
- the installation of three groundwater monitoring standpipes, to a maximum depth of 5.10 m, and two subsequent monitoring visits;
- testing of selected soil samples for contamination and geotechnical purposes; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

This report includes a contaminated land assessment which has been undertaken by a suitably qualified and competent professional in accordance with the methodology presented by the Environment Agency in their Land contamination risk assessment (LCRM)[1] published 8 October 2020. This 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. Risk management is divided into three stages; Risk Assessment, Options Appraisal and Remediation, and each stage comprises three tiers. The Risk Assessment stage includes preliminary risk assessment (PRA), generic quantitative risk assessment (GQRA) and detailed quantitative risk assessment (DQRA)and this report includes the PRA and GQRA.

The exploratory methods adopted in this investigation have been selected on the basis of the constraints of the site including but not limited to access and space limitations, together with any budgetary or timing constraints. Where it has not been possible to reasonably use an EC7 compliant investigation technique a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

### 1.3.1 Basement Impact Assessment

The work carried out includes a Hydrological and Hydrogeological Assessment and Land Stability Assessment (also referred to as Slope Stability Assessment). These assessments form part of the BIA procedure specified in the London Borough of Camden (LBC) Planning Guidance CPG[2] and their Guidance for Subterranean Development[3] prepared by Arup (the "Arup report") in accordance with Policy A5 of the Camden Local Plan 2017. The aim of the work is to provide information on surface water, groundwater and land stability and in particular to assess whether the development will affect neighbouring properties or groundwater movements and whether any identified impacts can be appropriately mitigated by the design of the development.

### 1.3.2 Qualifications

The land stability element of the Basement Impact Assessment (BIA) has been carried out by Martin Cooper, a BEng in Civil Engineering, a chartered engineer (CEng), member of the Institution of Civil Engineers (MICE), and Fellow of the Geological Society (FGS) who has over 20 years' specialist experience in ground engineering. The subterranean (groundwater) flow assessment has been carried out by John Evans, MSc in Hydrogeology, Chartered Geologist (CGeol) and Fellow of the Geological Society of London (FGS). The surface water and flooding assessment has been carried out by Rupert Evans, a hydrologist with more than ten years consultancy experience in flood risk assessment, surface water drainage schemes and hydrology / hydraulic modelling. Rupert Evans is a Chartered Environmentalist, Chartered Water and Environmental Manager and a Member of CIWEM.

The assessments have been made in conjunction with 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 some 30 years' experience in geotechnical engineering and engineering geology.

All assessors meet the qualification requirements of the Council guidance.

## 1.4 Limitations

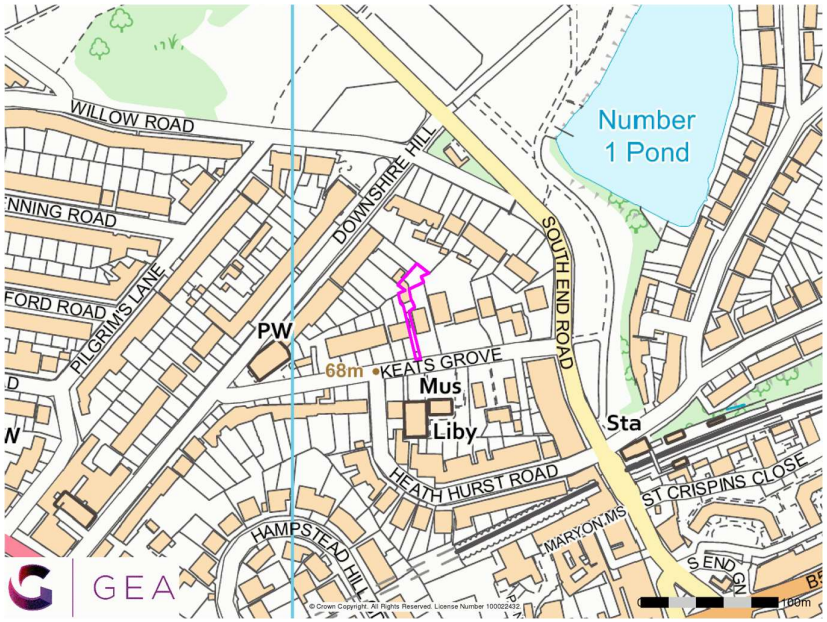
The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled and the number of soil, gas or ground water samples tested. 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 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.

1 https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm
2 London Borough of Camden Planning Guidance CPG (January 2021) *Basements*
3 Ove Arup & Partners (2010) *Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development.* For London Borough of Camden November 2010

# 2.0 The Site

## 2.1 Site Description

The site is located in the London Borough of Camden, roughly 150 m northwest of Hampstead Heath Railway Station and 700 m to the east of Hampstead London Underground Station. It is irregular in shape, measuring approximately 65 m by 20 m in maximum extent. The site fronts onto Keats Grove to the south and is bounded by similar three-storey properties to the north, east and west. The site may additionally be located by National Grid Reference 527090, 185730 and is shown on the map extract below.




A walkover of the site was carried out by a geotechnical engineer from GEA at the time of the fieldwork in 2020, and the site is understood to be unchanged. The site is occupied by 14A Keats Grove, a three-storey detached house with a single storey extension opening onto a garden to the rear. The house is located at the northern end of the property, with a long narrow driveway and then a footpath leading from Keats Grove. The driveway is covered in paving slabs, which appeared to be in relatively good condition, and a wooden shed partially obstructs the drive leaving only the path for access. The rear extension and garden are approximately 0.5 m below ground floor level while the footpath steps down towards the driveway and road. A number of mature deciduous trees are present within the rear garden of the property and within the surrounding gardens.

### 2.1.1 Adjoining Structures

It is not believed that either of the adjoining properties along Keats Grove, to the east and west of the site, have basements.

## 2.2 Site History

The history of the site and surrounding area has been researched by reference to archive historical maps and Ordnance Survey (OS) maps sourced from the Envirocheck database.

The earliest map studied, dated 1850, shows that the existing road network around the site had been established, although Keats Grove was then known as John Street. The next map, dated 1871, shows the site within the footprint of a large property fronting onto the main road, with a house partially covering the existing driveway and a small structure at the end of the garden. The surrounding area was predominantly residential, much as it is today, with Hampstead Heath Railway Station 150 m to the southeast and two of the Hampstead Ponds approximately 110 m to the east and 130 m to the northeast.

At some time between 1879 and 1895, the closer of the two ponds was drained and infilled, later to be occupied by an orchard and various footpaths, while John Street had been renamed as Keats Grove. Also, by the same time, two houses on either side of the site were demolished along with the small building at the end of the garden leaving a large open plot of land. This plot was split into four separate properties and developed with the existing houses by 1934. Opposite the site to the south, the Keats Museum and later, Keats Library had been established by the same time. The site and surrounding area remained essentially unchanged until sometime between 1996 and 1999, when an extension was built to the rear of the existing property.

## 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 search has revealed that there are no landfills, waste management, transfer, treatment or disposal sites within 1 km of the site. There have been no pollution incidents to controlled waters within 250 m of the site.

There is a single area of infilled land recorded within 150 m of the site, the former pond, located 135 m to the east of the site on Hampstead Heath and infilled between 1879 and 1895.

The search has indicated that the site is located in an area where less than 1% of homes are affected by radon emissions; which is the lowest classification given by the Health Protection Agency (HPA) and therefore no radon protective measures will be necessary.

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

## 2.4 Preliminary UXO Risk Assessment

A Preliminary UXO Risk Assessment has been completed by 1st Line Defence (report ref PA13493-00, dated May 2021), and a copy of the report is included in the appendix.

The risk assessment has been carried out in accordance with the guidelines provided by CIRIA[4], which state that the likelihood of encountering and detonating 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.

During World War II (WWII) the site was located within the Metropolitan Borough of Hampstead which sustained a very high bombing density according to official statistics. London Bomb Census mapping indicates no bombs landed on the site directly, although an incendiary shower was recorded over the area. Additionally, several bombs are recorded in the region surrounding the site with the closest approximately 50 m to the east. No damage is recorded to structures on the site and as such, it is likely to have remained occupied, increasing the likelihood of UXO being noticed and reported. On this basis, the risk of encountering UXO is not thought to be elevated higher than background levels for the region and as such, no further work is required in this respect.

## 2.5 Geology

The British Geological Survey (BGS) map of the area (Sheet 256) indicates the site is directly underlain by the London Clay. However, it is also in an area of head propensity such that Head Deposits may also be present over the London Clay.

According to the BGS memoir, the London Clay is homogenous, slightly calcareous silty clay to very silty clay, with some beds of clayey silt grading to silty fine-grained sand.

A previous investigation carried out by GEA at No 12 Keats Grove found that beneath a nominal thickness of made ground and a localised layer of Head Deposits, London Clay was encountered and proved to the full depth of the investigation. The made ground comprised dark brown clayey gravelly sand with fragments of extraneous material and extended to depths of between 0.40 m and 0.80 m. The Head Deposits were only encountered in a few of the boreholes and comprised soft becoming firm orange-brown silty sandy slightly gravelly clay with rootlets, selenite crystals and sandy pockets to depths of 2.60 m and 4.00 m. The London Clay comprised high becoming very high strength firm becoming stiff fissured brown becoming greyish brown silty clay with selenite crystals and selenite crystals to the full depth investigated, of 15.00 m.

A search of the BGS records has identified records of a deep borehole that was drilled roughly 120 m to the northeast of the site, which confirms that the London Clay is likely to extend to a depth of at least 80 m, below which mottled clay of the Lambeth Group is likely to be present.

4 CIRIA C681 (2009) *Unexploded ordnance (UXO) A guide for the construction industry*

## 2.6 Hydrology and Hydrogeology

The London Clay is classified by the Environment Agency (EA) as Unproductive Strata, referring to rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

The London Clay is not capable of supporting a groundwater table, although isolated pockets of perched groundwater do occur within fissures and silt and sand partings. Published data for the permeability of the London Clay indicates the horizontal permeability to generally range between 1 x $10^{-11}$ m/s and 1 x $10^{-9}$ m/s, with an even lower vertical permeability.

If Head Deposits are present on site, they are likely to be of higher permeability and to contain layers of coarser grained soils that could hold water, but are unlikely to contain continuous layers capable of transmitting groundwater due to the clay dominated matrix.

The previous nearby GEA investigation did not encounter groundwater during the fieldwork. Subsequent monitoring of standpipes measured water at depths of between 0.10 m and 5.45 m, thought to reflect the accumulation of perched water in the soil rather than a continuous water table.

The site is not indicated as being at risk from flooding, nor is it located within a Groundwater Source Protection Zone as defined by the Environment Agency. It is not listed within the London Borough of Camden report[5] as having suffered from surface water flooding in the 1975 or 2002 flooding events and is not shown on Figure 15 of the Arup report[6], or the EA surface water flood maps, as being in an area with a potential risk from surface water flooding.

Figure 11 of the Arup report and reference to the Lost Rivers of London[7] indicates that the nearest lost river is a tributary of the River Fleet, which flowed 150 m to the east of the site. The source of the River Fleet is from the sands of the Bagshot Formation which outcrop on Hampstead Heath, from which point it flowed in a generally southeasterly direction, through the Hampstead Ponds, before discharging to the River Thames, next to Blackfriars Bridge. The nearest surface water feature is the Hampstead No 1 Pond, 129 m to the northeast of the site.

The existing rear garden is almost entirely covered by grass and as such, infiltration of rainwater is largely unimpeded. However, the underlying clay will limit further infiltration, resulting in a high proportion of runoff in this area. The front of the property is largely covered by block paving, such that infiltration of rainwater is therefore generally restricted to surface water drains, with the majority of surface runoff draining into combined sewers in the road.

As the development does not result in a change to the present conditions, for example through the loss of any soft covered areas, there will not be an increase in runoff rate or volume into the existing sewer system, or that could have a potentially adverse impact on the surrounding area. There should not, therefore, be any requirement for any mitigation measures.

Mitigation measures are unlikely to be feasible in any case, due to a lack of available space and little opportunity to reduce runoff rates from the site via attenuation or rainwater harvesting. However, alternative SUDS measures could be considered, which could temporarily retain surface water flows, if a requirement to reduce the rate and amount of flow into the existing sewer system from present levels is identified.

## 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 had a residential end use for its entire developed history and is therefore not considered to have had a contaminative history. However, there is the potential for a significant thickness of made ground to be present from the demolition of previous buildings, with the potential for the fill materials to contain elevated concentrations of heavy metals and polyaromatic hydrocarbons (PAHs), in addition to asbestos.

5 London Borough of Camden (2003) *Floods in Camden, Report of the Floods Scrutiny Panel*
6 Ove Arup & Partners (2010) *Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development.* For London Borough of Camden November 2010
7 Nicholas Barton and Stephen Myers (2016) *London's Lost Rivers. Revised Edition.* Historical Publications Ltd

The nearby infilled pond is not thought likely to represent a potential source of soil gas as it was infilled between 1879 and 1895, and therefore any sources of gas in the infill material would by now have fully broken down.

### 2.7.2 Receptor

The occupants of the house will represent relatively high sensitivity receptors. 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 contact with any contaminants present during construction works.

Perched water may be present in the made ground or Head Deposits, particularly in the vicinity of existing foundations, although such pockets of water are likely to be localised and unlikely to form part of a general water table.

### 2.7.3 Pathway

Within the site, end users will be isolated from direct contact with any contaminants present within the made ground by the building and surrounding hard surfacing, thus no potential contaminant exposure pathways will exist with respect to end users. Only in areas of proposed soft landscaping will end users potentially come into contact with contaminants.

There will be a potential for contaminants to move onto or off the site horizontally within the made ground, although these pathways are already in existence. A pathway for ground workers to come into contact with any contamination will exist during construction work and services will come into contact with any contamination within the soils in which they are laid.

There is thus considered to be a low potential for a contaminant pathway to be present between any potential contaminant source and a target for the particular contaminant.

### 2.7.4 Preliminary Risk Appraisal

On the basis of the above it is considered that there is a VERY LOW risk of there being a significant contaminant linkage at this site, which would result in a requirement for major remediation work. Furthermore, as there is no evidence of filled ground within the vicinity of the site and no landfill sites, there is not considered to be a significant potential for hazardous soil gas to be present on or migrating towards the site.

# 3.0 Screening

The Camden planning guidance suggests that any development proposal that includes a basement should be screened to determine whether or not a full BIA is required.

## 3.1 Screening Assessment

A number of screening tools are included in the Arup document and for the purposes of this report reference has been made to Appendices E1, E2 and E3 which include a series of questions within screening flowcharts for surface flow and flooding, subterranean (groundwater) flow and land stability. The flowchart questions and responses to these questions are tabulated below.

### 3.1.1 Subterranean (groundwater) Screening Assessment

| Question | Response for 14a Keats Grove |
|---|---|
| 1a. Is the site located directly above an aquifer? | No. The site is directly underlain by the London Clay, which is classified as Unproductive strata. |
| 1b. Will the proposed basement extend beneath the water table surface? | No. The London Clay cannot support a water table and is classified as Unproductive strata. However, if an upper weathered layer or Head Deposits are present, this may have a higher permeability and could have the potential to collect groundwater if the stratum has a predominantly granular matrix, which is unlikely in this setting. |
| 2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line? | No. The Envirocheck report and Figure 11 of the Arup report confirm this. |
| 3. Is the site within the catchment of the pond chains on Hampstead Heath? | No. Figure 14 of the Arup report confirms that the site is not located within this catchment area. |
| 4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas? | No. The proposed basement will essentially cover the same area as the existing building and areas of hardstanding with any additional hardstanding comprising permeable paving. |
| 5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)? | No. It is not considered feasible that the ground would be sufficiently permeable to allow for a soakaway discharge design, nor do the details of the proposed development indicate the use of soakaway drainage. |

| Question | Response for 14a Keats Grove |
|---|---|
| 6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line? | No. There are no ponds or spring lines within 100 m of the site. |

The above assessment has not identified any potential issues that need to be further assessed.

### 3.1.2 Stability Screening Assessment

| Question | Response for 14a Keats Grove |
|---|---|
| 1. Does the existing site include slopes, natural or manmade, greater than 7°? | *Yes. As indicated on the Slope Angle Map Fig 16 of the Arup report.* |
| 2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°? | No. The site is not to be significantly re-profiled as part of the development. |
| 3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°? | *Yes. As indicated on the Slope Angle Map Fig 16 of the Arup report.* |
| 4. Is the site within a wider hillside setting in which the general slope is greater than 7°? | *Yes. As indicated on the Slope Angle Map Fig 16 of the Arup report.* |
| 5. Is the London Clay the shallowest strata at the site? | *Yes. As indicated on the geological map and Figures 3, 5 and 8 of the Arup report* |
| 6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained? | *Yes. A single Wild Cherry Tree will be removed as part of the development.* |
| 7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site? | *Yes. The area is prone to these effects as a result of the presence of shrinkable London Clay.* |
| 8. Is the site within 100 m of a watercourse or potential spring line? | No. The Envirocheck report and Figure 11 of the Arup report confirm this. |
| 9. Is the site within an area of previously worked ground? | No. Not according to Figure 3 of the Arup report. |
| 10a. Is the site within an aquifer? | No. The site is located above an unproductive stratum. |
| 10b. Will the proposed basement extend beneath the water table such that dewatering may be required during construction? | No. The London Clay cannot support a water table and is classified as an unproductive stratum. |
| 11. Is the site within 50 m of Hampstead Heath ponds? | No. Figure 14 of the Arup report confirms that the site is not located within this catchment area. |
| 12. Is the site within 5 m of a highway or pedestrian right of way? | No. The development is approximately 50 m away from the nearest highway or pedestrian right of way. |
| 13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties? | *Yes. The proposed basement will require deeper foundations, such that the development will increase the foundation depths relative to the neighbouring properties.* |
| 14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines? | No. Not according to Figure 18 of the Arup report and information provided by London Underground. |

The above assessment has identified the following potential issues that need to be assessed:

Q1 The site does include slopes greater than 7°.

Q3 The site does neighbour land with a slope greater than 7°.

Q4 The site is within a wider hillside setting in which the general slope is greater than 7°.

Q5 The London Clay is the shallowest strata at the site.

Q6 A tree will be removed as part of the development.

Q7 The site is in an area likely to be affected by seasonal shrink-swell.

Q13 The basement will increase the foundation depths relative to the neighbouring properties.

### 3.1.3 Surface Flow and Flooding Screening Assessment

| Question | Response for 14a Keats Grove |
|---|---|
| 1. Is the site within the catchment of the pond chains on Hampstead Heath? | No. Figure 14 of Arup report confirms that the site is not located within this catchment area. |
| 2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route? | No. Any additional surface water from the development will be attenuated and discharged into the Thames Water sewers to ensure the surface water flow regime will be unchanged.<br><br>The basement will largely be beneath the footprint of the building and areas of existing hardstanding. |
| 3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas? | No. The proposed basement will essentially cover the same area as the existing building and areas of hardstanding with any additional hardstanding comprising permeable paving. |
| 4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses? | No. Any additional surface water from the development will be attenuated and discharged into the Thames Water sewers to ensure the surface water flow regime will be unchanged.<br><br>The basement will largely be beneath the footprint of the building, and the 1m distance between the roof of the basement and ground surface as recommended by section 3.2 of the CPG Basements 2018 does not apply across these areas. |
| 5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses? | No. The proposed basement is very unlikely to result in any changes to the quality of surface water being received by adjacent properties or downstream watercourses as the surface water drainage regime will be unchanged and the land uses will remain the same. |
| 6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk of flooding, for example because the proposed basement is below the static water level of nearby surface water feature? | No. The findings of this BIA together with the Camden Flood Risk Management Strategy dated 2013 and Figures 3iii, 4e, 5a and 5b of the SFRA dated 2014, in addition to the Environment Agency online flood maps show that the site has a very low flooding risk from surface water, sewers, reservoirs (and other artificial sources), groundwater and fluvial/tidal watercourses.<br><br>It is possible that the basement will be constructed within pockets of perched water and the recommendations outlined in the BIA with regards to water-proofing and tanking of the basement will reduce the risk to acceptable levels.<br><br>In accordance with paragraph 5.11 of the CPG, a positive pumped device will be installed in the basement in order to further protect the site from sewer flooding. |

The above assessment has not identified any potential issues that need to be assessed.

# 4.0 Scoping and Site Investigation

The purpose of scoping is to assess in more detail the factors to be investigated in the impact assessment. Potential impacts are assessed for each of the identified potential impact factors.

## 4.1 Potential Impacts

The following potential impacts have been identified by the screening process.

| Potential Impact | Consequence |
|---|---|
| The site does include slopes greater than 7°. | Potential for local slope instability within the site. The slope stability will need to be ensured during temporary and permanent works. |
| The site does neighbour land with a slope greater than 7°. | Potential for slope instability within neighbouring site(s).The slope stability will need to be ensured during temporary and permanent works. |
| The site is within a wider hillside setting in which the general slope is greater than 7°. | Potential for a larger slope failure system, including re-activation of a pre-existing slide. The slope stability will need to be ensured during temporary and permanent works. |
| London Clay is the shallowest strata at the site. | The London Clay is prone to seasonal shrink-swell (subsidence and heave). |
| Seasonal shrink-swell can result in foundation movements. | Multiple potential impacts depending on the specific setting of the basement development. For example, the implications of a deepened basement/foundation system on neighbouring properties should be considered. |
| The basement will increase the foundation depths relative to the neighbouring properties. | The stability of neighbouring structures will need to be ensured throughout the development. A ground movement analysis is proposed to predict the likely movements as a result of the excavation. |
| A tree will be removed as part of the basement development. | The removal of a tree could cause swelling of the ground where cohesive soils are present, which could impact the stability of neighbouring structures within the zone of influence of the tree. |

These potential impacts have been investigated through the site investigation, as detailed in Section 13.0.

## 4.2 Exploratory Work

In view of the access limitations and in order to meet the objectives described in Section 1.2, four boreholes were advanced to depths of between 5.00 m and 12.00 m below ground level using a dismantlable opendrive sampling rig.

During boring, disturbed and undisturbed samples were obtained from the boreholes for subsequent laboratory examination and testing. Standard Penetration Tests (SPTs) were carried out at regular intervals to provide additional quantitative data on the strength of soils encountered.

Groundwater monitoring standpipes were installed into three of the boreholes, to depths of 4.00 m and 5.00 m below ground level and have been subsequently monitored on two occasions to date.

A selection of disturbed and undisturbed samples recovered from the boreholes was submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for a programme of contamination testing.

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

The borehole records are appended, together with the results of the laboratory testing and a site plan indicating the borehole locations.

## 4.3 Sampling Strategy

The boreholes were positioned on site by an engineer from GEA in accessible areas, with due regard to the proposed development and the locations of known buried services.

Three samples of the shallow soil 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, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols. The samples were also screened for asbestos. The contamination analyses were carried out at an MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTS standards. A summary of the MCERTs accreditation and test methods are included with the attached results and further details are available upon request.

# 5.0 Ground Conditions

The ground investigation has confirmed the expected ground conditions in that, beneath a moderate thickness of made ground and a superficial layer of Head Deposits, London Clay was encountered and proved to the full depth of the investigation.

## 5.1 Made Ground

The made ground comprised dark brown sandy gravelly clay with fragments of brick, concrete, flint, glass, ceramic tile, clinker, charcoal and slate and occasional rootlets and extended to depths of between 1.00 m and 1.30 m.

Apart from fragments of extraneous material, no evidence of significant contamination was identified during the fieldwork. As a precaution, three samples of the made ground were tested for the presence of contamination and the results are presented in Section 5.5.

## 5.2 Head Deposits

The Head Deposits comprised soft becoming firm brown silty sandy gravelly clay with rootlets, sandy lenses and pockets of gravel to depths of between 1.30 m and 3.20 m.

Laboratory plasticity index tests indicate this layer to be of high volume change potential.

## 5.3 London Clay

The London Clay comprised stiff fissured brown becoming greyish brown silty clay with sandy lenses and selenite crystals to the full depth investigated, of 12.00 m.

Laboratory plasticity index tests indicate this layer to be of high volume change potential. The results of the quick undrained triaxial tests indicate the clay to be of medium becoming high strength.

## 5.4 Groundwater

Groundwater was not encountered during drilling. Standpipes were installed in three of the boreholes to depths of 4.10 m and 5.10 m, which have been monitored on two occasions since installation, the results of which are shown in the table below.

| Date | Borehole No | Depth to water (m) below existing garden level |
|---|---|---|
| 19/07/2021 | 1 | 0.66 |
| | 3 | 0.81 |
| | 4 | 4.53 |
| 03/08/2021 | 1 | 0.90 |
| | 3 | 0.80 |
| | 4 | 2.50 |

## 5.5 Soil Contamination

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

| Determinant | BH1 0.50 m | BH3 0.50 m | BH4 0.50 m |
|---|---|---|---|
| Asbestos | Not detected | Not detected | Not detected |
| pH | 8.6 | 8.1 | 9.2 |
| Arsenic | 21 | 29 | 23 |
| Cadmium | <0.2 | <0.2 | 2.0 |
| Chromium | 37 | 31 | 36 |
| Lead | **300** | **460** | **700** |
| Mercury | 0.9 | 1.0 | 1.2 |
| Copper | 71 | 71 | 62 |
| Nickel | 26 | 20 | 21 |
| Total Cyanide | <1.0 | <1.0 | <1.0 |
| Total Phenols | <1.0 | <1.0 | <1.0 |
| Sulphide | <1.0 | <1.0 | 14 |
| Total TPH | 26 | 32 | 22 |

| Determinant | BH1 0.50 m | BH3 0.50 m | BH4 0.50 m |
|---|---|---|---|
| Naphthalene | <0.05 | <0.05 | <0.05 |
| Benzo(a)pyrene | 0.78 | 0.77 | 0.74 |
| Total PAH | 5.37 | 7.37 | 6.73 |
| Total Organic Carbon % | 1.9 | 1.8 | 1.5 |

Note: Figures in bold indicate values in excess of the generic guideline screening values.

### 5.5.1 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 are those that have values in excess of generic human health risk-based guideline values, which are either the CLEA[8] Soil Guideline Values where available, the Suitable 4 Use Values[9] (S4UL) produced by LQM/CIEH calculated using the CLEA UK Version 1.07[10] software, or the DEFRA Category 4 Screening values[11], assuming a residential end use with plant uptake. 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 less than six years old;
- that the exposure duration will be six years;
- that the critical exposure pathways will be direct soil and indoor dust ingestion, consumption of home grown produce, consumption of soil adhering to home grown produce, skin contact with soils and dust, and inhalation of dust and vapours; and
- that the building type equates to a 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;
- 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.

The results of the contamination testing have revealed elevated concentrations of lead within all three samples of made ground tested. All other contaminants were found to be below their respective generic guideline value.

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

8 *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.
9 *The LQM/CIEH S4Uls for Human Health Risk Assessment* S4UL3065 November 2014
10 Contaminated Land Exposure Assessment (CL|EA) Software Version 1.071 Environment Agency 2015
11 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

# 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 proposed development.

## 6.0 Introduction

It is understood that it is proposed to construct a new single level basement beneath the footprint of the existing building with new lightwells to the front and rear. Formation level for the proposed basement is understood to be approximately 3.50 m below ground level. Loads for the development are not known but are thought to be low to moderate.

## 7.0 Ground Model

The desk study indicated that the site has not had a potentially contaminative history, having had a residential use for its entire developed history. On the basis of the fieldwork, the ground conditions at this site can be characterised as follows:

- below a nominal thickness of made ground and a superficial layer of Head Deposits, London Clay is present to the full depth of the investigation;
- the made ground comprises dark brown clayey gravelly sand with fragments of extraneous material and extends to depths of between 1.00 m and 1.30 m;
- the Head Deposits comprise soft becoming firm brown silty sandy gravelly clay with sandy lenses and pockets of gravel to depths of between 1.30 m and 3.20 m;
- the London Clay comprises stiff fissured brown becoming greyish brown silty clay with sandy lenses and selenite crystals to the full depth investigated, of 12.00 m;
- monitoring measured groundwater at depths of between 0.66 m and 4.53 m, assumed to be associated with seepages from granular pockets within the Head Deposits filling the standpipes completed within the London Clay; and
- contamination testing has revealed the presence of elevated concentrations of lead within all of the samples of made ground tested.

## 8.0 Advice & Recommendations

Excavations for the proposed basement structure will require temporary support to maintain stability and to prevent any excessive ground movements.

It should be feasible to construct the basement without the requirement for groundwater protection measures, although provision will need to be made to control perched water inflows from the made ground.

Formation level for the proposed development is likely to be within London Clay at a depth of 3.50 m below ground level, which should provide an eminently suitable bearing stratum for spread or raft foundations excavated from basement level.

### 8.1 Basement Construction

Formation level for the basement is likely to be within the stiff clay of the London Clay at a depth of about 3.50 m.

The information obtained to date has indicated that significant inflows of groundwater are unlikely to be encountered within the basement excavation, such that it should be possible to form the basement without the need for any groundwater protection measures, however, it is recommended that trial pits are dug to as close to the proposed basement depth as possible to confirm this view. Shallow seepages may be encountered from within the made ground and granular layers within the Head Deposits, particularly in the vicinity of any existing foundations. However, such inflows are unlikely to be prolonged, or of significant volume, and should be adequately controlled using conventional methods, such as sump pumping; although it would be prudent for the chosen contractor to have a contingency in place should more significant inflows be encountered.

The design of basement support in the temporary and permanent conditions needs to take account of the necessity to maintain the stability of the surrounding structures and the possible requirement to control groundwater inflows. 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 whether it is to be incorporated into the permanent works and have a load bearing function.

At this stage it appears that groundwater is unlikely to be encountered within the basement excavation and the simplest method is therefore likely to be to form the retaining walls by means of concrete underpinning of the existing foundations using a traditional hit and miss approach, which is understood to be the preferred method and will have the benefit of minimising the plant required and maximising usable space in the new basement.

Careful workmanship will therefore be required to ensure that movement of the surrounding structures does not occur and the contractor should be required to provide details of how they intend to control groundwater and instability of excavations, should it arise.

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. An assessment of the movements has been carried out and is discussed in Part 3.

### 8.1.1 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 ($\phi'$ – degrees) |
|---|---|---|---|
| Made Ground | 1700 | Zero | 27 |
| Head Deposits | 1900 | Zero | 25 |
| London Clay | 1950 | Zero | 24 |

Significant groundwater inflows are not anticipated within the basement, although monitoring of the standpipes should be continued to confirm this view, along with trial excavations.

Provided that a fully effective drainage system can be ensured in order to prevent the build-up of groundwater behind the retaining walls, it should be possible to design the basement on the basis that water will not collect behind the walls. If an effective drainage system cannot be ensured, then a water level of two-thirds of the basement depth, subject to a minimum depth of 1.0 m, should be assumed. The advice in BS8102:2009[12] should be followed in this respect and with regard to the provision of suitable waterproofing.

### 8.1.2 Basement Heave

The 3.50 m deep excavation of the basement will result in a net unloading of around 70 $kN/m^2$, which will result in heave of the underlying London Clay. This will comprise immediate elastic movement, which will account for approximately 40 % of the total movement and be expected to be complete during the construction period, and long term movements, which will theoretically take many years to complete. These movements will, to some extent, be mitigated by the loads applied by the proposed development, however the ground movements associated with the proposed basement excavation and construction have been considered in more detail in Part 3 of this report.

## 8.2 Spread Foundations

Moderate width strip or pad foundations bearing beneath basement formation level in the stiff London Clay, may be designed to apply a net allowable bearing pressure of 150 $kN/m^2$. This value incorporates an adequate factor of safety against bearing capacity failure and should ensure that settlement remains within normal tolerable limits.

The requirement for compressible material alongside foundations should be determined by reference to the NHBC guidelines.

## 8.3 Shallow Excavations

On the basis of the borehole findings, it is considered that it will be generally feasible to form relatively shallow excavations terminating within the made ground or Head Deposits without the requirement for lateral support, although localised instabilities may occur where more granular material or groundwater is encountered.

Significant inflows of groundwater into shallow excavations are not generally anticipated, although seepages may be encountered from perched water tables within the made ground or Head Deposits, although such inflows should be suitably controlled by sump pumping.

If deeper excavations are 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 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.

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

## 8.4 Basement Floor Slab

Following excavation of the basement, the floor slab will need to be suspended over a void or a layer of compressible material 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.

## 8.5 Effect of Sulphates

Chemical analyses have revealed relatively low concentrations of soluble sulphate and near-neutral pH in accordance with Class DS-2 conditions of Table C2 of BRE Special Digest 1:SD Third Edition (2005). The measured pH values of the samples show that an ACEC class of AC-1s would be appropriate for the site. This assumes a static water condition at the site. The guidelines contained in the digest should be followed in the design of foundation concrete.

## 8.6 Contamination Risk Assessment

The desk study has indicated that the site has not had a contaminative history, having had a residential use throughout its developed history, in an area dominated by residential streets. However, the results of the contamination testing have identified elevated concentrations of lead within all three of the samples of made ground tested.

The source of the contamination is unknown but may be associated with the former demolition of a number of buildings on the site and neighbouring sites. The made ground was noted as containing fragments of extraneous material, including clinker, and it is therefore likely that a fragment of such material was present within the samples tested, accounting for the elevated concentrations. Information on Urban Soil Chemistry provided by the BGS also indicates that background concentrations for lead in the vicinity of the site are between 478.5 mg/kg and 660.4 mg/kg, such that a significant proportion of the measured concentrations could also be the result of residual airborne sources.

Lead compounds are relatively immobile, are unlikely to be in a soluble form and are considered to be non-volatile or of a low volatility. The contamination does not therefore present a significant vapour risk or a significant risk of leaching and migration within any perched groundwater within the made ground. As the site is underlain by the London Clay, classified as Unproductive Strata, a risk to groundwater has not been identified.

### 8.6.1 End Users

End users will be effectively isolated from any potential contamination within the extent of the existing and proposed structures, such that, only in proposed garden areas could end users conceivably come into direct contact with the contaminated soils, although this pathway is already in existence.

It would normally be recommended that a cover thickness of imported subsoil and topsoil of 300 mm in thickness should be specified for any areas of new landscaping in accordance with recommendations from BRE[13]. However, this may not be necessary as the site is already in use as a garden, but additional sampling and testing is likely to be required to determine need for any remedial measures.

### 8.6.2 Protection of Site Workers

Site workers should be made aware of the potential 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[14] and CIRIA[15] and the requirements of the Local Authority Environmental Health Officer.

A watching brief should be maintained during the site works and if any suspicious soil is encountered, it should be inspected by a suitably qualified engineer and further testing carried out if required.

## 8.7 Waste Disposal

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 classification is a staged process and this investigation represents the preliminary sampling exercise of that process. Once the extent and location of the waste that is to be removed has been defined, further sampling and testing may be necessary. The results from this ground investigation should be used to help define the sampling plan for such further testing, which could include WAC leaching tests where the totals analysis indicates the soil to be a hazardous waste or inert waste from a contaminated site. It should however be noted that the Environment Agency guidance WM3[16] states that landfill WAC analysis, specifically leaching test results, must not be used for waste classification purposes.

13 BRE (2004) *Cover systems for land regeneration. Thickness of cover systems for contaminated land.* BRE pub 465
14 HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land* HMSO
15 CIRIA (1996) *A guide for safe working on contaminated sites* Report 132, Construction Industry Research and Information Association
16 Environment Agency 2015. *Guidance on the classification and assessment of waste.* Technical Guidance WM3 First Edition

Any spoil arising from excavations or landscaping works, which is not to be re-used in accordance with the CL:AIRE[17] guidance, will need to be disposed of to a licensed tip. Waste going to landfill is subject to landfill tax at either the standard rate of £98.60 per tonne (about £185 per $m^3$) or at the lower rate of £3.15 per tonne (roughly £5.85 per $m^3$). However, the classifications for tax purposes and disposal purposes differ and currently all made ground and topsoil is taxable at the 'standard' rate and only naturally occurring soil and stones, which are accurately described as such in terms of the 2011 Order, would qualify for the 'lower rate' of landfill tax.

Based on the technical guidance provided by the EA it is considered likely that the soils encountered during this ground investigation, as represented by the chemical analyses carried out, would be generally classified as follows.

| Soil Type | Waste Classification (Waste Code) | WAC Testing Required Prior to Landfill Disposal? | Current applicable rate of Landfill Tax |
|---|---|---|---|
| Made ground | Non-hazardous (17 05 04) | No | £98.60/tonne (Standard rate) |
| Natural Soils | Inert (17 05 04) | Should not be required but confirm with receiving landfill | £3.15 / tonne (Reduced rate for uncontaminated naturally occurring rocks and soils) |

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. The Environment Agency has issued a position paper[18] 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 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 (EA) 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.

17 CL:AIRE March 2011. *The Definition of Waste: Development Industry Code of Practice* Version 2

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

# Part 3: Ground Movement Analysis

This section of the report comprises an analysis of the ground movements arising from the proposed basement and foundation scheme discussed in Part 2 and the information obtained from the investigation, presented in Part 1 of the report.

## 9.0 Introduction

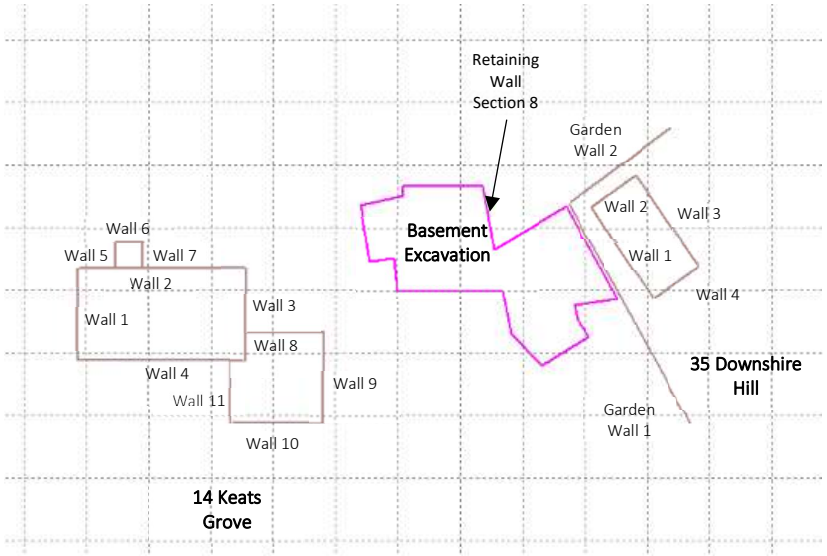
The sides of an excavation will move to some extent regardless of how they are supported. The movement will typically be both horizontal and vertical and will be influenced by the engineering properties of the ground, groundwater level and flow, the efficiency of the various support systems employed and the efficiency or stiffness of any support structures used.

An analysis has been carried out of the likely movements arising from the proposed excavation and the results of this analysis have been used to predict the effect of these movements on surrounding structures.

### 9.1 Basis of Ground Movement Assessment

Sensitive structures relevant to this assessment include No 14 Keats Grove, the Grade II listed garden walls of Nos 36, 37 and 38 Devonshire Hill and the outbuilding of 35 Downshire Hill. All other nearby structures lie outside of the extent of the 1 mm movement contour and therefore do not require consideration. Neither property is considered to have a basement and the foundations have been modelled to extend to a depth of 0.75 m below ground level. Building heights have been assumed on the basis of a standard storey height of 3.50 m per storey, plus the foundation. A height of 2.00 m above ground level has been assumed for the listed garden walls. The existing structure is to be underpinned as therefore underpinning has been modelled from the assumed base of the existing foundations, of 0.90 m below ground level.

A plan outlining the nearby sensitive structures is shown opposite.




### 9.2 Construction Sequence

Consideration is being given to the construction of a new basement that will extend to a depth of approximately 3.50 m beneath the entire footprint of the existing building. It is currently understood that the retaining walls are proposed to be constructed by means of traditional underpinning. Where lightwells are proposed, the retaining walls will be cast insitu using a similar panel style methodology, but will be designed as a cantilever concrete wall.

The following sequence of operations has been derived to enable analysis of the ground movements around the basement, both during and after construction.

Essentially the sequence may be considered as two groups of activities, the first comprising the short-term temporary works, whilst the second represents the construction of the permanent works.

The detail of the support provided to adjacent walls is beyond the scope of this report and the structural engineer will be best placed to agree the methodology with the chosen contractor(s) once appointed.

### 9.2.1 Temporary Support to Underpinned Walls

It is understood that underpinning of the existing boundary walls will take place in a 'hit and miss' sequence, in stages to be agreed with the temporary works engineer and under party wall agreement.

Underpinning is to be undertaken in short sections not exceeding 1.00 m in length, with no adjacent pin to be excavated until a minimum of 48 hours after the adjacent pin has been cast and dry-packed placed, with the sides of the excavation adequately shored and propped.

The underpins will be adequately laterally propped and sufficiently dowelled together, and the concrete will be cast and adequately cured prior to excavation of the basement and removal of the formwork and supports. It is assumed that the corners of the excavation will be locally stiffened by cross-bracing or similar and that the new retaining walls will not be cantilevered at any stage during the construction process. It follows therefore that adequate temporary propping of the new retaining walls, particularly at the top level, will remain in place at all times during excavation of the proposed basement until the construction of permanent concrete floor slabs has been completed.

### 9.2.2 Permanent Works

When the final excavation depths have been reached the permanent works will be formed which, from the information provided, are understood to comprise reinforced concrete walls with a drained cavity discharging to a sump pit.

Reinforced concrete will be used for the proposed basement raft slab.

It is anticipated that the floor slabs, which will act as permanent props, will be constructed lowest level first and when each floor has achieved adequate strength, the temporary props will be removed, and the subsequent walls and floors cast until the structure is complete.

It is understood that the walls of the lightwells will be constructed without top propping in both the temporary and permanent conditions.

# 10.0 Ground Movements

An assessment of ground movements within and surrounding the excavation has been undertaken using the X-Disp and P-Disp computer programs licensed from the OASYS suite of geotechnical modelling software from Arup. These programs are commonly used within the ground engineering industry and are considered to be appropriate tools for this analysis.

The X-Disp and P-Disp programs have been used to predict ground movements likely to arise from the construction of the proposed basement. This includes the heave / settlement of the ground (vertical movement) and the lateral movement of soil behind the proposed retaining walls (horizontal movement).

For the purpose of these analyses, the corners have been defined by x and y coordinates, with the x-direction perpendicular with the orientation of Keats Grove, whilst the y-direction is parallel with the orientation of Keats Grove. Vertical movement is in the z-direction. For this movement analysis, the basement has been modelled as a polygon which will be formed through underpinning of the existing foundations and party walls.

The proposed basement footprint contains re-entrant corners, which, due to limitations within the software, causes a doubling up of movements, creating an issue for any analysis, as in reality the opposite is likely to be the case, with an overall reduction in ground movements in these areas due to the increased stiffness of the structure at these points. For the purpose of this assessment, no correction and / or reduction has been made account for the re-entrant corners, such that the analysis can be considered extremely conservative in this area.

It is assumed that suitable propping will be provided during the construction of the basement as well as in the permanent condition, such that the walls can be considered to be stiff for the purpose of the ground movement modelling. Samples of the output movement contour plots are included within the appendix and the full outputs of all the analyses can be provided on request.

## 10.1 Ground Movements – Surrounding the Basement

The magnitude of the settlement resulting from the proposed basement construction will be controlled to a large extent by the quality of workmanship of the underpins and by the existing building that is likely to provide additional rigidity.

For the purpose of this assessment a high quality of construction has been assumed, such that potential movements are expected to be kept to a minimum.

### 10.1.1 Model Used

For the X-Disp analysis, the soil movement relationships used for the embedded retaining walls are the default values within CIRIA report C760[19], which were derived from a number of historic case studies.

#### Installation of retaining walls:

For the X-Disp analysis, the installation curves for the panel-like planar diaphragm wall have been adopted as most appropriate for the soil movement relationship for walls installed by underpinning techniques.

#### Excavation Phase:

Settlement of the soil behind the new retaining wall may occur due to the excavation in front of the wall causing the wall to deflect. For underpinning these movements are unlikely to be significant as the walls will be subject to a continued vertical loading from the structure above and will be fully propped on exposure. However, for the purpose of this X-Disp analysis, ground movement curves for 'excavation in front of stiff wall in stiff clay' have been adopted to provide a conservative assessment of any potential excavation movements from this construction technique. The cantilevered walls of the lightwells have been modelled using the ground movement curves for 'excavation in front of low stiffness wall in stiff clay' which reflect the lower stiffness of these walls.

### 10.1.2 Results

The movements predicted by X-Disp are summarised in the table below; the results are presented below and in subsequent tables to the degree of accuracy required to allow predicted variations in ground movements around the structure to be illustrated but may not reflect the anticipated accuracy of the predictions.

| Phase of Works | Wall Movement (mm) | |
|---|---|---|
| | Vertical Settlement | Horizontal Movement |
| Installation of Underpins | 1.0 to 3.0 | 1.0 to 3.0 |
| Combined Installation and Excavation Movements | 4.0 to 8.0 | 5.0 to 10.0 |

The movements set out in the table and discussed above are the maximum movements and the analysis has indicated that they occur immediately or just outside the line of the retaining walls, and also account for the likely overprediction of movements within re-entrant corners included within the model.

## 10.2 Ground Movements – Resulting from Excavation

### 10.2.1 Model Used

Unloading of the London Clay will take place as a result of the excavation of the proposed basements and the reduction in vertical stress will cause heave to take place. Undrained soil parameters have been used to estimate the potential short-term movements, which include the "immediate" or elastic movements as a result of the basement excavation. Drained parameters have been used to provide an estimate of the total long-term movement.

The elastic analysis requires values of soil stiffness at various levels to calculate displacements. Values of stiffness for the soils at this site are readily available from published data[20] and a well-established method has been used to provide estimated values. Relationships of $E_u = 750\ C_u$ and $E' = 0.75\ E_u$ for the cohesive soils have been used to obtain values of Young's modulus.

The 3.50 m deep excavation of the basement will result in a net unloading of around 70 kN/m$^2$, which will result in heave of the underlying London Clay.

The soil parameters used in this analysis and tabulated below have been derived from the onsite investigation. A rigid boundary for the analysis has been set at a depth of 88 m below ground level, which is the depth of the base of the London Clay provided by a nearby BGS archive borehole (BGS ID; 590585 / BGS Reference: TQ28 NE5) located 140 m northwest of the site.

| Stratum | Depth Range (m) | Eu (MPa) | E'(MPa) |
|---|---|---|---|
| Made Ground | GL to 1.2 | 15 | 11.25 |
| Head Deposits | 1.2 to 3.0 | 26.25 to 37.50 | 19.69 to 28.13 |
| London Clay | 3.0 to 12.0 | 37.50 to 93.75 | 438.75 to 585.0023301 |

19 Gaba, A, Hardy, S, Powrie, W, Doughty, L and Selemetas, D (2017) *Embedded retaining walls – guidance for economic design* CIRIA Report C760

20 Burland JB, Standing, JR, and Jardine, FM (2001) *Building response to tunnelling, case studies from construction of the Jubilee Line Extension.* CIRIA Special Publication 200

### 10.2.2 Results

The predicted movements are summarised in the table below; the results are presented below and in subsequent tables to the degree of accuracy required to allow predicted variations in ground movements around the structure(s) to be illustrated, but may not reflect the anticipated accuracy of the predictions. In the table below, heave movements are shown as negative.

| Location | Short-term Movement – Excavation Only | Short-term Movement – Complete Construction | Total Movement |
|---|---|---|---|
| Centre of proposed basement | -6.0 | <-2.0 | -4.00 |
| Edge of proposed basement | -1.50 to -4.50 | <-2.0 | -1.00 to -3.50 |

If a compressible material is used beneath the slab, it will need to be designed to be able to resist the potential uplift forces generated by the ground movements. In this respect, potential heave pressures are typically taken to equate to around 40% of the total unloading pressure.

# 11.0 Damage Assessment

In addition to the above assessment of the likely movements that will result from the proposed development, any neighbouring buildings within the zone of influence of the excavations are considered to be sensitive structures, requiring Building Damage Assessments, on the basis of the classification given in Table 6.4 of CIRIA report C760.

The sensitive structures outlined previously have been modelled as displacement lines in the analysis along which the damage assessment has been undertaken.

## 11.1 Damage to Neighbouring Structures

The ground movements resulting from the piling and basement excavation phases have been calculated using X-Disp modelling software to carry out an assessment of the likely damage to adjacent properties and the results are discussed below.

The building damage reports for sensitive structures highlighted above are included in the appendix and indicate that predominantly the damage to the adjoining and nearby structures due to basement construction are between damage categories 'Negligible (0)' and 'Very Slight (1)'. A summary of the structures indicated as affected is included below.

| Structure | Elevation | Category* |
|---|---|---|
| No 35 Downshire Hill | Wall 1 | Negligible (0) |
| | Wall 2 | Very Slight (1) |
| | Wall 3 | Negligible (0) |
| | Wall 4 | Less than Sensitivity Limit |
| Garden Walls | Wall 1 | Negligible (0) |
| | Wall 2 | Negligible (0) |
| No 14 Keats Grove | Wall 1 | Less than Sensitivity Limit |
| | Wall 2 | Less than Sensitivity Limit |
| | Wall 3 | Less than Sensitivity Limit |
| | Wall 4 | Less than Sensitivity Limit |

| Structure | Elevation | Category* |
|---|---|---|
| | Wall 5 | Less than Sensitivity Limit |
| | Wall 6 | Less than Sensitivity Limit |
| | Wall 7 | Less than Sensitivity Limit |
| | Wall 8 | Less than Sensitivity Limit |
| | Wall 9 | Less than Sensitivity Limit |
| | Wall 10 | Less than Sensitivity Limit |
| | Wall 11 | Less than Sensitivity Limit |

*From Table 6.4 of C760: Classification of visible damage to walls.

The results discussed above are based on individual building lines, or walls, that in some instances, have been further divided up within the analysis into a series of segments that are assumed to be able to move independently of one another, with the most critical segment determining the result for the entire wall. In reality, this is unlikely to be the case as the walls will behave as single stiff elements that are also joined continuously with the rest of the structure. Therefore, where a section of the wall has been predicted to experience damage of more than Category 1 (very slight), the segments of movement have been combined to reflect the higher stiffness of the wall and the overall damage category of the combined segments is provided in the table.

The results provide a conservative estimate of the behaviour of each of the sensitive structures and overestimate the degree of damage, although they provide a useful indication of the most critical structures within the adjoining properties that may require further assessment, as detailed below.

## 11.2 Sensitivity Analysis

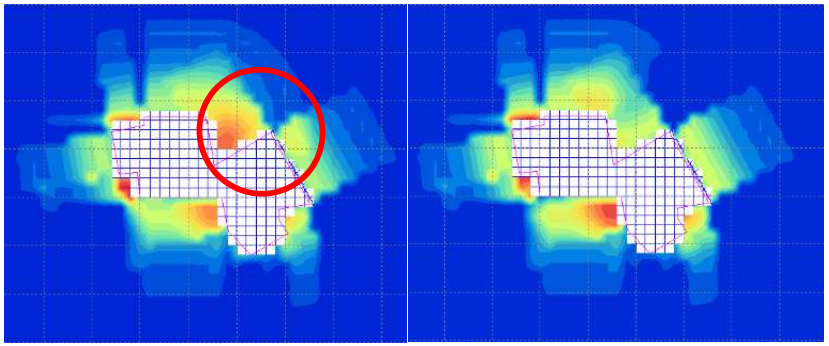
A sensitivity analysis has been carried out to determine what scale of movements would result in nearby structures experiencing damage in excess of Category 1 (very slight). The results indicate that limiting the movements resulting from the excavation to a maximum of 5 mm on the horizontal plane and 4 mm on the vertical plane will ensure damage remains within tolerable limits with the exception of a single wall of the outbuilding of No 35 Downshire Hill (Wall 2). However, it should be noted that the presence of reentrant corners has resulted in an overestimation of the movements experienced on this wall, therefore further analysis has been carried out to refine the assessment as detailed in the following section.

## 11.3 Re-entrant Corners

The geometry of the basement includes re-entrant corners. Due to limitations of the software, where re-entrant corners are included within the assessment the movements of different sections of retaining wall are added together by the software where they overlap, which can result in higher damage predictions to surrounding structures than would occur in reality.

In this case, the large re-entrant corner in the northwest of the site has been found to be causing movements through the basement excavation that are being added to the movements resulting from the other nearby retaining wall sections. This cannot occur in reality as any movements could not be translated through the open excavation as the soil will have been removed during the basement excavation. The summing of the predicted movements have resulted in larger movements being predicted for the walls of the outbuilding of No 35 Downshire Hill and the Walls to the north of the site.

Therefore, a check has been made by turning off the movements resulting from the excavation for wall section 8 (as labelled on the plan on page 18). The following images show the unrealistic movements occurring as a result of the summing of the movements causing a small plume of additional movement occurring in front of wall section 10 (within red circle) in the original analysis on the left, and the movements predicted by the additional analysis on the right.



It is clear that the uniform movements along the length of the wall in the altered analysis provides a more realistic prediction of the movements that should be anticipated following the basement construction and a check of the damage classification occurring as a result has indicated that the damage to the surrounding structures will remain within tolerable limits (Category 1 - Very Slight, or below). A full copy of the inputs and outputs for this altered analysis have been included within the appendix. The other plumes of movement resulting from reentrant corners have been ignored as they were found to not have an affect on the building damage assessment due to the distance and orientation of the surrounding structures.

### 11.4 Monitoring of Ground Movements

The predictions of ground movement based on the ground movement analysis should be checked by monitoring of the adjacent properties and structures. The structures to be monitored during the construction stages should include the existing property and the neighbouring structures assessed above. Condition surveys of the above existing structures should be carried out before and after the proposed works.

The precise monitoring strategy will be developed at a later stage, and it will be subject to discussions and agreements with the owners of the adjacent properties and structures. Contingency measures will be implemented if movements of the adjacent structures exceed predefined trigger levels. Both contingency measures and trigger levels will need to be developed within a future monitoring specification for the works.

## 12.0 GMA Conclusions

The analysis has concluded that the predicted damage to the neighbouring properties from the construction of the proposed basements would be 'Negligible' to 'Very Slight'.

On this basis, the damage that has been predicted to occur as a result of the construction the proposed basement falls within the limits acceptable to the London Borough of Camden assuming that the careful control is taken during construction of the proposed excavations, and monitoring will be required to ensure that no excessive movements occur that would lead to damage in excess of these limits.

The separate phases of work, including piling and subsequent excavation of the proposed basement, will in practice be separated by a number of weeks. This will provide an opportunity for the ground movements during and immediately after installation of the retaining walls to be measured and the data acquired can be fed back into the design and compared with the predicted values. Such a comparison will allow the ground model to be reviewed and the predicted wall movements to be reassessed prior to the main excavation taking place so that propping arrangements can be adjusted if required.

# Part 4: Basement Impact Assessment

This section of the report evaluates the direct and indirect implications of the proposed project, based on the findings of the previous screening and scoping, site investigation and ground movement assessment.

## 13.0 Introduction

The screening identified a number of potential impacts. The desk study and ground investigation information has been used below to review the potential impacts, to assess the likelihood of them occurring and the scope for reasonable engineering mitigation.

### 13.1 Potential Impacts

The table below summarises the previously identified potential impacts and the additional information that is now available from the ground investigation in consideration of each impact.

| Potential Impact | Consequence |
|---|---|
| The site does include slopes greater than 7°. | The slope stability will need to be ensured during the works. |
| The site does neighbour land with a slope greater than 7°. | The slope stability will need to be ensured during the works. |
| The site is within a wider hillside setting in which the general slope is greater than 7°. | The slope stability will need to be ensured during the works. |
| London Clay is the shallowest stratum at the site. | The London Clay is prone to seasonal shrink-swell (subsidence and heave). |
| Seasonal shrink-swell can result in foundation movements. | The London Clay is prone to seasonal shrink-swell and can cause structural damage. Desiccation was not noted during the fieldwork. |
| The basement will increase the foundation depths relative to the neighbouring properties. | The stability of neighbouring structures will need to be ensured throughout the development. A ground movement analysis is proposed to predict the likely movements as a result of the excavation. |
| A tree will be removed as part of the basement development. | The removal of a tree could cause swelling of the ground where cohesive soils are present, which could impact the stability of neighbouring structures within the zone of influence of the tree. |

The results of the site investigation have therefore been used below to review the remaining potential impacts, to assess the likelihood of them occurring and the scope for reasonable engineering mitigation.

*The site does include slopes greater than 7°, neighbours land with a slope greater than 7° and is within a wider hillside setting in which the general slope is greater than 7°.*

The stability of all slopes will need to be considered in the temporary works design and ensured throughout the duration of the works.

*London Clay is the shallowest strata / Seasonal Shrink-Swell*

Subject to inspection of excavations in the normal way to ensure that there is not significant unexpectedly deep root growth, it is not considered that the occurrence of shrink-swell issues in the local area has any bearing on the proposed development.

*Increase in foundation depths relative to neighbours*

The proposed development will increase the depth of the footings with respect to the neighbours such that the development has the potential to cause damage to those structures. A ground movement assessment has been carried out which indicates that damage will remain within acceptable limits.

*Removal of a tree as part of the development*

It is proposed to remove a single Wild Cherry tree of 7 m in height. Wild Cherry is known to have a moderate water demand and reference to NHBC guidance indicates that the zone of influence for the tree would be a circle of 5.25 m radius. There are no potentially sensitive structures located within this area, with only fences being present. Therefore the removal of the tree will not impact any of the neighbouring structures.

## 13.2 BIA Conclusions

A Basement Impact Assessment has been carried out following the information and guidance published by the London Borough of Camden.

It is concluded that the proposed development is unlikely to result in any specific land or slope stability issues.

## 13.3 Non-Technical Summary of Evidence

This section provides a short summary of the evidence acquired and used to form the conclusions made within the BIA.

### 13.3.1 Screening

The following table provides the evidence used to answer the subterranean (groundwater flow) screening questions.

| Question | Evidence |
|---|---|
| 1a. Is the site located directly above an aquifer? | Aquifer designation maps acquired from the Environment Agency as part of the desk study and Figures 3, 5 and 8 of the Arup report. |
| 1b. Will the proposed basement extend beneath the water table surface? | Previous nearby GEA investigations and BGS archive borehole records. |
| 2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line? | Topographical and historical maps acquired as part of the desk study, reference to the Lost Rivers of London and Figures 11 and 12 of the Arup report. |
| 3. Is the site within the catchment of the pond chains on Hampstead Heath? | Figures 12 and 14 of the Arup report |
| 4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas? | A site walkover and existing plans of the site have confirmed the proportions of hardstanding and soft landscaping, which have been compared to the proposed drawings to determine the changes in the proportions. |
| 5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)? | The details of the proposed development do not indicate the use of soakaway drainage. |
| 6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line? | Topographical maps acquired as part of the desk study and Figures 11 and 12 of the Arup report. |

The following table provides the evidence used to answer the slope stability screening questions.

| Question | Evidence |
|---|---|
| 1. Does the existing site include slopes, natural or manmade, greater than 7°? | Topographical maps and Figures 16 and 17 of the Arup report and confirmed during a site walkover |
| 2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°? | The details of the proposed development provided do not include the re-profiling of the site to create new slopes |
| 3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°? | Topographical maps and Figures 16 and 17 of the Arup report |
| 4. Is the site within a wider hillside setting in which the general slope is greater than 7°? | |
| 5. Is the London Clay the shallowest strata at the site? | Geological maps and Figures 3, 5 and 8 of the Arup report |
| 6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained? | The details of the proposed development. |
| 7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site? | Knowledge on the ground conditions of the area and reference to NHBC guidelines were used to make an assessment of this, in addition to a visual inspection of the buildings carried out during the site walkover. |
| 8. Is the site within 100 m of a watercourse or potential spring line? | Topographical maps acquired as part of the desk study and Figures 11 and 12 of the Arup report |
| 9. Is the site within an area of previously worked ground? | Geological maps and Figures 3, 5 and 8 of the Arup report |
| 10. Is the site within an aquifer? | Aquifer designation maps acquired from the Environment Agency as part of the desk study and Figures 3, 5 and 8 of the Arup report. |

| Question | Evidence |
|---|---|
| 11. Is the site within 50 m of Hampstead Heath ponds? | Topographical maps acquired as part of the desk study and Figures 12 and 14 of the Arup report |
| 12. Is the site within 5 m of a highway or pedestrian right of way? | Site plans and the site walkover. |
| 13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties? | Camden planning portal and the site walkover confirmed the position of the proposed basement relative the neighbouring properties. |
| 14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines? | Maps and plans of infrastructure tunnels were reviewed. |

The following table provides the evidence used to answer the surface water flow and flooding screening questions.

| Question | Evidence |
|---|---|
| 1. Is the site within the catchment of the pond chains on Hampstead Heath? | Topographical maps acquired as part of the desk study and Figures 12 and 14 of the Arup report |
| 2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route? | A site walkover confirmed the current site conditions and the details provided on the proposed development. |
| 3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas? | |
| 4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses? | |
| 5. Will the proposed basement result in changes to the quantity of surface water being received by adjacent properties or downstream watercourses? | |
| 6. Is the site in an area known to be at risk from surface water flooding such as South Hampstead, West Hampstead, Gospel Oak and Kings Cross, or is it at risk of flooding because the proposed basement is below the static water level of a nearby surface water feature? | Flood risk maps acquired from the Environment Agency as part of the desk study, Figure 15 of the Arup report, the Camden Flood Risk Management Strategy dated 2013 and the North London Strategic Flood Risk Assessment dated 2008, and reference to the site specific FRA. |

### 13.3.2 Scoping and Site Investigation

The questions in the screening stage that were answered 'yes', were taken forward to a scoping stage and the potential impacts discussed in Section 4.0 of this report, with reference to the possible impacts outlined in the Arup report.

A ground investigation has been carried out, which has allowed an assessment of the potential impacts of the basement development on the various receptors identified from the screening and scoping stages. Principally the investigation aimed to establish the ground conditions, including the groundwater level, the engineering properties of the underlying soils to enable suitable design of the basement development and the configuration of existing party wall foundations. The findings of the investigation are discussed in Section 5.0 of this report and summarized in both Section 7.0 and the Executive Summary.

### 13.3.3 Impact Assessment

Section 14.0 of this report summarises whether, on the basis of the findings of the investigation, the potential impacts still need to be given consideration and identifies ongoing risks that will require suitable engineering mitigation. Section 9.0 of this report also provides recommendations for the design of the proposed development.

A ground movement analysis and building damage assessment has been carried out and its findings are presented in Part 3.

# 14.0 Outstanding Risks & 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 may 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.

As discussed throughout the report, perched water is likely to be encountered during the basement excavation, although the finding of the investigation indicate that potential inflows are unlikely to be significant and should be adequately dealt with through sump pumping. However, groundwater monitoring should be continued, and trial excavations should be considered to assess the extent of inflows to be expected within the proposed basement excavations.

The investigation has not identified the presence of any significant contamination and as the some of the made ground will be removed from this site through the excavation of the proposed basement and large areas are covered by hardstanding, remedial measures should not be required, other than where areas of soft landscaping are to be formed. However, as with any site there is a potential for further areas of contamination to be present within the made ground beneath parts of the site not covered by the investigation it is recommended that a watching brief is maintained during any groundworks for the proposed new foundations and that if any suspicious soils are encountered that they are inspected by a geoenvironmental engineer and further assessment may be required.

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.

# Appendix

## a. Field Work

Site Plan
Borehole Records

## b. Lab Testing

Geotechnical Test Results
SPT & Cohesion/Depth Graph
Chemical Test Results
Generic Risk Based Screening Values

## c. Desk Study

Envirocheck Extracts
Historical Maps
UXO Preliminary Risk Assessment

## d. Ground Movement Analysis

PDisp Analysis – Excavation Movements
PDisp Analysis – Short Term Movements
PDisp Analysis – Total Movements
PDisp Analysis – All Input and Output Data

XDisp Analysis – Installation Movements
XDisp Analysis – Installation & Excavation Movements
PDisp Analysis – All Input and Output Data

# appendix a

## Field Work

Site Plan
Borehole Records

appendix a

GEA

GEA

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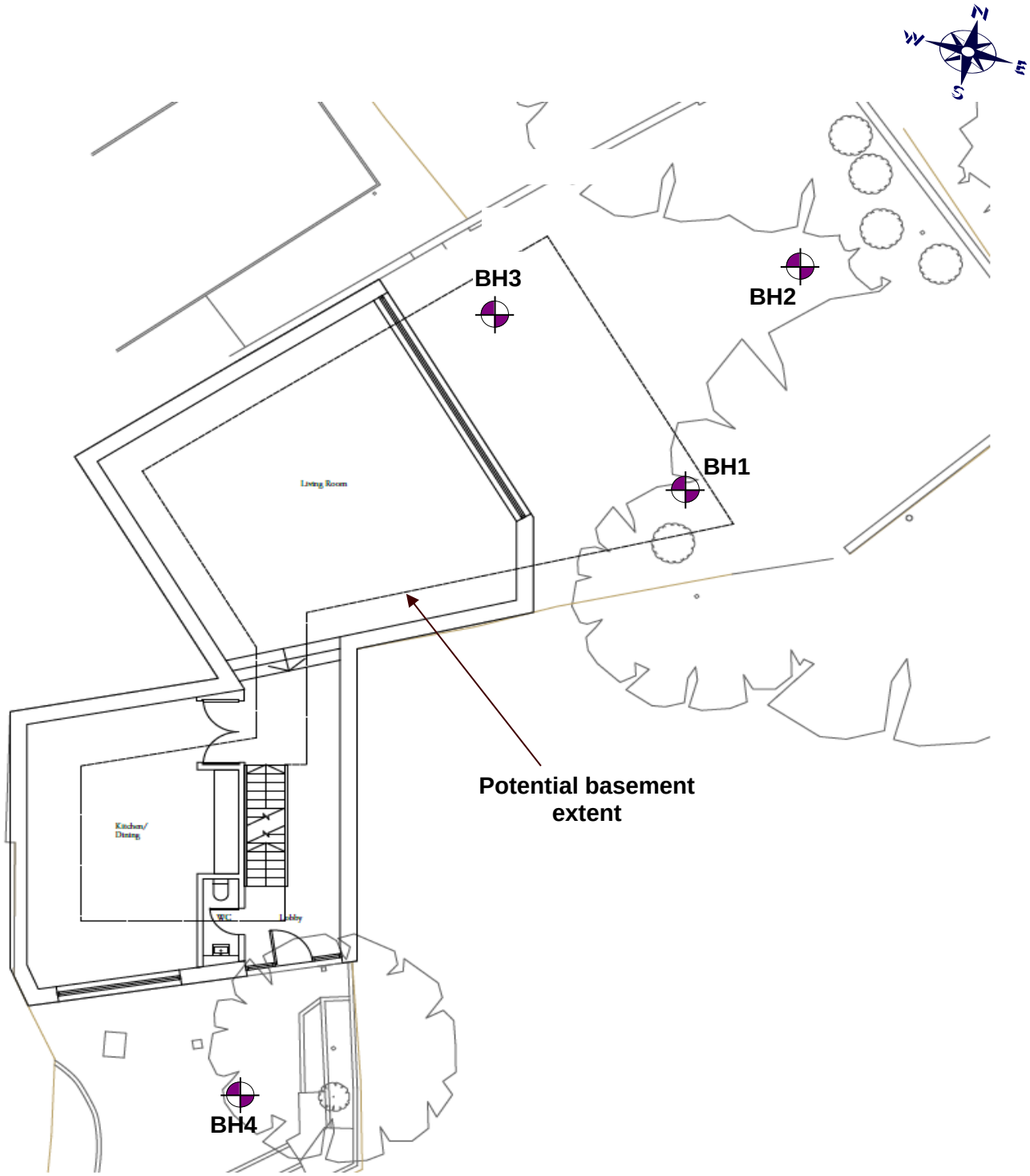
# Site Plan

| | |
|---|---|
| **Site** | 14A Keats Grove, London NW3 |
| **Client** | Naomi Tesler & Alex Ziff |
| **Engineer** | Enginuiti |

**Job Number** J21141

**Sheet** 1 / 1




0 5 10 15

Approximate Scale in metres

GEA

Geotechnical & Environmental Associates

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| 14A Keats Grove, London NW3 2RS | | | | **BH1** |
| Job No | Date | Ground Level (m OD) | Co-Ordinates () | |
| J21141 | 01-07-21 | 67.53 | | |
| **Client** | | Engineer | | Sheet |
| Naomi Testler and Alex Ziff | | Engenuiti | | 1 of 2 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Instrument / Backfill |
|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | |
| 0.50 | D | | | | | (1.10) | Turf over MADE GROUND (dark brown sandy gravelly clay with fragments of brick, concrete, flint and ceramic tile) | |
| | | | | 66.43 | | 1.10 | | |
| 1.20 | D | 2,2/2,2,1,1<br>N60 = 6<br>PP = 1.5 | | 66.23 | | 1.30 | Soft becoming firm brown very sandy very gravelly CLAY | |
| 1.70 | D | PP = 1.5<br>PP = 1.5 | | | | | Firm fissured brown mottled grey silty CLAY with sandy lenses and selenite crystals. Rootlets to a depth of 2.0 m | |
| 2.20 | D | 1,3/2,2,3,2<br>N60 = 9<br>PP = 2 | | | | | | |
| 2.70 | D | PP = 1.5<br>PP = 1.5 | | | | | | |
| 3.20 | D | 1,2/2,2,3,3<br>N60 = 10<br>PP = 1.5 | | | | | 3.00 ... becoming stiff | |
| 3.70 | D | PP = 2<br>PP = 1.5 | | | | | | |
| 4.20 | D | PP = 2.25<br>1,1/2,2,3,3<br>N60 = 10 | | | | | | |
| 4.70 | D | PP = 2<br>PP = 2<br>PP = 2.25 | | | | | | |
| 5.20 | D | 2,2/3,3,4,5<br>N60 = 16<br>PP = 3 | | | | | | |
| | | PP = 1.5<br>PP = 2.5 | | | | | | |
| 6.20 | D | 2,2/3,3,4,4<br>N60 = 15<br>PP = 2.5 | | | | | | |
| | | | | | | (11.15) | | |
| 7.20 | D | 1,3/4,4,5,5<br>N60 = 19 | | | | | | |
| 8.20 | D | 3,4/4,5,6,6<br>N60 = 22 | | | | | | |
| 9.20 | D | 3,4/4,5,6,7<br>N60 = 23 | | | | | | |
| | | | | | | | 9.80 ... becoming greyish brown | |

| Boring Progress and Water Observations | | | | | |
|---|---|---|---|---|---|
| Depth | Date | Time | Casing Depth | Casing Dia. mm | Water Depth |
| | | | | | |

**GENERAL REMARKS**

Inspection pit dug to 1.20 m
Groundwater not encountered
Standpipe installed to 4.00 m
PP = Pocket penetrometer result

| All dimensions in metres<br>Scale 1:62.5 | Method/ Plant Used Opendrive sampling rig (dismantlable) | Logged By GC |
|---|---|---|

Report ID: CABLE PERCUSSION || Project: J21141 - 14A KEATS GROVE.GPJ || Library: GEA LIBRARY.GLB || Date: 26 August 2021

GEA

Geotechnical & Environmental Associates

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| 14A Keats Grove, London NW3 2RS | | | | **BH1** |
| Job No | Date | Ground Level (m OD) | Co-Ordinates () | |
| J21141 | 01-07-21 | 67.53 | | |
| **Client** | | Engineer | | Sheet |
| Naomi Testler and Alex Ziff | | Engenuiti | | 2 of 2 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Instrument / Backfill |
|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | |
| 10.20 | D | 4,5/5,6,7,8 N60 = 27 | | | | | Firm fissured brown mottled grey silty CLAY with sandy lenses and selenite crystals. Rootlets to a depth of 2.0 m(continued) | |
| 11.20 | D | 4,5/5,6,7,8 N60 = 27 | | | | | | |
| | | 4,5/5,6,8,7 N60 = 27 | | 55.08 | | 12.45 | | |

**Boring Progress and Water Observations**

| Depth | Date | Time | Casing Depth | Casing Dia. mm | Water Depth |
|---|---|---|---|---|---|
| | | | | | |

**GENERAL REMARKS**

Inspection pit dug to 1.20 m
Groundwater not encountered
Standpipe installed to 4.00 m
PP = Pocket penetrometer result

| All dimensions in metres Scale 1:62.5 | Method/ Plant Used Opendrive sampling rig (dismantlable) | Logged By GC |
|---|---|---|

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GEA

Geotechnical & Environmental Associates

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| 14A Keats Grove, London NW3 2RS | | | | **BH2** |
| Job No | Date | Ground Level (m OD) | Co-Ordinates () | |
| J21141 | 01-07-21 | 67.10 | | |
| **Client** | | Engineer | | Sheet |
| Naomi Testler and Alex Ziff | | Engenuiti | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Instrument / Backfill |
|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | |
| | | | | | | (1.30) | Turf over MADE GROUND (dark brown sandy gravelly clay with fragments of brick, concrete, flint, glass and clinker with rootlets) | |
| | | 1,1/1,2,2,2 N60 = 7 PP = 1 | | 65.80 | | 1.30 | | |
| 1.50 | D | PP = 1.5 | | | | | Soft brown sandy gravelly CLAY with rootlets | |
| | | 1,2/3,2,3,3 N60 = 11 PP = 1.5 | | | | (1.90) | 1.80 ... becoming firm<br>1.90 ... pocket of flint gravel<br>2.10 ... pocket of flint gravel | |
| 2.50 | D | PP = 1.5 PP = 1.5 PP = 2 | | | | | 2.60 ... pocket of flint gravel | |
| | | 2,3/3,3,3,3 N60 = 12 | | 63.90 | | 3.20 | 3.10 ... pocket of flint gravel | |
| 3.50 | D | PP = 2.5 PP = 2.25 PP = 2 | | | | | Stiff fissured brown mottled grey silty CLAY with selenite crystals and sandy lenses | |
| | | 2,2/2,3,2,2 N60 = 9 | | | | (2.25) | | |
| 4.50 | D | PP = 2.5 PP = 3.5 PP = 2 | | | | | | |
| | | 2,3/3,4,3,3 N60 = 13 PP = 2 | | 61.65 | | 5.45 | | |

| Boring Progress and Water Observations | | | | | |
|---|---|---|---|---|---|
| Depth | Date | Time | Casing Depth | Casing Dia. mm | Water Depth |
| | | | | | |

GENERAL REMARKS

Inspection pit dug to 1.20 m
Groundwater not encountered
PP = Pocket penetrometer result

| All dimensions in metres Scale 1:62.5 | Method/ Plant Used Opendrive sampling rig (dismantlable) | Logged By GC |
|---|---|---|

Report ID: CABLE PERCUSSION || Project: J21141 - 14A KEATS GROVE.GPJ || Library: GEA LIBRARY.GLB || Date: 26 August 2021

GEA

Geotechnical & Environmental Associates

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| 14A Keats Grove, London NW3 2RS | | | | **BH3** |
| Job No | Date | Ground Level (m OD) | Co-Ordinates () | |
| J21141 | 02-07-21 | 67.60 | | |
| **Client** | Engineer | | | Sheet |
| Naomi Testler and Alex Ziff | Engenuiti | | | 1 of 1 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Instrument / Backfill |
|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | |
| | | | | 67.55 | | 0.05 | Paving slab | |
| | | | | 67.50 | | 0.10 | MADE GROUND (yellow sand) | |
| 0.50 | D | | | | | (0.90) | MADE GROUND (dark brown sandy gravelly clay with fragments of brick, concrete, flint, charcoal and clinker with rootlets) | |
| | | | | 66.60 | | 1.00 | | |
| | | 1,1/2,1,2,1<br>N60 = 6<br>PP = 1 | | | | | Soft brown mottled grey silty sandy slightly gravelly CLAY with sandy lenses and rootlets | |
| 1.50 | D | PP = 1 | | | | (1.40) | | |
| | | PP = 1<br>1,1/2,3,2,3<br>N60 = 10 | | | | | 1.90 ... pocket of flint gravel | |
| | | | | 65.20 | | 2.40 | | |
| 2.50 | D | PP = 1.5<br>PP = 1.75<br>PP = 1.75 | | | | | High strength stiff fissured brown mottled grey silty CLAY with selenite crystals and sandy lenses | |
| | | 1,2/2,2,2,3<br>N60 = 9<br>PP = 1.5 | | | | | | |
| 3.50 | D | PP = 2.5<br>PP = 1.5<br>PP = 1.5 | | | | (3.05) | | |
| | | PP = 1.5 | | | | | | |
| 4.50 | D | PP = 1.5 | | | | | | |
| | | PP = 2.5 | | | | | | |
| 5.00-5.45 | U | 32 blows | | | | | | |
| | | | | 62.15 | | 5.45 | | |

**Boring Progress and Water Observations**

| Depth | Date | Time | Casing Depth | Casing Dia. mm | Water Depth |
|---|---|---|---|---|---|
| | | | | | |

**GENERAL REMARKS**

Inspection pit dug to 1.20 m
Groundwater not encountered
Standpipe installed to 5.00 m
PP = Pocket penetrometer result

| All dimensions in metres<br>Scale 1:62.5 | Method/ Plant Used Opendrive sampling rig (dismantlable) | Logged By GC |
|---|---|---|

Report ID: CABLE PERCUSSION || Project: J21141 - 14A KEATS GROVE.GPJ || Library: GEA LIBRARY.GLB || Date: 26 August 2021

GEA

Geotechnical & Environmental Associates

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| 14A Keats Grove, London NW3 2RS | | | | **BH4** |
| Job No | Date | Ground Level (m OD) | Co-Ordinates () | |
| J21141 | 02-07-21 | 68.15 | | |
| **Client** | Engineer | | | Sheet |
| Naomi Testler and Alex Ziff | Engenuiti | | | 1 of 2 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Instrument / Backfill |
|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | |
| | | | | 68.10 | | 0.05 | Paving slab | |
| | | | | 68.05 | | 0.10 | MADE GROUND (yellow sand) | |
| 0.50 | D | | | | | (1.10) | MADE GROUND (dark brown sandy gravelly clay with fragments of brick, concrete, flint, slate, charcoal, clinker with rootlets) | |
| | | 1,1/2,1,2,1 N60 = 6 | | 66.95 | | 1.20 | | |
| | | PP = 1 | | | | | Firm brown mottled orange-brown and grey silty slightly sandy gravelly CLAY with sandy lenses and rootlets | |
| 1.50 | D | PP = 1.75 | | | | | 1.60 ... pocket of flint gravel | |
| | | PP = 1.5 | | | | (1.80) | | |
| | | PP = 1.5 | | | | | | |
| 2.50 | D | PP = 1.5 | | | | | | |
| | | PP = 1.75 | | 65.15 | | 3.00 | | |
| | | 1,1/1,2,2,3 N60 = 8 | | | | | 2.90 ... pocket of flint gravel | |
| | | PP = 1.75 | | | | | Medium becoming high strength stiff fissured brown mottled grey silty CLAY with sandy lenses and selenite crystals | |
| 3.50 | D | PP = 2 | | | | | | |
| | | PP = 2.5 | | | | | | |
| 4.00-4.45 | U | 31 blows PP = 3 | | | | | | |
| | | 1,2/3,3,4,4 N60 = 15 | | | | | | |
| 5.50 | D | | | | | | | |
| 6.00-6.45 | U | 34 blows | | | | | | |
| 6.50 | D | | | | | (7.45) | | |
| | | 2,3/2,4,5,5 N60 = 17 | | | | | | |
| 7.50 | D | | | | | | | |
| | | 2,3/3,4,5,5 N60 = 18 | | | | | | |
| 8.50 | D | | | | | | | |
| | | 3,4/5,4,5,6 N60 = 21 | | | | | | |
| 9.50 | D | | | | | | 9.50 ... becoming greyish brown | |

**Boring Progress and Water Observations**

| Depth | Date | Time | Casing Depth | Casing Dia. mm | Water Depth |
|---|---|---|---|---|---|
| | | | | | |

**GENERAL REMARKS**

Inspection pit dug to 1.20 m
Groundwater not encountered
Standpipe installed to 5.00 m
PP = Pocket penetrometer result

| All dimensions in metres Scale 1:62.5 | Method/ Plant Used Opendrive sampling rig (dismantlable) | Logged By GC |
|---|---|---|

Report ID: CABLE PERCUSSION || Project: J21141 - 14A KEATS GROVE.GPJ || Library: GEA LIBRARY.GLB || Date: 26 August 2021

GEA

Geotechnical & Environmental Associates

| Project | | | | BOREHOLE No |
|---|---|---|---|---|
| 14A Keats Grove, London NW3 2RS | | | | **BH4** |
| Job No | Date | Ground Level (m OD) | Co-Ordinates () | |
| J21141 | 02-07-21 | 68.15 | | |
| **Client** | | Engineer | | Sheet |
| Naomi Testler and Alex Ziff | | Engenuiti | | 2 of 2 |

| SAMPLES & TESTS | | | Water | STRATA | | | | Instrument / Backfill |
|---|---|---|---|---|---|---|---|---|
| Depth | Type No | Test Result | | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION | |
| | | 3,5/5,4,5,5<br>N60 = 20 | | 57.70 | | 10.45 | | |

**Boring Progress and Water Observations**

| Depth | Date | Time | Casing Depth | Casing Dia. mm | Water Depth |
|---|---|---|---|---|---|
| | | | | | |

**GENERAL REMARKS**

Inspection pit dug to 1.20 m
Groundwater not encountered
Standpipe installed to 5.00 m
PP = Pocket penetrometer result

| All dimensions in metres<br>Scale 1:62.5 | Method/ Plant Used Opendrive sampling rig (dismantlable) | Logged By GC |
|---|---|---|

Report ID: CABLE PERCUSSION || Project: J21141 - 14A KEATS GROVE.GPJ || Library: GEA LIBRARY.GLB || Date: 26 August 2021

# appendix b

## Lab Testing

Geotechnical Test Results
SPT & Cohesion/Depth Graph
Chemical Test Results
Generic Risk Based Screening Values

# SUMMARY OF GEOTECHNICAL TESTING

| Sample details | | | | | Classification Tests | | | | | Density Tests | | Undrained Triaxial Compression | | | | Chemical Tests | | | Other tests and comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Depth (m) | Sample Ref | Type | Description | WC % | LL % | PL % | PI % | <425 µm % | Bulk Mg/m³ | Dry Mg/m³ | Condition | 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 | | D | Orangish brown mottled brownish grey sandy clayey GRAVEL. | 10.1 | 69 | 24 | 45 | 22 | | | | | | | | | | |
| BH1 | 2.20 | | D | Brown mottled greyish brown silty CLAY with rare gypsum. | 31.3 | 78 | 27 | 51 | 100 | | | | | | | | | | |
| BH1 | 5.20 | | D | | | | | | | | | | | | | 7.9 | 0.55 | | |
| BH1 | 6.20 | | D | Brown mottled greyish brown silty CLAY with rare gypsum. | 31.2 | 69 | 26 | 43 | 100 | | | | | | | | | | |
| BH2 | 4.50 | | D | Greyish brown and grey silty CLAY with rare gypsum. | 31.4 | 80 | 27 | 53 | 100 | | | | | | | | | | |
| BH3 | 1.50 | | D | Orangish brown mottled greyish brown gravelly silty CLAY. | 18.3 | 76 | 23 | 53 | 54 | | | | | | | 8.5 | < 0.010 | | |
| BH3 | 5.00 | | U | Stiff brown CLAY | 33.0 | | | | | 1.87 | 1.40 | Undisturbed | 100 | 167 | 83 | | | | |
| BH4 | 4.00 | | U | Stiff dark brown mottled grey CLAY. | 33.6 | | | | | 1.85 | 1.38 | Undisturbed | 80 | 105 | 52 | | | | |
| BH4 | 6.00 | | U | Stiff brown mottled grey CLAY | 32.4 | | | | | 1.81 | 1.37 | Undisturbed | 120 | 143 | 72 | | | | |
| BH4 | 7.50 | | D | | | | | | | | | | | | | 8.1 | 0.45 | | |

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

Checked and Approved by

S Burke

S Burke - Senior Technician
30/07/2021

Project Number:

**GEO / 33543**

Project Name:

**KEATS GROVE**
**J21141**

GEOLABS®

# SUMMARY OF GEOTECHNICAL TESTING

| Sample details | | | | | Classification Tests | | | | | Density Tests | | Undrained Triaxial Compression | | | | Chemical Tests | | | Other tests and comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Depth (m) | Sample Ref | Type | Description | WC % | LL % | PL % | PI % | <425 µm % | Bulk Mg/m³ | Dry Mg/m³ | Condition | Cell Pressure kPa | Deviator Stress kPa | Shear Stress kPa | pH | 2:1 W/S SO4 g/L | W/S Mg mg/L | |
| BH4 | 8.50 | | D | Brownish grey silty CLAY with rare gypsum. | 25.7 | 63 | 25 | 38 | 100 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

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

Checked and Approved by

S Burke

S Burke - Senior Technician
30/07/2021

Project Number:

**GEO / 33543**

Project Name:

**KEATS GROVE**
**J21141**

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BS EN ISO 17892-8 : 2018

# UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

| | |
|---|---|
| Location | BH3 |
| Depth (m) | 5.00 |
| Sample Type | U |

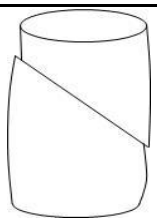
Description:

Stiff brown CLAY

**Specimen Details**

| | | |
|---|---|---|
| Specimen conditions | | Undisturbed |
| Length | (mm) | 139.0 |
| Diameter | (mm) | 69.5 |
| Moisture content | (%) | 33.0 |
| Bulk density | (Mg/m³) | 1.87 |
| Dry density | (Mg/m³) | 1.40 |
| **Test Details** | | |
| Latex membrane thickness | (mm) | 0.3 |
| Specimen height prior to shearing | (mm) | 139.0 |
| Membrane correction | (kPa) | 0.5 |
| Mean rate of shear | (%/min) | 1.4 |
| Cell pressure | (kPa) | 100 |
| Strain at failure | (%) | 4.7 |
| Maximum deviator stress | (kPa) | 167 |
| Shear Stress Cu | (kPa) | 83 |

**Mode of failure**



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

Tested by SB
Checked and Approved by

S Burke - Senior Technician
30/07/2021

Project Number:

**GEO / 33543**

Project Name:

**KEATS GROVE**
**J21141**

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# UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

| | |
|---|---|
| Location | BH4 |
| Depth (m) | 4.00 |
| Sample Type | U |

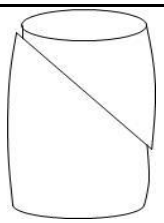
Description:

Stiff dark brown mottled grey CLAY.

**Specimen Details**

| | | |
|---|---|---|
| Specimen conditions | | Undisturbed |
| Length | (mm) | 139.3 |
| Diameter | (mm) | 69.7 |
| Moisture content | (%) | 33.6 |
| Bulk density | (Mg/m³) | 1.85 |
| Dry density | (Mg/m³) | 1.38 |
| **Test Details** | | |
| Latex membrane thickness | (mm) | 0.3 |
| Specimen height prior to shearing | (mm) | 139.3 |
| Membrane correction | (kPa) | 0.7 |
| Mean rate of shear | (%/min) | 2.9 |
| Cell pressure | (kPa) | 80 |
| Strain at failure | (%) | 6.5 |
| Maximum deviator stress | (kPa) | 105 |
| Shear Stress Cu | (kPa) | 52 |

**Mode of failure**



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

Tested by SB
Checked and Approved by

S Burke - Senior Technician
30/07/2021

Project Number:

**GEO / 33543**

Project Name:

**KEATS GROVE**
**J21141**

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# UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

| | |
|---|---|
| Location | BH4 |
| Depth (m) | 6.00 |
| Sample Type | U |

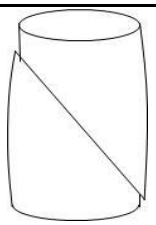
Description:

Stiff brown mottled grey CLAY

**Specimen Details**

| | | |
|---|---|---|
| Specimen conditions | | Undisturbed |
| Length | (mm) | 139.8 |
| Diameter | (mm) | 70.5 |
| Moisture content | (%) | 32.4 |
| Bulk density | (Mg/m³) | 1.81 |
| Dry density | (Mg/m³) | 1.37 |
| **Test Details** | | |
| Latex membrane thickness | (mm) | 0.3 |
| Specimen height prior to shearing | (mm) | 139.8 |
| Membrane correction | (kPa) | 0.4 |
| Mean rate of shear | (%/min) | 1.4 |
| Cell pressure | (kPa) | 120 |
| Strain at failure | (%) | 3.2 |
| Maximum deviator stress | (kPa) | 143 |
| Shear Stress Cu | (kPa) | 72 |

**Mode of failure**



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

Tested by SB
Checked and Approved by

S Burke

S Burke - Senior Technician
30/07/2021

Project Number:

**GEO / 33543**

Project Name:

**KEATS GROVE**
**J21141**

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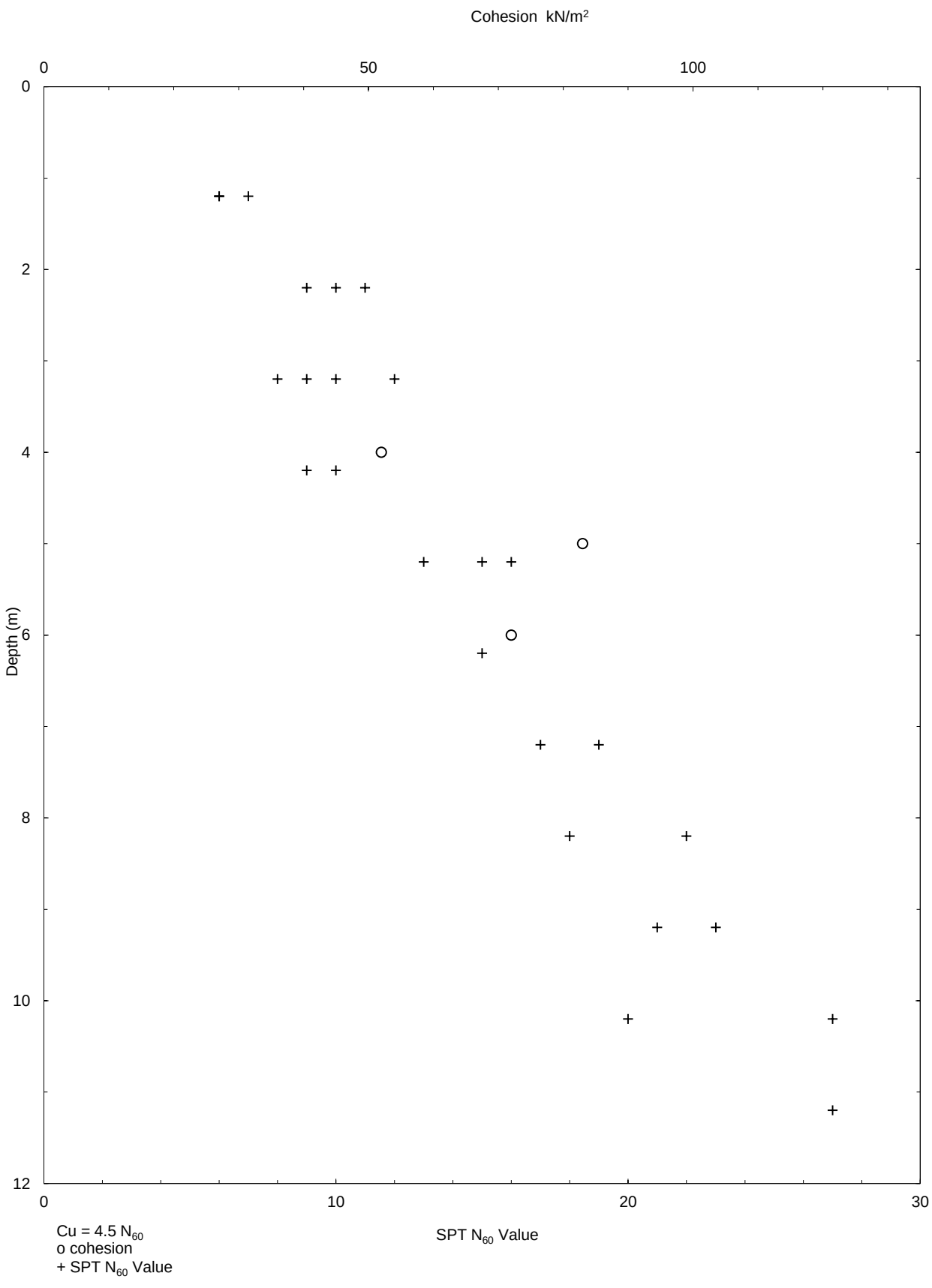
# SPT & Cohesion / Depth Graph

| | |
|---|---|
| **Site** | 14A Keats Grove, London NW3 2RN |
| **Client** | Naomi Testler and Alex Ziff |
| **Engineer** | Enginuiti |

**Job Number** J21141

**Sheet** 1 / 1



**George Clifton**
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WD18 8YS

**t:** 01923 225404
**f:** 01923 237404
**e:** reception@i2analytical.com

# Analytical Report Number : 21-85035

| | | | |
|---|---|---|---|
| **Project / Site name:** | Keats Grove | **Samples received on:** | 05/07/2021 |
| **Your job number:** | J21141 | **Samples instructed on/ Analysis started on:** | 05/07/2021 |
| **Your order number:** | | **Analysis completed by:** | 12/07/2021 |
| **Report Issue Number:** | 1 | **Report issued on:** | 13/07/2021 |
| **Samples Analysed:** | 3 soil samples | | |

**Signed:** A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

**Analytical Report Number: 21-85035**
**Project / Site name: Keats Grove**

| **Lab Sample Number** | | | | 1927037 | 1927038 | 1927039 |
|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH4 | BH1 | BH3 |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied |
| **Depth (m)** | | | | 0.50 | 0.50 | 0.50 |
| **Date Sampled** | | | | 02/07/2021 | 01/07/2021 | 02/07/2021 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | 0.01 | NONE | 11 | 14 | 12 |
| Total mass of sample received | kg | 0.001 | NONE | 1.1 | 1.1 | 1.1 |
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected |
| **General Inorganics** | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 9.2 | 8.6 | 8.1 |
| Total Cyanide | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| Total Sulphate as SO4 | mg/kg | 50 | MCERTS | 990 | 630 | 830 |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | g/l | 0.00125 | MCERTS | 0.075 | 0.021 | 0.030 |
| Sulphide | mg/kg | 1 | MCERTS | 14 | < 1.0 | < 1.0 |
| Water Soluble Chloride (2:1) | mg/kg | 1 | MCERTS | 17 | 4.0 | 11 |
| Total Organic Carbon (TOC) | % | 0.1 | MCERTS | 1.5 | 1.9 | 1.8 |
| **Total Phenols** | | | | | | |
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| **Speciated PAHs** | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | 0.43 | 0.27 | 0.57 |
| Anthracene | mg/kg | 0.05 | MCERTS | 0.10 | < 0.05 | < 0.05 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | 1.2 | 0.68 | 1.4 |
| Pyrene | mg/kg | 0.05 | MCERTS | 1.0 | 0.63 | 1.1 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | 0.82 | 0.62 | 0.78 |
| Chrysene | mg/kg | 0.05 | MCERTS | 0.53 | 0.50 | 0.66 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | 0.71 | 0.73 | 0.78 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | 0.40 | 0.29 | 0.46 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | 0.74 | 0.78 | 0.77 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.39 | 0.42 | 0.40 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | 0.42 | 0.45 | 0.48 |
| **Total PAH** | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 6.73 | 5.37 | 7.37 |

**Analytical Report Number: 21-85035**
**Project / Site name: Keats Grove**

| Lab Sample Number | | | | 1927037 | 1927038 | 1927039 |
|---|---|---|---|---|---|---|
| **Sample Reference** | | | | BH4 | BH1 | BH3 |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied |
| **Depth (m)** | | | | 0.50 | 0.50 | 0.50 |
| **Date Sampled** | | | | 02/07/2021 | 01/07/2021 | 02/07/2021 |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | |
| **Heavy Metals / Metalloids** | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 23 | 21 | 29 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 | < 0.2 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 36 | 37 | 31 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 62 | 71 | 71 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 700 | 300 | 460 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | 1.2 | 0.9 | 1.0 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 21 | 26 | 20 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 180 | 130 | 150 |
| **Petroleum Hydrocarbons** | | | | | | |
| TPH C10 - C40 | mg/kg | 10 | MCERTS | 22 | 26 | 32 |
| TPH (C8 - C10) | mg/kg | 0.1 | MCERTS | < 0.1 | < 0.1 | < 0.1 |
| TPH (C10 - C12) | mg/kg | 2 | MCERTS | < 2.0 | < 2.0 | < 2.0 |
| TPH (C12 - C16) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 |
| TPH (C16 - C21) | mg/kg | 1 | MCERTS | 6.1 | 8.4 | 8.8 |
| TPH (C21 - C35) | mg/kg | 1 | MCERTS | 16 | 16 | 24 |

U/S = Unsuitable Sample  I/S = Insufficient Sample

**Analytical Report Number : 21-85035**
**Project / Site name: Keats Grove**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description * |
|---|---|---|---|---|
| 1927037 | BH4 | None Supplied | 0.5 | Brown clay and loam with gravel and vegetation. |
| 1927038 | BH1 | None Supplied | 0.5 | Brown clay and loam with gravel and vegetation. |
| 1927039 | BH3 | None Supplied | 0.5 | Brown clay and loam with gravel and vegetation. |

**Analytical Report Number : 21-85035**
**Project / Site name: Keats Grove**

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method. | L038-PL | D | MCERTS |
| Metals in soil by ICP-OES | Determination of metals in soil by aqua-regia digestion followed by ICP-OES. | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil. | L038-PL | D | MCERTS |
| Asbestos identification in soil | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques. | In house method based on HSG 248 | A001-PL | D | ISO 17025 |
| Chloride, water soluble, in soil | Determination of Chloride colorimetrically by discrete analyser. | In house method. | L082-PL | D | MCERTS |
| Hexavalent chromium in soil | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry. | In-house method | L080-PL | W | MCERTS |
| Moisture Content | Moisture content, determined gravimetrically. (30 oC) | In house method. | L019-UK/PL | W | NONE |
| Monohydric phenols in soil | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry. | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL | W | MCERTS |
| Speciated EPA-16 PAHs in soil | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| pH in soil (automated) | Determination of pH in soil by addition of water followed by automated electrometric measurement. | In house method. | L099-PL | D | MCERTS |
| Sulphide in soil | Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode. | In-house method | L010-PL | D | MCERTS |
| Total sulphate (as SO4 in soil) | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES. | In house method. | L038-PL | D | MCERTS |
| Stones content of soil | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight. | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL | D | NONE |
| Total cyanide in soil | Determination of total cyanide by distillation followed by colorimetry. | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL | W | MCERTS |
| Total organic carbon (Automated) in soil | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | In house method. | L009-PL | D | MCERTS |
| TPH Banding in Soil by FID | Determination of hexane extractable hydrocarbons in soil by GC-FID. | In-house method, TPH with carbon banding and silica gel split/cleanup. | L076-PL | W | MCERTS |
| TPH in (Soil) | Determination of TPH bands by HS-GC-MS/GC-FID | In-house method, TPH with carbon banding and silica gel split/cleanup. | L076-PL | D | MCERTS |

**Analytical Report Number : 21-85035**
**Project / Site name: Keats Grove**

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

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|

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

**Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.**

GEA

Widbury Barn
Widbury Hill
Ware
SG12 7QE

# Generic Risk-Based Soil Screening Values

| | | | |
|---|---|---|---|
| **Site** | 14A Keats Grove, London NW3 2RN | **Job Number** | J21141 |
| **Client** | Naomi Testler & Alex Ziff | **Sheet** | 1 / 2 |
| **Engineer** | Engenuiti | | |

**Proposed End Use** **Residential with plant uptake**

**Soil Organic Matter content %** **2.5**

| Contaminant | Screening Value mg/kg | Data Source |
|---|---|---|
| ***Metals*** | | |
| Arsenic | 37 | C4SL |
| Cadmium | 26 | C4SL |
| Chromium (III) | 910 | S4UL |
| Chromium (VI) | 21 | C4SL |
| Copper | 2,400 | S4UL |
| Lead | 200 | C4SL |
| Elemental Mercury | 1.2 | S4UL |
| Inorganic Mercury | 40 | S4UL |
| Nickel | 180 | S4UL |
| Selenium | 350 | SGV |
| Zinc | 3,700 | S4UL |
| ***Anions*** | | |
| Soluble Sulphate | 500 mg/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 | 5.60 | S4UL |
| Acenaphthylene | 420 | S4UL |
| Acenaphthene | 510 | S4UL |
| Fluorene | 400 | S4UL |
| Phenanthrene | 220 | S4UL |
| Anthracene | 5,400 | S4UL |
| Fluoranthene | 560 | S4UL |
| Pyrene | 1,200 | S4UL |
| Benzo(a)anthracene | 11.0 | S4UL |
| Chrysene | 22 | S4UL |
| Benzo(b)fluoranthene | 3.3 | S4UL |
| Benzo(k)fluoranthene | 93.0 | S4UL |
| Benzo(a)pyrene | 4.40 | C4SL |
| Indeno(1 2 3 cd)pyrene | 36.0 | S4UL |
| Dibenz(a h)anthracene | 0.28 | S4UL |
| Benzo (g h i)perylene | 340 | S4UL |
| **Total PAH Screen** | **62.9** | B(a)P / 0.15 |

| Contaminant | Screening Value mg/kg | Data Source |
|---|---|---|
| ***Hydrocarbons*** | | |
| Banded TPH (8-10) | 128 | Calc1 |
| Banded TPH (10-12) | 277 | Calc1 |
| Banded TPH (12-16) | 508 | Calc1 |
| Banded TPH (16-21) | 831 | Calc1 |
| Banded TPH (21-35) | 2308 | Calc1 |
| Benzene | 0.34 | C4SL |
| Toluene | 320 | SGV |
| Ethyl Benzene | 180 | SGV |
| Xylene | 120 | SGV |
| Aliphatic C5-C6 | 78 | S4UL |
| Aliphatic C6-C8 | 230 | S4UL |
| Aliphatic C8-C10 | 65 | S4UL |
| Aliphatic C10-C12 | 330 | S4UL |
| Aliphatic C12-C16 | 2400 | S4UL |
| Aliphatic C16-C35 | 92,000 | S4UL |
| Aromatic C6-C7 | See Benzene | S4UL |
| Aromatic C7-C8 | See Toluene | S4UL |
| Aromatic C8-C10 | 83 | S4UL |
| Aromatic C10-C12 | 180 | S4UL |
| Aromatic C12-C16 | 330 | S4UL |
| Aromatic C16-C21 | 540 | S4UL |
| Aromatic C21-C35 | 1500 | S4UL |
| PRO ($C_5$ –$C_{10}$) | 776 | Calc2 |
| DRO ($C_{12}$ –$C_{28}$) | 95,270 | Calc2 |
| Lube Oil ($C_{28}$ –$C_{44}$) | 93,500 | Calc2 |
| **TPH** | **500** | Trigger to consider speciated testing |
| ***Chlorinated Solvents*** | | |
| 1,1,1 trichloroethane (TCA) | 18 | S4UL |
| tetrachloroethane (PCA) | 2.8 | S4UL |
| tetrachloroethene (PCE) | 0.39 | S4UL |
| trichloroethene (TCE) | 0.034 | S4UL |
| 1,2-dichloroethane (DCA) | 0.011 | S4UL |
| vinyl chloride (Chloroethene) | 0.00087 | S4UL |
| tetrachloromethane (Carbon tetra | 0.056 | S4UL |
| trichloromethane (Chloroform) | 1.7 | S4UL |

*Notes*

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

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

SGV - Soil Guideline Value, derived from the CLEA model and published by Environment Agency 2009 - where not superseded by C4SL

S4UL - LQM/CIEH Suitable for use Level (2015) based on 'minimal' level of risk

Calc1 - sum of thresholds for Ali & Aro fractions - assuming a 35% Aro:65% Ali ratio as is commonly encountered in the soil

Calc2 - sum of nearest available carbon range specified including BTEX for PRO fraction

Total PAH based on B(a)P / 0.15 - GEA experience indicates that Benzo(a) pyrene rarely exceeds 15% of the total PAH concentration

# appendix c

## Desk Study

Risk Assessment Tables
Envirocheck Extracts
Historical Maps
UXO Preliminary Risk Assessment

appendix c

# Envirocheck® Report:

## Datasheet

### Order Details:

**Order Number:**
279009213_1_1

**Customer Reference:**
J21141

**National Grid Reference:**
527090, 185730

**Slice:**
A

**Site Area (Ha):**
0.05

**Search Buffer (m):**
1000

### Site Details:

14a, Keats Grove
LONDON
NW3 2RS

### Client Details:

Mr S Branch
GEA Ltd
Widbury Barn
Widbury Hill
Ware
Herts
SG12 7QE

GEA

# Contents


| Report Section | Page Number |
|---|---|
| Summary | - |
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| Hazardous Substances | - |
| Geological | 16 |
| Industrial Land Use | 21 |
| Sensitive Land Use | 38 |
| Data Currency | 39 |
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**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 this 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 v53.0**

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m (*up to 2000m) |
|---|---|---|---|---|---|
| **Agency & Hydrological** | | | | | |
| BGS Groundwater Flooding Susceptibility | pg 1 | | Yes | | n/a |
| Contaminated Land Register Entries and Notices | | | | | |
| Discharge Consents | pg 1 | | | | 1 |
| Prosecutions Relating to Controlled Waters | | | n/a | n/a | n/a |
| 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 | | | 3 | 4 |
| Local Authority Pollution Prevention and Control Enforcements | | | | | |
| Nearest Surface Water Feature | pg 2 | | Yes | | |
| Pollution Incidents to Controlled Waters | | | | | |
| Prosecutions Relating to Authorised Processes | | | | | |
| Registered Radioactive Substances | pg 2 | | | 40 | |
| River Quality | | | | | |
| River Quality Biology Sampling Points | | | | | |
| River Quality Chemistry Sampling Points | | | | | |
| Substantiated Pollution Incident Register | pg 9 | | | 1 | |
| Water Abstractions | pg 9 | | | | (*10) |
| Water Industry Act Referrals | | | | | |
| Groundwater Vulnerability Map | pg 11 | Yes | n/a | n/a | n/a |
| Groundwater Vulnerability - Soluble Rock Risk | | | n/a | n/a | n/a |
| Groundwater Vulnerability - Local Information | | | n/a | n/a | n/a |
| Bedrock Aquifer Designations | pg 11 | 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 |
| OS Water Network Lines | pg 12 | | 3 | 4 | 17 |

| 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 Landfill Coverage | pg 15 | 1 | n/a | n/a | n/a |
| Local Authority Recorded Landfill Sites | | | | | |
| Potentially Infilled Land (Non-Water) | pg 15 | | | 1 | 6 |
| Potentially Infilled Land (Water) | pg 15 | | 1 | 1 | |
| 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 | | | | | |

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m (*up to 2000m) |
|---|---|---|---|---|---|
| **Geological** | | | | | |
| BGS 1:625,000 Solid Geology | pg 16 | Yes | n/a | n/a | n/a |
| BGS Estimated Soil Chemistry | | | | | |
| BGS Recorded Mineral Sites | | | | | |
| BGS Urban Soil Chemistry | pg 16 | | Yes | Yes | Yes |
| BGS Urban Soil Chemistry Averages | pg 19 | Yes | | | |
| CBSCB Compensation District | | | 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 19 | 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 19 | Yes | Yes | n/a | n/a |
| Potential for Running Sand Ground Stability Hazards | pg 19 | Yes | | n/a | n/a |
| Potential for Shrinking or Swelling Clay Ground Stability Hazards | pg 19 | 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 |
| **Industrial Land Use** | | | | | |
| Contemporary Trade Directory Entries | pg 21 | | 8 | 28 | 75 |
| Fuel Station Entries | pg 30 | | | 1 | |
| Points of Interest - Commercial Services | pg 30 | | | 3 | 13 |
| Points of Interest - Education and Health | pg 31 | | | 5 | 2 |
| Points of Interest - Manufacturing and Production | pg 32 | | 2 | 1 | 11 |
| Points of Interest - Public Infrastructure | pg 33 | | 2 | 9 | 6 |
| Points of Interest - Recreational and Environmental | pg 34 | | 1 | 2 | 12 |
| Gas Pipelines | | | | | |
| Underground Electrical Cables | pg 36 | | | 6 | 6 |

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m (*up to 2000m) |
|---|---|---|---|---|---|
| **Sensitive Land Use** | | | | | |
| Ancient Woodland | | | | | |
| Areas of Adopted Green Belt | | | | | |
| Areas of Unadopted Green Belt | | | | | |
| Areas of Outstanding Natural Beauty | | | | | |
| Environmentally Sensitive Areas | | | | | |
| Forest Parks | | | | | |
| Local Nature Reserves | pg 38 | | | | 1 |
| 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 | | | | | |
| World Heritage Sites | | | | | |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **BGS Groundwater Flooding Susceptibility**<br>Flooding Type: Limited Potential for Groundwater Flooding to Occur | A13NW (NW) | 203 | 1 | 527000 185950 |
| 1 | **Discharge Consents**<br>Operator: Thames Water Utilities Ltd<br>Property Type: WTW/WATER COLLECTION/TREATMENT/SUPPLY<br>Location: Hampstead<br>Authority: Environment Agency, Thames Region<br>Catchment Area: Not Supplied<br>Reference: Temp.0140<br>Permit Version: 1<br>Effective Date: 15th September 1989<br>Issued Date: 15th September 1989<br>Revocation Date: 5th October 2000<br>Discharge Type: Trade Effluent<br>Discharge Environment: Freshwater Stream/River<br>Receiving Water: River Thames<br>**Status:** **Authorisation revoked**<br>Positional Accuracy: Located by supplier to within 100m | A17SW (W) | 943 | 2 | 526200 186100 |
| 2 | **Local Authority Pollution Prevention and Controls**<br>Name: The Royal Free Hospital<br>Location: Pond Street, LONDON, NW3 2QG<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: Not Given<br>Dated: 24th July 1992<br>Process Type: Local Authority Air Pollution Control<br>Description: PG5/1Clinical waste incineration processes under 1 tonne an hour<br>**Status:** **Authorisation revoked**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (SE) | 354 | 3 | 527296 185410 |
| 3 | **Local Authority Pollution Prevention and Controls**<br>Name: Belsize Park Service Station<br>Location: 215 Haverstock Hill, LONDON, NW3 4RE<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC21<br>Dated: 2nd January 1999<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG1/14 Petrol filling station<br>**Status:** **Permitted**<br>Positional Accuracy: Automatically positioned to the address | A8NE (S) | 482 | 3 | 527187 185227 |
| 4 | **Local Authority Pollution Prevention and Controls**<br>Name: Top Choice Dry Cleaners<br>Location: 96 Fleet Road, London, Nw3 2qx<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC13<br>Dated: 12th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status:** **Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A14SW (SE) | 492 | 3 | 527529 185471 |
| 5 | **Local Authority Pollution Prevention and Controls**<br>Name: Perkins Dry Cleaners<br>Location: 171 Haverstock Hill, London, Nw3 4qs<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC7<br>Dated: 12th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status:** **Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A8SE (S) | 691 | 3 | 527342 185055 |
| 5 | **Local Authority Pollution Prevention and Controls**<br>Name: Swan Dry Cleaners<br>Location: 163 Haverstock Hill, London, Nw3 4qt<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC42<br>Dated: 24th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status:** **Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A8SE (S) | 724 | 3 | 527371 185032 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 6 | **Local Authority Pollution Prevention and Controls**<br>Name: Perkins Dry Cleaners<br>Location: 40 Heath Street, London, Nw3 6te<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC9<br>Dated: 12th January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A12SW (W) | 704 | 3 | 526374 185724 |
| 7 | **Local Authority Pollution Prevention and Controls**<br>Name: Pyramid Cleaners<br>Location: 52 Besize Lane, London, Nw3 5ar<br>Authority: London Borough of Camden, Pollution Projects Team<br>Permit Reference: PPC/DC8<br>Dated: 1st January 2007<br>Process Type: Local Authority Pollution Prevention and Control<br>Description: PG6/46 Dry cleaning<br>**Status: Permitted**<br>Positional Accuracy: Located by supplier to within 10m | A8SW (S) | 747 | 3 | 526872 184985 |
| | **Nearest Surface Water Feature** | A13NE (NE) | 129 | - | 527206 185836 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, Hampstead, LONDON, Greater London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AR0446<br>Dated: 12th July 1995<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 351 | 2 | 527292 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital,Pond Street,Hampstead, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: CD3170<br>Dated: 13th July 2009<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Application has been authorised and any conditions apply to the operator**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital,Pond Street,Hampstead, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: CB2954<br>Dated: 20th July 2007<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to an authorisation under S13 or S14 RSA in respect of a registration under S7 when Technetium 99M is used being =< 10 gigabecquerels<br>**Status: Authorisation either revoked or cancelled**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital,Pond Street,Hampstead, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Ca2592<br>Dated: 13th April 2006<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Minor variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
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| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bz9162<br>Dated: 9th December 2005<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Minor variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, HAMPSTEAD, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bz1617<br>Dated: 9th September 2005<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust (Ant)<br>Location: Royal Free Hospital, Pond Street, Hampstead, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bz0777<br>Dated: 14th July 2005<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Minor variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185411 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, HAMPSTEAD, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: By5714<br>Dated: 6th December 2004<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, HAMPSTEAD, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: By5706<br>Dated: 22nd November 2004<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Discretionary registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Application has been authorised and any conditions apply to the operator**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, HAMPSTEAD, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bw6841<br>Dated: 1st December 2003<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Minor variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
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| 8 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust (Ant)<br>Location: Royal Free Hospital, Pond Street, Hampstead, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bw7643<br>Dated: 1st December 2003<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Minor variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185411 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital,Pond Street,Hampstead, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bt8759<br>Dated: 12th May 2003<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, HAMPSTEAD, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bs4863<br>Dated: 25th July 2002<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Minor variation to a registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust (Ant)<br>Location: Royal Free Hospital, Pond Street, HAMPSTEAD, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Br6392<br>Dated: 29th April 2002<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, HAMPSTEAD, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Br6406<br>Dated: 29th April 2002<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Substantial variation to a registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Polymasc Pharmaceuticals Plc<br>Location: Royal Free Hospital, Pond Street, Hampstead, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bj5678<br>Dated: 14th February 2001<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Authorisation under RSA<br>**Status: Authorisation either revoked or cancelled**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
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| 8 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust (Ant)<br>Location: Royal Free Hospital, Pond Street, Hampstead, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bj5716<br>Dated: 14th February 2001<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185411 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital,Pond Street,Hampstead, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AV1327<br>Dated: 11th August 1997<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital,Pond Street,Hampstead, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AH9987<br>Dated: 21st June 1994<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 354 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust (Ant)<br>Location: Medical Physics Department Royal Free Hospital, Pond Street, Hampstead, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bz0831<br>Dated: 14th July 2005<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Minor variation to a registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (SE) | 355 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free And University College Medical School Of University College London<br>Location: Medical Physics Department, Royal Free Hospital, Pond Street, London, Greater London, NW3 2PF<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bm0214<br>Dated: 28th November 2001<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Substantial variation to a registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 355 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bj5708<br>Dated: 14th February 2001<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 355 | 2 | 527297 185410 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
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| 8 | **Registered Radioactive Substances**<br>Name: Royal Free And University College Medical School Of University College London<br>Location: Medical Physics Department, Royal Free Hospital, Pond Street, London, Greater London, NW3 2PF<br>Authority: Environment Agency, Thames Region<br>Permit Reference: BB6254<br>Dated: 27th October 1998<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Minor variation to a registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 355 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free And University College Medical School Of University College London<br>Location: Medical Physics Department, Royal Free Hospital, Pond Street, London, Greater London, NW3 2PF<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AR0403<br>Dated: 12th July 1995<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 355 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, LONDON, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AB4095<br>Dated: 31st March 1991<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 355 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free London Nhs Foundation Trust<br>Location: The Royal Free Hospital, Pond Street, Hampstead, Nw3 2qg<br>Authority: Environment Agency, Thames Region<br>Permit Reference: UB3935DG<br>Dated: Not Supplied<br>Process Type: Not Supplied<br>Description: Not Supplied<br>**Status: Application has been determined by the EA**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 355 | 2 | 527297 185410 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, Hampstead, LONDON, Greater London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AT8398<br>Dated: 17th January 1996<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Minor variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 356 | 2 | 527292 185405 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead NHS Trust<br>Location: Royal Free Hospital, Pond Street, Hampstead, LONDON, Greater London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AR0373<br>Dated: 11th July 1995<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Minor variation to a registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 357 | 2 | 527302 185410 |

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| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead NHS Trust<br>Location: Royal Free Hospital, Pond Street, Hampstead, LONDON, Greater London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AV8011<br>Dated: 25th October 1996<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 360 | 2 | 527292 185400 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free Hampstead Nhs Trust<br>Location: Royal Free Hospital, Pond Street, Hampstead, LONDON, Greater London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AE8658<br>Dated: 24th March 1992<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Registration under the Act of multiple open sources which are also the subject of authorisations<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 361 | 2 | 527302 185405 |
| 8 | **Registered Radioactive Substances**<br>Name: University College London<br>Location: Royal Free Campus, Rowland Hill Street, London, Nw3 2pf<br>Authority: Environment Agency, Thames Region<br>Permit Reference: By6001<br>Dated: 7th May 2015<br>Process Type: Not Supplied<br>Description: Not Supplied<br>**Status: Replaced**<br>Positional Accuracy: Located by supplier to within 100m | A13SE (SE) | 364 | 2 | 527300 185400 |
| 8 | **Registered Radioactive Substances**<br>Name: University College London<br>Location: Royal Free Campus, Rowland Hill Street, London, Nw3 2pf<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bz9758<br>Dated: 7th May 2015<br>Process Type: Not Supplied<br>Description: Not Supplied<br>**Status: Replaced**<br>Positional Accuracy: Located by supplier to within 100m | A13SE (SE) | 364 | 2 | 527300 185400 |
| 8 | **Registered Radioactive Substances**<br>Name: University College London<br>Location: Royal Free Campus, Rowland Hill Street, London, Nw3 2pf<br>Authority: Environment Agency, Thames Region<br>Permit Reference: SB3598DT<br>Dated: Not Supplied<br>Process Type: Not Supplied<br>Description: Not Supplied<br>**Status: Application has been determined by the EA**<br>Positional Accuracy: Located by supplier to within 100m | A13SE (SE) | 364 | 2 | 527300 185400 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free And University College Medical School Of University College London<br>Location: Royal Free Hospital, Pond Street, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: By6010<br>Dated: 3rd August 2005<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Substantial variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (SE) | 365 | 2 | 527299 185399 |

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| 8 | **Registered Radioactive Substances**<br>Name: Royal Free And University College Medical School Of University College London<br>Location: Royal Free Hospital, Pond Street, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bw7635<br>Dated: 1st December 2003<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Minor variation to authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (SE) | 365 | 2 | 527299 185399 |
| 8 | **Registered Radioactive Substances**<br>Name: Royal Free And University College Medical School Of University College London<br>Location: Royal Free Hospital, Pond Street, London, NW3 2QG<br>Authority: Environment Agency, Thames Region<br>Permit Reference: Bj5694<br>Dated: 14th February 2001<br>Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)<br>Description: Authorisation under RSA<br>**Status: Authorisation superseded by a substantial or non substantial variation**<br>Positional Accuracy: Manually positioned to the address or location | A13SE (SE) | 365 | 2 | 527299 185399 |
| 9 | **Registered Radioactive Substances**<br>Name: Polymasc Pharmaceuticals Plc<br>Location: Anthony Nolan Building, Royal Free Hospital Site, Fleet Road; Hampstead, LONDON, Greater London, NW3 2EZ<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AU4924<br>Dated: 20th February 1996<br>Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)<br>Description: Registration under the Act of an open source which is also the subject of an authorisation<br>**Status: Authorisation either revoked or cancelled**<br>Positional Accuracy: Manually positioned to the address or location | A14SW (SE) | 456 | 2 | 527500 185495 |
| 10 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust<br>Location: Anthony Nolan Histocompatibility Laboratories, 77b Fleet Road, Hampstead, London, Nw3 2qr<br>Authority: Environment Agency, Thames Region<br>Permit Reference: CB1915<br>Dated: 21st January 2016<br>Process Type: Not Supplied<br>Description: Not Supplied<br>**Status: Replaced**<br>Positional Accuracy: Automatically positioned to the address | A14SW (SE) | 458 | 2 | 527442 185404 |
| 10 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust<br>Location: Anthony Nolan Histocompatibility Laboratories, 77b Fleet Road, Hampstead, London, Nw3 2qr<br>Authority: Environment Agency, Thames Region<br>Permit Reference: CB5171<br>Dated: 21st January 2016<br>Process Type: Not Supplied<br>Description: Not Supplied<br>**Status: Replaced**<br>Positional Accuracy: Automatically positioned to the address | A14SW (SE) | 458 | 2 | 527442 185404 |
| 10 | **Registered Radioactive Substances**<br>Name: Anthony Nolan Trust<br>Location: Anthony Nolan Histocompatibility Laboratories, 77b Fleet Road, Hampstead, London, Nw3 2qr<br>Authority: Environment Agency, Thames Region<br>Permit Reference: AB3298DT<br>Dated: Not Supplied<br>Process Type: Not Supplied<br>Description: Not Supplied<br>**Status: Application has been determined by the EA**<br>Positional Accuracy: Automatically positioned to the address | A14SW (SE) | 458 | 2 | 527442 185404 |

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| 11 | **Substantiated Pollution Incident Register**<br>Authority: Environment Agency - Thames Region, North East Area<br>Incident Date: 23rd September 2003<br>Incident Reference: 191922<br>Water Impact: Category 2 - Significant Incident<br>Air Impact: Category 4 - No Impact<br>Land Impact: Category 4 - No Impact<br>Positional Accuracy: Located by supplier to within 10m<br>Pollutant: Pollutant Not Identified: Not Identified | A18SE (NE) | 370 | 2 | 527254 186101 |
| | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: 28/39/39/0219<br>Permit Version: 1<br>Location: Swiss Cottage Open Space- Borehole<br>Authority: Environment Agency, Thames Region<br>Abstraction: Municipal Grounds: Spray Irrigation - Direct<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Swiss Cottage Open Space, Winchester Road, London.<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 1st April 2008<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A3SW (S) | 1449 | 2 | 526800 184280 |
| | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: Th/039/0039/087<br>Permit Version: 1<br>Location: Swiss Cottage Open Space- Borehole<br>Authority: Environment Agency, Thames Region<br>Abstraction: Municipal Grounds: Spray Irrigation - Direct<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Swiss Cottage Open Space, Winchester Road, London<br>Authorised Start: 01 April<br>Authorised End: 31 March<br>Permit Start Date: 5th December 2013<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A2SE (S) | 1478 | 2 | 526750 184261 |
| | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: Th/039/0039/087<br>Permit Version: 1<br>Location: Swiss Cottage Open Space- Borehole<br>Authority: Environment Agency, Thames Region<br>Abstraction: Municipal Grounds: General Washing/Process Washing<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Swiss Cottage Open Space, Winchester Road, London<br>Authorised Start: 01 April<br>Authorised End: 31 March<br>Permit Start Date: 5th December 2013<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A2SE (S) | 1478 | 2 | 526750 184261 |
| | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: Th/039/0039/087<br>Permit Version: 1<br>Location: Swiss Cottage Open Space- Borehole<br>Authority: Environment Agency, Thames Region<br>Abstraction: Municipal Grounds: Lake And Pond Throughflow<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Swiss Cottage Open Space, Winchester Road, London<br>Authorised Start: 01 April<br>Authorised End: 31 March<br>Permit Start Date: 5th December 2013<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | A2SE (S) | 1478 | 2 | 526750 184261 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
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| | **Water Abstractions**<br>Operator: Greenwich Leisure Limited<br>Licence Number: 28/39/39/0091<br>Permit Version: 101<br>Location: Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Commercial/Industrial/Public Services: Drinking; Cooking; Sanitary; Washing; (Small Garden)<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: Kentish Town Sports Centre, Prince Of Wales Road, London<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 25th May 2012<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 100m | (SE) | 1978 | 2 | 528800<br>184700 |
| | **Water Abstractions**<br>Operator: Greenwich Leisure Limited<br>Licence Number: 28/39/39/0091<br>Permit Version: 101<br>Location: Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Other Industrial/Commercial/Public Services: Process Water<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: St. Pancras Public Baths, Prince Of Wales Road, London Nw1<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 25th May 2012<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 100m | (SE) | 1978 | 2 | 528800<br>184700 |
| | **Water Abstractions**<br>Operator: Greenwich Leisure Ltd<br>Licence Number: 28/39/39/0091<br>Permit Version: 101<br>Location: Two Bores At Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Other Industrial/Commercial/Public Services: Process Water<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: St. Pancras Public Baths, Prince Of Wales Road, London Nw1<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 5th April 2012<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 100m | (SE) | 1978 | 2 | 528800<br>184700 |
| | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: 28/39/39/0091<br>Permit Version: 100<br>Location: Two Bores At Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Commercial/Industrial/Public Services: Drinking; Cooking; Sanitary; Washing; (Small Garden)<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): 605<br>Yearly Rate (m3): 76509<br>Details: Kentish Town Sports Centre, Prince Of Wales Road, London<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 13th June 1966<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 100m | (SE) | 1978 | 2 | 528800<br>184700 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: 28/39/39/0091<br>Permit Version: 100<br>Location: Two Bores At Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Industrial; Commercial And Public Services: Laundry Use<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: St. Pancras Public Baths, Prince Of Wales Road, London Nw1<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 13th June 1966<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | (SE) | 1978 | 2 | 528800<br>184700 |
| | **Water Abstractions**<br>Operator: London Borough Of Camden<br>Licence Number: 28/39/39/0091<br>Permit Version: 100<br>Location: Two Bores At Kentish Town Sports Centre, Prince Of Wales St<br>Authority: Environment Agency, Thames Region<br>Abstraction: Other Industrial/Commercial/Public Services: Process Water<br>Abstraction Type: Water may be abstracted from a single point<br>Source: Groundwater<br>Daily Rate (m3): Not Supplied<br>Yearly Rate (m3): Not Supplied<br>Details: St. Pancras Public Baths, Prince Of Wales Road, London Nw1<br>Authorised Start: 01 January<br>Authorised End: 31 December<br>Permit Start Date: 13th June 1966<br>Permit End Date: Not Supplied<br>Positional Accuracy: Located by supplier to within 10m | (SE) | 1978 | 2 | 528800<br>184700 |
| | **Groundwater Vulnerability Map**<br>Combined Classification: Unproductive Aquifer (may have productive aquifer beneath)<br>Combined Vulnerability: Unproductive<br>Combined Aquifer: Unproductive Bedrock Aquifer, No Superficial Aquifer<br>Pollutant Speed: Low<br>Bedrock Flow: Mixed<br>Dilution: 300-550 mm/year<br>Baseflow Index: 40-70%<br>Superficial Patchiness: <90%<br>Superficial Thickness: <3m<br>Superficial Recharge: No Data | A13NE (SE) | 0 | 4 | 527090<br>185735 |
| | **Groundwater Vulnerability - Soluble Rock Risk**<br>None | | | | |
| | **Bedrock Aquifer Designations**<br>Aquifer Designation: Unproductive Strata | A13NE (SE) | 0 | 4 | 527090<br>185735 |
| | **Superficial Aquifer Designations**<br>No Data Available | | | | |
| | **Extreme Flooding from Rivers or Sea without Defences**<br>None | | | | |
| | **Flooding from Rivers or Sea without Defences**<br>None | | | | |
| | **Areas Benefiting from Flood Defences**<br>None | | | | |
| | **Flood Water Storage Areas**<br>None | | | | |
| | **Flood Defences**<br>None | | | | |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 12 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 5204.1<br>Watercourse Level: Underground<br>Permanent: True<br>Watercourse Name: The Fountains<br>Catchment Name: Thames<br>Primacy: 1 | A13SE (E) | 132 | 5 | 527230 185730 |
| 13 | **OS Water Network Lines**<br>Watercourse Form: Lake<br>Watercourse Length: 172.6<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Hampstead Ponds<br>Catchment Name: Thames<br>Primacy: 1 | A13NE (NE) | 146 | 5 | 527233 185821 |
| 14 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 13.5<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A13SE (E) | 225 | 5 | 527315 185663 |
| 15 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 18.7<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A13NE (NE) | 292 | 5 | 527289 185984 |
| 16 | **OS Water Network Lines**<br>Watercourse Form: Lake<br>Watercourse Length: 118.5<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Hampstead Ponds<br>Catchment Name: Thames<br>Primacy: 1 | A13NE (NE) | 304 | 5 | 527285 186003 |
| 17 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 11.9<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18SE (NE) | 382 | 5 | 527249 186116 |
| 18 | **OS Water Network Lines**<br>Watercourse Form: Lake<br>Watercourse Length: 178.1<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Hampstead Ponds<br>Catchment Name: Thames<br>Primacy: 1 | A18SE (N) | 390 | 5 | 527245 186127 |
| 19 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 71.1<br>Watercourse Level: Underground<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18SE (N) | 522 | 5 | 527163 186285 |
| 20 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 10.1<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18SE (N) | 578 | 5 | 527125 186345 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 21 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 40.8<br>Watercourse Level: Underground<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18SE (N) | 581 | 5 | 527116 186349 |
| 22 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 131.7<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18SW (N) | 600 | 5 | 527043 186367 |
| 23 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 68.4<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18SW (N) | 631 | 5 | 526954 186384 |
| 24 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 214.5<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18SW (N) | 631 | 5 | 526954 186384 |
| 25 | **OS Water Network Lines**<br>Watercourse Form: Lake<br>Watercourse Length: 117.6<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Hampstead Ponds<br>Catchment Name: Thames<br>Primacy: 1 | A18NW (N) | 699 | 5 | 526937 186451 |
| 26 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 17.4<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A19SW (NE) | 736 | 5 | 527476 186396 |
| 27 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 62.7<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18NW (NW) | 749 | 5 | 526771 186446 |
| 28 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 124.3<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18NW (NW) | 749 | 5 | 526771 186446 |
| 29 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 5.9<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A19NW (NE) | 753 | 5 | 527483 186411 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 30 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 184.0<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A19SW (NE) | 753 | 5 | 527488 186408 |
| 31 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 164.2<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18NW (N) | 814 | 5 | 526922 186565 |
| 32 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 2.9<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A19NW (NE) | 918 | 5 | 527635 186507 |
| 33 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 119.8<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A19NW (NE) | 919 | 5 | 527638 186507 |
| 34 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 37.2<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18NW (N) | 942 | 5 | 526820 186671 |
| 35 | **OS Water Network Lines**<br>Watercourse Form: Inland river<br>Watercourse Length: 9.8<br>Watercourse Level: On ground surface<br>Permanent: True<br>Watercourse Name: Not Supplied<br>Catchment Name: Thames<br>Primacy: 1 | A18NW (N) | 942 | 5 | 526820 186671 |

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|---|---|---|---|---|---|
| | **Local Authority Landfill Coverage**<br>Name: London Borough of Camden<br>- Has no landfill data to supply | | 0 | 6 | 527090<br>185735 |
| 36 | **Potentially Infilled Land (Non-Water)**<br>Bearing Ref: N<br>Use: Unknown Filled Ground (Pit, quarry etc)<br>Date of Mapping: 1996 | A18SE<br>(N) | 490 | 8 | 527250<br>186231 |
| 37 | **Potentially Infilled Land (Non-Water)**<br>Bearing Ref: S<br>Use: Unknown Filled Ground (Pit, quarry etc)<br>Date of Mapping: 1996 | A8NE<br>(S) | 509 | 8 | 527284<br>185228 |
| 38 | **Potentially Infilled Land (Non-Water)**<br>Bearing Ref: SE<br>Use: Unknown Filled Ground (Pit, quarry etc)<br>Date of Mapping: 1996 | A8NE<br>(SE) | 571 | 8 | 527347<br>185189 |
| 39 | **Potentially Infilled Land (Non-Water)**<br>Bearing Ref: SE<br>Use: Unknown Filled Ground (Pit, quarry etc)<br>Date of Mapping: 1996 | A9NW<br>(SE) | 581 | 8 | 527473<br>185261 |
| 40 | **Potentially Infilled Land (Non-Water)**<br>Bearing Ref: SW<br>Use: Unknown Filled Ground (Pit, quarry etc)<br>Date of Mapping: 1996 | A7NE<br>(SW) | 623 | 8 | 526616<br>185296 |
| 41 | **Potentially Infilled Land (Non-Water)**<br>Bearing Ref: SW<br>Use: Unknown Filled Ground (Pit, quarry etc)<br>Date of Mapping: 1996 | A8SW<br>(SW) | 746 | 8 | 526763<br>185029 |
| 42 | **Potentially Infilled Land (Non-Water)**<br>Bearing Ref: SW<br>Use: Unknown Filled Ground (Pit, quarry etc)<br>Date of Mapping: 1991 | A7SE<br>(SW) | 937 | 8 | 526467<br>184999 |
| 43 | **Potentially Infilled Land (Water)**<br>Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc)<br>Date of Mapping: 1873 | A13SE<br>(E) | 135 | 8 | 527228<br>185721 |
| 44 | **Potentially Infilled Land (Water)**<br>Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc)<br>Date of Mapping: 1873 | A13NW<br>(NW) | 366 | 8 | 526813<br>186007 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **BGS 1:625,000 Solid Geology**<br>Description: Thames Group | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **BGS Estimated Soil Chemistry**<br>No data available | | | | |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527233, 185694<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 31.90 mg/kg<br>Cadmium Measured Concentration: 0.60 mg/kg<br>Chromium Measured Concentration: 126.40 mg/kg<br>Lead Measured Concentration: 478.50 mg/kg<br>Nickel Measured Concentration: 45.60 mg/kg | A13SE (E) | 140 | 1 | 527233 185694 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 526732, 185657<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 40.30 mg/kg<br>Cadmium Measured Concentration: 0.60 mg/kg<br>Chromium Measured Concentration: 97.40 mg/kg<br>Lead Measured Concentration: 660.40 mg/kg<br>Nickel Measured Concentration: 34.00 mg/kg | A12SE (W) | 357 | 1 | 526732 185657 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527216, 185357<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 19.70 mg/kg<br>Cadmium Measured Concentration: 0.80 mg/kg<br>Chromium Measured Concentration: 96.90 mg/kg<br>Lead Measured Concentration: 626.10 mg/kg<br>Nickel Measured Concentration: 27.60 mg/kg | A8NE (S) | 364 | 1 | 527216 185357 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527297, 186229<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 21.10 mg/kg<br>Cadmium Measured Concentration: 0.30 mg/kg<br>Chromium Measured Concentration: 115.30 mg/kg<br>Lead Measured Concentration: 367.50 mg/kg<br>Nickel Measured Concentration: 18.70 mg/kg | A18SE (NE) | 505 | 1 | 527297 186229 |

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|---|---|---|---|---|---|
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 526737, 186262<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 11.40 mg/kg<br>Cadmium Measured Concentration: 0.50 mg/kg<br>Chromium Measured Concentration: 155.00 mg/kg<br>Lead Measured Concentration: 104.40 mg/kg<br>Nickel Measured Concentration: 7.80 mg/kg | A17SE (NW) | 607 | 1 | 526737 186262 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 526763, 185153<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 17.60 mg/kg<br>Cadmium Measured Concentration: 0.60 mg/kg<br>Chromium Measured Concentration: 55.10 mg/kg<br>Lead Measured Concentration: 617.70 mg/kg<br>Nickel Measured Concentration: 22.30 mg/kg | A8NW (SW) | 637 | 1 | 526763 185153 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527766, 185717<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 14.80 mg/kg<br>Cadmium Measured Concentration: 0.50 mg/kg<br>Chromium Measured Concentration: 62.40 mg/kg<br>Lead Measured Concentration: 150.60 mg/kg<br>Nickel Measured Concentration: 19.50 mg/kg | A14SE (E) | 669 | 1 | 527766 185717 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527669, 185211<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 18.20 mg/kg<br>Cadmium Measured Concentration: 0.60 mg/kg<br>Chromium Measured Concentration: 99.60 mg/kg<br>Lead Measured Concentration: 936.90 mg/kg<br>Nickel Measured Concentration: 25.60 mg/kg | A9NW (SE) | 756 | 1 | 527669 185211 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527758, 186258<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 17.00 mg/kg<br>Cadmium Measured Concentration: 0.30 mg/kg<br>Chromium Measured Concentration: 103.40 mg/kg<br>Lead Measured Concentration: 230.10 mg/kg<br>Nickel Measured Concentration: 21.30 mg/kg | A19SW (NE) | 825 | 1 | 527758 186258 |

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| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 526223, 185630<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 19.70 mg/kg<br>Cadmium Measured Concentration: 0.50 mg/kg<br>Chromium Measured Concentration: 127.10 mg/kg<br>Lead Measured Concentration: 514.80 mg/kg<br>Nickel Measured Concentration: 23.20 mg/kg | A12SW (W) | 863 | 1 | 526223 185630 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 526278, 185352<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 25.30 mg/kg<br>Cadmium Measured Concentration: 0.50 mg/kg<br>Chromium Measured Concentration: 122.20 mg/kg<br>Lead Measured Concentration: 273.70 mg/kg<br>Nickel Measured Concentration: 19.50 mg/kg | A7NW (SW) | 884 | 1 | 526278 185352 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527169, 184808<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 20.70 mg/kg<br>Cadmium Measured Concentration: 0.60 mg/kg<br>Chromium Measured Concentration: 83.40 mg/kg<br>Lead Measured Concentration: 2153.80 mg/kg<br>Nickel Measured Concentration: 34.90 mg/kg | A8SE (S) | 895 | 1 | 527169 184808 |
| | **BGS Measured Urban Soil Chemistry**<br>Source: British Geological Survey, National Geoscience Information Service<br>Grid: 527271, 186735<br>Soil Sample Type: Topsoil<br>Sample Area: London<br>Arsenic Measured Concentration: 13.50 mg/kg<br>Cadmium Measured Concentration: 0.40 mg/kg<br>Chromium Measured Concentration: 104.50 mg/kg<br>Lead Measured Concentration: 217.30 mg/kg<br>Nickel Measured Concentration: 12.30 mg/kg | A18NE (N) | 983 | 1 | 527271 186735 |

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| | **BGS Urban Soil Chemistry Averages**<br>Source: British Geological Survey, National Geoscience Information Service<br>Sample Area: London<br>Count Id: 7209<br>Arsenic Minimum Concentration: 1.00 mg/kg<br>Arsenic Average Concentration: 17.00 mg/kg<br>Arsenic Maximum Concentration: 161.00 mg/kg<br>Cadmium Minimum Concentration: 0.10 mg/kg<br>Cadmium Average Concentration: 0.90 mg/kg<br>Cadmium Maximum Concentration: 165.20 mg/kg<br>Chromium Minimum Concentration: 13.00 mg/kg<br>Chromium Average Concentration: 79.00 mg/kg<br>Chromium Maximum Concentration: 2094.00 mg/kg<br>Lead Minimum Concentration: 11.00 mg/kg<br>Lead Average Concentration: 280.00 mg/kg<br>Lead Maximum Concentration: 10000.00 mg/kg<br>Nickel Minimum Concentration: 2.00 mg/kg<br>Nickel Average Concentration: 28.00 mg/kg<br>Nickel Maximum Concentration: 506.00 mg/kg | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **Coal Mining Affected Areas**<br>In an area that might not be affected by coal mining | | | | |
| | **Non Coal Mining Areas of Great Britain**<br>No Hazard | | | | |
| | **Potential for Collapsible Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **Potential for Compressible Ground Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **Potential for Ground Dissolution Stability Hazards**<br>Hazard Potential: No Hazard<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 50 | 1 | 527037 185708 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SW (SW) | 138 | 1 | 527015 185584 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Low<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (NE) | 156 | 1 | 527179 185897 |
| | **Potential for Landslide Ground Stability Hazards**<br>Hazard Potential: Low<br>Source: British Geological Survey, National Geoscience Information Service | A13SE (E) | 218 | 1 | 527313 185710 |
| | **Potential for Running Sand Ground Stability Hazards**<br>Hazard Potential: Very Low<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **Potential for Shrinking or Swelling Clay Ground Stability Hazards**<br>Hazard Potential: Moderate<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| | **Radon Potential - Radon Affected Areas**<br>Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level).<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |
| | **Radon Potential - Radon Protection Measures**<br>Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions<br>Source: British Geological Survey, National Geoscience Information Service | A13NE (SE) | 0 | 1 | 527090 185735 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 45 | **Contemporary Trade Directory Entries**<br>Name: Oven Cleaning (Hampstead)<br>Location: 32, Downshire Hill, London, NW3 1NT<br>Classification: Oven cleaning<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NW (NW) | 71 | - | 527034 185812 |
| 46 | **Contemporary Trade Directory Entries**<br>Name: Bri-Clean Laundries<br>Location: 57, South End Road, London, NW3 2QB<br>Classification: Laundries & Launderettes<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 97 | - | 527188 185678 |
| 46 | **Contemporary Trade Directory Entries**<br>Name: Padma<br>Location: Davu House, 2b, Heath Hurst Road, LONDON, NW3 2RX<br>Classification: Textile Manufacturing<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 128 | - | 527204 185637 |
| 47 | **Contemporary Trade Directory Entries**<br>Name: Interior Couture<br>Location: 14a, Downshire Hill, LONDON, NW3 1NR<br>Classification: Wallpapers & Wall Coverings<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SW (W) | 130 | - | 526950 185723 |
| 48 | **Contemporary Trade Directory Entries**<br>Name: Kronus (Uk) Ltd<br>Location: 6, Park End, London, NW3 2SE<br>Classification: Catering Equipment<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13NE (E) | 164 | - | 527263 185752 |
| 49 | **Contemporary Trade Directory Entries**<br>Name: American Dry Cleaning<br>Location: 29, South End Road, London, NW3 2PT<br>Classification: Dry Cleaners<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 185 | - | 527235 185581 |
| 49 | **Contemporary Trade Directory Entries**<br>Name: House Of Mistry<br>Location: 15, South End Road, LONDON, NW3 2PT<br>Classification: Pharmaceutical Manufacturers & Distributors<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 220 | - | 527251 185547 |
| 49 | **Contemporary Trade Directory Entries**<br>Name: Bevan Scaffolding<br>Location: 14, SOUTH END ROAD, LONDON, NW3 2QE<br>Classification: Scaffolding & Work Platforms<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 224 | - | 527275 185569 |
| 50 | **Contemporary Trade Directory Entries**<br>Name: Metro Cleaning Cameden<br>Location: 38, South End Close, London, NW3 2RB<br>Classification: Cleaning Services - Domestic<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SE (SE) | 251 | - | 527319 185590 |
| 51 | **Contemporary Trade Directory Entries**<br>Name: T5 Oil & Gas<br>Location: 45 Pond Street, London, NW3 2PR<br>Classification: Oil & Gas Exploration Supplies & Services<br>**Status: Inactive**<br>Positional Accuracy: Manually positioned to the road within the address or location | A13SE (SE) | 269 | - | 527270 185497 |
| 52 | **Contemporary Trade Directory Entries**<br>Name: Lily'S Kitchen<br>Location: 6, Rosslyn Mews, London, NW3 1NN<br>Classification: Pet Foods & Animal Feeds<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SW (W) | 333 | - | 526769 185611 |
| 52 | **Contemporary Trade Directory Entries**<br>Name: Bang & Olufsen<br>Location: 44, Rosslyn Hill, London, NW3 1NH<br>Classification: Electrical Goods Sales, Manufacturers & Wholesalers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A13SW (SW) | 342 | - | 526764 185598 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 98 | **Contemporary Trade Directory Entries**<br>Name: Mysparks Ltd<br>Location: 122, Frognal, London, NW3 6XU<br>Classification: Electrical Engineers<br>**Status: Active**<br>Positional Accuracy: Automatically positioned to the address | A12NW (W) | 934 | - | 526150 185865 |
| 99 | **Contemporary Trade Directory Entries**<br>Name: Chalcot House Services<br>Location: Flat 1, 51, Belsize Park Gardens, London, NW3 4JL<br>Classification: Commercial Cleaning Services<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A8SE (S) | 969 | - | 527202 184737 |
| 100 | **Contemporary Trade Directory Entries**<br>Name: Hot Chiu<br>Location: Garden Flat, 26, Fitzjohns Avenue, London, NW3 5NB<br>Classification: Food Products - Manufacturers<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A7SE (SW) | 987 | - | 526607 184839 |
| 101 | **Contemporary Trade Directory Entries**<br>Name: Urban Shield Ltd<br>Location: 25, Savernake Road, London, NW3 2JT<br>Classification: Pest & Vermin Control<br>**Status: Inactive**<br>Positional Accuracy: Automatically positioned to the address | A14SE (E) | 995 | - | 528090 185669 |
| 102 | **Fuel Station Entries**<br>Name: Belsize Park Service Station<br>Location: 215, Haverstock Hill , Belsize Park , London, Inner London, NW3 4QE<br>Brand: BP<br>Premises Type: Petrol Station<br>**Status: Open**<br>Positional Accuracy: Automatically positioned to the address | A8NE (S) | 483 | - | 527188 185227 |
| 103 | **Points of Interest - Commercial Services**<br>Name: A V Auto Locksmiths<br>Location: 38 Willow Road, London, NW3 1TN<br>Category: Repair and Servicing<br>Class Code: Vehicle Repair, Testing and Servicing<br>Positional Accuracy: Positioned to address or location | A12NE (W) | 372 | 7 | 526722 185864 |
| 104 | **Points of Interest - Commercial Services**<br>Name: Car Wash<br>Location: Belzier Park Service Station 215, Haverstock Hill, London, NW3 4QE<br>Category: Personal, Consumer and other Services<br>Class Code: Vehicle Cleaning Services<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 482 | 7 | 527187 185227 |
| 104 | **Points of Interest - Commercial Services**<br>Name: B P Car Wash<br>Location: 215 HAVERSTOCK HILL, London, NW3 4QE<br>Category: Personal, Consumer and other Services<br>Class Code: Vehicle Cleaning Services<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 483 | 7 | 527188 185227 |
| 105 | **Points of Interest - Commercial Services**<br>Name: Targus Seatrade<br>Location: 201 Haverstock Hill, London, NW3 4QG<br>Category: Transport, Storage and Delivery<br>Class Code: Distribution and Haulage<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 606 | 7 | 527272 185121 |
| 106 | **Points of Interest - Commercial Services**<br>Name: Zapem Pest Control London<br>Location: 26 Downside Crescent, London, NW3 2AS<br>Category: Contract Services<br>Class Code: Pest and Vermin Control<br>Positional Accuracy: Positioned to address or location | A9NW (SE) | 685 | 7 | 527537 185179 |
| 107 | **Points of Interest - Commercial Services**<br>Name: Comac Motors<br>Location: 13 Daleham Mews, London, NW3 5DB<br>Category: Repair and Servicing<br>Class Code: Vehicle Repair, Testing and Servicing<br>Positional Accuracy: Positioned to address or location | A8SW (S) | 826 | 7 | 526773 184937 |
| 107 | **Points of Interest - Commercial Services**<br>Name: Comac Motors<br>Location: 19 Daleham Mews, London, NW3 5DB<br>Category: Repair and Servicing<br>Class Code: Vehicle Repair, Testing and Servicing<br>Positional Accuracy: Positioned to address or location | A8SW (S) | 851 | 7 | 526770 184911 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 110 | **Points of Interest - Education and Health**<br>Name: Royal Free Hospital<br>Location: Royal Free Hospital, Pond Street, London, NW3 2QG<br>Category: Health Practitioners and Establishments<br>Class Code: Hospitals<br>Positional Accuracy: Positioned to address or location | A13SE (SE) | 355 | 7 | 527297 185410 |
| 110 | **Points of Interest - Education and Health**<br>Name: Royal Free Hospital<br>Location: Royal Free Hospital, Pond Street, London, NW3 2QG<br>Category: Health Practitioners and Establishments<br>Class Code: Accident & Emergency Department<br>Positional Accuracy: Positioned to address or location | A13SE (SE) | 355 | 7 | 527297 185410 |
| 111 | **Points of Interest - Education and Health**<br>Name: Piercey Day Hospital<br>Location: 23 East Heath Road, London, NW3 1DU<br>Category: Health Practitioners and Establishments<br>Class Code: Hospitals<br>Positional Accuracy: Positioned to address or location | A17SW (NW) | 841 | 7 | 526380 186224 |
| 111 | **Points of Interest - Education and Health**<br>Name: Queen Marys House<br>Location: 23 East Heath Road, London, NW3 1DU<br>Category: Health Practitioners and Establishments<br>Class Code: Hospitals<br>Positional Accuracy: Positioned to address or location | A17SW (NW) | 864 | 7 | 526353 186225 |
| 112 | **Points of Interest - Manufacturing and Production**<br>Name: Works<br>Location: Not Supplied<br>Category: Industrial Features<br>Class Code: Unspecified Works Or Factories<br>Positional Accuracy: Positioned to an adjacent address or location | A13NE (E) | 153 | 7 | 527251 185744 |
| 112 | **Points of Interest - Manufacturing and Production**<br>Name: Works<br>Location: NW3<br>Category: Industrial Features<br>Class Code: Unspecified Works Or Factories<br>Positional Accuracy: Positioned to an adjacent address or location | A13NE (E) | 154 | 7 | 527252 185744 |
| 113 | **Points of Interest - Manufacturing and Production**<br>Name: Air Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A8NE (S) | 497 | 7 | 527273 185237 |
| 113 | **Points of Interest - Manufacturing and Production**<br>Name: Air Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A8NE (SE) | 566 | 7 | 527344 185193 |
| 113 | **Points of Interest - Manufacturing and Production**<br>Name: Air Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A8NE (SE) | 573 | 7 | 527339 185183 |
| 114 | **Points of Interest - Manufacturing and Production**<br>Name: Air Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A8NW (S) | 563 | 7 | 526974 185149 |
| 115 | **Points of Interest - Manufacturing and Production**<br>Name: Air Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A9NW (SE) | 571 | 7 | 527482 185282 |
| 116 | **Points of Interest - Manufacturing and Production**<br>Name: Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A7NE (SW) | 736 | 7 | 526712 185068 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 116 | **Points of Interest - Manufacturing and Production**<br>Name: Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A8SW (SW) | 760 | 7 | 526752 185019 |
| 117 | **Points of Interest - Manufacturing and Production**<br>Name: Sand Pit<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Sand, Gravel and Clay Extraction and Merchants<br>Positional Accuracy: Positioned to an adjacent address or location | A14NE (E) | 742 | 7 | 527840 185798 |
| 118 | **Points of Interest - Manufacturing and Production**<br>Name: Air Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A9NW (SE) | 760 | 7 | 527732 185289 |
| 119 | **Points of Interest - Manufacturing and Production**<br>Name: Zarka Marble Ltd<br>Location: 43 Belsize Lane, London, NW3 5AU<br>Category: Extractive Industries<br>Class Code: Stone Quarrying and Preparation<br>Positional Accuracy: Positioned to address or location | A8SW (S) | 815 | 7 | 526861 184917 |
| 119 | **Points of Interest - Manufacturing and Production**<br>Name: Zarka Marble Ltd<br>Location: 43 Belsize Lane, London, NW3 5AU<br>Category: Extractive Industries<br>Class Code: Stone Quarrying and Preparation<br>Positional Accuracy: Positioned to address or location | A8SW (S) | 815 | 7 | 526861 184917 |
| 120 | **Points of Interest - Manufacturing and Production**<br>Name: Air Shaft<br>Location: NW3<br>Category: Extractive Industries<br>Class Code: Unspecified Quarries Or Mines<br>Positional Accuracy: Positioned to an adjacent address or location | A7SE (SW) | 938 | 7 | 526472 184994 |
| 121 | **Points of Interest - Public Infrastructure**<br>Name: Hampstead Heath Rail Station<br>Location: South End Road, NW3<br>Category: Public Transport, Stations and Infrastructure<br>Class Code: Railway Stations, Junctions and Halts<br>Positional Accuracy: Positioned to address or location | A13SE (SE) | 170 | 7 | 527250 185634 |
| 121 | **Points of Interest - Public Infrastructure**<br>Name: Hampstead Heath Station<br>Location: South End Road, NW3<br>Category: Public Transport, Stations and Infrastructure<br>Class Code: Railway Stations, Junctions and Halts<br>Positional Accuracy: Positioned to address or location | A13SE (SE) | 170 | 7 | 527250 185634 |
| 122 | **Points of Interest - Public Infrastructure**<br>Name: Hampstead Police Station<br>Location: Hampstead Police Station 26, Rosslyn Hill, London, NW3 1PD<br>Category: Central and Local Government<br>Class Code: Police Stations<br>Positional Accuracy: Positioned to address or location | A13SW (SW) | 262 | 7 | 526883 185539 |
| 122 | **Points of Interest - Public Infrastructure**<br>Name: Metropolitan Police Service Hampstead<br>Location: Hampstead Police Station 26, Rosslyn Hill, London, NW3 1PD<br>Category: Central and Local Government<br>Class Code: Police Stations<br>Positional Accuracy: Positioned to address or location | A13SW (SW) | 275 | 7 | 526866 185540 |
| 123 | **Points of Interest - Public Infrastructure**<br>Name: Sluice<br>Location: NW3<br>Category: Water<br>Class Code: Weirs, Sluices and Dams<br>Positional Accuracy: Positioned to an adjacent address or location | A13NE (NE) | 264 | 7 | 527231 185992 |
| 123 | **Points of Interest - Public Infrastructure**<br>Name: Sluice<br>Location: NW3<br>Category: Water<br>Class Code: Weirs, Sluices and Dams<br>Positional Accuracy: Positioned to an adjacent address or location | A13NE (NE) | 267 | 7 | 527235 185993 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 124 | **Points of Interest - Public Infrastructure**<br>Name: BP Service Station Belsize Park Self Serve<br>Location: Belzier Park Service Station 215, Haverstock Hill, London, NW3 4QE<br>Category: Road And Rail<br>Class Code: Petrol and Fuel Stations<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 482 | 7 | 527187 185227 |
| 124 | **Points of Interest - Public Infrastructure**<br>Name: Belzier Park Service Station<br>Location: Belzier Park Service Station 215, Haverstock Hill, London, NW3 4QE<br>Category: Road And Rail<br>Class Code: Petrol and Fuel Stations<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 482 | 7 | 527187 185227 |
| 124 | **Points of Interest - Public Infrastructure**<br>Name: Belsize Park Self Serve<br>Location: Belzier Park Service Station 215, Haverstock Hill, London, NW3 4QE<br>Category: Road And Rail<br>Class Code: Petrol and Fuel Stations<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 482 | 7 | 527187 185227 |
| 124 | **Points of Interest - Public Infrastructure**<br>Name: BP Service Station<br>Location: 215 Haverstock Hill, London, NW3 4QE<br>Category: Road And Rail<br>Class Code: Petrol and Fuel Stations<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 483 | 7 | 527188 185227 |
| 124 | **Points of Interest - Public Infrastructure**<br>Name: Belsize Park Self Serve<br>Location: Belzier Park Service Station 215, Haverstock Hill, London, NW3 4QE<br>Category: Road And Rail<br>Class Code: Petrol and Fuel Stations<br>Positional Accuracy: Positioned to address or location | A8NE (S) | 483 | 7 | 527188 185227 |
| 125 | **Points of Interest - Public Infrastructure**<br>Name: Sluice<br>Location: NW3<br>Category: Water<br>Class Code: Weirs, Sluices and Dams<br>Positional Accuracy: Positioned to an adjacent address or location | A18SE (N) | 576 | 7 | 527121 186344 |
| 126 | **Points of Interest - Public Infrastructure**<br>Name: Sluice<br>Location: NW3<br>Category: Water<br>Class Code: Weirs, Sluices and Dams<br>Positional Accuracy: Positioned to an adjacent address or location | A18NW (N) | 695 | 7 | 526938 186447 |
| 126 | **Points of Interest - Public Infrastructure**<br>Name: Sluice<br>Location: NW3<br>Category: Water<br>Class Code: Weirs, Sluices and Dams<br>Positional Accuracy: Positioned to an adjacent address or location | A18NW (N) | 699 | 7 | 526935 186450 |
| 127 | **Points of Interest - Public Infrastructure**<br>Name: A M Rubbish Clearance<br>Location: 71 Dunboyne Road, London, NW3 2YY<br>Category: Infrastructure and Facilities<br>Class Code: Waste Storage, Processing and Disposal<br>Positional Accuracy: Positioned to address or location | A9NE (SE) | 781 | 7 | 527795 185357 |
| 128 | **Points of Interest - Public Infrastructure**<br>Name: Graveyard<br>Location: Not Supplied<br>Category: Infrastructure and Facilities<br>Class Code: Cemeteries and Crematoria<br>Positional Accuracy: Positioned to an adjacent address or location | A12SW (W) | 830 | 7 | 526249 185702 |
| 128 | **Points of Interest - Public Infrastructure**<br>Name: Grave Yard<br>Location: NW3<br>Category: Infrastructure and Facilities<br>Class Code: Cemeteries and Crematoria<br>Positional Accuracy: Positioned to an adjacent address or location | A12SW (W) | 838 | 7 | 526241 185701 |
| 129 | **Points of Interest - Recreational and Environmental**<br>Name: Play Area<br>Location: NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A13NW (N) | 123 | 7 | 527055 185886 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 130 | **Points of Interest - Recreational and Environmental**<br>Name: Playground<br>Location: Not Supplied<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A13SE (SE) | 274 | 7 | 527351 185607 |
| 130 | **Points of Interest - Recreational and Environmental**<br>Name: Playground<br>Location: St Crispins Close, NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A13SE (SE) | 274 | 7 | 527351 185608 |
| 131 | **Points of Interest - Recreational and Environmental**<br>Name: Play Area<br>Location: NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A18SW (NW) | 636 | 7 | 526752 186307 |
| 132 | **Points of Interest - Recreational and Environmental**<br>Name: Play Area<br>Location: NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A9NW (SE) | 642 | 7 | 527635 185355 |
| 133 | **Points of Interest - Recreational and Environmental**<br>Name: Playground<br>Location: Not Supplied<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A14NE (E) | 744 | 7 | 527841 185818 |
| 133 | **Points of Interest - Recreational and Environmental**<br>Name: Playground<br>Location: Savernake Road, NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to address or location | A14NE (E) | 744 | 7 | 527840 185823 |
| 134 | **Points of Interest - Recreational and Environmental**<br>Name: Playground<br>Location: NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A14NE (E) | 872 | 7 | 527971 185781 |
| 134 | **Points of Interest - Recreational and Environmental**<br>Name: Adventure Playground<br>Location: Not Supplied<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A14NE (E) | 872 | 7 | 527971 185783 |
| 134 | **Points of Interest - Recreational and Environmental**<br>Name: Adventure Playground<br>Location: NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to address or location | A14NE (E) | 913 | 7 | 528011 185795 |
| 135 | **Points of Interest - Recreational and Environmental**<br>Name: Adventure Playground<br>Location: NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A9SW (SE) | 908 | 7 | 527702 185026 |
| 135 | **Points of Interest - Recreational and Environmental**<br>Name: Adventure Playground<br>Location: Not Supplied<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A9SW (SE) | 948 | 7 | 527689 184963 |
| 135 | **Points of Interest - Recreational and Environmental**<br>Name: Adventure Playground<br>Location: Fountain Mews, NW3<br>Category: Recreational<br>Class Code: Playgrounds<br>Positional Accuracy: Positioned to an adjacent address or location | A9SW (SE) | 948 | 7 | 527689 184963 |

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 149 | **Local Nature Reserves**<br>Name: Belsize Wood<br>Multiple Area: N<br>Area (m2): 2723<br>Source: Natural England<br>Designation Date: 1st October 2004 | A9NW (SE) | 555 | 9 | 527487 185309 |

# Data Suppliers

A selection of organisations who provide data within this report

| Data Supplier | Data Supplier Logo |
|---|---|
| Ordnance Survey | |
| Environment Agency | |
| Scottish Environment Protection Agency | |
| The Coal Authority | |
| British Geological Survey | |
| Centre for Ecology and Hydrology | |
| Natural Resources Wales | |
| Scottish Natural Heritage | |
| Natural England | |
| Public Health England | |
| Ove Arup | |
| Stantec UK Ltd | |

# Useful Contacts

| Contact | Name and Address | Contact Details |
|---|---|---|
| 1 | **British Geological Survey - Enquiry Service**<br>British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG | Telephone: 0115 936 3143<br>Fax: 0115 936 3276<br>Email: enquiries@bgs.ac.uk<br>Website: www.bgs.ac.uk |
| 2 | **Environment Agency - National Customer Contact Centre (NCCC)**<br>PO Box 544, Templeborough, Rotherham, S60 1BY | Telephone: 03708 506 506<br>Email: enquiries@environment-agency.gov.uk |
| 3 | **London Borough of Camden - Pollution Projects Team**<br>Seventh Floor, Town Hall Extension, Argyle Street, London, WC1H 8EQ | Telephone: 020 7278 4444<br>Fax: 020 7860 5713<br>Website: www.camden.gov.uk |
| 4 | **Environment Agency - Head Office**<br>Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD | Telephone: 01454 624400<br>Fax: 01454 624409 |
| 5 | **Ordnance Survey**<br>Adanac Drive, Southampton, Hampshire, SO16 0AS | Telephone: 03456 05 05 05<br>Email: customerservices@ordnancesurvey.co.uk<br>Website: www.ordnancesurvey.gov.uk |
| 6 | **London Borough of Camden**<br>Town Hall, Judd Street, London, WC1H 9JE | Telephone: 020 7974 4444<br>Fax: 020 7974 6866<br>Email: info@camden.gov.uk<br>Website: www.camden.gov.uk |
| 7 | **PointX**<br>7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY | Website: www.pointx.co.uk |
| 8 | **Landmark Information Group Limited**<br>Imperium, Imperial Way, Reading, Berkshire, RG2 0TD | Telephone: 0844 844 9966<br>Fax: 0844 844 9951<br>Email: helpdesk@landmark.co.uk<br>Website: www.landmark.co.uk |
| 9 | **Natural England**<br>County Hall, Spetchley Road, Worcester, WR5 2NP | Telephone: 0300 060 3900<br>Email: enquiries@naturalengland.org.uk<br>Website: www.naturalengland.org.uk |
| - | **Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards**<br>Chilton, Didcot, Oxfordshire, OX11 0RQ | Telephone: 01235 822622<br>Fax: 01235 833891<br>Email: radon@phe.gov.uk<br>Website: www.ukradon.org |
| - | **Landmark Information Group Limited**<br>Imperium, Imperial Way, Reading, Berkshire, RG2 0TD | Telephone: 0844 844 9952<br>Fax: 0844 844 9951<br>Email: customerservices@landmarkinfo.co.uk<br>Website: www.landmarkinfo.co.uk |

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

# Geology 1:50,000 Maps Legends

## Artificial Ground and Landslip

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|---|---|---|---|
| | WGR | Worked Ground (Undivided) | Void | Not Supplied - Holocene |

## Superficial Geology

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|---|---|---|---|
| | DHGR | Dollis Hill Gravel Member | Sand and Gravel | Not Supplied - Cromerian |
| | STGR | Stanmore Gravel Formation | Sand and Gravel | Not Supplied - Pleistocene |

## Bedrock and Faults

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|---|---|---|---|
| | LC | London Clay Formation | Clay, Silt and Sand | Not Supplied - Ypresian |
| | CLGB | Claygate Member | Clay, Silt and Sand | Not Supplied - Ypresian |
| | BGS | Bagshot Formation | Sand | Not Supplied - Ypresian |

GEA

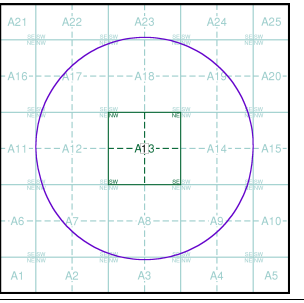
## Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

## Geology 1:50,000 Maps Coverage

| | |
|---|---|
| **Map ID:** | **1** |
| **Map Sheet No:** | **256** |
| **Map Name:** | **North London** |
| **Map Date:** | **2006** |
| **Bedrock Geology:** | **Available** |
| **Superficial Geology:** | **Available** |
| **Artificial Geology:** | **Available** |
| **Faults:** | **Not Supplied** |
| **Landslip:** | **Available** |
| **Rock Segments:** | **Not Supplied** |

## Geology 1:50,000 Maps - Slice A




## Order Details:

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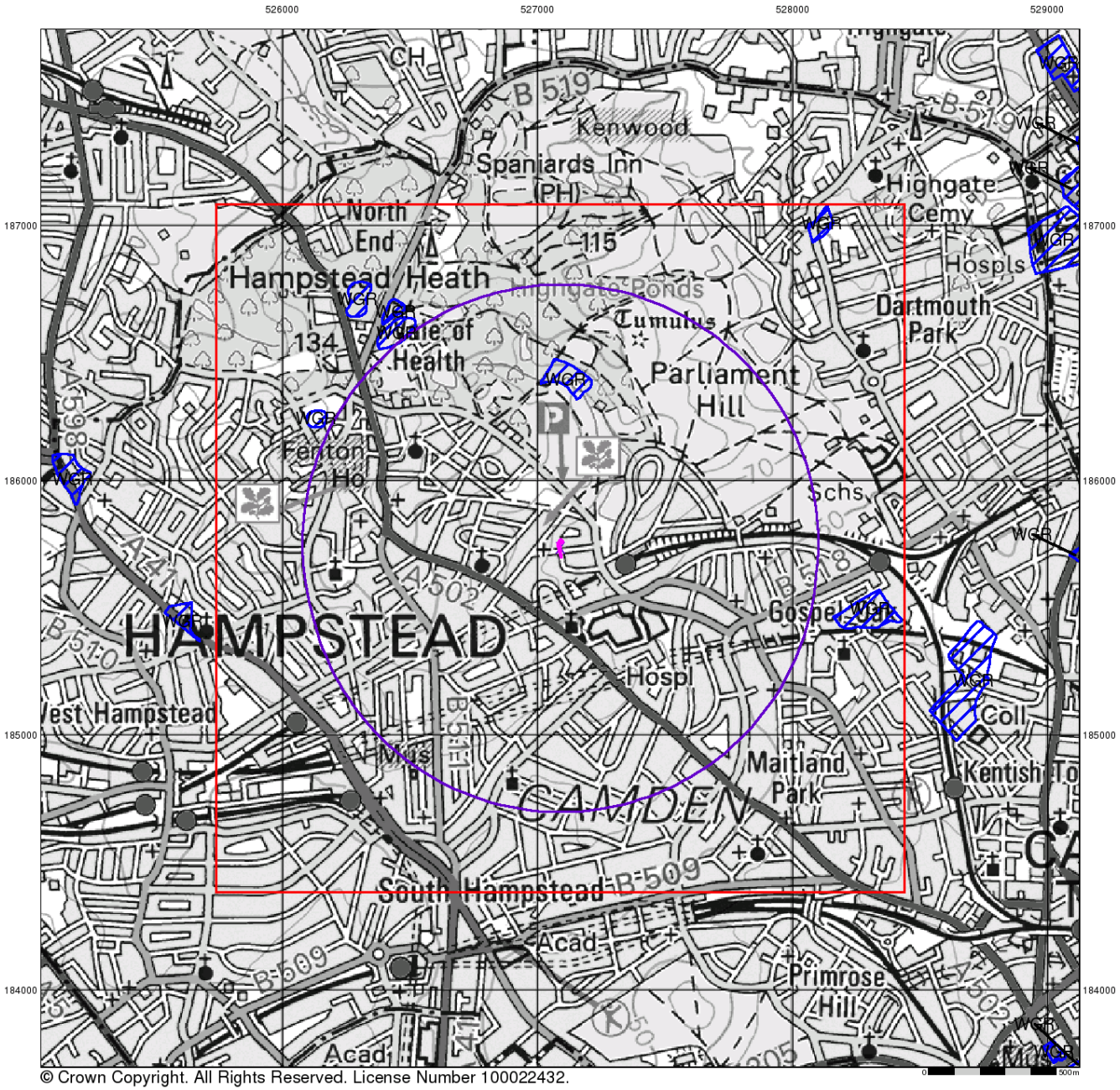
| Customer Reference: | J21141 |
| National Grid Reference: | 527090, 185730 |
| Slice: | A |
| Site Area (Ha): | 0.05 |
| Search Buffer (m): | 1000 |

## Site Details:

14a, Keats Grove, LONDON, NW3 2RS





GEA

## Artificial Ground and Landslip

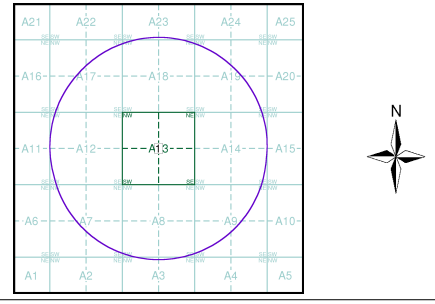
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

## Artificial Ground and Landslip Map - Slice A




## Order Details:

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## Site Details:

14a, Keats Grove, LONDON, NW3 2RS

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
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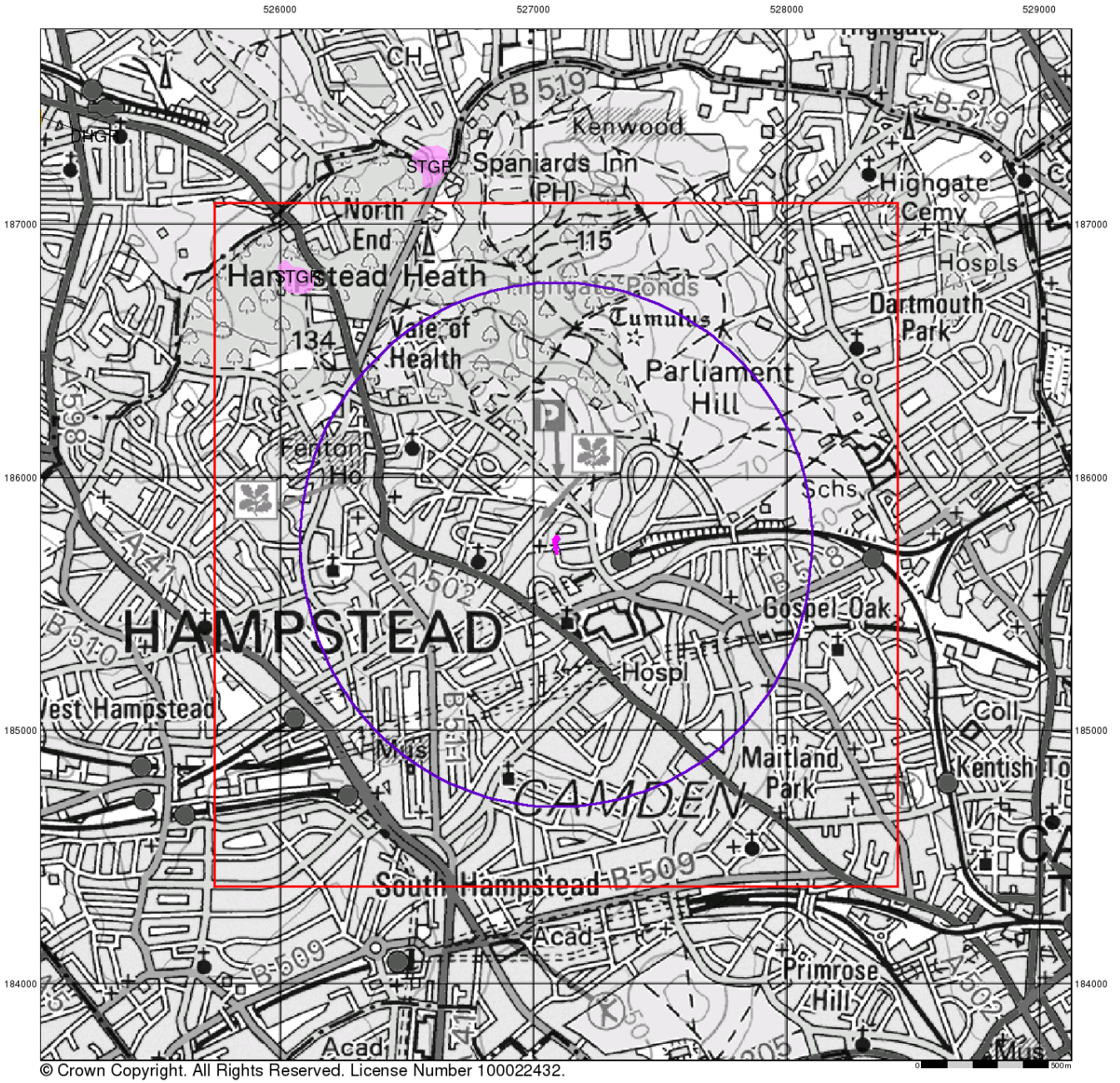




GEA

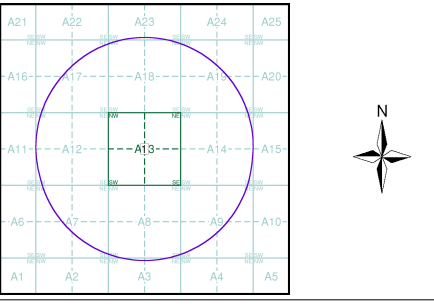
## Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

## Superficial Geology Map - Slice A




## Order Details:

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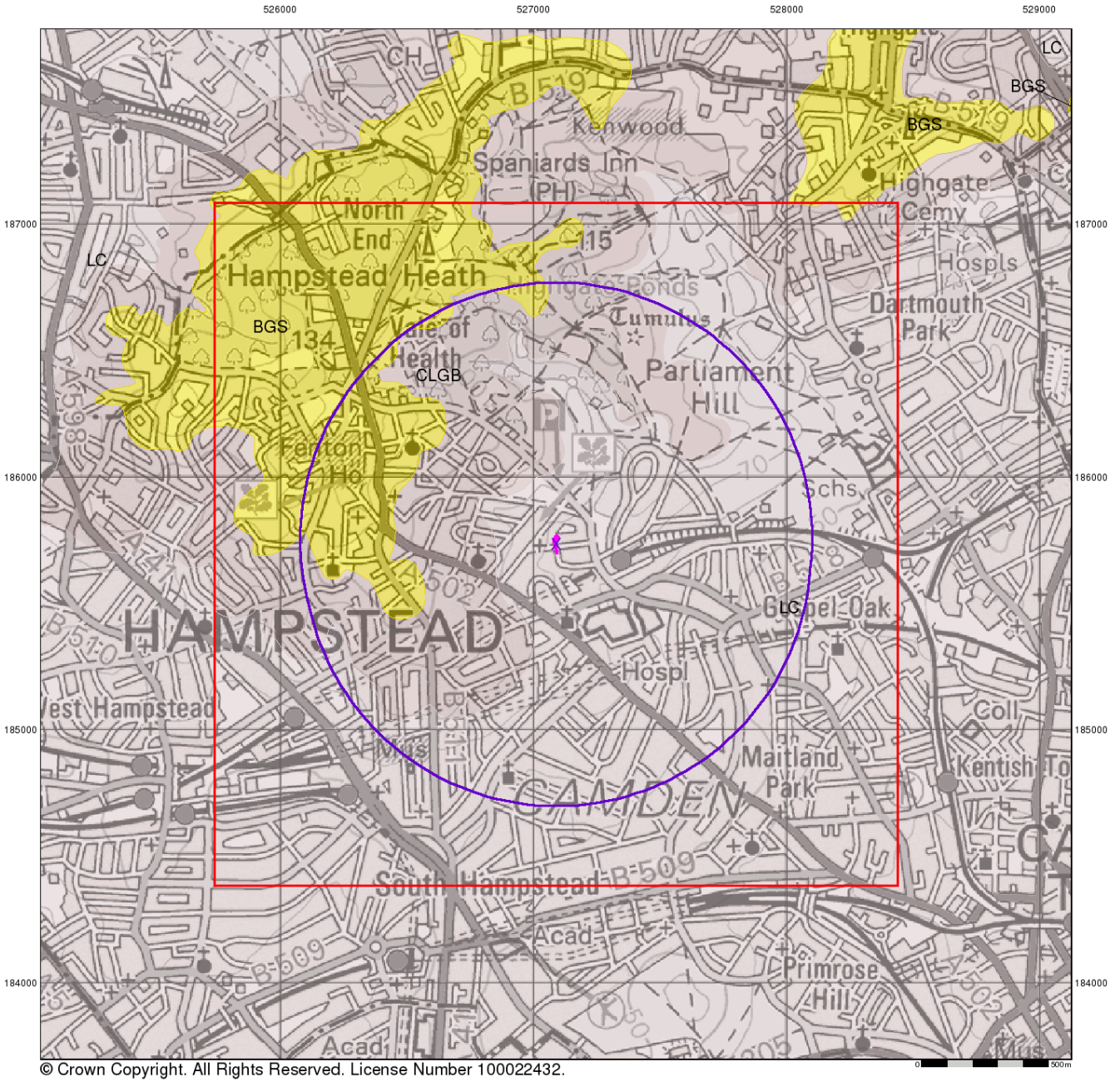





GEA

## Bedrock and Faults

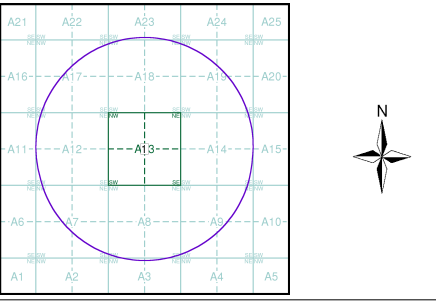
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

## Bedrock and Faults Map - Slice A

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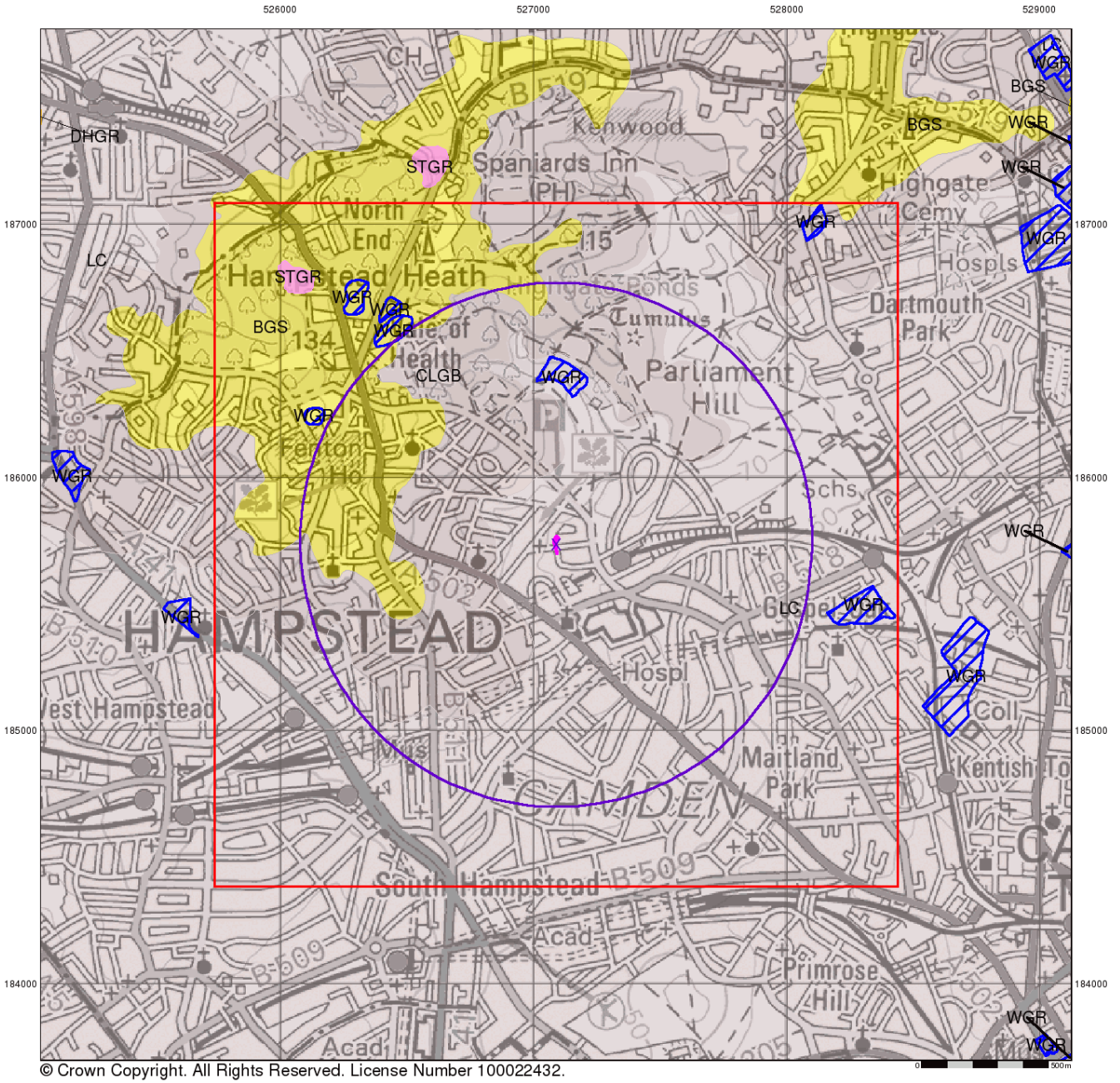





GEA

## Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

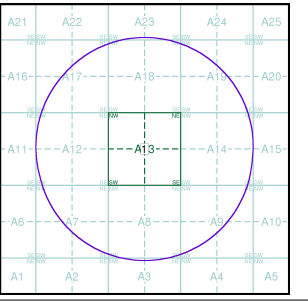
## Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

## Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

## Combined Geology Map - Slice A

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| Site Area (Ha): | 0.05 |
| Search Buffer (m): | 1000 |

## Site Details:

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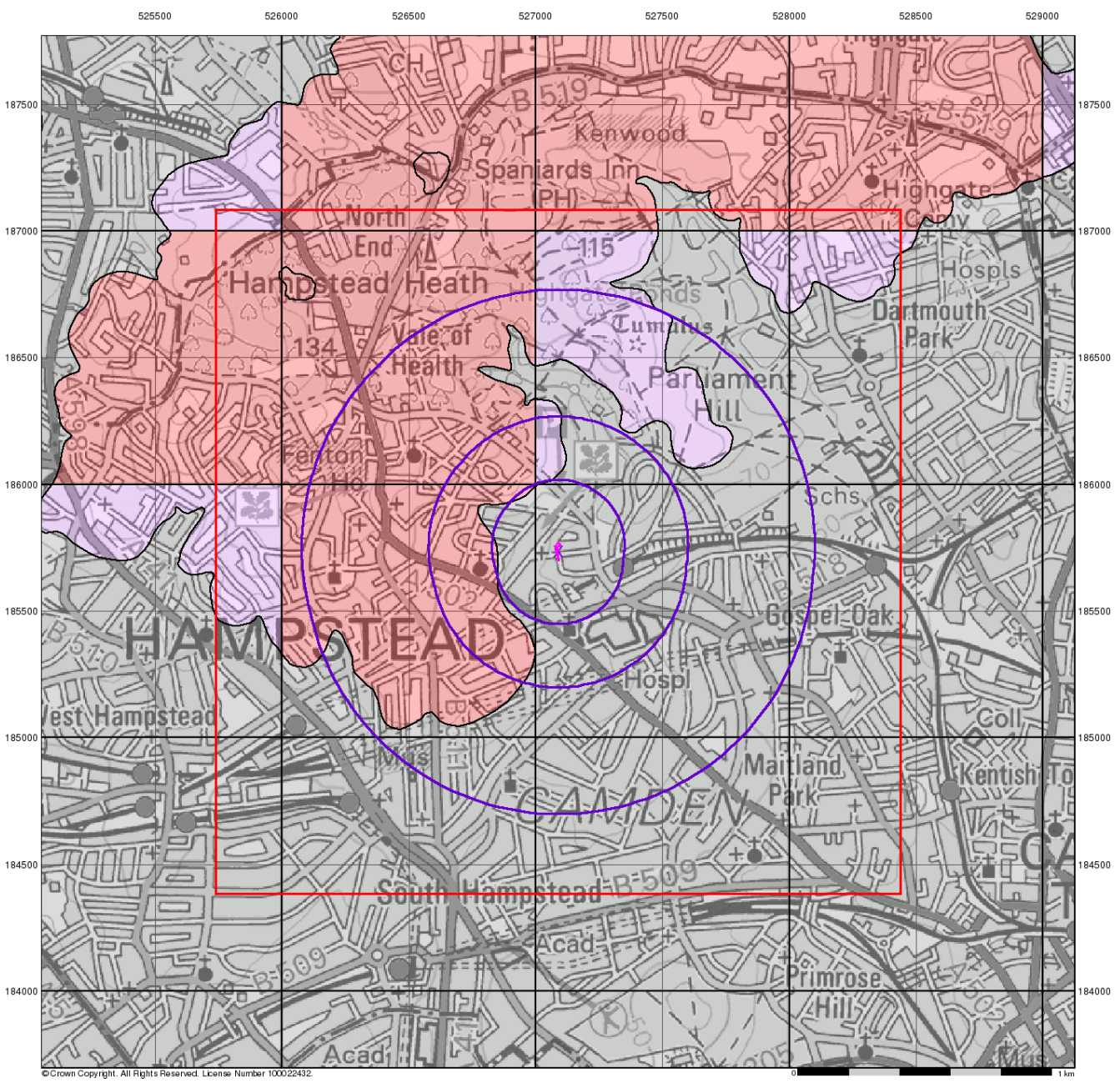



GEA

# Groundwater Vulnerability

## General

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

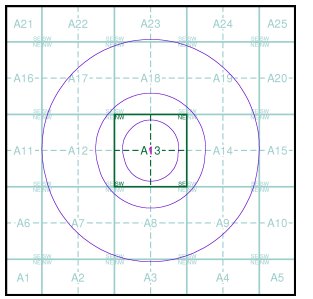
## Agency and Hydrological

| Bedrock Aquifers | Superficial Aquifers |
|---|---|
| High Vulnerability, Principal Aquifer | High Vulnerability, Principal Aquifer |
| High Vulnerability, Secondary Aquifer | High Vulnerability, Secondary Aquifer |
| Medium Vulnerability, Principal Aquifer | Medium Vulnerability, Principal Aquifer |
| Medium Vulnerability, Secondary Aquifer | Medium Vulnerability, Secondary Aquifer |
| Low Vulnerability, Principal Aquifer | Low Vulnerability, Principal Aquifer |
| Low Vulnerability, Secondary Aquifer | Low Vulnerability, Secondary Aquifer |

Unproductive Aquifer

Soluble Rock

## Site Sensitivity Context Map - Slice A




## Order Details

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|---|---|
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| Customer Ref: | J21141 |
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| Site Area (Ha): | 0.05 |
| Search Buffer (m): | 1000 |

## Site Details

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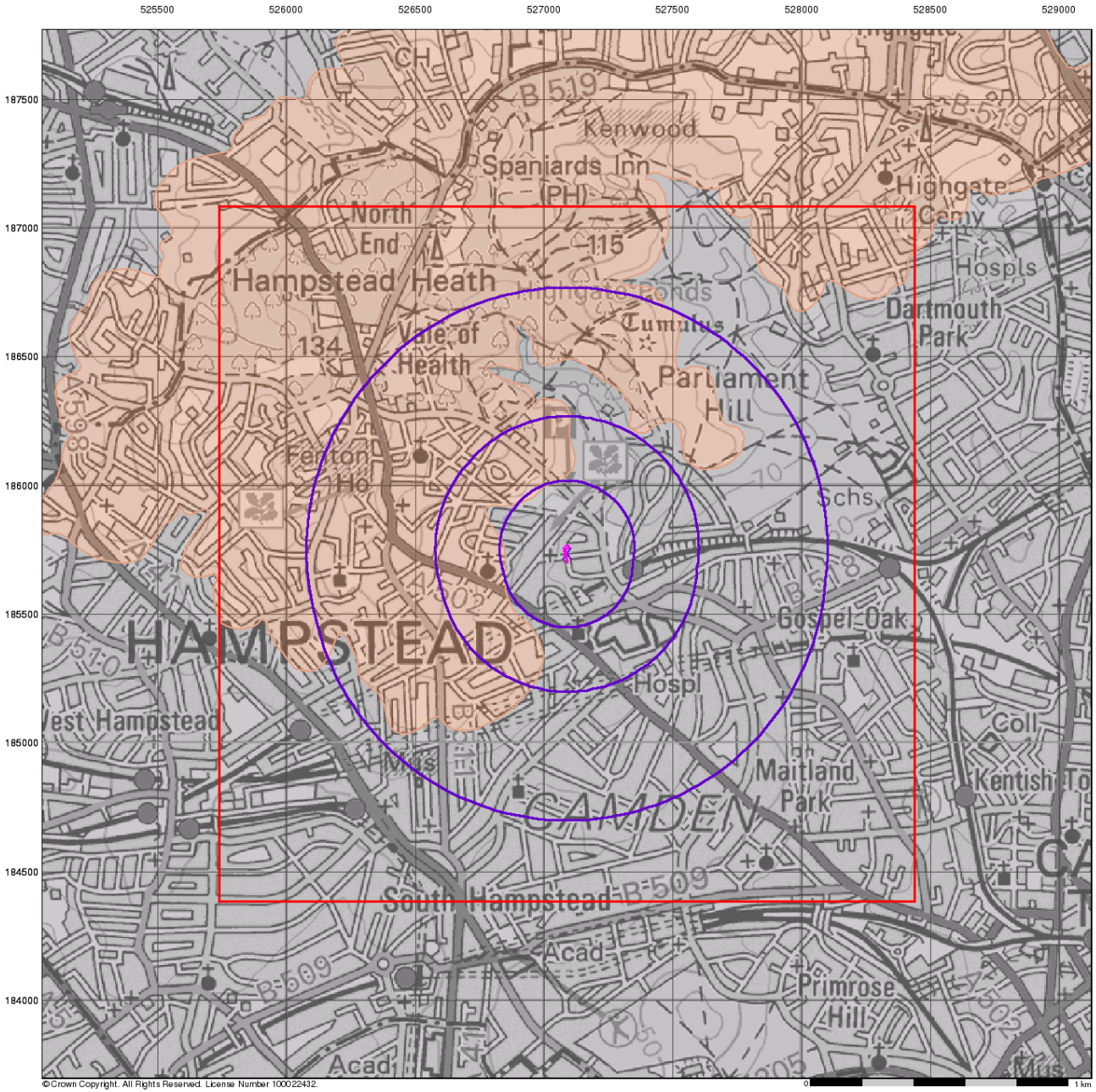



GEA

# Bedrock Aquifer Designation

## General

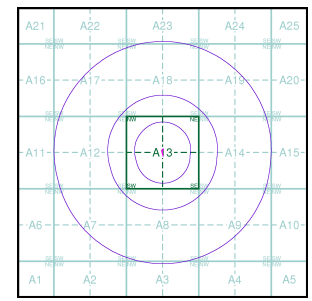
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

## Agency and Hydrological

**Geological Classes**

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

## Site Sensitivity Context Map - Slice A




## Order Details

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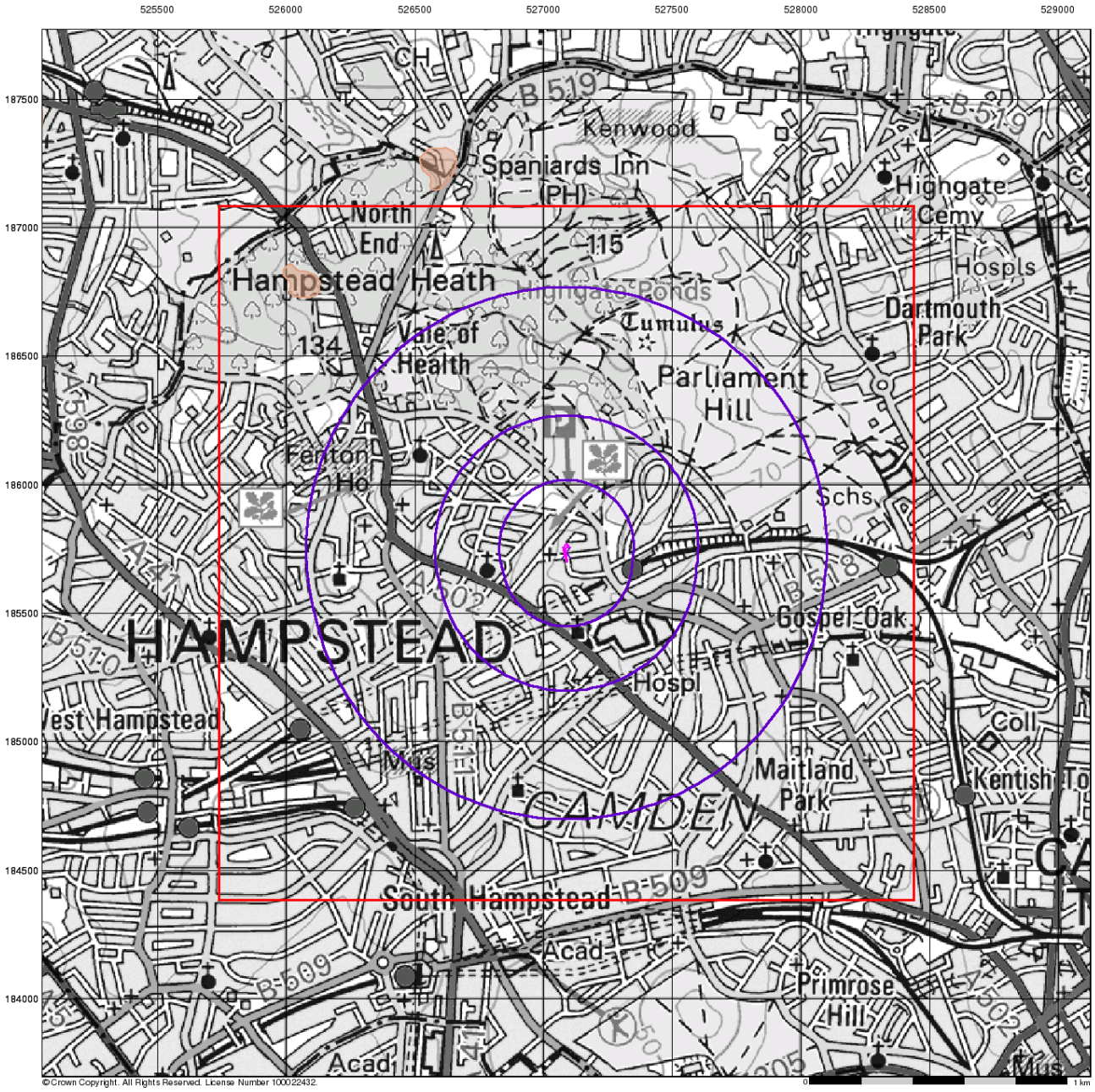



GEA

# Superficial Aquifer Designation

## General

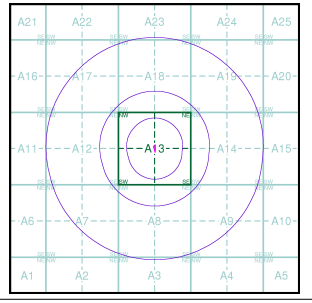
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

## Agency and Hydrological

**Geological Classes**

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

## Site Sensitivity Context Map - Slice A




## Order Details

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|---|---|
| Order Number: | 279009213_1_1 |
| Customer Ref: | J21141 |
| National Grid Reference: | 527090, 185730 |
| Slice: | A |
| Site Area (Ha): | 0.05 |
| Search Buffer (m): | 1000 |

## Site Details

14a, Keats Grove, LONDON, NW3 2RS


GEA

# Source Protection Zones

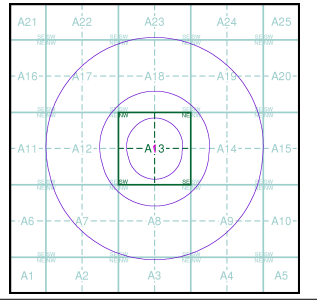
## General

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

## Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

## Site Sensitivity Context Map - Slice A




## Order Details

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| National Grid Reference: | 527090, 185730 |
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| Site Area (Ha): | 0.05 |
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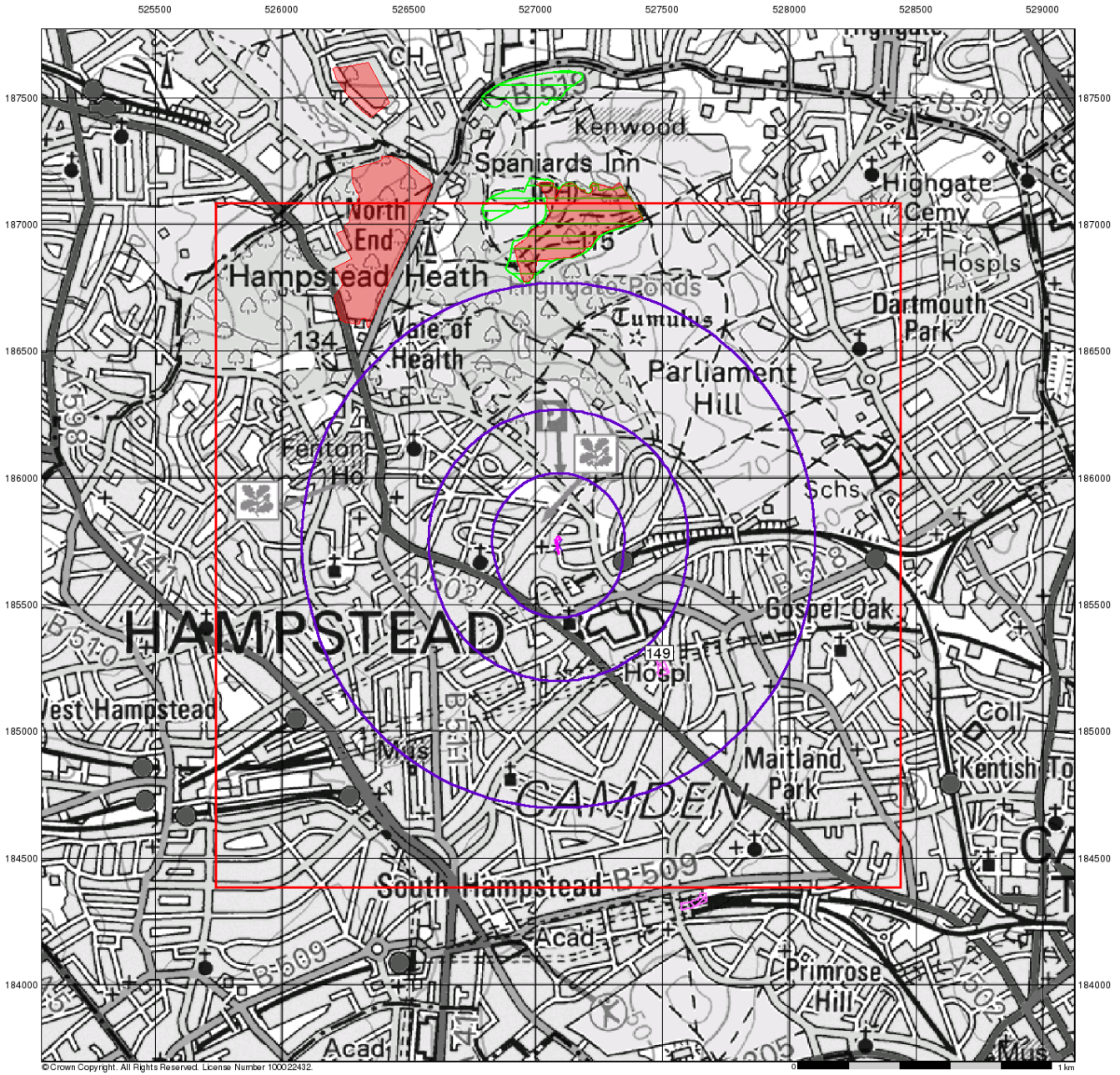




GEA

## Sensitive Land Uses

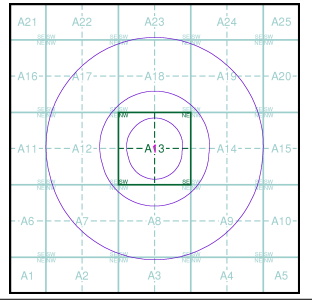
### General

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

### Sensitive Land Uses

- Ancient Woodland
- 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
- World Heritage Sites

### Site Sensitivity Context Map - Slice A

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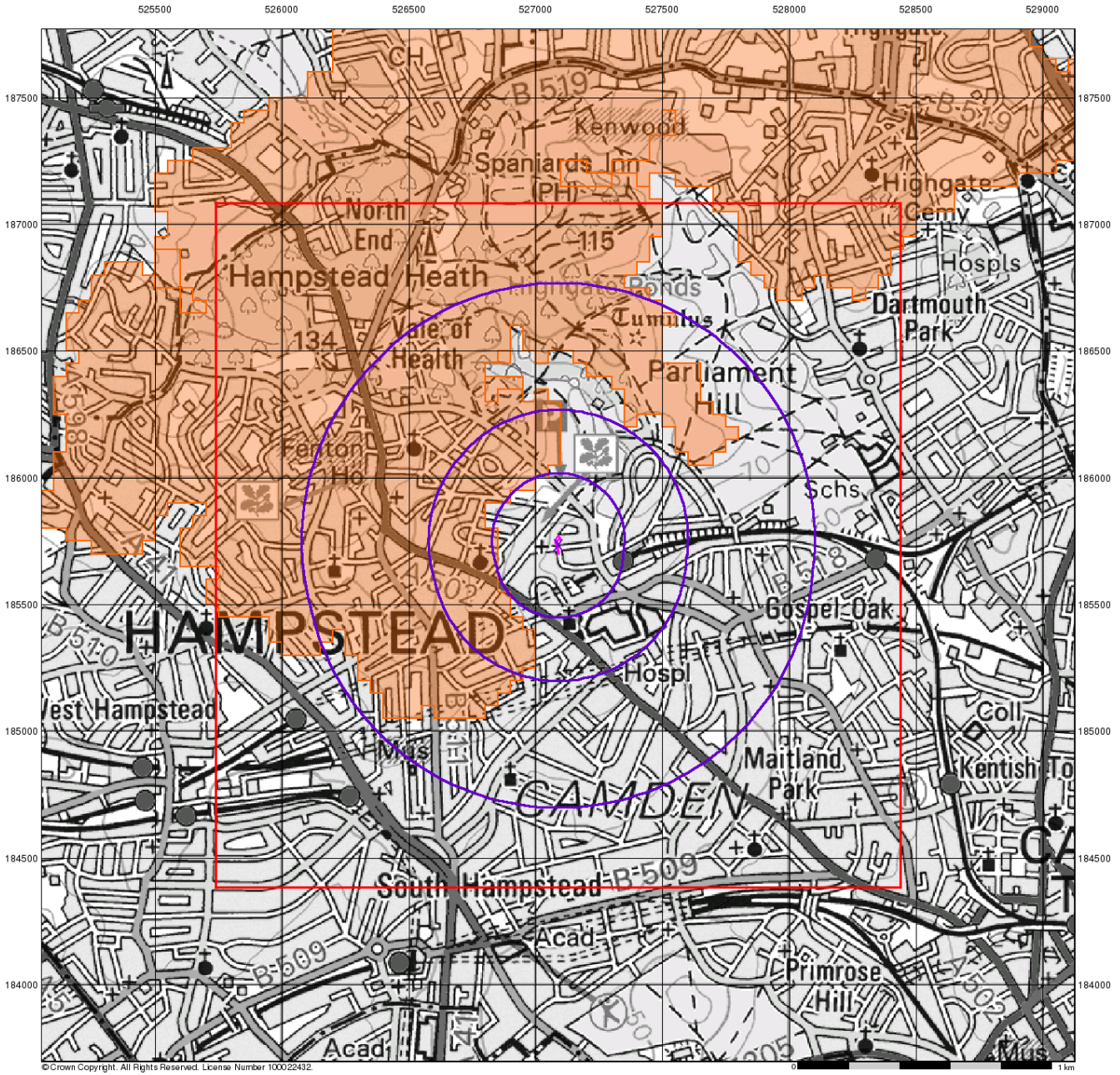




GEA

## BGS Flood GFS Data

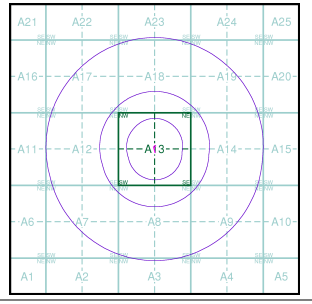
### General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice

### Agency and Hydrological (Flood)

Limited Potential for Groundwater Flooding to Occur
Potential for Groundwater Flooding of Property Situated Below Ground Level
Potential for Groundwater Flooding to Occur at Surface

## Site Sensitivity Context Map - Slice A

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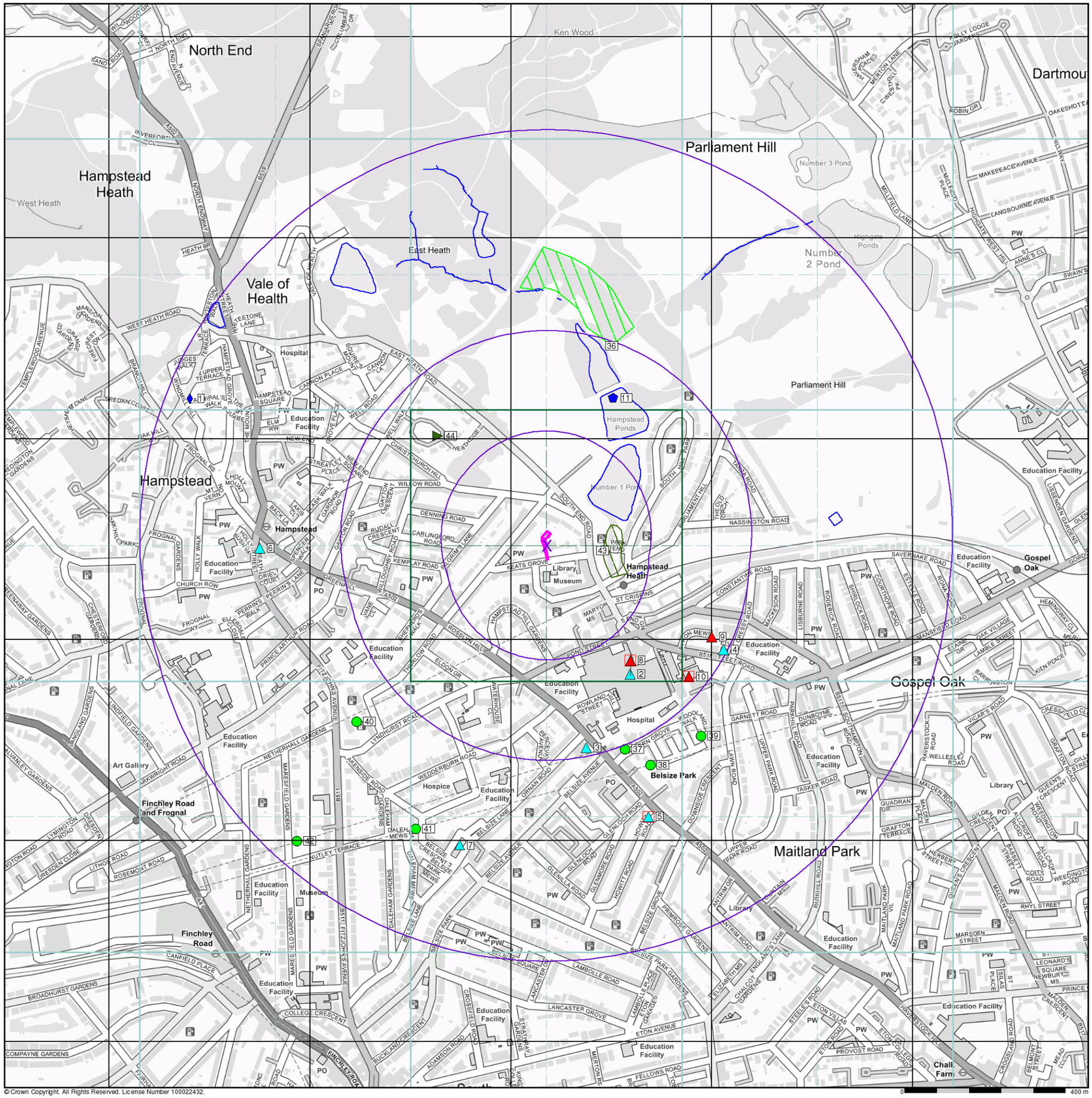





GEA

## General

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

Several of Type at Location

## Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

## Hazardous Substances

COMAH Site | Explosive Site | NIHHS Site

- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

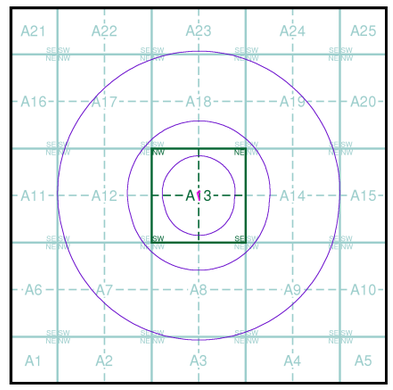
## Geological

- BGS Recorded Mineral Site

## Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

## Site Sensitivity Map - Slice A

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