Pentavia, Mill Hill

London NW7 2ET

Ground Investigation Report (April 2016)

Date: 22/03/19

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

CPC Project Services LLP

Ground Investigation

Pentavia Retail Park
Watford Way
MILL HILL
London
NW7 2ET

Report No: 15.02.014a
September 2016

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For and on behalf of ListersGeo, trading name of Listers Geotechnical Consultants Ltd

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1	5th April 2016	Draft
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EXECUTIVE SUMMARY

Project Reference	15.02.014a.
Site Location	Pentavia Retail Park, Watford Way, Mill Hill, London, NW7 2ET.
OS Grid Reference	Approximate centre of the site – 521851, 191303.
Development Proposals	A multi-storey residential apartment building, with an associated undercroft car park, access road and areas of soft landscaping.
Existing Buildings	Large warehouse type retail units in the central area of the site and a restaurant in the southern area of the site.
Topography	The site is mainly flat except for some slopes associated with a raised area of land in the northern area of the site. In addition, the ground levels beyond the southwestern boundary and parts of the northwestern boundary are lower than those on the site.
Vegetation	There is little vegetation on the site except for a few semi-mature trees in the northern area of the site and a few ornamental bushes across the car park in the southern area of the site.
Published Geology	The geological map for the area shows the site to be underlain by Made Ground over solid geology of the Palaeogene age London Clay Formation.
Site History	During the late nineteenth century and the early twentieth century the site was part of several large fields. By the mid twentieth century part of a road embankment was present across parts of the eastern area of the site, the northern area of the site was part of allotments and the southern area of the site part of a sports ground. By the end of the twentieth century the ground levels had been raised across the site and the retail units and restaurant currently on the site were constructed.
Hydrology	There are no on site surface water features. The nearest surface water feature to the site is a road side ditch located 21m to the north of the site.
Hydrogeology	The site is underlain by Unproductive strata.
Geotechnical Hazards	Deep Made Ground across the site.
Ground Conditions Encountered	The site and laboratory work from this and the previous investigation, reference 15.02.014 and dated May 2015, has shown the site to be underlain by Made Ground over solid geology of the Palaeogene age London Clay Formation. The Made Ground was encountered across the site from ground level down to an average depth of 9.8m across most of the site, but 4.8m in the southern area of the site. It generally comprised grey brown slightly sandy slightly gravelly clay, with the gravel consisting of flint, brick, concrete and some glass, clinker and wood. Some of the boreholes required chiselling and/or refused in the Made Ground, the cause of this is considered likely to be the presence of cobble and boulder sized material in the Made Ground. The London Clay Formation was encountered across the site underlying the Made Ground down to the base of the boreholes at depths of up to 25.0m. It generally comprised firm, becoming stiff at a typical depth of 9.0m and very stiff at a typical depth of 23.0m, grey brown slightly sandy clay.
Groundwater Encountered	Groundwater strikes were encountered at depths of between 0.5m and 9.0m depth at the boreholes, and standing water levels between 2.1m and 6.2m depth were recorded during the groundwater monitoring visits.
Ground Contamination	The Made Ground across the site is contaminated with Benzo(b)fluoranthene and Dibenzo(a,h)anthracene.
Groundwater Contamination	It is considered the site does not pose a significant risk to controlled waters.
Site Remediation Required	Capping of soft landscaped areas.
Foundations	Piled foundations (see Appendix A for pile design parameters).
Floor Slabs	Due to the presence of deep Made Ground across the site then suspended floor slabs are recommended.
Soil Gases	The gas monitoring carried out to date indicates Characteristic Gas Situation CS2. However, it is recommended Characteristic Gas Situation CS3 be assumed unless further gas monitoring visits are made.

Waste Soil Classification	Non-hazardous.
Chemical Attack On Buried Concrete	Design Sulphate Class DS – 2. ACEC Class AC – 2.
Roads & Hard Standing Design	Due to the site being underlain by deep Made Ground soil reinforcement is recommended.

This executive summary should be read in conjunction with the main report.

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GROUND INVESTIGATION REPORT

INTRODUCTION

A ground investigation has been undertaken for a proposed new residential development at Pentavia Retail Park, Watford Way, Mill Hill, London, NW7 2ET. A Site Location Plan is provided in Appendix A.

The Ordnance Survey National Grid Reference for the approximate centre of the site is 521851 191303.

This report describes the desk study and intrusive site investigation activities carried out by ListersGeo in order to provide an evaluation of the ground conditions and the extent of any soil contamination present on the site. The report presents initial human health and groundwater risk assessments based on the findings of the desk study information and subsequent contamination laboratory testing. The contamination risk assessment has been carried out using the source-pathway-receptor risk assessment methodology.

The report also discusses the geotechnical implications with regard to the proposed development based on the findings of the fieldwork and subsequent laboratory testing.

Instructions to undertake the investigation were received from Mr Sarfraz Akbar of CPC Project Services LLP in their Budget Estimate Acceptance Form, dated the 6th January 2016.

A previous ground investigation report was carried out on part of this site by Listers Geotechnical Consultants Ltd, reference 15.02.014 and dated May 2015, and we have relied on information within that report to aid our recommendations. The site boundaries and development proposals for the previous investigation were significantly different to those associated with this investigation. However, this current report should be read in conjunction with the previous report for full details of investigations undertaken at the site.

This report has been prepared for the sole use of the client and their professional advisors. This report shall not be relied upon by third parties without the express written authority of ListersGeo. If an unauthorised third party comes into possession of this report they must not rely on it and the authors owe them no duty of care and skill.

SCOPE OF THE INVESTIGATION

The scope of the investigation was to undertake a desk study and walkover survey, provide an assessment of the geotechnical engineering properties of the ground and the extent of any soil contamination on the site. A contaminated land risk assessment was undertaken based on the Contaminated Land Exposure Assessment (CLEA) and Environment Agency RTM guidelines.

PROPOSALS

It is our understanding the development proposals are for a multi-storey residential apartment building, including an undercroft car park, access road and soft landscaped areas.

SITE INFORMATION AND WALKOVER SURVEY

A walkover survey of the site and its immediate surrounds was undertaken as part of this investigation on the 25th January 2016. A selection of site photographs is presented in Appendix A.

The site consists of a roughly triangular shaped parcel of land, with overall dimensions of approximately 385m by 120m and covers an area of approximately 2.3 hectares. It is currently mainly occupied by an existing retail development, with large warehouse type retail units located in the central area of the site, a car park and restaurant in the southern area of the site and undeveloped land in the northern area of the site. The site is mainly flat lying, except for the undeveloped land in the northern area of the site which appears to have been built up compared to the surrounding area. Consequently, its surface is raised by approximately 1.5m to 2.0m compared to the rest of the site and there are some slopes associated with this raised land. No obvious sign of instability associated with these slopes was observed during the site walkover.

The eastern site boundary is mainly formed by a low brick wall with the A1 Watford Way located just beyond. The southern site boundary is open with an access road and a fuel filling station just beyond. The southwestern site boundary is formed by a wooden fence with the M1 motorway just beyond. The northeastern site boundary is partly open and partly formed by a wooden fence, both with a path and undeveloped land just beyond. The ground levels beyond most of the site's boundaries are similar to those on site, except for the surface of the M1, which is approximately 1.5m lower than the ground level on the site, and the undeveloped land and path beyond parts of the northeastern site boundary which is approximately 4.0m below the ground level on the site. Consequently, there are concrete retaining structures along parts of the southwestern and northeastern site boundaries. No obvious signs of structural distress associated with these retaining walls were observed during the site walkover.

The warehouse type retail units located in the central area of the site are steel framed structures with metal sheet cladding and flat roofs. The restaurant is a brick constructed structure with a pitched tiled roof. No access was possible into these buildings at the time of the site walkover.

The undeveloped northern area of the site has a few semi-mature trees across it, and the car parking area that forms most of the southern area of the site has some ornamental bushes. Except for these there is little vegetation across the site.

It is our understanding a sewer aligned roughly northeast to southwest is present in the service yard for the retail units in the northern area of the site. In addition, a manhole cover lifted in this area revealed a deep chamber with running water within it. It wasn't possible to determine the direction the water was flowing.

Although no obvious signs of contamination were observed on the site, it's considered spills and leaks from cars parked at the site and migration of hydrocarbons onto the site from the fuel filling station located close to the southern site boundary are potential sources of contamination.

GEOLOGY

Reference to the British Geological Survey 1:50,000 scale map and other published geological information on the area indicates that the site is likely to be underlain by Made Ground over solid geology of the Palaeogene age London Clay Formation.

The geological map for the area shows the site to be underlain by Made Ground, however the nature of this Made Ground is not described. It also states, 'Within older urban areas, much of the surface has been

partially or wholly disturbed by human activity and thus made, worked and landscaped ground are not delimited.' On this basis, it is anticipated the site is likely to be underlain by deep Made Ground.

The London Clay Formation is described as clay that is silty in parts, and may be up to 110m thick in this area.

There are no freely available historic borehole logs located within 100m of the site.

PREVIOUS WORK

A ground investigation was previously undertaken by Listers Geotechnical Consultants Ltd for a proposed commercial development that covered parts of the current site, reference 15.02.014 and dated May 2015. The development proposals and boundaries have altered significantly between the two investigations and the salient points relevant to this report are included here, however the full report should be referred to for more detail.

- The site was part of two large fields between 1882 and 1914. Through the mid twentieth century the northern area of the site was an allotment and the southern area a sports ground, in addition a drain aligned roughly northeast to southwest was located in the northern area of the site. By 1983 the ground levels across the site had been raised as part of the construction works for the M1. By 1990 the warehouse type retail units in the northern area of the site and the restaurant building in the southern area of the site had been constructed.
- The site is at low risk of unexploded ordnance.
- There are no on site surface water features, however there is a deep sewer that appeared to be aligned northeast to southwest in the northern area of the site. The deep sewer is roughly on the same alignment as the drain noted to be crossing the northern area of the site during the mid twentieth century.
- In terms of its hydrogeology the site is located over Unproductive Strata, the London Clay Formation.
- The site is recorded to have been a landfill site during the mid twentieth century. There is no record as to what types of waste were accepted, however it was considered it was likely to have been associated with the construction works for the M1.
- No radon protection measures are required for new buildings at the site.
- The Initial Conceptual Site Model for the site identified the Made Ground associated with the site's former use as a landfill, spills and leaks from the site's former land use and from parked vehicles, local current and historical industrial/commercial land uses and ground gases as potential sources of contamination. The potential receptors for the site were identified as the end users of the site and construction workers, and potential pathways as direct soil ingestion, dermal contact with the soil and inhalation of vapours and ground gases.
- The intrusive investigations involved five cable percussive boreholes down to a maximum depth of 20.0m, and six hand excavated trial pits down to a maximum depth of 1.2m. The ground conditions encountered comprised Made Ground down to proven depths of between 8.5m and 10.5m over solid geology of the London Clay Formation down to the base of the boreholes.

- The Made Ground generally comprised firm or stiff brown slightly gravelly slightly sandy clay, and contained some cobbles. The gravel and cobbles consisted of brick, concrete and flint. Classification testing indicated the Made Ground had medium volume change potential, based on the BRE Digest 240.
- The London Clay Formation generally comprised stiff brown or grey slightly sandy clay, with classification testing indicating it has medium and high volume change potential based on the BRE Digest 240.
- The contamination testing did not reveal any elevated concentrations compared to the relevant environmental standards for human health for a commercial site. However, a sample of Made Ground from the undeveloped northern area of the site was found to contain chrysotile type asbestos at concentrations below detectable limits of less than 0.001%.
- The conclusions of the Human Health Risk Assessment was there was no evidence of widespread contamination at the site, however due to the presence of asbestos in the undeveloped northern area of the site, areas of soft landscaping in the northern area of the site will require a capping layer to break the potential pollutant linkage.
- No controlled waters receptors were identified for the site; therefore it was considered the site does not pose a significant risk to controlled waters.
- Due to the presence of deep Made Ground across the site piled foundations founded well down into the London Clay Formation were recommended.
- Although the gas monitoring carried out as part of the investigation did not reveal significant concentrations of carbon dioxide or methane, due to the site being located over a former landfill further gas monitoring was recommended in order to allow a more detailed ground gas risk assessment.
- Based on the chemical testing results most of the waste soils were classified as inert, the Design Sulphate Class as DS-2 and the Aggressive Chemical Environment for Concrete as AC-2.

The Human Health Risk Assessment for the previous investigation was based on the proposed end use for the site being commercial. However, the current proposals are for an end use of residential with plant uptake. In order to provide an appropriate Human Health Risk Assessment for the current residential proposals the chemical testing results for the previous investigation described above have been re-assessed by comparing them with the relevant environmental screening standard for a residential site with plant uptake.

Of the contaminants tested for only lead recorded a value higher than its relevant environmental standard value for human health for a residential setting.

Statistical analyses using the methodology set out in the CL:AIRE Document, ‘Guidance on Comparing Soil Contamination Data with a Critical Concentration,’ has been undertaken on the laboratory test results in order to establish a ‘true mean concentration (μ)’ within the planning scenario for each determinant over the whole site area.

These analyses establish whether the data is normally distributed as well as taking into account possible erroneously high values and determine whether contamination ‘outliers’ features are present on the site.

Once this has been established the 'upper confidence limit of 95% on μ' are subsequently compared with the relevant environmental standard value, or 'Critical Concentration (C_c)'.

For the purposes of statistical analysis, where values are recorded at below detectable limits then the limit value is adopted. This can distort the data distribution and erroneously identify outliers. Where outliers fall below C_c, then further assessment is not warranted and such results are considered to pose a low risk to end users.

Of the six samples tested as a part of the previous investigation, the values for lead obtained ranged from 29mg/kg to 210mg/kg. The statistical analysis showed that there were no outliers recorded and the data was normally distributed. The one-sample t-test was undertaken on the lead results with a 95% upper confidence limit of 164mg/kg being established for the site. This is below the C4SL for Lead of 200mg/kg.

A copy of the statistical analysis results is provided in Appendix H.

DESK STUDY AND BACKGROUND INFORMATION

GENERAL

Considering the significant changes to the site boundaries and proposed end use for the site a new review of the desk study data acquired for the site as part of the previous investigation by Listers Geotechnical Consultants Ltd, reference 15.02.014 and dated May 2015, has been undertaken to establish the former land usage and the potential for any historically derived sources of chemical contamination, as well as provide information to aid our geotechnical assessment. A copy of the desk study information is presented in Appendix G of this report.

The information provided in the desk study is obtained from independent third party sources. We have relied on this information but no guarantee can be given for the accuracy or completeness of the third party data used. It should be appreciated that such data is not exhaustive and is constantly being updated and reviewed in light of new information and procedures. Therefore improved practices, technology and new information may affect our conclusions and hence this report should be referred back to us for reassessment if new data comes to light, or changes in legislation/best practise is identified prior to development. Similarly should the development commence after expiry of one year from publication of this report, then we recommend this report is referred back to us for reassessment.

The desk study comprises a review of the following consultations and information sources:

- Environment Agency (EA)
- Natural England
- National Geoscience Information Service
- Public Health England
- Centre for Ecology & Hydrology
- British Geological Survey (BGS)
- Contemporary Trade Directories
- Historical Ordnance Survey maps
- Unexploded Ordnance (UXO) maps

Information from the above referenced sources has been utilised to develop a conceptual model of the site for use in the geotechnical appraisal and source-pathway-receptor risk assessment.

HISTORY OF THE SITE

The history of the site has been established by reviewing the historical Ordnance Survey maps and aerial imagery of the area, collected as part of the desk study information. This has established the following:

Time Period	Historical usage of the site	Historical usage of the surrounding Area
1883-1913	The site is part of several large fields, with tree lined field boundaries aligned roughly northeast to southwest across the site. There are two ponds in the northern half of the site. Most of the site boundaries are open with the fields continuing beyond.	There are railways aligned roughly northwest to southeast close to the southwestern and northeastern site boundaries. There are no other significant developments within 100m of the site.
1935	A road embankment is shown across parts of the eastern area of the site.	A road, which is on the same alignment as the current A1 Watford Way, is located just beyond the eastern site boundary. There are houses located within 100m of the site beyond the railway to the northeast of the site.
1964	The northern area of the site is part of allotments, and the southern area part of a sports ground. A pavilion is shown in the southern area of the site and a further structure on the southwestern site boundary. In addition, a drain is shown aligned roughly northeast to southwest across the northern area of the site.	A works yard is shown approximately 100m to the north of the site.
1979-1983	The ground levels across the site appear to have been raised so the ground level across most of the site is now the same as the ground level of the A1 Watford Way. As a consequence an embankment sloping downwards towards the northeast is shown across the northern area of the site.	The M1 is shown just beyond the southwestern site boundary, and it is considered likely the ground levels have been raised across the site as part of the construction process for the M1. The railway previously located close to the northeastern site boundary is no longer shown.
1990-2014	The site has been developed with structures shown on the same configuration as the current large retail units in the northern area of the site and the restaurant in the southern area of the site.	A fuel filing station is shown just beyond the southern boundary for the site.

The historical Ordnance Survey maps for the site described above indicate the presence of a drain aligned roughly northeast to southwest across the northern area of the site. A manhole cover was lifted during the site walkover revealing deep running water. It is our understanding there is a deep sewer culverted beneath the northern area of the site and it is considered the drain noted on the historical Ordnance Survey maps and the deep running water noted during the site walkover are likely to be the culverted deep sewer.

UNEXPLODED ORDNANCE AND BOMB SITES

As part of the previous investigation, reference 15.02.014 and dated May 2015, an Unexploded Ordnance (UXO) Preliminary Risk Review was carried out for this site.

This found the following;

- No military history was found for the site.
- No records were found to indicate that the site was subjected to aerial bombardment by the Luftwaffe during World War II.
- No records were found to indicate that items of UXO have been found or recovered from the site.
- The footprint of the site has undergone extensive redevelopment since 1945.

The conclusion of the Preliminary Risk Review was that there was only a low UXO risk on this site.

HYDROLOGY

There are no surface water features on the site. Based on the site walkover and desk study information acquired for the site the nearest surface water feature to the site is a road side ditch located 21m to the north. Due to the nature of this feature and its location off site it is not considered to be at risk from the site.

There are no current surface water abstraction licenses located within 1,000m of the site.

HYDROGEOLOGY

Information obtained from the Environment Agency indicates that the site is located on Unproductive Strata, the London Clay Formation.

The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are divided into two different types of aquifer designation:

- **Superficial (Drift)** - Permeable unconsolidated (loose) deposits. For example, sands and gravels.
- **Bedrock** - Solid permeable formations e.g. sandstone, chalk and limestone.

For each type there are Principal, Secondary A, Secondary B and Unproductive Strata, each with a decreasing rank of importance.

There are no current groundwater abstraction licenses located within 1,000m of the site.

According to information provided by the Environment Agency the site is not within a Source Protection Zone (SPZ). An SPZ is a protection zone placed around a well or borehole that supplies groundwater of potable quality.

There has been one substantiated pollution incident to controlled waters within 250m of the site. This occurred in 1995 and was located 115m to the northwest of the site. It involved oils and was classified as a Category 3 – Minor Incident. Due to the nature of the incident, the time since it occurred and its distance from the site this pollution incident is not considered to pose a significant risk to the site.

LANDFILL, WASTE TREATMENT AND INDUSTRIAL USAGE SITES

Reference to records from the BGS, the Environment Agency and the Local Authority indicates that there are no current waste transfer or treatment sites or waste management facilities within 1,000m of the site. However, they do indicate there was a registered waste transfer site located approximately 40m to the south of the site. The site was authorised to accept asbestos, but not biodegradable or putrescible waste, clinical wastes, notifiable wastes or special wastes. Its license is recorded to have lapsed in 1985.

Reference to records indicates that there was a Local Authority Recorded Landfill and a Historical Landfill on the site. There is no information regarding the type of waste accepted, however the last input is recorded as 1965. It is considered these activities were likely to be associated with the construction of the M1 London Extension which was opened in the late 1960s.

In addition, there are two Local Authority Recorded Landfill Sites and two other Historical Landfill Sites located within 500m of the site. Two of these were located approximately 360m to the south of the site, with the specified waste including inert waste and the last input recorded as 1978. The other two were located 488m to the southwest of the site, with the specified waste including inert and industrial waste and the last input recorded as 1986.

There are two applications for Local Authority Pollution Prevention and Controls located within 500m of the site. Both of these are located at the Watford Way Filling Station which is located just beyond the southern site boundary.

There are nine Contemporary Trade Directory Entries that have been found within 250m of the site. The nearest of these is on the site and is for an electrical goods sales and manufacturers (Comet). The others include a garage services, a paint and varnish stripping business and a car body repairs. A full list is included in the Envirocheck Report provided in Appendix G.

The nearest active fuel filling station is the Watford Way Filling Station referred to above and located just beyond the southern site boundary.

RADON GAS

Envirocheck utilise information from the National Geoscience Information Service and the British Geological Society to determine if the site is within a radon affected area and if radon protection is considered necessary. The BGS data complies with the BR 211, 'Radon: Guidance on Protective Measures for New Buildings,' and indicates that no radon gas protection is required for new buildings at this site.

RISK OF GASEOUS CONTAMINATION

We have provisionally assessed the risk of ground gases impacting the site, by reference to guidance given in the paper, 'A Pragmatic Approach to Ground Gas Risk Assessment for the 21st Century,' Card and Wilson, 2011. This is a follow up paper to the CIRIA Report 665 and is compatible with that document.

The site is located on a Local Authority Recorded Landfill site and a Historical Landfill site. It is not known what types of waste were accepted, however it is considered likely that the landfill activities were likely to be associated with the construction of the M1 London Extension in the 1960s. On this basis, the landfill material

is unlikely to have contained significant quantities of degradable material. However, the presence of the landfill operations at the site is considered to be a potential source of ground gases, and therefore it is considered at this stage ground gases do pose a risk to the site and monitoring will be required.

GROUND RELATED HAZARDS

The desk study information identified that the site does not lie within an area likely to be affected by coal or non-coal mining.

The Hazard Potential for shrinking and swelling clay at the site is classified as moderate. The Hazard Potential for the following is classified as very low or no hazard; collapsible ground, compressible ground, ground dissolution, landslide and running sand.

BACKGROUND SOIL CHEMISTRY

Information from the BGS regarding the urban soil chemistry averages for the London area are as follows;

Contaminant	Urban Soil Averages (mg/kg)
Arsenic	17
Cadmium	0.9
Chromium	79
Lead	280
Nickel	28

Most of these concentrations are below the generic environmental screening standards for a residential site, however the concentration for lead is above the C4SL for a residential site with plant uptake of 200mg/kg.

POTENTIALLY SENSITIVE LAND USES

The site is not located within an environmentally sensitive area.

CONCEPTUAL SITE MODEL

A preliminary qualitative risk assessment has been carried out using the source-pathway-receptor principle to create a conceptual model for the site.

As such, potential sources of contamination and potential receptors have been assessed using the Contaminated Land Exposure Assessment (CLEA) Guidelines. The fact that a pathway must exist between a potential source of contamination and a potential receptor for there to be a risk, has been taken into account.

The results of the desk study and walkover indicate that the following potential sources of ground contamination are present at or in close proximity to the site:

- Deep Made Ground associated with the site's former use as a landfill site is likely to be present.
- Contaminants associated with the site's historical use.
- Minor spills and leaks from vehicles parked at the site.

- Migration of contaminants onto the site from local current and historical industrial and commercial land uses, including the fuel filling station located just beyond the southern site boundary.
- Ground gases generated below the site or migrating on to the site from offsite sources..

The following most sensitive receptors have been identified at the site:

Human Health

- End users of the site (residents).
- Construction workers.

It is considered that a number of potential pathways exist between these potential sources and the above identified receptors.

For the human receptors these include:

- Direct soil ingestion in areas of exposed soil.
- Ingestion of soil attached to homegrown fruit and vegetables.
- Ingestion of fruit and vegetables with contamination uptake.
- Inhalation of indoor and outdoor vapours and dust.
- Dermal contact with contaminated soil.
- Inhalation of ground gases.

EXPLORATION AND TESTING

GENERAL

As part of this investigation a total of twenty-seven exploratory holes were formed at the site, inclusive of three machine excavated trial pits, seven cable percussion boreholes, twelve continuous tube sample boreholes and five dynamic probe holes, between the 25th and 28th January 2016. The logs are provided in Appendix B.

The exploratory hole locations were surveyed using a manhole cover positioned in the site access road near the southern corner of the existing retail units as a temporary datum (65.46m AOD), as provided on the Laser Survey's Topographical Drawing reference C6235.

SAMPLING STRATEGY

The positions of the exploratory holes were selected by ListersGeo mainly to provide a wide coverage of information on the site area. However, BH104 was located close to the southern site boundary in order to target the fuel filling station that is located just beyond the southern area of the site, and TP102 and TP103 were located close to the southwestern site boundary in order to determine information regarding the concrete retaining wall that forms part of the southwestern site boundary. Access was limited to the external areas of the site.

The positions of the exploratory holes undertaken at the site as part of this investigation can be seen on the Exploratory Hole Location Plan in Appendix A. The results of the laboratory testing are provided in Appendix C.

METHODOLOGY

The trial pits, TP101 to TP103, were excavated with a JCB type backhoe excavator. TP101 was taken down to 3.0m depth, however both TP102 and TP103 had to be terminated at 0.5m depth due to concrete obstructions. Small-disturbed samples were taken at regular intervals down to the base of the trial pits for subsequent laboratory testing and inspection. On completion, the trial pits were carefully backfilled with arisings in thin layers, ensuring that excavated material was replaced in the same order as it had been removed.

The continuous tube sample boreholes, CT101 to CT112, were put down using an Archway Competitor Dart rig to a maximum depth of 6.0m. CT110 was terminated at 0.5m depth due to a concrete obstruction, CT104 was terminated at 4.0m depth after it collapsed and CT101 and CT102 were terminated at depths of 4.4m and 5.0m respectively due to refusal on unknown obstructions. The boreholes were advanced using a plastic lined steel tube sampling system, driven into the ground by a top drive percussive hammer. A near continuous 87mm – 57mm diameter core sample was recovered of the sampled materials for future examination and sub-sampling. Following the sampling, super heavyweight dynamic probing, SHDP101 to SHDP105, was carried out adjacent to the positions of boreholes CT101 to CT105 in order to give an indication of the relative density of the soils encountered at these locations. Due to damage incurred to the dynamic probe rods while carry out SHDP105 that made it impossible to carry our further probe holes, standard penetration testing was carried out at 1.0m intervals at boreholes CT106 to CT112.

Boreholes BH101 to BH107 were drilled utilising a standard cable percussion rig, at a diameter of 150mm, down to a maximum depth of 25.0m below ground level. Due to the presence of a concrete obstruction BH103 was terminated at 0.5m depth. Metal casing was extended to a maximum depth of 9.5m in order to avoid the collapse of the loose deposits within the upper part of the boreholes and to seal out groundwater inflows. Disturbed samples were collected at regular intervals throughout the boreholes for future laboratory inspection and testing. Standard penetration tests (SPTs) and undisturbed tube samples (U100s) were taken at 1.0m intervals down to 10.0m depth and at 1.5m intervals thereafter.

On completion of the boring boreholes BH101, BH104, BH105 and BH107 were utilised for the installation of a 50mm diameter slotted uPVC standpipe from 6.0m depth to up 1.0m below existing ground level. From 1.0m depth up to ground level a plain pipe was added. The slotted sections of the standpipes were surrounded with pea gravel, while expansive bentonite clay was added around the plain pipe and below the slotted section to seal the borehole. The standpipes were finished with a stopcock cover, which was then concreted flush with ground level.

Engineering and geoenvironmental conclusions given in this report are based on data obtained from these sources but it should be noted that variations, which affect these conclusions, may inevitably occur between and beyond the test locations. Also water levels may vary with time.

GROUND CONDITIONS

The site and laboratory test work revealed that the general succession of strata can be represented by Made Ground over solid geology of the London Clay Formation. Our Ground Model for the site may be summarised as follows:

Made Ground - Encountered at each test location from ground level down to depths of between 9.0m and 11.0m across most of the site, with an average thickness of 9.8m. However, in the southern area of the site, around the existing restaurant, the Made Ground was encountered from ground level down to depths of between 4.3m and 5.1m, with an average thickness of 4.8m. It generally comprised asphalt or concrete hardstanding down to depths of between 0.4m and 0.7m, but typically 0.4m, over grey and brown slightly sandy slightly gravelly clay, with the gravel consisting of fine to coarse sub-rounded to sub-angular flint, brick, concrete and some glass, clinker and wood. However, at two locations in the eastern area of the site, CT101 between 0.2m and 1.3m depth and CT104 between 2.0m and 4.0m depth, it comprised grey sandy fine to coarse sub-angular to angular gravel of brick, concrete and some wood. Chiselling was required at one of the cable percussive boreholes, BH102, between 7.0m and 7.2m depth. In addition, four of the continuous tube boreholes had to be terminated short of the planned depth of 6.0m due to refusal on unknown obstructions. It is considered the likely cause of the chiselling and the refusals was the presence of cobble and/or boulder sized obstructions in the Made Ground.

Classification tests on selected samples revealed moisture contents ranging from 9% to 47%, but generally ranging from 24% to 34%. The fines fractions of the same samples were classified as soils of low, medium or high volume change potential see the NHBC Building Standards Chapter 4.2 and the BRE Digest 240. Restricted sieve analyses on corresponding samples revealed granular soil fractions between 2% and 65%, but generally less than 14%.

Two undrained triaxial compression tests undertaken on undisturbed samples of the Made Ground revealed shear strengths of 21kPa and 96kPa. Laboratory shear vane tests revealed undrained shear strengths ranging from 30kPa to 84kPa. 'N' values derived from standard penetration tests in the boreholes generally ranged from 7 to 22.

The results of these in-situ and laboratory tests are variable with depth, and this variation is considered to be a reflection of the variability of strength of the Made Ground both laterally and vertically.

Loss on ignition tests revealed organic contents ranging from 3% to 7%.

London Clay Formation - Encountered at each test location that penetrated the base of the Made Ground down to the base of the boreholes at depths of up to 25.0m. It generally comprised firm, becoming stiff at a typical depth of 9.0m and very stiff at a typical depth of 23.0m, grey and brown slightly sandy clay.

Classification tests on selected samples revealed moisture contents ranging from 21% to 45%, but generally between 25% and 35%. The fines fractions of the same samples were classified as soils of medium and high volume change potential see the NHBC Building Standards Chapter 4.2 and the BRE Digest 240. Restricted sieve analyses on corresponding samples revealed granular soil fractions of between 1% and 7%.

Undrained triaxial compression tests undertaken on undisturbed samples revealed shear strengths generally increasing with depth and ranging from 85kPa at 11.5m depth to 166kPa at 17.5m. The number of blows taken to retrieve the undisturbed U100 tube samples from the boreholes ranged between 39 and 100. Laboratory shear vane tests on the same samples recorded undrained shear strengths generally increasing with depth and ranging from 80kPa at 6.0m depth to greater than 150kPa at 22.0m depth. 'N' values derived from standard penetration tests in the boreholes generally increased with depth and ranged from 22 at 7.0m depth to 38 at 24.5m depth.

The results of the in-situ and laboratory testing indicate the London Clay Formation increases in strength with depth in a roughly linear fashion, ranging from approximately 60kPa at 5.0m depth to approximately 150kPa at 23.0m depth.

California Bearing Ratio (CBR) Tests

Laboratory CBR tests were undertaken on five samples of the Made Ground recovered from the boreholes at depths of between 0.5m and 0.7m. The results ranged from 1% to 4%.

Sulphate and pH Tests

Made Ground

Soluble sulphate tests carried out on samples of the Made Ground recovered from the exploratory holes recorded values ranging from 0.23g/l to 0.71g/l, in conjunction with pH values ranging from 7.0 to 7.6.

London Clay Formation

Soluble sulphate tests carried out on samples of the London Clay Formation recovered from the exploratory holes recorded values ranging from 0.12g/l to 1.42g/l, in conjunction with pH values ranging from 7.0 to 7.5.

GROUNDWATER

Groundwater strikes were encountered in the Made Ground at eleven locations at depths of between 0.5m and 9.0m. At the cable percussive boreholes twenty minutes following the groundwater strikes the water levels has risen by 0.1m to 0.6m, and at the continuous tube boreholes on completion of the boreholes the water levels had fallen by between 0.3m and 3.5m.

Groundwater monitoring visits of the four locations installed during this investigation and two installed as part of the previous investigation, reference 15.02.014 and dated May 2015, recorded standing groundwater levels between 2.1m and 6.2m depth.

GROUND GAS

Ground gas monitoring of the four locations installed during this investigation and the two locations installed during the previous investigation, reference 15.02.014 and dated May 2015, was carried out as a part of this investigation. These visits recorded oxygen levels of between 10.2% and 21.1% by volume, carbon dioxide levels of between 0.1% and 12.1% by volume and methane levels of between 0.0% and 8.6% by volume. The flow rates ranged between 0.0l/hr and 1.5l/hr.

The results are provided in Appendix B.

GROUND CONTAMINATION ASSESSMENT

SOIL TESTING

As part of this investigation eleven of the samples of Made Ground collected on site during this investigation were tested for a range of contaminants. The suite of testing carried out on the samples was decided upon following consultation of R&D CLR Publications, published as part of the Contaminated Land Exposure Assessment (CLEA), a joint venture between the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency.

The test suite included a range of:

- Metals and inorganic substances.
- Speciated Polyaromatic Hydrocarbons (PAH).
- Total Petroleum Hydrocarbons (TPH), with eight band split.
- Asbestos screening.

The soil samples were tested to obtain 'Total' values within the soil.

The results of the tests from this investigation are included in Appendix C.

RISK ASSESSMENT GUIDELINES – HUMAN HEALTH

The human health risk assessment has been undertaken using the guidance provided in the Environment Agency's publication CLR11, 'Model Procedures for the Management of Contaminated Land,' published in September 2004. Human health assessment criteria used are based upon the proposed final land use of the site, in this case the guidelines for 'Residential with homegrown produce' have been used.

Currently in the UK, no statutory limits for the presence of contaminants in soils or groundwater exist. Therefore, the results of the soil samples tested are compared to the following environmental quality standards:

Category 4 Screening Levels (C4SLs)

Published in March 2014 by DEFRA, C4SLs were primarily produced to support the revised Statutory Guidance to support Part 2A of the Environmental Protection Act 1990, which was published in April 2012. This Guidance introduced a new four-category system for classifying land under Part 2A for cases of a Significant Possibility of Significant Harm to human health, where Category 1 includes land where the level of risk is clearly unacceptable and Category 4 includes land where the level of risk posed is acceptably low.

With regards to using the C4SLs for planning purposes the DEFRA letter of 3rd September 2014 from Lord de Mauley established that they are also suitable for use in planning situations, as does the DCLGs 'Planning Portal' document 2014.

Suitable 4 Use Levels (S4ULs)

As well as the limited number of C4SLs (and where C4SLs are not available), the set of S4ULs produced by Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH) in 2015 using the CLEA software, are used as a screening tool.

The CLEA software 1.06 version was released in October 2009 and is a deterministic exposure model with altered exposure data to the original model. The model allows the creation of a generic assessment criteria database with which to screen laboratory testing results. These generic assessment criteria are conservative and based upon common assumptions.

RISK ASSESSMENT GUIDELINES – GROUNDWATER

The procedures set out in Environment Agency's Remedial Targets Methodology, 'Hydrogeological Risk Assessment for Contaminated Land,' (2006), have been followed.

RESULTS OF TOTAL SOIL TESTS

Of all the contaminants tested for just two, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene, recorded values higher than their relevant environmental screening values for human health for a residential setting.

Where this has occurred, statistical analyses using the methodology set out in the CL:AIRE Document, 'Guidance on Comparing Soil Contamination Data with a Critical Concentration,' have been undertaken on the laboratory test results in order to establish a 'true mean concentration (μ)' within the planning scenario for each determinant over the whole site area.

These analyses establish whether the data is normally distributed as well as taking into account possible erroneously high values and determine whether contamination 'outliers' features are present on the site. Once this has been established the 'upper confidence limit of 95% on μ' are subsequently compared with the relevant environmental standard value, or 'Critical Concentration (C_c)'.

For the purposes of statistical analysis, where values are recorded at below detectable limits then the limit value is adopted. This can distort the data distribution and erroneously identify outliers. Where outliers fall below C_c, then further assessment is not warranted and such results are considered to pose a low risk to end users.

To enable a more robust statistical analysis we have combined the chemical test results from the previous investigation, reference 15.02.014 and dated May 2015, with the chemical test results for the Made Ground from this investigation. During the previous investigation Lead recorded a value above the relevant environmental screening value for human health for a residential setting, therefore Lead has been included in the statistical analysis.

A copy of the chemical testing results from the previous investigation are included in Appendix H.

The results of the analyses are described below and presented in Appendix D of this report.

Lead

Of the seventeen samples tested, the values obtained ranged from 19mg/kg to 210mg/kg.

The statistical analysis showed that there were no outliers recorded and the data was normally distributed. The one-sample t-test was undertaken on the results, with a 95% upper confidence limit of 124mg/kg being established for the site. This is below the C4SL for Lead of 200mg/kg.

Benzo(b)fluoranthene

Of the seventeen samples tested, the values obtained ranged from <0.1mg/kg to 6.1mg/kg.

The statistical analysis showed that there was one outlier recorded. However, it is considered there is insufficient evidence to indicate that more than one type of Made Ground exists at the site, and therefore zoning is unrealistic. On this basis statistical analysis was carried out on all the data. The data were non-normally distributed and the Chebychev test was undertaken on these results, with a 95% upper confidence limit of 3.1mg/kg being established for the site. This exceeds the S4UL for Benzo(b)fluoranthene of 2.6mg/kg.

Dibenzo(a,h)anthracene

Of the seventeen samples tested, the values obtained ranged from <0.1mg/kg to 0.98mg/kg.

The statistical analysis showed that there was one outlier recorded. However, it is considered there is insufficient evidence to indicate that more than one type of Made Ground exists at the site, and therefore zoning is unrealistic. On this basis statistical analysis was carried out on all the data. The data were non-normally distributed and the Chebychev test was undertaken on these results, with a 95% upper confidence limit of 0.5mg/kg being established for the site. This exceeds the S4UL for Dibenzo(a,h)anthracene of 0.24mg/kg.

Hydrocarbons

Some hydrocarbon ranges C16 to C21 were recorded above the limits of detection from the samples taken at four locations, CT106, CT107, CT108 and CT111. However, the recorded concentrations were well below the relevant human health thresholds for a residential site.

Asbestos

No suspected asbestos containing material was observed in the soils during this investigation, and no asbestos was identified in the asbestos screens carried out as part of this investigation.

HUMAN HEALTH RISK ASSESSMENT

The following qualitative risk assessment has been carried out using the source-pathway-receptor principle. As such, potential sources of contamination have been assessed using the CLEA Guidelines. The fact that a pathway must exist between a potential source and potential receptor for there to be a risk, has been taken into account. The potential human receptors evaluated for their individual risk are:

- End users of the site (residents).
- Construction workers.

GENERAL

The chemical testing and statistical analysis carried out on the results of this and the previous investigation, reference 15.02.014 and dated May 2015, have shown the whole of the site to be contaminated with Benzo(b)fluoranthene and Dibenzo(a,h)anthracene.

Asbestos

No suspected asbestos containing material was observed in the soils during this investigation, and no asbestos was identified in the asbestos screens carried out as part of this investigation.

However, Chrysotile type asbestos at a concentration of less than 0.001% was recorded from a sample of Made Ground taken at a depth of 0.5m from TP6 during the previous investigation. TP6 was loctaed in the undeveloped area in the northern area of the site. No asbestos was identified in the other two asbestos screens carried out on samples taken from the undeveloped northern area of the site as part of the this and the previous investigation.

On the basis of the above it is considered asbestos is not likely to be widespread across the site, but some should be anticipated within the Made Ground in the undeveloped northern area of the site. In this area, as long as the Made Ground is covered with hardstanding or imported Topsoil in areas of soft landscaping, then it does not pose a significant risk. However, if excavated and allowed to dry out and become dusty during groundworks it would become a risk to construction workers and surrounding residents.

Any developer undertaking construction works in the northern area of the site where the Made Ground will be disturbed will have a duty of care to its employees and the surrounding residents to ensure that the Control of Asbestos Regulations 2012 are adhered to. We recommend that specialist advice is gained regarding air monitoring and on site visual inspection where breaking ground for construction is planned.

Should suspected asbestos be identified then this should be removed by competent personnel.

On the basis of the above, it is considered that it is necessary to implement remedial measures at the site to break the source-pathway-receptor linkage between the contaminated soils and the end users.

CONSTRUCTION WORKERS

The exposure route of primary concern for the Benzo(b)fluoranthene and Dibenzo(a,h)anthracene contamination is 'direct soil ingestion,' and for asbestos 'inhalation.' For the construction workers there is a direct link to the soil when they undertake the site work and therefore different measures should be taken to manage the short-term exposure risk of coming into contact with contaminated soil.

To reduce the risk to as low as reasonably practicable for the construction workers it is recommended that appropriate health and safety measures be implemented along with the use of Personal Protective Equipment (PPE). All personnel coming into contact with the soil, ground workers in particular, should be instructed to use gloves when on site to avoid dermal contact and restrict inadvertent hand-to-mouth ingestion. Washing facilities should be provided for the site staff to use, and should be used prior to eating or smoking. Reference should be made to the HSE Document, 'Protection of Workers and the General Public during Development of Contaminated Land.'

The presence of asbestos fibres/clumps within the Made Ground in the northern area of the site mean the ground in this area will need to remain damp to prevent any fibres becoming airborne. Groundworkers should be made aware of potential risks of asbestos during the groundworks.

REMEDIAL MEASURES

Elevated concentrations of Benzo(b)fluoranthene and Dibenzo(a,h)anthracene have been recorded within Made Ground soil samples collected from the site. In addition, the presence of asbestos fibres/clumps has been detected in a Made Ground sample taken from the northern area of the site.

It has been established that these pose a significant risk to the end users of the site and the construction workers involved in the development of the site. Reference to LQM/CIEH document, 'The LQM/CIEH S4ULs for Human Health Risk Assessment,' indicates the main pathways of concern for Benzo(b)fluoranthene and Dibenzo(a,h)anthracene are ingestion of soil and indoor dust and consumption of homegrown produce and attached soil. The main pathway for asbestos is inhalation.

As such, the following remedial solutions are suggested:

i. **Cover system**: removal of the pathway between the contaminated soil and end users, by adding a carefully designed cover layer in areas of domestic gardens and soft landscaped areas on the site. This would work by removing the pathway and so breaking the pollutant linkage.

   Using the latest guidance document, BRE 465, 'Cover Thickness Design for Regeneration,' produced by ENSR International Ltd, on behalf of the BRE, AGS and DTI, a cover thickness of 400mm should be adopted, assuming the imported material is ***certified clean prior to use***. This cover layer would consist of 150mm of **clean** topsoil and 250mm of **clean** subsoil.

   This may be undertaken by either raising site levels or removing some of the soil to create the depth required. In our experience the regulating authorities often have differing opinions on the minimum cover thickness required. A reduced thickness of 300mm may be acceptable in less sensitive landscaped areas, such as public open space. We therefore recommend approval is sought from the Local Authority regarding the minimum cover thicknesses required at this site.

For disposal details of these soils reference should be made to the CLASSIFICATION OF WASTE MATERIAL section at the end of this report.

Validation Testing

In landscaped areas validation of the imported topsoil/sub soil thicknesses will be necessary along with testing certificates demonstrating the imported soils are suitable for use as discussed below.

Imported Topsoil and Subsoil Specification

Any new soil imported to the site should have been tested for a range of chemicals or determinants by the supplier. The TPH analysis should ideally have a breakdown of the carbon banding ranges.

The concentrations of determinants required in the topsoil must take into account the thickness of the cover system that is being implemented in the gardens at the site and the concentrations of any elevated levels of contaminants in the soil beneath.

To ensure that the requirements of the 400mm cover system are fulfilled, any imported subsoil or topsoil should contain levels of Benzo(b)fluoranthene and Dibenzo(a,h)anthracene at less than 75% of the current C4SLs or S4ULs or the SACs established for this site.

It should be noted that newly placed topsoil will settle over time and may not then fulfil the full thickness requirement of the cover system. Consideration to a combination of subsoil and topsoil should be given to reduce this effect.

REGULATORY APPROVAL

Any finalised remedial measures concerning human health will need to be approved by the relevant Local Authority Environmental Health Department or the NHBC prior to development. These should be accompanied with a copy of this report and any subsequent investigation reports.

Once remediation methods have been finalised it is recommended that a remediation strategy is written so that all parties involved in the development are clear about the chosen methods, implementation programmes and verification testing regimes that are required.

POST REMEDIATION VERIFICATION

Any remedial measures undertaken at the site will require independent verification once completed to ensure the pollutant linkage to the end users of the site has been removed. This is undertaken to satisfy the relevant regulatory authorities and other interested parties, including future owners of the site, banks, insurers and mortgage companies. This usually involves a small validation investigation to confirm that the remediation has been successful.

Any soil imported to the site should be accompanied by a certificate of chemical analysis. Otherwise, further testing for contaminants must be undertaken to demonstrate that the imported soils are clean. The engineer performing the verification will need to see the soil testing results to validate the imported soil prior to the cover system being constructed to ensure that it is suitable for use.

If the imported soil was found to be unsuitable, it would need removal and replacing with new clean soil.

GROUNDWATER RISK ASSESSMENT

No controlled waters receptors have been identified for the site. On this basis, there is no pollutant linkage and therefore no significant risk to controlled waters.

To avoid delays, the above conclusion should be agreed with the relevant regulator prior to construction.

GEOTECHNICAL ENGINEERING CONCLUSIONS

GENERAL

We understand the development proposals are for a multi-storey residential apartment building, including an undercroft car park, access road and soft landscaped areas.

The site and laboratory work carried out as part of this and the previous investigation, reference 15.02.014 and dated May 2015, has shown the site to be underlain by Made Ground over solid geology of the London Clay Formation.

The Made Ground was encountered across most of the site from ground level down to an average depth of 9.8m, however in the southern area of the site around the existing restaurant it was encountered from ground level down to an average depth of 4.8m. It generally comprised hardstanding of asphalt, block paving or concrete down to a typical depth of 0.4m, but in places up to 0.7m thick, over soft, firm or stiff grey and brown slightly sandy slightly gravelly clay, with the gravel consisting of fine to coarse sub-rounded to sub-angular flint, brick, concrete and some glass, clinker and wood. The requirement for chiselling at one of the cable percussive boreholes and refusal of some of the continuous tube boreholes on obstructions in the Made Ground is considered to be evidence of the presence of cobbles and boulder sized material within the Made Ground.

The laboratory testing shows the Made Ground to have low, medium or high volume change potential as defined by NHBC Building Standards Chapter 4.2 and the BRE Digest 240. To allow a conservative approach we recommend high volume change potential is assumed.

The London Clay Formation was encountered across the site underlying the Made Ground down to the base of the boreholes at depths of up to 25.0m. It generally comprised firm, becoming stiff at a typical depth of 9.0m and very stiff at a typical depth of 23.0m, grey and brown slightly sandy clay.

The laboratory testing shows the London Clay Formation to have medium or high volume change potential as defined by NHBC Building Standards Chapter 4.2 and the BRE Digest 240. To allow a conservative approach we recommend high volume change potential is assumed.

Based on the desk study data acquired as part of this and the previous investigation it is considered the source of the Made Ground at the site is likely to be related to raising of ground levels during the construction of the M1 London Extension. Based on site observations, in-situ testing and laboratory classification tests it is considered the Made Ground is comprised predominantly of re-worked London Clay Formation, with some manmade material mixed in.

Groundwater strikes were encountered in the Made Ground at fourteen of the locations formed during this and the previous investigations across the site at depths of between 0.5m and 9.0m. At the cable percussive boreholes twenty minutes following the groundwater strikes the water levels had risen by 0.1m to 0.6m, and at the continuous tube boreholes on completion of the boreholes the water levels had fallen by between 0.3m and 3.5m. In addition, groundwater monitoring visits of the four locations installed during this investigation and the two installed as part of the previous investigation recorded standing groundwater levels of between 2.1m and 6.2m depth.

No obvious pattern related to the depth of groundwater encountered during this and the previous investigation has been established. It is considered the groundwater encountered is likely to be representative of perched groundwater in the Made Ground that has trickled into the boreholes and not the regional groundwater level. Due to the general cohesive nature of the soils underlying the site the water in the boreholes was not able to flow away from the boreholes.

SITE EXCAVATION

Specialist breaking plant will be required to break out the surface hardstanding, which is typically 0.4m thick but in places is up to 0.7m thick, and any existing substructures that need removing. However, based on observations made during this and the previous investigation, reference 15.02.014 and dated May 2015, conventional hydraulic plant should be satisfactory for excavations in the underlying Made Ground.

Based on observations made during and 'N' values derived from this and the previous investigation it is anticipated excavations in the cohesive type made ground are generally likely to remain stable in the short term. However, some granular type Made Ground was encountered and some short term instability should be anticipated in these soils, particularly if groundwater ingress should be encountered. Therefore, in line with HSE guidelines, all excavations requiring personnel access should be adequately supported to avoid the risk of collapse.

Groundwater strikes were encountered at fourteen of the locations formed during this and the previous investigations across the site, and standing water levels were recorded at between 2.1m and 6.2m depth during the subsequent groundwater monitoring visits. However, it is considered the groundwater encountered during this investigation is representative of perched groundwater within the Made Ground rather than the regional groundwater level. On the basis of the findings of this investigation and the previous investigation it is considered the use of conventional pumping from sumps should be satisfactory in order to maintain dry excavations for shallow excavations at this site.

FOUNDATION SOLUTIONS

The Made Ground is considered unsuitable as a bearing stratum due to its variability and potential for unacceptable total and differential settlements under applied foundation loadings. Based on the findings of this investigation the average thickness of the Made Ground is 9.8m across most of the site, and 4.8m across the southern area of the site. On this basis, shallow foundations are not suitable and piled foundations will be required.

Pile Foundations

On the basis, of the above, it is recommended that new foundations should be supported on piles founded well down into the London Clay Formation.

Preliminary pile design unit values of ultimate shaft and end bearing resistance are given in Appendix A. Settlements of piled foundations should be acceptably small.

The advice of a specialist piling contractor should be obtained to determine the most appropriate pile type and its design. The piling contractor needs to be aware of the presence of some cobble and boulder sized

obstructions within the Made Ground. In addition, the piling contractor should be aware of the groundwater encountered during the drilling and monitoring.

The site is underlain by deep Made Ground and therefore issues related to negative skin friction are a possibility. Based on the historical Ordnance Survey maps acquired as part of the desk study data for this project it is likely the Made Ground has been in place for approximately fifty years, and therefore much of the self weight settlement of it is likely to have taken place. However, taking into account the thickness of cohesive Made Ground across the site it is considered prudent to make some allowance for negative skin friction in the pile design.

GROUND FLOOR SLABS

Due to the presence of deep made Ground across the site then suspended floor slabs are recommended.

However, should ground bearing floor slabs be preferred then, due to the presence of deep Made Ground across the site, it is recommended that geogrids or similar soil reinforcement techniques be employed to provide a subgrade with a known CBR value. Discussions should be held with a soil reinforcement company (such as Tensar) who would design a sub-grade to a specified CBR value that would be likely to limit differential settlement.

Based on information given in the Concrete Society Technical Report 34, 'Concrete Industrial Ground Floors,' and a soil type of moist clay the modulus of sub-grade reaction (k) for the cohesive Made Ground encountered across the site from depths of approximately 0.4m at this site is 0.03N/mm^2/mm.

GAS PROTECTION

The risk of ground gases impacting the site was assessed by reference to the paper, 'A Pragmatic Approach to Ground Gas Risk Assessment for the 21st Century,' Card and Wilson, 2011. This is a follow up paper to the CIRIA Report 665 and is compatible with that document. This indicated that due to the site being located on a Local Authority Recorded Landfill site and a Historical Landfill Site ground gases do pose a risk to the site. In addition, the site works encountered thick Made Ground that contained some degradable material, i.e., wood, across the site. As part of this and the previous investigation, reference 15.02.014 and dated May 2015, six boreholes were installed with gas monitoring standpipes. The four that were installed as part of this investigation have been monitored four times over a period of two months, and the two that were installed as part of the previous investigation have been monitored six times over a period of one year.

The gas monitoring has recorded carbon dioxide levels up to 12.1% by volume and methane levels up to 8.6% by volume, with flow rates of up to 1.5l/hr.

These results have been evaluated with reference to the Code of Practice for the, 'Characterisation and Remediation from Ground Gas in Affected Developments,' BS8485:2007.

Using the maximum carbon dioxide reading of 12.1% with the maximum flow rate of 1.5l/h, the maximum gas screening value for carbon dioxide is 0.19l/hr. Using the maximum methane reading of 8.6% with the maximum flow rate of 1.5l/hr, the maximum gas screening value for methane is 0.13l/hr.

Based on the gas monitoring results from this and the previous investigation the site is classified as Characteristic Gas Situation CS2.

Based on Table 2 from BS8485:2007, a Characteristic gas Situation CS2 site would require three points of gas protection and a Characteristic Gas Situation CS3 site would require four points of gas protection. Reference to Table 3 in the same document indicates a ventilated undercroft car park provides four points of gas protection. Therefore, as long as a ventilated undercroft car park remains part of the development proposals it is considered the site will have a conservative gas protection up to Characteristic Gas Situation CS3 level and no further gas monitoring will be required. Should the development proposals significantly alter, i.e., no longer include a ventilated undercroft car park, then considering the site's location over a former landfill that contains some degradeable material, i.e., wood, a conservative Characteristic Gas Situation of CS3 should be assumed or further monitoring in order to enable a more detailed Ground Gas Risk Assessment to be carried out.

The BGS advises that no radon gas protection measures are necessary for this site.

The above conclusions should be agreed with the relevant local Regulatory Authority as soon as possible prior to development; to reduce any potential delays to the development should they require further clarification of this report or further ground gas monitoring.

WORKING PLATFORMS FOR TRACKED PLANT

If construction on the site requires the use of heavy tracked plant then reference will need to be made to the most recent guide for the design of, 'Working Platforms for Tracked Plant,' 2004, produced by the BRE.

Use of such plant will require construction of either a working platform or an adequate running surface if the subgrade is determined as being already adequate to support the anticipated plant loadings.

The subgrade down to at least 4.0m depth should be considered as essentially a cohesive Made Ground. Accordingly the following soil characteristics should be used for preliminary Working Platform design in accord with the most recent guidance given by the Building Research Establishment.

Anticipated Subgrade Characteristics down to 2.00m Depth	
Undrained Shear Strength Cu	30kN/m^2
Effective unit weight of subgrade material	18kN/m^3

It should be noted that soft spots and zones of weaker soil may exist on any site at shallow depth that will have a significant influence on the instability of tracked plant. The location of such features will not readily be determined by a general ground investigation for foundation design and more specific investigation at shallow depth may be required before the design of a working platform can be completed.

The advice of a specialist contractor should be sought to determine the most suitable size and thickness of platform required for their specific plant. This will take into account the size of the plant and anticipated loadings imposed on the working platform.

HEAVE AND RETAINING WALL DESIGN

It is our understanding that as part of the development plans it is proposed to construct an undercroft car park. At the time of writing this report the dimensions or method of construction were not known, although several factors should be taken into account.

Retaining Wall Design Parameters

Based on the groundwater monitoring carried out as part of this and the previous investigations, for the design of both temporary and permanent retaining structures at the sides of the undercroft car park groundwater should be assumed to be at approximately 2.1m bgl and the following design parameters should be used:

Parameter	Made Ground	London Clay Formation
c'	0kN/m^2	10kN/m^2
ϕ'	17°	17°
c_u	30kN/m^2	80kN/m^2
γ_b	18kN/m^3	19kN/m^3

Heave

Assuming an M_v value of 0.07m^2/MN within the Made Ground, a width of 50m and a depth of 1.0m for the undercroft car park and a bulk density of 18kN/m^3 within the Made Ground, total heave within the centre of the excavation is expected to be between 50mm and 60mm. This calculation does not take the loads imposed by the proposed structure into account.

Some assumptions have been made in order to make the total heave calculations. A change in the width or depth of the excavations will result in a different total heave. Therefore, it is recommended further calculations are made when the final development proposals are known.

Typically at least 50% of immediate heave may be anticipated during typical construction timescales and before any new imposed loads are introduced by the new building. Hence the long term heave in the centre of the excavation should not exceed approximately 30mm.

Should the predicted heave be considered unacceptable for the new building precautionary design measures should be adopted. This could be achieved either by introducing a void beneath the slab to accommodate predicted movement or the slab designed to resist the uplift pressures.

Settlement of Adjacent Structures

When making excavations loss of lateral support to the adjacent soil (along with other factors) can lead to settlement of the ground surrounding that excavation. Significant settlement is generally assumed to take place within a line marked by a slope of 1 (horizontal) and 2 (vertical) (or 64°) from the base of the excavation. As such, assuming a depth of 1.0m for excavations, it is recommended that existing foundations within a zone of influence of approximately 0.5 metres from the edge of the excavation be supported by underpinning.

CLASSIFICATION OF WASTE MATERIAL

The excavations on site from foundation and services trenches will produce a considerable amount of surplus soil. Under current waste management legislation if this soil is surplus to requirements it will be classified as waste and need disposing of at a licensed facility.

If surplus soil is to be taken off-site as waste and disposed of, the implementation of the Landfill Directive means that the waste soil requires classification in accordance with the European Waste Catalogue prior to leaving site.

European Waste Catalogue Determination

Using the 'Total' soil contamination test results from this investigation and the previous investigation, reference 15.02.014 and dated May 2016, in conjunction with the HazWasteOnline spreadsheets, the Made Ground soils have been classified as **non-hazardous** waste.

A summary of the results of the assessment for this investigation is provided in Appendix F, and for the previous investigation in Appendix H. The full details of the assessment are available upon request.

Asbestos

Technical Guidance WM2 states that, 'if the waste contains **fibres** that are free and dispersed then the waste will be hazardous if the waste as a whole contains 0.1% or more asbestos.' It also states that, 'where the waste contains identifiable **pieces** of asbestos (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then the waste is hazardous if the concentration of asbestos in the pieces alone is 0.1% or more.'

No asbestos was identified by the asbestos screens carried out as part of this investigation or from most of the asbestos screens carried out as part of the previous investigation. However, fibres/clumps of Chrysotile type asbestos was identified at a concentration of <0.001% from a sample of Made Ground taken from TP6 at 0.5m. This trial pit was located in the undeveloped northern area of the site.

On this basis, it is considered there is no evidence of widespread asbestos contamination of the Made Ground across the site, however low levels of <0.001%, should be anticipated in the Made Ground from the undeveloped northern area of the site. At this concentration the waste soils from the northern area of the site would not be classified as hazardous.

Waste Acceptance Criteria (WAC) Testing Results

To further classify the waste soils for landfill disposal, Waste Acceptance Criteria (WAC) testing has been carried out on four samples of the Made Ground collected from site during this and the previous investigation. The results show that two of the samples **fail** the **inert** waste criteria due to the levels of Sulphate and Total Dissolved Solids. The samples were located within the Made Ground at 0.5m depth in BH101 and 3.0m depth at BH105.

The WAC testing results for this investigation are presented in Appendix F, and for the previous investigation in Appendix H.

Waste Classification

From the results of the asbestos screens, HazWasteOnline spreadsheets and the WAC testing, currently, the waste Made Ground soils on this site are classified as **non-hazardous**.

Analytical results relevant to the materials being disposed of should be provided to the landfill operators or waste management contractors to confirm whether it meets their license agreements and to confirm tipping costs.

The Landfill Regulations dictate that all waste must be treated before going to landfill. This treatment should fulfil all of the following three criteria:

- Physical, thermal, chemical or biological process including sorting.
- Change the characteristics of the waste.
- Reduce the volume, reduce the hazardous nature, facilitate its handling or enhance its recovery.

The most basic method of pre-treatment is sorting of the waste and re-cycling any possible materials, many waste disposals companies will have on-site recycling facilities that will be able to undertake this process at the landfill site. However, if treatment would not reduce its quantity or the hazards it poses to human health or the environment, then all three steps may not be necessary. The exception is inert waste for which treatment is not technically feasible.

The Environment Agency expect all landfill operators to obtain written evidence that the waste they accept has been pre-treated. We recommend that a signed certificate should be obtained describing the treatment to give to the receiving landfill. Further testing may be required after the treatment before the soil is accepted by the relevant landfill.

RE-USE OF MATERIAL ON SITE

Currently, if surplus soil is 'fit for re-use' on the site and has not been treated, its re-use is allowed within the planning law. If it needs treating prior to re-use, exemptions can be sought from the Environment Agency to allow this activity.

A recent voluntary code of practice published by CL:AIRE, in conjunction with the EA, (the Definition of Waste: Development Industry Code of Practice, Version 2) endorses the re-use of surplus soil on and off the site of origin without the need for exemptions from the EA, dependent on whether it is "fit for purpose". It also supports the use of "Hub and Cluster" sites (to enable surplus soil to be used on agreed sites in the local vicinity, dependent on the soil being 'fit for purpose').

Based upon the human health risk assessment the soils on this site are not considered to be suitable to be re-used on site for landscaping purposes.

SLOPE STABILITY

The site is generally flat, however the northern area of the site is raised compared to the rest of the site by approximately 1.5m to 2.0m, consequently there are some slopes around this area of the site. No signs of instability related to these slopes were observed during this site investigation, therefore at their current angles the slopes are assumed to be stable. However, it is likely some re-grading of these slopes and/or the use of retaining structures will be required in order to accommodate the proposed development. It is possible that the proposed development at the site may impact on the slope's stability.

In the absence of detailed ground analysis, as a guide consideration should be given to the following to avoid possible instability:

- Increasing/redirecting water flow through the slope (e.g. sheet piling, retaining walls >1m, soakaways).
- Long continuous open foundation/service excavations; say in excess of 10m, parallel to ground contours.
- Unduly loading the slope, such as infilling following ground contours, say 1m above existing ground levels.
- Permanent cuttings following ground contours more than say 1m.

Retaining Walls

Parameters to aid the design of temporary and permanent retaining walls are given in the Heave and Retaining Wall Design section above.

SUBSURFACE CONCRETE

Soluble sulphate tests carried out on samples of the Made Ground recorded values ranging from 0.23g/l to 0.71g/l, with a characteristic value of 0.66g/l. pH values ranged from 7.0 to 7.6.

Soluble sulphate tests carried out on samples of the London Clay Formation recorded values ranging from 0.12g/l to 1.42g/l, with a characteristic value of 1.26g/l. pH values ranged from 7.0 to 7.5.

The chemical test results have been assessed in accord with BRE Special Digest 1.

To allow a conservative approach mobile groundwater conditions have been assumed. Considering the site's history of development and to allow a conservative approach, for the purposes of assessing the site for the Aggressive Chemical Environment for Concrete the site has been classified as a brownfield location.

Based on the above, the Design Sulphate Class for this site is **DS-2**, and the Aggressive Chemical Environment for Concrete (ACEC) class is **AC-2**.

ACCESS ROADS AND PARKING

Deep Made Ground was encountered over the whole of the site. Pavement construction may be considered on this existing fill. Where deep Made Ground is encountered beneath the area of proposed pavement it is recommended that geogrids or similar soil reinforcement techniques be employed to provide a subgrade with a known CBR value. Discussions should be held with a soil reinforcement company (such as Tensar) who would design a subgrade to a specified CBR value.

The following should also be taken into consideration:

- Inspection of the formation and removal of any surface areas of soft, organic or other unsuitable materials.
- 'Heavy' proof rolling of the resultant formation, to compact loose granular materials and locate any soft spots at shallow depth beneath the formation for subsequent removal.
- Removal of intact or loose obstructions where noted at surface, or known based on the investigation, to a depth of at least 600mm beneath the formation to prevent the creation of hard spots or voiding.
- Backfilling of any excavation with well-compacted inert granular material.
- Adopt a pavement design based upon an equilibrium CBR of less than 2%.

The laboratory testing indicates some of the cohesive Made Ground has a plasticity index of less than 15%, and is therefore frost susceptible. On this basis, a pavement thickness of not less than 450mm should be used.

UNDERGROUND SERVICES

Elevated levels of some hydrocarbons were recorded in the Made Ground soils at the site. These contaminants could potentially affect services pipes. It should be noted that the utility companies often have their own local guidelines and standards on levels of shallow soil contamination in the ground that may or may not be acceptable for the installation of below ground services. These standards may be different to those specified for assessing risks to human health and groundwater.

The local requirements should be obtained from the particular service supply company as soon as possible to avoid unexpected delays or additional development costs.

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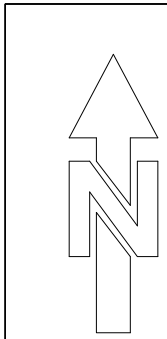
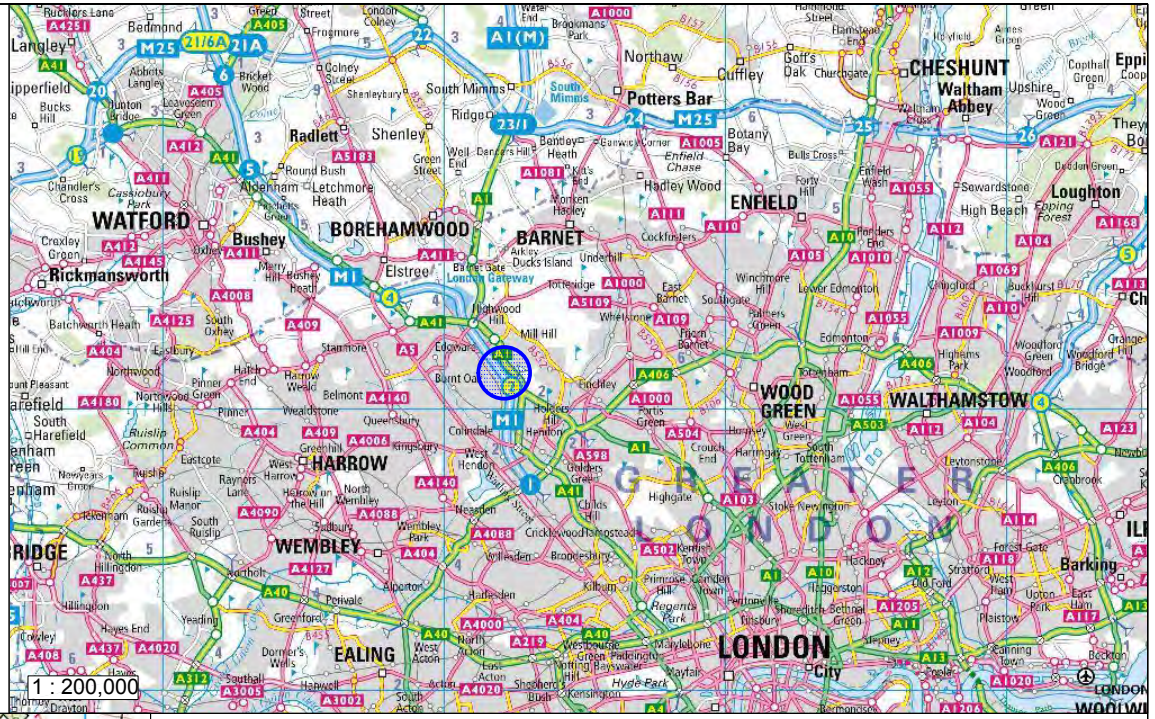
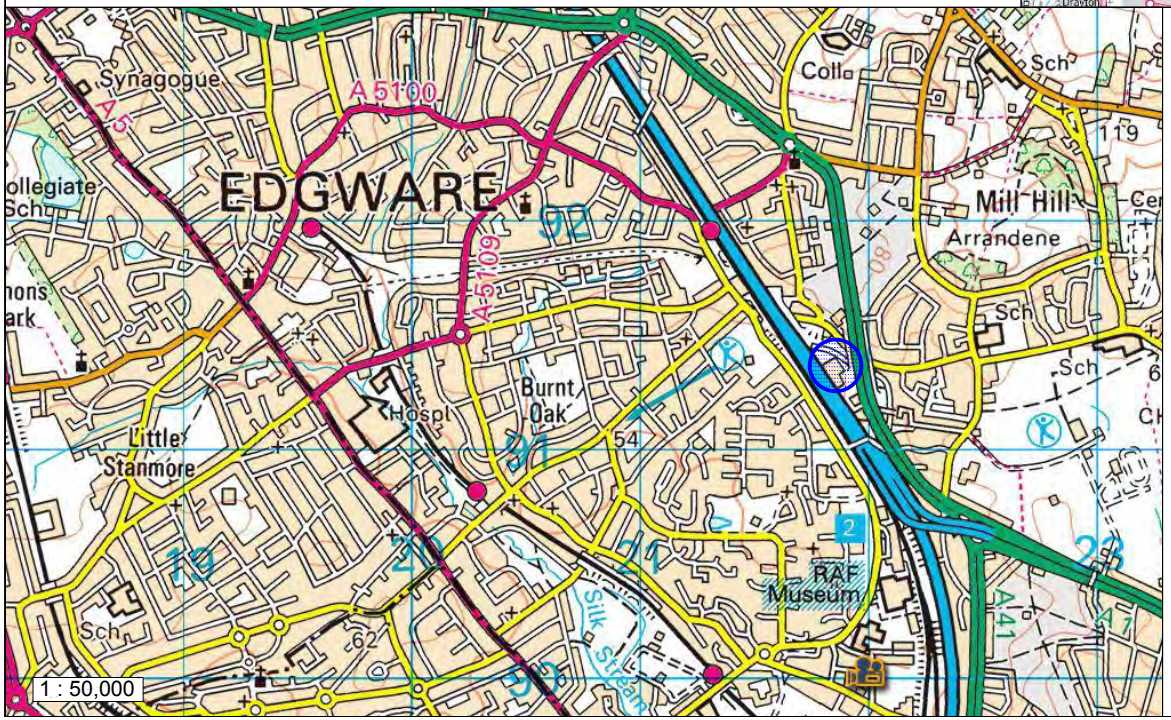
APPENDIX A
PLANS AND PHOTOGRAPHS







Key:

Approximate Site Location

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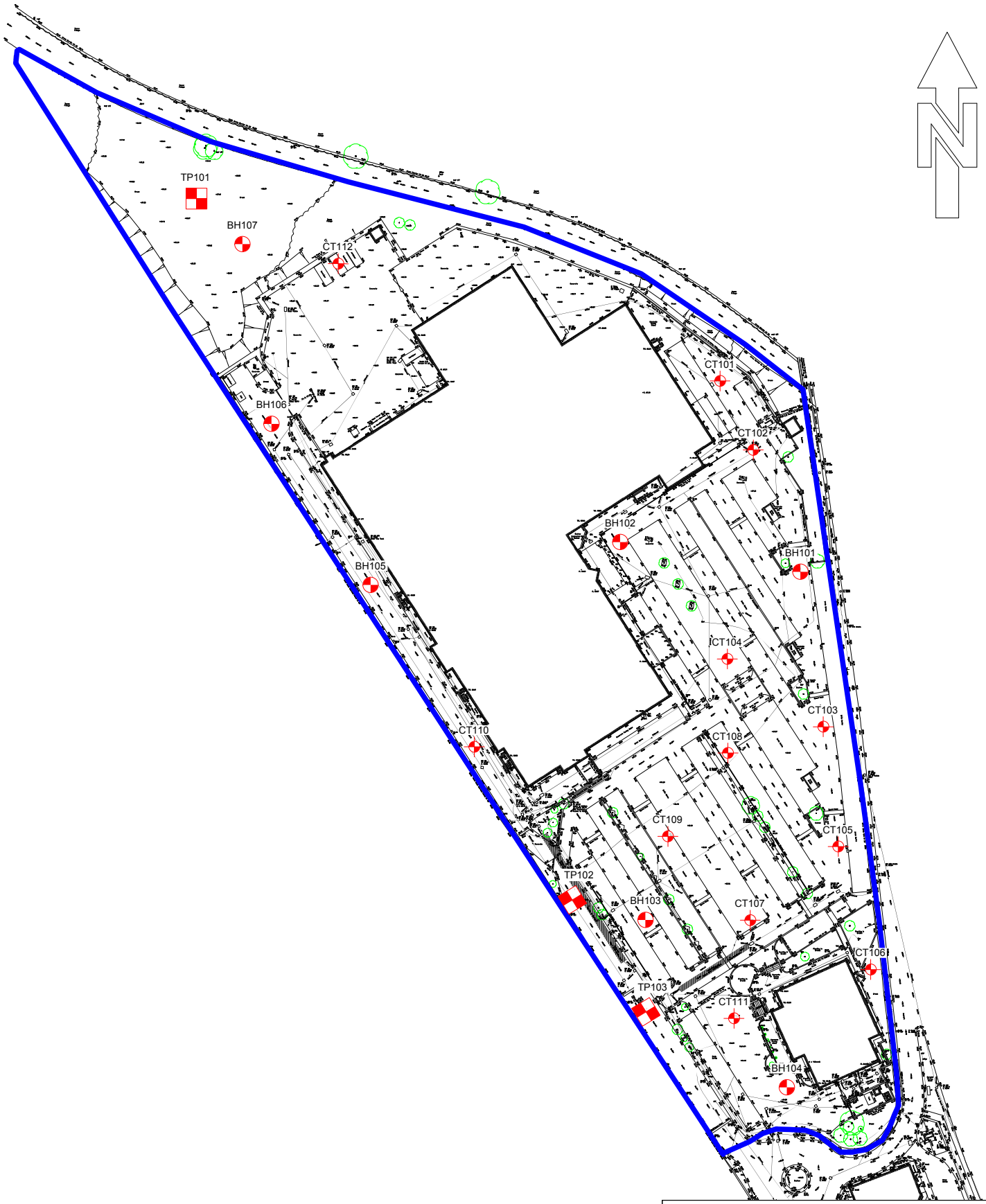
Listers Geotechnical Consultants Ltd www.listersgeotechnics.co.uk Tel: 01327 860060

Title: Site Location Plan		
Site: Pentavia Retail Park, Watford Way, Mill Hill, London, NW7 2ET		
Scale: NTS	Job No: 15.02.014a	Drawn By: BL



Key:

- Cable Percussive Borehole
- Continuous Tube Sampler Borehole
- Machine Excavated Trial Pit

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Title: Exploratory Hole Location Plan - Existing Site Layout		
Site: Pentavia Retail Park, Watford Way, Mill Hill, London, NW7 2ET		
Scale: NTS	Job No: 15.02.014a	Drawn By: BL

Eastern area of the site, viewed from the south

Restaurant in the southern area of the site, viewed from the south

Project Ref: 15.02.014a

Listers Geotechnical Consultants Ltd.

Slapton Hill Barn,
Blakesley Road,
Slapton,
Towcester,
Northants,
NN12 8QD
Telephone: (01327) 860060
Email: info@listersgeotechnics.co.uk

Title: **Site Photographs**

Site: **Pentavia Retail Park, Watford Way, Mill Hill, London, NW7 2ET**

Scale: **NTS**

Drawn by: **LC**

Date: 04/16

Dwg No: Fig 1

The retail unit's service road that forms the western area of the site, viewed from the south

Northern area of the site, viewed from the north

Project Ref: 15.02.014a

Eastern area of the site, viewed from tl

Listers Geotechnical Consultants Ltd.

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Email: info@listersgeotechnics.co.uk

Title: **Site Photographs**

Site: **Pentavia Retail Park, Watford Way, Mill Hill, London, NW7 2ET**

Scale: NTS	**Drawn by:** LC
Date: 04/16	**Dwg No:** Fig 1

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APPENDIX B
FIELDWORK AND TESTING

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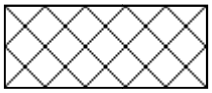
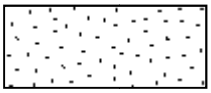
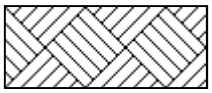
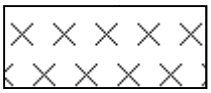
1.0 SOIL/ROCK SYMBOLS

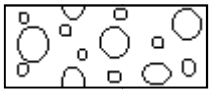
1.1 Soils

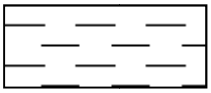

Made Ground

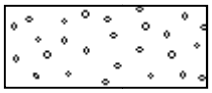

Sand

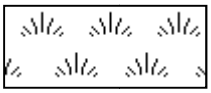

Topsoil


Silt

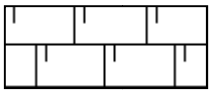

Boulders and Cobbles


Clay

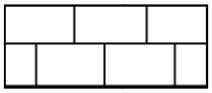

Gravel

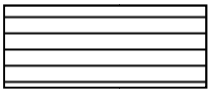

Peat

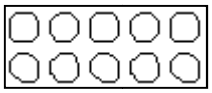
1.2 Rocks, Sedimentary

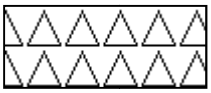

Chalk


Siltstone

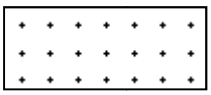

Limestone


Mudstone


Conglomerate


Breccia


Coal


Sandstone

SOIL/ROCK SYMBOLS

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LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

TEST LOCATION: TP101

Date of Excavation: 25/01/2016

Description of Strata	Strata Change			Samples		Hand Vane kPa	Water Level -m
	Legend	Depth -m	Depth (Thickness) -m	Depth -m	Type		
MADE GROUND Brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular brick, flint and concrete. Contains roots down to 0.70m.		0.00	(3.00)				Dry
Trial Pit terminated at 3.00 m		3.00	3.00				

Ground Level: 67.70 m AOD

Grid Reference: 521750, 191400

Remarks:
1. Method of excavation: Tracked excavator.
2. Trial pit dimensions: 0.60 x 2.50 x 3.00m.
3. Depth of visible roots: 0.70m.
4. No groundwater encountered.
5. Sides stable.
6. Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
P	Penetrometer Test
M	Mexe Penetrometer
CBR	CBR Sample
UF	Under Foundations

TRIAL PIT LOG

Report No. 15.02.014a

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LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

TEST LOCATION: TP102

Date of Excavation: 25/01/2016

Description of Strata	Strata Change			Samples		Hand Vane kPa	Water Level -m
	Legend	Depth -m	Depth (Thickness) -m	Depth -m	Type		
MADE GROUND Asphalt hardstanding		0.00	(0.10) 0.10				
MADE GROUND Brown sandy fine to coarse sub-rounded to sub-angular GRAVEL of brick, concrete and flint Trial pit terminated at 0.50m due to concrete obstruction			(0.40) 0.50				Dry
Trial Pit terminated at 0.50 m		1.00 2.00 3.00					

Ground Level: 65.00 m AOD

Grid Reference: 521857, 191199

Remarks:
1. Method of excavation: JCB 3CX.
2. Trial pit dimensions: 0.60 x 2.50 x 0.50m.
3. No roots visible.
4. No groundwater encountered.
5. Sides stable.
6. Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
P	Penetrometer Test
M	Mexe Penetrometer
CBR	CBR Sample
UF	Under Foundations

TRIAL PIT LOG

Report No. 15.02.014a

LISTERS GEO
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LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

TEST LOCATION: TP103

Date of Excavation: 25/01/2016

Description of Strata	Strata Change			Samples		Hand Vane kPa	Water Level -m
	Legend	Depth -m	Depth (Thickness) -m	Depth -m	Type		
MADE GROUND Asphalt hardstanding		0.00	(0.10) 0.10				
MADE GROUND Brown sandy fine to coarse sub-rounded to sub-angular GRAVEL of brick, concrete and flint			(0.40)				
Trial Pit terminated at 0.50 m			0.50				Dry
		1.00					
		2.00					
		3.00					

Ground Level: 64.60 m AOD

Grid Reference: 521869, 191181

Remarks:
1. Method of excavation: JCB 3CX.
2. Trial pit dimensions: 0.60 x 2.50 x 0.50m.
3. No roots visible.
4. No groundwater encountered.
5. Sides stable.
6. Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
V	Vane Test
P	Penetrometer Test
M	Mexe Penetrometer
CBR	CBR Sample
UF	Under Foundations

TRIAL PIT LOG

Report No. 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH101

Date of Boring: 25/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Tarmac hardstanding with a granular sub-base		0.0	0.20				
MADE GROUND Concrete			0.40	0.50	B		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular flint, brick and some concrete, glass, clinker and wood		1.0		1.20	S	12	
				1.50	D		
		2.0		2.00	S	12	
				2.50	B		
		3.0		3.00	S	15	
				3.50	D		
		4.0		4.00	S	18	
				4.50	D		
		5.0	(9.30)	5.00	U	(100)	
				5.50	D		
		6.0		6.00	S	17	
				6.50	D		
		7.0		7.00	S	19	
				7.50	D		
		8.0		8.00	U	(100)	
				8.50	D		▼
		9.0		9.00	S	20	▽
				9.20	D		
				9.50	D		
Continued next sheet		10.0	9.70				

Ground Level: 67.80m AOD
Grid Reference: 521917, 191306
Borehole Diameter: 150mm
Casing: 9.50m
Instrumentation: Standpipe installed to 6.00m depth

Remarks:
1. Method of excavation: Cable percussive rig.
2. Groundwater strike at 9.00m. After 20 minutes water level 8.40m.
3. Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value
A	Amber
V	Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH101

Date of Boring: 25/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
LONDON CLAY FORMATION Detail 9.70m - 20.00m : Stiff grey brown slightly sandy CLAY		10.0		10.00	S	26	
		11.0		11.00	D		
				11.50	U	(100)	
		12.0					
				12.50	D		
		13.0		13.00	S	26	
		14.0		14.00	D		
				14.50	S	29	
		15.0	(10.30)				
				15.50	D		
		16.0		16.00	U	(100)	
		17.0		17.00	D		
				17.50	S	35	
		18.0					
				18.50	D		
		19.0		19.00	S	33	
Base of borehole at 20.00 m		20.0					

Ground Level: 67.80m AOD
Grid Reference: 521917, 191306
Borehole Diameter: 150mm
Casing: 9.50m
Instrumentation: Standpipe installed to 6.00m depth

Remarks:
1.Method of excavation: Cable percussive rig.
2.Groundwater strike at 9.00m. After 20 minutes water level 8.40m.
3.Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value
A	Amber
V	Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH102

Date of Boring: 25/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding with a granular sub-base		0.0	0.30 0.40	0.50	B		
MADE GROUND Concrete		1.0		1.20	S	12	
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular flint, brick and some clinker and concrete				1.50	D		
		2.0		2.00	S	9	
				2.50	D		
		3.0		3.00	U	(84)	Dry
				3.50	D		
		4.0		4.00	S	12	
			(8.60)	4.50	D		
		5.0		5.00	S	15	
				5.50	D		
		6.0		6.00	U	(100)	
				6.50	D		
		7.0		7.00	S	50/24mm	
				7.50	D		
		8.0		8.00	S	18	
				8.50	D		
LONDON CLAY FORMATION Stiff grey and brown slightly sandy CLAY		9.0	9.00	9.00	B		
				9.50	D		
Continued next sheet		10.0					

Ground Level: 66.90m AOD
Grid Reference: 521869, 191309
Borehole Diameter: 150mm
Casing: 2.50m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. No groundwater encountered.
3. Chiselling: 7.00m - 7.20m (1 hr).
4. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH102

Date of Boring: 25/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
LONDON CLAY FORMATION (Contd/...) Stiff grey and brown slightly sandy CLAY		10.0		10.00	S	22	
		11.0		11.00	D		
				11.50	S	21	
		12.0					
				12.50	D		
		13.0		13.00	S	22	Dry
				14.00	D		
- fissured below 14.00m depth			(11.00)	14.50	S	25	
		15.0					
				15.50	D		
		16.0		16.00	S	27	
				17.00	D		
		17.0		17.50	S	29	
		18.0					
				18.50	D		
		19.0		19.00	S	29	
Base of borehole at 20.00 m		20.0					

Ground Level: 66.90m AOD
Grid Reference: 521869, 191309
Borehole Diameter: 150mm
Casing: 2.50m
Instrumentation: None

Remarks:
1.Method of excavation: Cable percussive rig.
2.No groundwater encountered.
3.Chiselling: 7.00m - 7.20m (1 hr).
4.Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value
A	Amber
V	Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH103

Date of Boring: 28/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
MADE GROUND Asphalt hardstanding with a granular sub-base		0.0	0.40				
MADE GROUND Concrete Borehole terminated at 0.50m after 11/2 hrs of chiselling had progressed only 0.10m		1.0	0.50				Dry
Base of borehole at 0.50 m		2.0					
		3.0					
		4.0					
		5.0					
		6.0					
		7.0					
		8.0					
		9.0					
		10.0					

Ground Level: 64.60m AOD
Grid Reference: 521869, 191181
Borehole Diameter: 150mm
Casing:
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. No groundwater encountered.
3. Chiselling from 0.40m to 0.50m (1 1/2 hrs).
4. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH104

Date of Boring: 27/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding with a granular sub-base		0.0	0.40	0.50	B		
MADE GROUND Grey slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular brick and flint		1.0		1.20	S	7	
				1.50	D		
		2.0	(3.90)	2.00	S	8	
				2.50	D		
		3.0		3.00	U	(75)	Dry
				3.50	D		
		4.0		4.00	S	14	
LONDON CLAY FORMATION Firm grey and brown slightly sandy CLAY			4.30	4.50	B		
		5.0		5.00	S	15	
				5.50	D		
		6.0		6.00	U	(100)	
				6.50	D		
- becomes stiff at 7.00m		7.0		7.00	S	22	
				7.50	D		
		8.0		8.00	S	22	
				8.50	D		
		9.0		9.00	U	(100)	
				9.50	D		
Continued next sheet		10.0					

Ground Level: 64.50m AOD
Grid Reference: 521915, 191157
Borehole Diameter: 150mm
Casing: 1.30m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. No groundwater encountered.
3. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH104

Date of Boring: 27/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
LONDON CLAY FORMATION (Contd/..)..Stiff grey and brown slightly sandy CLAY - mudstone between 10.50m and 10.70m		10.0		10.00	S	25	
		11.0		11.00	D		
				11.50	S	24	
		12.0	(15.70)				
				12.50	D		
		13.0		13.00	U	(100)	Dry
		14.0		14.00	D		
				14.50	S	27	
		15.0					
				15.50	D		
		16.0		16.00	S	28	
		17.0		17.00	D		
				17.50	U	(100)	
		18.0					
				18.50	D		
		19.0		19.00	S	29	
Base of borehole at 20.00 m		20.0					

Ground Level: 64.50m AOD
Grid Reference: 521915, 191157
Borehole Diameter: 150mm
Casing: 1.30m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. No groundwater encountered.
3. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
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LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH105

Date of Boring: 28/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Concrete		0.0	(0.70)				
			0.70	0.70	B		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular brick, concrete and flint		1.0		1.20	S	12	
				1.70	D		
		2.0		2.00	S	11	
				2.50	D		
		3.0		3.00	S	13	▽
				3.50	D		
		4.0		4.00	S	16	
				4.50	D		
		5.0		5.00	U	(27)	
				5.45	D		
		6.0	(10.30)	6.00	S	13	
				6.50	D		
		7.0		7.00	S	16	
				7.50	D		
		8.0		8.00	S	16	
				8.50	D		
		9.0		9.00	S		
				9.50	D		
Continued next sheet		10.0					

Ground Level: 66.20m AOD
Grid Reference: 521794, 191302
Borehole Diameter: 150mm
Casing: 1.50m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. Groundwater strike at 3.00m, after 20 minutes water level 2.90m.
3. Chiselling: 0.30m-0.70m (1 hr).
4. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH105

Date of Boring: 28/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
MADE GROUND (Contd/...)..Firm grey and brown slightly sandy CLAY		10.0		10.00	S	17	
		11.0	11.00	11.00	B		
LONDON CLAY FORMATION Firm grey and brown slightly sandy CLAY				11.50	S	17	
		12.0					
				12.50	D		
- becomes stiff at 13.00m		13.0		13.00	U	(39)	
				13.95	D		
		14.0		14.50	S	32	
		15.0					
				15.50	D		
		16.0		16.00	S	23	
				17.00	B		
		17.0		17.50	S	30	
		18.0	(14.00)	18.00	D		
		19.0		19.00	S	31	
Continued next sheet		20.0					

Ground Level: 66.20m AOD
Grid Reference: 521794, 191302
Borehole Diameter: 150mm
Casing: 1.50m
Instrumentation: None

Remarks:
1.Method of excavation: Cable percussive rig.
2.Groundwater strike at 3.00m, after 20 minutes water level 2.90m.
3.Chiselling: 0.30m-0.70m (1 hr).
4.Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH105

Date of Boring: 28/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
LONDON CLAY FORMATION (Contd/..) Stiff grey and brown slightly sandy CLAY		20.0		20.00	D		
				20.50	U	(79)	
		21.0					
- becomes very stiff at 22.00m		22.0		22.00	S	34	
		23.0		23.00	D		
				23.50	D	35	
		24.0		24.00	D		
				24.50	S	37	
Base of borehole at 25.00 m		25.0	25.00				
		26.0					
		27.0					
		28.0					
		29.0					
		30.0					

Ground Level: 66.20m AOD
Grid Reference: 521794, 191302
Borehole Diameter: 150mm
Casing: 1.50m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. Groundwater strike at 3.00m, after 20 minutes water level 2.90m.
3. Chiselling: 0.30m-0.70m (1 hr).
4. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH106

Date of Boring: 27/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
MADE GROUND Concrete		0.0	0.50	0.50	B		
MADE GROUND Grey brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular flint, brick and occasional wood		1.0		1.20	S	12	
				1.70	D		
		2.0		2.00	S	15	
				2.50	D		
		3.0		3.00	S	15	
				3.50	D		
		4.0		4.00	U	(32)	▽
				4.45	S	13	
		5.0		5.00	S	18	
			(10.00)	5.50	D		
		6.0		6.00	S	21	
				6.50	D		
		7.0		7.00	S	15	
				7.50	D		
		8.0		8.00	S	19	
				8.50	D		
		9.0		9.00	S	18	
				9.50	D		
Continued next sheet		10.0					

Ground Level: 66.50m AOD
Grid Reference: 521771, 191340
Borehole Diameter: 150mm
Casing: 1.50m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. Groundwater strike at 4.00m, after 20 minutes water level 3.80m.
3. Chiselling from 0.30m to 0.50m (3/4 hr).
4. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH106

Date of Boring: 27/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
MADE GROUND (Contd/..)..Grey brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular flint, brick and occasional wood		10.0		10.00	S	18	
			10.50	10.50	B		
LONDON CLAY FORMATION Stiff grey and brown slightly sandy CLAY		11.0		11.00	D		
				11.50	U	(57)	
		12.0		11.95	D		
		13.0		13.00	S	23	
		14.0		14.00	D		
				14.50	S	24	
		15.0		15.00	B		
		16.0		16.00	U	(71)	
		17.0					
			(14.50)	17.50	S	30	
		18.0					
				18.50	D		
		19.0		19.00	S	29	
		20.0					

Continued next sheet

Ground Level: 66.50m AOD
Grid Reference: 521771, 191340
Borehole Diameter: 150mm
Casing: 1.50m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. Groundwater strike at 4.00m, after 20 minutes water level 3.80m.
3. Chiselling from 0.30m to 0.50m (3/4 hr).
4. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH106

Date of Boring: 27/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
LONDON CLAY FORMATION (Contd/..).. Stiff grey and brown slightly sandy CLAY		20.0		20.00	D		
				20.50	S	33	
		21.0					
				21.50	D		
		22.0		22.00	U	(83)	
				22.45	D		
		23.0					
- becomes very stiff at 23.50m				23.50	S	37	
		24.0		24.00	D		
				24.50	S	36	
Base of borehole at 25.00 m		25.0	25.00				
		26.0					
		27.0					
		28.0					
		29.0					
		30.0					

Ground Level: 66.50m AOD
Grid Reference: 521771, 191340
Borehole Diameter: 150mm
Casing: 1.50m
Instrumentation: None

Remarks:
1. Method of excavation: Cable percussive rig.
2. Groundwater strike at 4.00m, after 20 minutes water level 3.80m.
3. Chiselling from 0.30m to 0.50m (3/4 hr).
4. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH107

Date of Boring: 26/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular brick, flint and concrete		0.0		0.00	B		
		1.0		1.20	S	11	
				1.70	D		
		2.0		2.00	S	15	▽
				2.50	D		
		3.0		3.00	S	15	
				3.50	D		
		4.0		4.00	S	16	
			(9.00)	4.50	D		
		5.0		5.00	U	(30)	
				5.45	S	21	
		6.0		6.00	S	19	
				6.50	D		
		7.0		7.00	S	21	
				7.50	D		
		8.0		8.00	S	22	
				8.50	D		
LONDON CLAY FORMATION Stiff grey and brown slightly sandy CLAY		9.0	9.00	9.00	U	(54)	
				9.45	D		
Continued next sheet		10.0					

Ground Level: 66.50m AOD
Grid Reference: 521770, 191383
Borehole Diameter: 150mm
Casing: 2.00m
Instrumentation: Standpipe installed to 6.00m depth

Remarks:
1. Method of excavation: Cable percussive rig.
2. Groundwater strike at 2.00m, after 20 minutes water level 1.90m.
3. Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH107

Date of Boring: 26/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
LONDON CLAY FORMATION (Contd/...)..Stiff grey and brown slightly sandy CLAY		10.0		10.00	S	25	
		11.0		11.00	D		
				11.50	S	27	
		12.0					
				12.50	D		
		13.0		13.00	S	29	
		14.0		14.00	D		
				14.50	S	27	
		15.0					
				15.50	B		
		16.0		16.00	U	(77)	
		17.0	(16.00)				
				17.50	S	31	
		18.0					
				18.50	D		
		19.0		19.00	S	29	
Continued next sheet		20.0					

Ground Level: 66.50m AOD
Grid Reference: 521770, 191383
Borehole Diameter: 150mm
Casing: 2.00m
Instrumentation: Standpipe installed to 6.00m depth

Remarks:
1.Method of excavation: Cable percussive rig.
2.Groundwater strike at 2.00m, after 20 minutes water level 1.90m.
3.Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. BH107

Date of Boring: 26/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
LONDON CLAY FORMATION (Contd/..).. Stiff grey and brown slightly sandy CLAY - becomes very stiff at 20.50m		20.0		20.00	D		
				20.50	S	35	
		21.0		21.00	D		
		22.0		22.00	U	(89)	
				22.45	D		
		23.0		23.00	D		
				23.50	S	36	
		24.0		24.00	D		
				24.50	S	38	
Base of borehole at 25.00 m		25.0	25.00				
		26.0					
		27.0					
		28.0					
		29.0					
		30.0					

Ground Level: 66.50m AOD
Grid Reference: 521770, 191383
Borehole Diameter: 150mm
Casing: 2.00m
Instrumentation: Standpipe installed to 6.00m depth

Remarks:
1.Method of excavation: Cable percussive rig.
2.Groundwater strike at 2.00m, after 20 minutes water level 1.90m.
3.Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value
A Amber
V Vial

BOREHOLE LOG

Report No 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

DPH and SHDP DYNAMIC PROBING

This is a simple test consisting of driving a rod with an oversize point at its base into the ground. A uniform, regular, hammer blow is used. The blow count is recorded for every 100mm of driving (N_{100}) and the results presented as a plot of blow count against depth.

Outside the UK this type of testing has been used extensively in a wide range of formats (ie. various hammer weights, hammer drops, point sizes, etc.) for many years. Since 1985 Dynamic Probing has become widely accepted in this country and the first British Standard for this test was published in 1990.

The standard equipment is a petrol powered unit using a 50kg hammer dropping through 0.50m 32mm diameter rods and a 15cm^2 area cone. This is the Heavy Dynamic Probe (DPH) and the equipment has been selected for general use as giving a good compromise between sensitivity in loose materials and penetration rates in denser materials. A sacrificial cone is used for each probing. A damper is used between the hammer and anvil.

The Super Heavy Dynamic Probe (DPSH) is a heavier version, using a 63.5kg hammer dropping through 0.75m, 32mm diameter rods and a 20cm^2 area cone.

The hammer operation is automated and driving is carried out as a continuous operation from ground level without a borehole. The test therefore not only provides a continuous record for the full depth penetration but also avoids many of the problems associated with poor operator technique when carrying out SPTs in boreholes.

Dynamic Probing provides an excellent method for locating boundaries between strata of differing density and driving resistance as well as comparative assessments of a single strata across a site. Comparisons between Dynamic probing results, SPT values and other soil parameters are given in DIN4094. Information on UK practice and correlation data in UK soils was published at the ICE Conference on Penetration Testing in 1988.

The complete machine weights 140kg stands 2.5m high and measures 750mm wide x 850mm deep when erected. For movement between positions the mast is lowered and the machine wheeled on an integral axle. Probing can be carried out within 300mm of a vertical wall.

References:

1. Subsoil; exploration by penetration tests -DIN4094. December 1990 (Standard and supplement)
2. Soils for civil engineering purposes. In-situ tests. - BS1377 Part 9 1990
3. Penetration testing in the UK. (Proceedings of the geotechnology conference organised by the Institution of Civil Engineers and held in Birmingham 6-8 July 1988)
4. Code of Practice for Site Investigations – BS5930:2015 Section 4

DPH and SHDP DYNAMIC PROBING INFORMATION

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Test Location	Depth at Start of Test -m	Spoon or Cone	Blows per 75mm Penetration				'N' Value	Strata Type
BH101	1.20	S	3	3	3	3	12	MG
	2.00	S	3	3	3	3	12	MG
	3.00	C	4	3	4	4	15	MG
	4.00	C	4	4	5	5	18	MG
	6.00	S	4	4	5	4	17	MG
	7.00	S	4	5	5	5	19	MG
	9.00	S	3	5	6	6	20	MG
	10.00	S	4	5	6	6	21	LCF
	13.00	S	6	6	7	7	26	LCF
	14.50	S	6	7	8	8	29	LCF
	17.50	S	8	9	9	9	35	LCF
	19.00	S	7	8	9	9	33	LCF
BH102	1.20	S	3	3	3	3	12	MG
	2.00	S	2	2	2	3	9	MG
	4.00	S	2	3	3	4	12	MG
	5.00	S	3	4	4	4	15	MG
	7.00	C	21	18	7	4/240	>50	MG
	8.00	S	4	4	5	5	18	MG
	9.00	S	4	5	6	5	20	LCF
	10.00	S	4	5	6	7	22	LCF
	11.50	S	5	5	6	5	21	LCF
	13.00	S	4	5	6	7	22	LCF
	14.50	S	5	6	7	7	25	LCF
	16.00	S	6	6	7	8	27	LCF
	17.50	S	6	7	8	8	29	LCF
	19.00	S	5	7	8	9	29	LCF

Key

MG - Made Ground

LCF - London Clay Formation

STANDARD PENETRATION TESTS

Report: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Test Location	Depth at Start of Test -m	Spoon or Cone	Blows per 75mm Penetration				'N' Value	Strata Type
BH104	1.20	S	1	2	2	2	7	MG
	2.00	S	2	2	2	2	8	MG
	4.00	S	3	4	3	4	14	MG
	5.00	S	3	4	4	4	15	LCF
	7.00	S	5	5	6	6	22	LCF
	8.00	S	5	6	5	6	22	LCF
	10.00	S	5	6	7	7	25	LCF
	11.50	S	5	6	6	7	24	LCF
	14.50	S	6	6	7	8	27	LCF
	16.00	S	7	6	7	8	28	LCF
	19.00	S	6	7	8	8	29	LCF
BH105	1.20	S	4	3	2	3	12	MG
	2.00	S	3	3	2	3	11	MG
	3.00	S	3	4	3	3	13	MG
	4.00	S	4	4	5	3	16	MG
	6.00	S	2	3	4	4	13	MG
	7.00	S	5	3	4	4	16	MG
	8.00	S	4	5	4	3	16	MG
	9.00	S	4	3	5	4	16	MG
	10.00	S	4	4	5	4	17	MG
	11.50	S	4	4	5	4	17	LCF
	14.50	C	8	8	9	7	32	LCF
	16.00	S	6	5	6	6	23	LCF
	17.50	S	8	7	8	7	30	LCF
	19.00	S	8	7	9	7	31	LCF
	22.00	S	8	9	8	9	34	LCF

Key

MG - Made Ground

LCF - London Clay Formation

STANDARD PENETRATION TESTS

Report: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Test Location	Depth at Start of Test -m	Spoon or Cone	Blows per 75mm Penetration				'N' Value	Strata Type
BH106	1.20	S	4	3	3	2	12	MG
	2.00	S	4	5	3	3	15	MG
	3.00	S	3	4	3	5	15	MG
	4.45	C	3	4	3	3	13	MG
	5.00	S	5	5	4	4	18	MG
	6.00	S	6	6	5	4	21	MG
	7.00	S	5	3	4	3	15	MG
	8.00	S	4	5	6	4	19	MG
	9.00	S	5	5	4	4	18	MG
	10.00	S	6	3	4	5	18	MG
	13.00	S	6	5	7	5	23	LCF
	14.50	S	5	6	7	6	24	LCF
	17.50	S	7	8	7	8	30	LCF
	19.00	S	8	8	7	6	29	LCF
	20.50	S	9	9	8	7	33	LCF
BH107	1.20	S	3	3	2	3	11	MG
	2.00	S	4	3	4	4	15	MG
	3.00	S	4	4	3	4	15	MG
	4.00	S	4	4	5	3	16	MG
	5.45	S	6	6	5	4	21	MG
	6.00	S	3	5	5	6	19	MG
	7.00	S	6	6	5	4	21	MG
	8.00	S	6	5	5	6	22	MG
	10.00	S	7	6	7	5	25	LCF
	11.50	S	8	7	6	6	27	LCF
	13.00	S	8	7	7	7	29	LCF
	14.50	S	6	5	8	8	27	LCF

Key

MG - Made Ground

LCF - London Clay Formation

STANDARD PENETRATION TESTS

Report: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Test Location	Depth at Start of Test -m	Spoon or Cone	Blows per 75mm Penetration				'N' Value	Strata Type
BH107	17.50	S	8	8	7	8	31	LCF
	19.00	S	7	8	7	7	29	LCF
	20.50	S	9	8	9	9	35	LCF
	23.50	S	9	10	8	9	36	LCF
	24.50	S	9	9	11	9	38	LCF
CT106	1.00		2	3	2	3	10	MG
	2.00		2	2	2	2	8	MG
	3.00		2	2	3	4	11	MG
	4.00		3	3	3	3	12	MG
	5.00		2	2	3	2	9	LCF
	6.00		2	3	2	3	10	LCF
CT107	1.00		1	1	1	2	5	MG
	2.00		1	1	2	2	6	MG
	3.00		2	2	2	2	8	MG
	4.00		2	2	2	2	8	MG
	5.00		2	4	4	4	14	MG
	6.00		2	2	2	3	9	MG
CT108	1.00		2	4	2	2	10	MG
	2.00		1	2	5	6	14	MG
	3.00		1	2	2	3	8	MG
	4.00		3	4	3	4	14	MG
	5.00		2	2	2	2	8	MG
	6.00		2	2	2	3	9	MG

Key

MG - Made Ground

LCF - London Clay Formation

STANDARD PENETRATION TESTS

Report: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Test Location	Depth at Start of Test -m	Spoon or Cone	Blows per 75mm Penetration				'N' Value	Strata Type
CT109	1.00		4	5	12	4	25	MG
	2.00		2	2	2	3	9	MG
	3.00		2	2	1	2	7	MG
	4.00		1	2	1	2	6	MG
	5.00		1	2	2	2	7	MG
	6.00		2	2	3	2	9	MG

Key

MG - Made Ground

LCF - London Clay Formation

STANDARD PENETRATION TESTS

Report: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT101

Date of Boring: 25/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Paving on sand blinding		0.0	0.20	0.20	D		
MADE GROUND Grey sandy fine to coarse sub-angular to angular GRAVEL of brick and concrete			(1.10)	0.50	D		
		1.0	1.30	1.00	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to angular brick and flint				1.30	D		
				1.50	D		Dry
		2.0		2.00	D		
				2.40	D		
			(3.10)				
		3.0		3.00	D		
		4.0		4.00	D		
Borehole terminated at 4.40m, due to refusal *Base of borehole at 4.40 m*			4.40				
		5.0					
		6.0					

Ground Level: 66.50mAOD

Grid Reference: 521883, 191365

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.No groundwater encountered.
3.Logged by Lee Chippington BS5930 + A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT102

Date of Boring: 25/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Paving on sand blinding		0.0	0.20	0.20	D		
MADE GROUND Grey brown very sandy fine to coarse sub-angular to angular GRAVEL of concrete and brick			0.60	0.60	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to angular brick and flint		1.0		1.00	D		
				1.50	D		
		2.0		2.00	D		
				2.50	D		
			(4.40)				
		3.0		3.00	D		
				3.50	D		
		4.0		4.00	D		
				4.50	D		
Borehole terminated at 5.00m, due to refusal *Base of borehole at 5.00 m*		5.0	5.00				
		6.0					

Ground Level: 66.90mAOD

Grid Reference: 521897, 191337

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.Groundwater strike at 0.50m, on completion, 1.50m.
3.Logged by Lee Chippington BS5930 + A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT103

Date of Boring: 25/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding with a granular sub-base		0.0		0.14	D		
			0.50	0.50	D		▽
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular flint and some brick		1.0		1.00	D		
				1.50	D		
		2.0		2.00	D		
				2.50	D		
			(4.50)				
		3.0		3.00	D		
				3.50	D		
		4.0		4.00	D		▼
Base of borehole at 5.00 m		5.0	5.00				
		6.0					

Ground Level: 67.80mAOD

Grid Reference: 521926, 191255

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.Groundwater strike at 0.50m, on completin 4.00m.
3.Logged by Lee Chippington BS5930 + A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT104

Date of Boring: 26/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding with a granular sub-base		0.0		0.12	D		
			0.40	0.40	D		
MADE GROUND Grey and brown slightly sandy gravelly CLAY. Gravel is fine to coarse sub-angular brick and concrete		1.0	(1.60)	1.00	D		
				1.50	D		
MADE GROUND Grey silty sandy fine to coarse sub-angular to angular GRAVEL of brick, concrete and wood		2.0	2.00	2.00	D		
		3.0	(2.00)	3.00	D		
Borehole terminated at 4.00m, due to collapse *Base of borehole at 4.00 m*		4.0	4.00				
		5.0					
		6.0					

Ground Level: 67.10mAOD

Grid Reference: 521899, 191277

Borehole Diameter: 87-67mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.Groundwater strike at 0.40m, on completion 1.00m.
3.Logged by Lee Chippington BS5930 + A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT105

Date of Boring: 26/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding on a granular sub-base		0.0		0.14	D		
			0.50	0.50	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to angular brick and flint		1.0		1.00	D		
				1.50	D		Dry
		2.0		2.00	D		
				2.50	D		
		3.0		3.00	D		
			(5.50)	3.50	D		
		4.0		4.00	D		
				4.50	D		
		5.0		5.00	D		
				5.50	D		
Base of borehole at 6.00 m		6.0	6.00				

Ground Level: 66.50mAOD

Grid Reference: 521931, 191222

Borehole Diameter: 87-47mm

Borehole Cased To:

Instrumentation: None

Remarks:
1. Method of excavation: Continuous tube sampler.
2. No groundwater encountered.
3. Logged by Lee Chippington BS5930 + A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT106

Date of Boring: 26/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular brick		0.0	(0.60) 0.60	0.10 0.60	D D		
MADE GROUND Grey and brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse sub-angular to angular brick, flint and occasional glass		1.0		1.00 1.50	S D	100	Dry
		2.0		2.00 2.50	S D	8	
		3.0	(4.50)	3.00 3.50	S D	11	
		4.0		4.00 4.50 4.70	S D D	12	
		5.0		5.00 5.00	S D	9	
LONDON CLAY FORMATION Firm grey and brown slightly sandy CLAY			5.10 (0.90)				
Base of borehole at 6.00 m		6.0	6.00	6.00	S	10	

Ground Level: 66.00mAOD

Grid Reference: 521939, 191185

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.No groundwater encountered.
3.Logged by Lee Chippington BS5930 + A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT107

Date of Boring: 27/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding on a granular sub-base		0.0	0.30	0.10	D		
				0.30	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to angular brick, flint and some concrete				0.50	D		▽
		1.0		1.00	S	50	
				1.50	D		
		2.0		2.00	S	6	
				2.50	D		
		3.0	(5.70)	3.00	S	8	
				3.50	D		
		4.0		4.00	S	8	▼
				4.50	D		
		5.0		5.00	S	14	
				5.50	D		
Base of borehole at 6.00 m		6.0	6.00	6.00	S	11	

Ground Level: 65.60mAOD

Grid Reference: 521907, 191196

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.Groundwater strike at 0.50m, on completion 4.00m.
3.Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT108

Date of Boring: 27/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding on a granular sub-base		0.0		0.12	D		
			0.40	0.40	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to sub-angular brick, flint and some concrete and wood		1.0		1.00	S	10	
				1.50	D		
		2.0		2.00	S	14	
				2.50	D		
		3.0		3.00	S	8	
			(5.60)				
				3.50	D		
		4.0		4.00	S	14	
		5.0		5.00	S	8	
				5.50	D		
Base of borehole at 6.00 m		6.0	6.00	6.00	S	9	

Ground Level: 66.70mAOD

Grid Reference: 521892, 191245

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.Groundwater strike at 0.50m, on completion 2.90m.
3.Logged by Lee Chippington to BS5930 +A2.

▽ Water Strike
▼ Water (Standing Level)
W Water Sample
B Bulk Sample
D Small Disturbed Sample
U Undisturbed Sample
(No. of blows shown in brackets)
SPT Standard Penetration Test
CPT Cone Penetration Test
* Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT109

Date of Boring: 27/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding on a granular sub-base		0.0	(0.80)	0.10	D		
				0.50	D		
			0.80	0.80	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to angular brick, flint and some wood and concrete		1.0		1.00	S	25	
				1.50	D		
		2.0		2.00	S	9	
				2.50	D		
		3.0		3.00	S	7	▽
			(5.20)	3.50	D		▼
		4.0		4.00	S	6	
				4.50	D		
		5.0		5.00	S	7	
Base of borehole at 6.00 m		6.0	6.00	6.00	S	9	

Ground Level: 65.90mAOD

Grid Reference: 521872, 191216

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: Dry

Remarks:
1.Method of excavation: Continuous tube sampler.
2.Groundwater strike at 3.00m, on completion 3.30m.
3.Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT110

Date of Boring: 28/01/2016

Description of Strata	Strata Change			Samples		SPT CPT N Value	Water Level -m
	Legend	Depth -m		Depth -m	Type		
		Scale	Strata				
MADE GROUND Concrete on a granular sub-base		0.0		0.20	D		
Borehole terminated at 0.50m due to a concrete obstruction			0.50				
Base of borehole at 0.50 m		1.0					Dry
		2.0					
		3.0					
		4.0					
		5.0					
		6.0					

Ground Level: 65.70mAOD

Grid Reference: 521825, 191252

Borehole Diameter: 87mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.No groundwater encountered.
3.Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT111

Date of Boring: 28/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Asphalt hardstanding with a granular sub-base		0.0		0.10	D		
			0.40	0.50	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to angular brick, flint and some wood and clinker		1.0		1.00	S	12	
				1.50	D		
		2.0		2.00	S	15	Dry
				2.50	D		
			(4.50)				
		3.0		3.00	S	14	
				3.50	D		
		4.0		4.00	S	16	
				4.50	D		
			4.90				
LONDON CLAY FORMATION Stiff brown slightly sandy CLAY		5.0		5.00	S	20	
			(1.10)	5.50	D		
Base of borehole at 6.00 m		6.0	6.00	6.00	S	19	

Ground Level: 64.80mAOD

Grid Reference: 521903, 191179

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1. Method of excavation: Continuous tube sampler.
2. No groundwater encountered.
3. Logged by Lee Chippington to BS5930 +A2.

▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

LOCATION: Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET

BOREHOLE NO. CT112

Date of Boring: 28/01/2016

Description of Strata	Strata Change: Legend	Strata Change: Depth -m Scale	Strata Change: Depth -m Strata	Samples: Depth -m	Samples: Type	SPT CPT N Value	Water Level -m
MADE GROUND Dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse sub-angular to angular flint and occasional brick		0.0		0.10	D		
			0.50	0.50	D		
MADE GROUND Grey and brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to angular flint and brick		1.0		1.00	S	7	
				1.50	D		
		2.0		2.00	S	12	▽
				2.50	D		
		3.0		3.00	S	18	
			(5.50)	3.50	D		
		4.0		4.00	S	15	▼
				4.50	D		
		5.0		5.00	S	15	
				5.50	D		
Base of borehole at 6.00 m		6.0	6.00	6.00	S	13	

Ground Level: 66.30mAOD

Grid Reference: 521785, 191385

Borehole Diameter: 87-57mm

Borehole Cased To:

Instrumentation: None

Remarks:
1.Method of excavation: Continuous tube sampler.
2.Groundwater strike at 2.00m, on completion 4.00m.
3.Logged by Lee Chippington to BS5930 +A2.

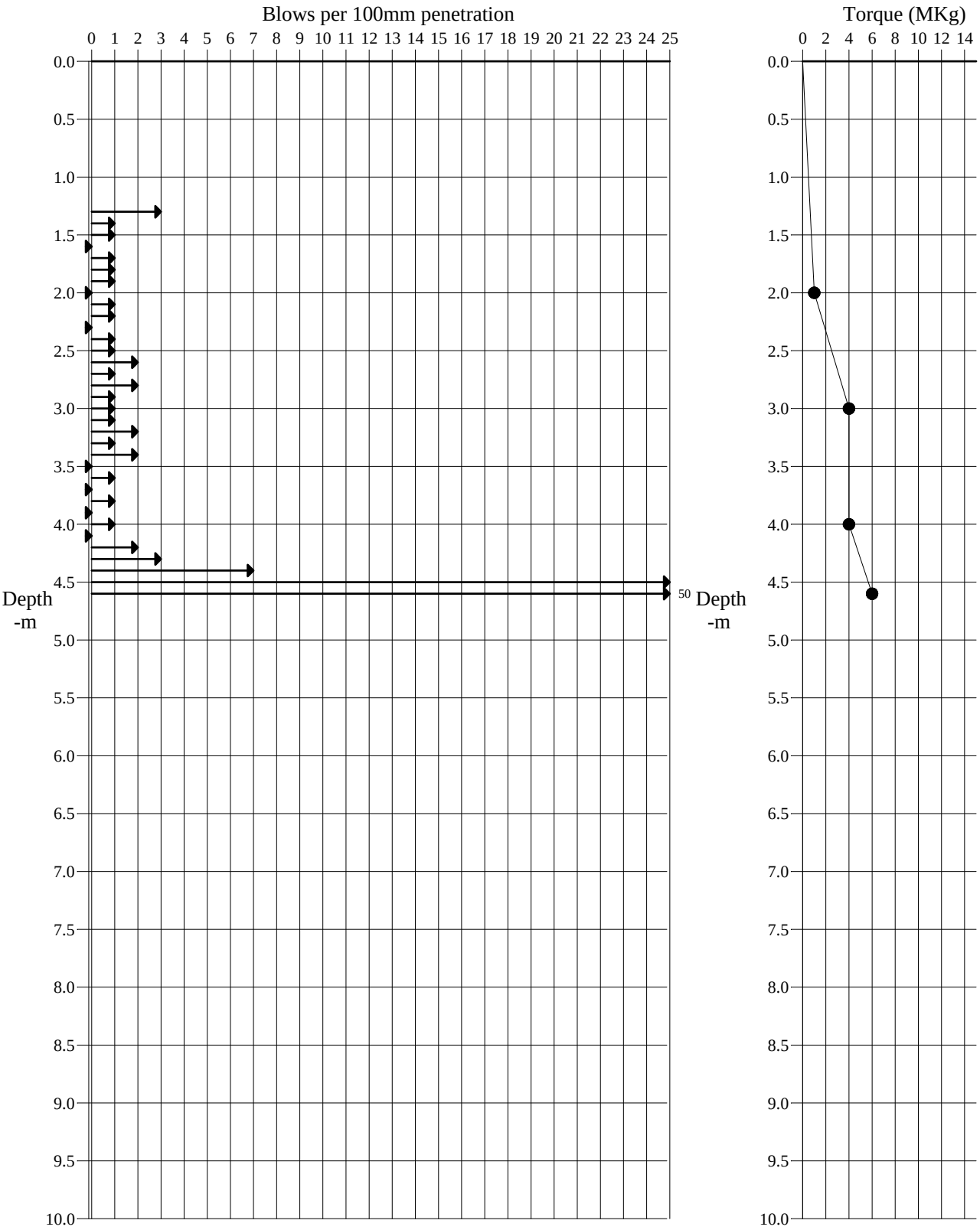
▽	Water Strike
▼	Water (Standing Level)
W	Water Sample
B	Bulk Sample
D	Small Disturbed Sample
U	Undisturbed Sample
	(No. of blows shown in brackets)
SPT	Standard Penetration Test
CPT	Cone Penetration Test
*	Extrapolated Value

BOREHOLE LOG

Report No: 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET | Probe:SHDP 101 | Date Probed:25/01/2016

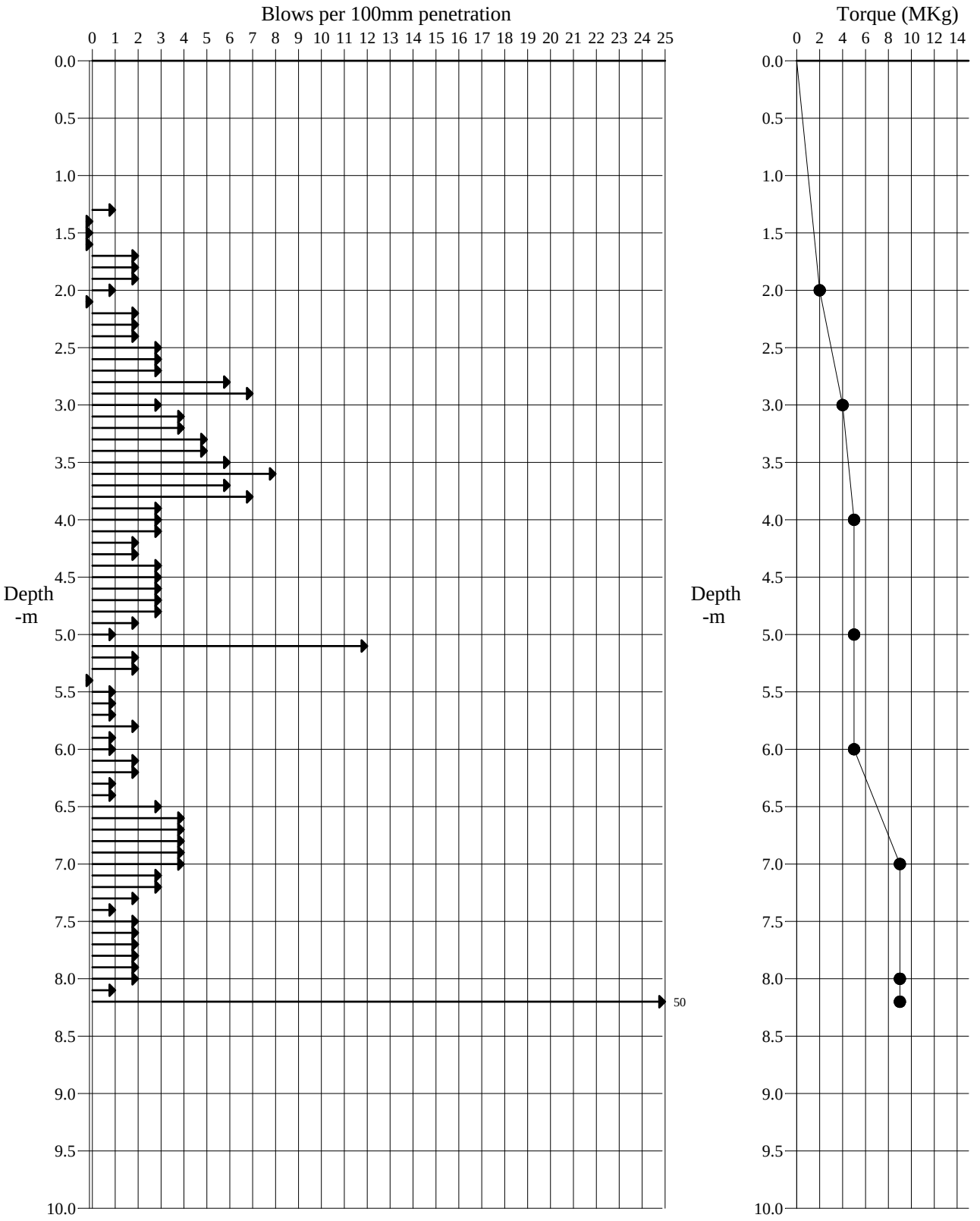


DYNAMIC PROBE / TORQUE

Report No: 15.02.014a
Client Ref.

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET | Probe:SHDP 102 | Date Probed:25/01/2016

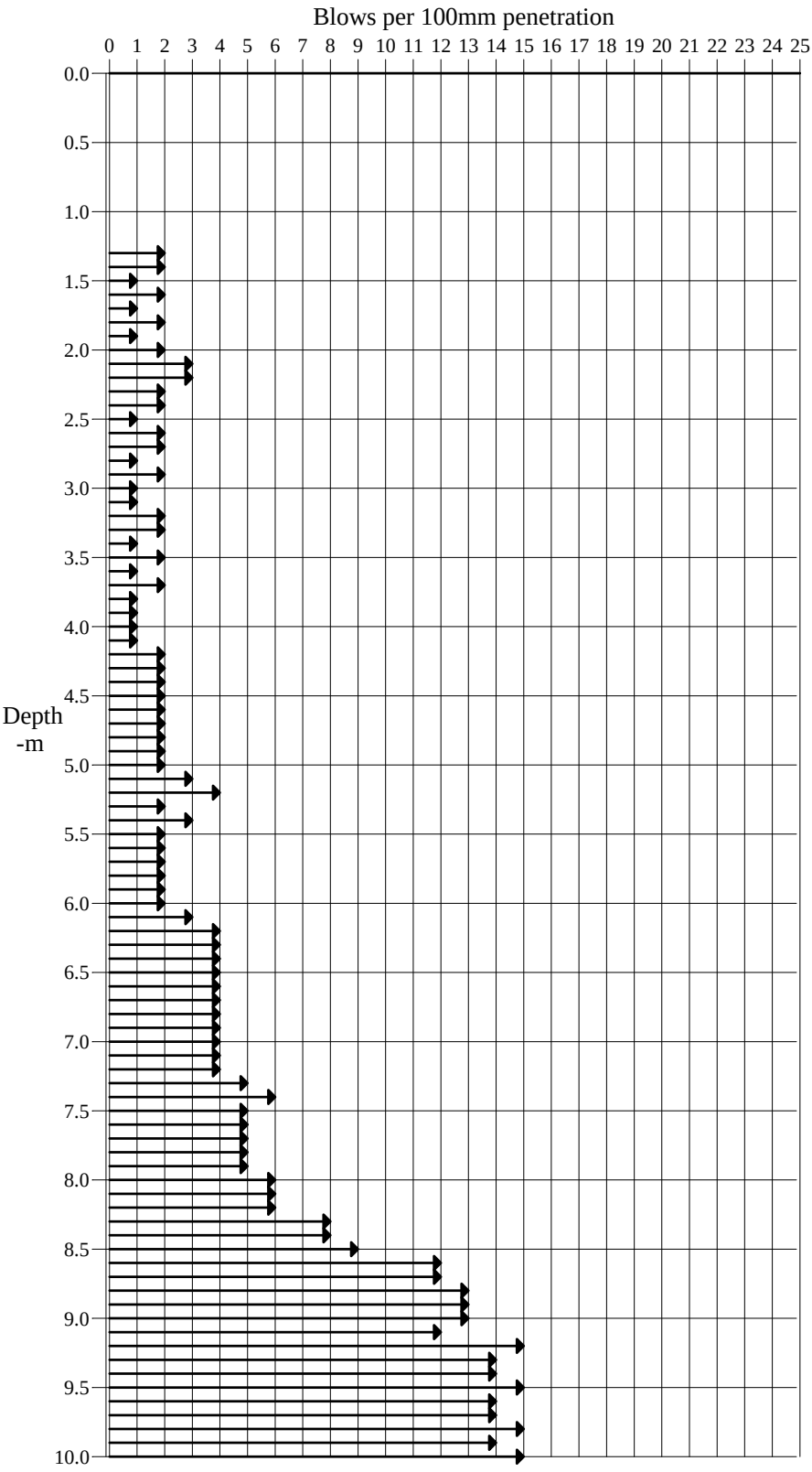


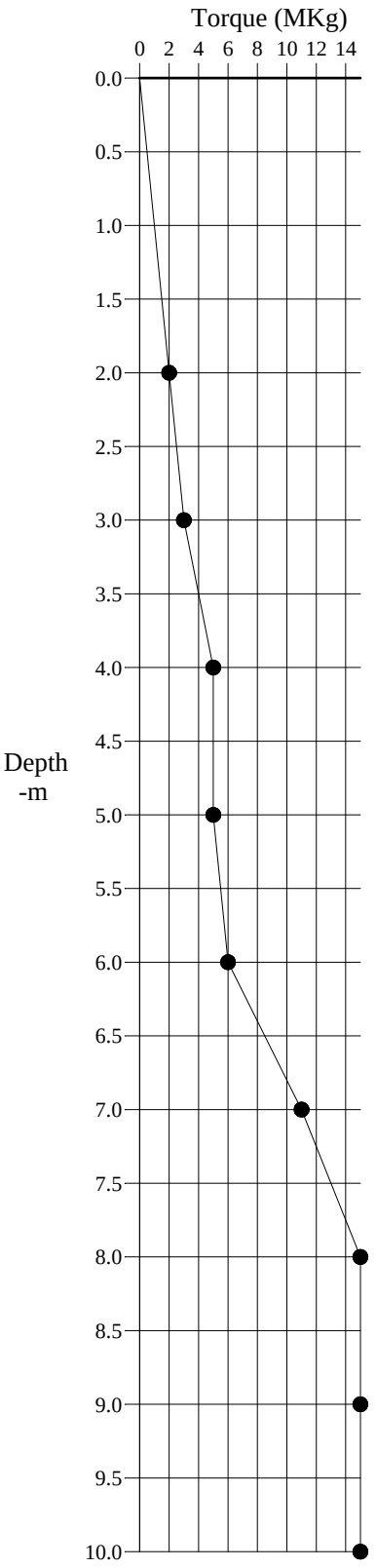
DYNAMIC PROBE / TORQUE

Report No: 15.02.014a
Client Ref.

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET | Probe:SHDP 103 | Date Probed:25/01/2016



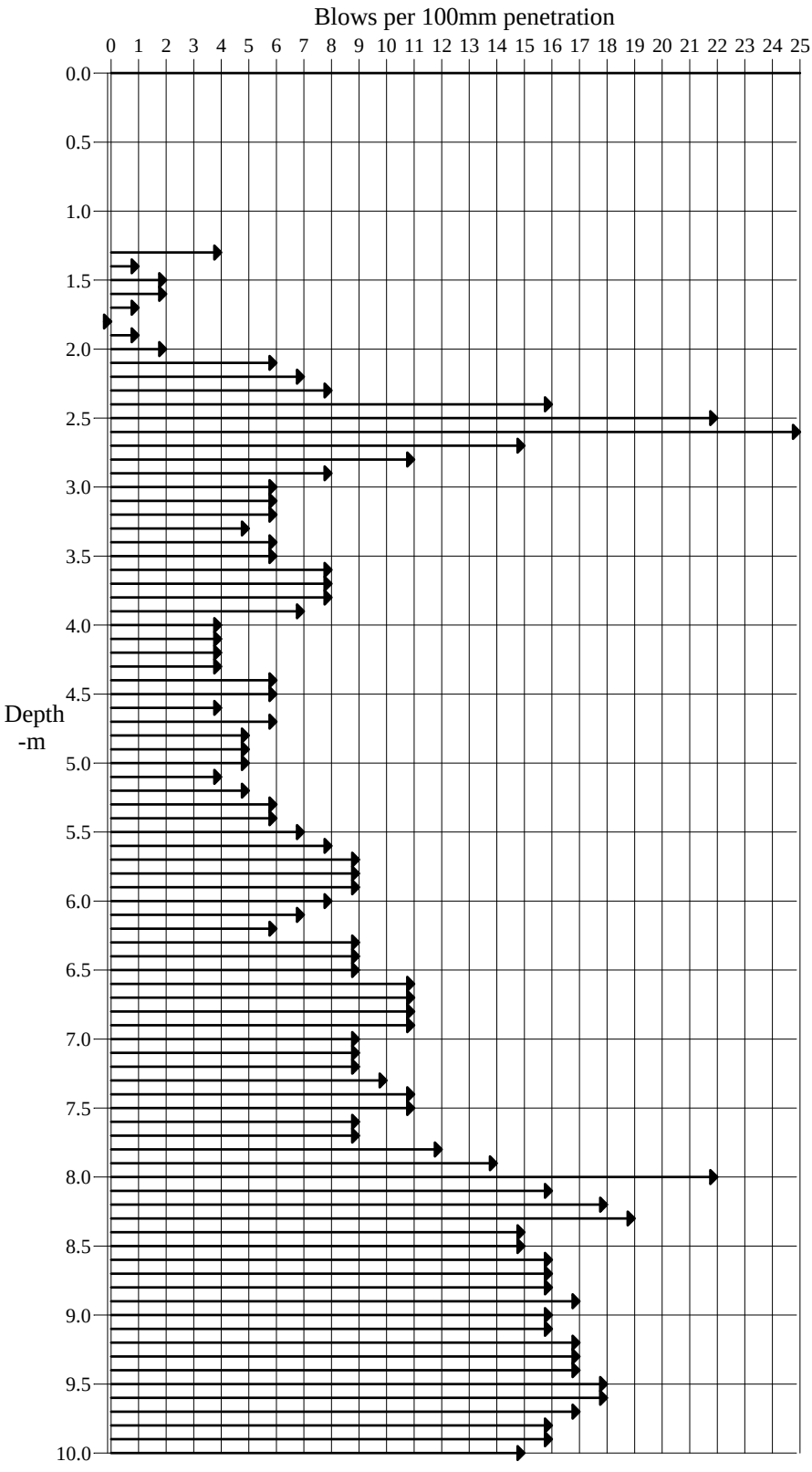


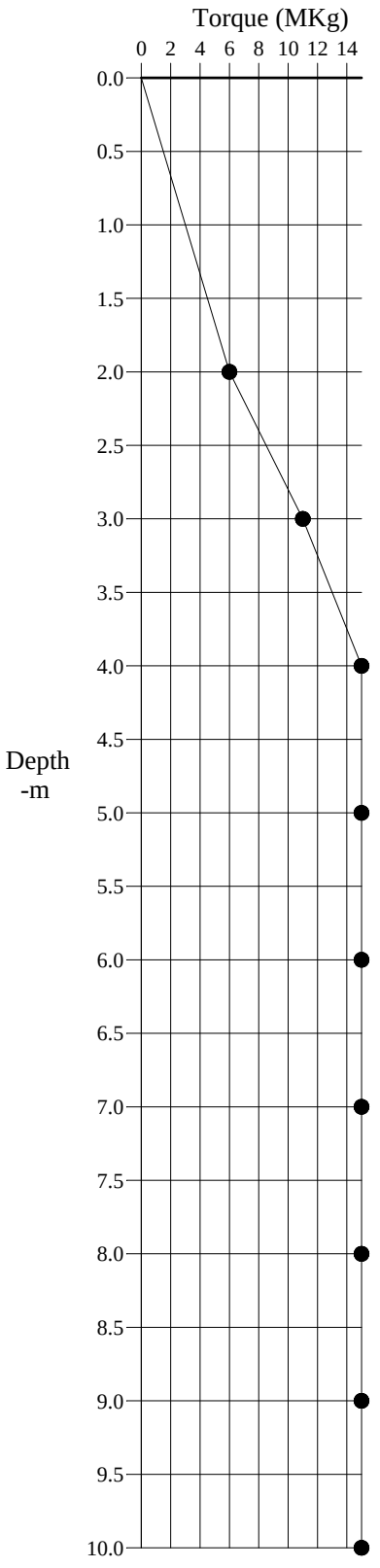
DYNAMIC PROBE / TORQUE

Report No: 15.02.014a
Client Ref.

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET | Probe:SHDP 104 | Date Probed:25/01/2016



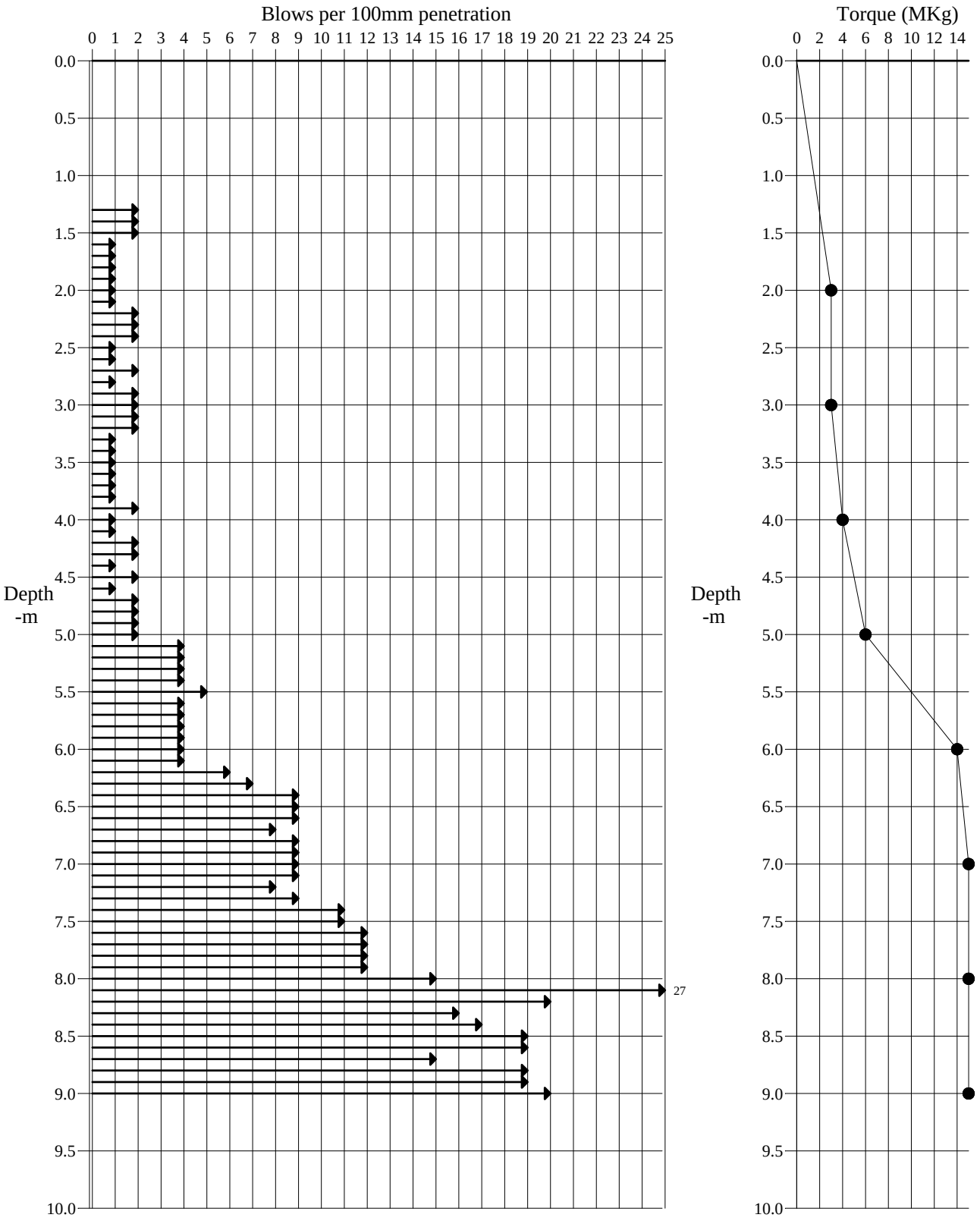


DYNAMIC PROBE / TORQUE

Report No: 15.02.014a
Client Ref.

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Pentavia Retail Park, Watford Way, Mill Hill, NW7 2ET | Probe:SHDP 105 | Date Probed:25/01/2016



DYNAMIC PROBE / TORQUE

Report No: 15.02.014a
Client Ref.

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Date	Weather	Test Location	Methane CH4(%)	Carbon Dioxide CO_2(%)	Oxygen O2(%)	Atmospheric Pressure (mBar)	Flow (l/h)	Water Level (m bgl)
04/02/2016	Dry	BH101	0.0	1.6	19.7	1015	0.0	5.90
		BH104	8.6	5.4	12.1	1017	0.2	6.00
		BH105	0.0	0.1	16.1	1016	0.0	3.80
		BH107	0.0	0.5	19.3	1017	0.2	6.20
		BH2	0.4	1.2	17.1	1017	0.2	3.50
		BH3	0.4	0.6	17.0	1017	0.1	3.50
10/02/2016	Dry	BH101	0.1	1.7	20.3	988	0.6	5.9
		BH104	7.9	11.3	10.2	986	1.5	6.00
		BH105	0.1	0.2	17.3	988	0.0	2.70
		BH107	0.1	0.2	21.1	989	0.0	2.10
		BH2	0.7	2.1	16.1	989	0.4	3.30
		BH3	0.5	0.6	17.5	990	0.1	3.50
26/02/2016	Overcast	BH101	0.1	0.3	20.5	1001	0.2	5.90
		BH104	5.4	12.1	12.1	1001	0.6	6.00
		BH105	0.1	0.2	18.9	1001	0.0	2.10
		BH107	0.0	0.3	20.5	1001	0.1	2.50
		BH2	0.2	0.3	20.6	1001	0.1	3.30
		BH3	0.4	0.2	21.0	1001	0.0	3.50
Gas measurements taken using a portable Geotech GA5000 gas monitor								

GAS MONITORING RESULTS

Report No. 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Date	Weather	Test Location	Methane CH4(%)	Carbon Dioxide CO_2(%)	Oxygen O2(%)	Atmospheric Pressure (mBar)	Flow (l/h)	Water Level (m bgl)
10/03/2016	Rain	BH101	0.0	1.4	18.2	1008	0.7	5.70
		BH104	3.8	11.1	14.5	1010	0.1	5.70
		BH105	0.0	0.1	19.9	1009	0.0	2.10
		BH107	0.0	0.2	19.8	1009	0.0	6.20
		BH2	0.7	2.2	15.9	1010	0.6	3.30
		BH3	0.3	0.1	19.5	1010	0.1	3.10

Gas measurements taken using a portable Geotech GA5000 gas monitor

GAS MONITORING RESULTS

Report No. 15.02.014a

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

APPENDIX C
LABORATORY TESTING RESULTS AND TABLES

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD

Telephone:- 01327 860947/860060 Fax:- 01327 860430 Email: groundtech@listersgeotechnics.co.uk

PROJECT INFORMATION		SAMPLE INFORMATION		
Site Location:-	Pentavia Retail Park, Watford Way, Mill Hill, London	**Laboratory Tests Undertaken:-**		
		TEST TYPE	**TEST METHOD**	**TESTED**
		Natural Moisture Contents (MC%)	(BS 1377:Part 2:1990 Clause 3.2)	✓
		Liquid Limits (%)	(BS 1377:Part 2:1990 Clause 4.3)	✓
		Plastic Limits (%)	(BS 1377:Part 2:1990 Clause 5.3)	✓
		Plasticity Index (%)	(BS 1377:Part 2:1990 Clause 5.4)	✓
		Linear Shrinkage (%)	(BS 1377:Part 2:1990 Clause 6.5)	
		PSD - Wet Sieving	(BS 1377:Part 2:1990 Clause 9.2)	✓
Client Reference:-	-	Engineering Sample Descriptions	(BS 5930 : Section 6)	
		Passing 425/63 (μm)	-	✓
		Hydrometer	(BS 1377:Part 2:1990 Clause 9.5)	
Date Samples Received:-	27th January 2016	Loss on Ignition (%)	-	✓
Date Testing Completed:-	1st March 2016	Soil Suctions (kPa)	BRE Digest IP 4/93, 1993	
		Bulk Density (Mg/m^3)	(BS 1377:Part 2:1990 Clause 7.2)	✓
		Strength Tests	(BS 1377:Part 7:1990 Clause 8 & 9)	✓
		Soluble Sulphate Content (SO^4g/l)	(BS 1377:Part 3:1990 Clause 5.3)	✓
		pH value	(BS 1377:Part 3:1990 Clause 9.4)	✓
		California Bearing Ratios (CBR)	(BS 1377:Part 4:1990 Clause 7)	✓
		Compaction Tests	(BS 1377:Part 4:1990 Clauses 3.0-3.6)	
The results relate only to the samples tested				

Laboratory testing in accord with BS EN ISO/IEC 17025-2000 and Quality Management in accord with ISO 9001

Signed on behalf of GroundTech Laboratories:- L Clappington **Technical Signatory**

Quality Assured to ISO 9001

GEOTECHNICAL LABORATORY TEST RESULTS

Project Ref: 15.02.014a

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 101	B	0.50		26																				
	D	0.50		29																				
	D	1.20		30																				
	D	1.50		32											4								7.3	0.36
	D	2.00	PI/63	28	67	27	40	99	40	CH	98	0.42	29	0.03										
	B	2.50		25																				
	D	2.50		17																			7.4	0.67
	U100	3.00		25													2.02	TL	61	192	96			
	D	3.00	PSD	10																				
	D	3.50		21																				
	D	4.00		16																				
	D	4.50		18																				
	B	5.00		35																				
	D	5.00	PI/63	34	68	24	44	88	39	CH	81	0.50	26	0.23										
	D	5.50		31																				
	D	6.00		36																				
	D	6.50		25																				
	D	7.00		22																				
	D	7.50	PI/63	33	63	25	38	96	37	CH	91	0.52	27	0.21									7.2	0.60
	B	8.00		38																				
	D	8.00		30																				
	D	8.50		38																				
	D	9.00		36																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Reference
15.02.014a

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 101	B	9.20		45																				
	D	9.50		36																				
	D	10.00		32																				
	D	11.00	PI/63	33	73	27	46	100	46	CV	99	0.45	29	0.13										
	D	11.50		32																				
	D	12.50		37																				
	D	13.00		32																				
	D	14.00	PI/63	30	73	26	47	100	47	CV	95	0.41	28	0.09										
	D	14.50		29																				
	D	15.50	PI/63	28	72	26	46	100	46	CV	96	0.39	28	0.04									7.1	0.38
	U100	16.00		31													1.98	TL	320	240	120			
	D	16.00		31																				
	D	17.00		27																				
	D	17.50		23																				
	D	18.50		24																				
	D	19.00		27																				
	D	20.00	PI/63	24	58	22	36	100	36	CH	99	0.41	24	0.06										
BH 102	B	0.50		25																				
	D	0.50		28																			7.4	0.38
	D	1.20		22																				
	D	1.50		29																				
	D	2.00		15																				
	D	2.50	PI/63	34	62	23	39	73	28	CH	64	0.55	25	0.28										

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Reference
15.02.014a

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 102	D	3.00		17																				
	D	3.50		24																				
	D	4.00	PI/63	36	52	22	30	85	26	CH	75	0.69	24	0.47										
	D	4.50		27																				
	D	5.00		28																				
	D	5.50	PI/63	31	61	24	37	91	34	CH	84	0.51	26	0.19										
	D	6.00		32																				
	D	6.50		32																				
	D	7.00		29																				
	D	8.00		29																				
	B	9.00	PI/63	35	75	26	49	100	49	CV	98	0.47	28	0.18									7.1	0.36
	D	9.00		30																				
	D	9.50		32																				
	D	10.00		33																				
	D	11.00		33																				
	D	11.50		32																				
	D	12.00	PI/63	29	68	25	43	96	41	CH	94	0.43	27	0.09										
	D	13.00		32																				
	D	14.00		33																				
	D	14.50		30																				
	B	14.50	PI/63	33	65	24	41	100	41	CH	98	0.51	26	0.22										
	D	15.50		28																				
	D	16.00		28																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 102	D	17.00		27																				
	D	17.50		27																				
	D	18.50		28																				
	D	19.00		25																				
	D	20.00	PI/63	28	59	23	36	100	36	CH	99	0.47	25	0.14									7.2	0.25
BH 104	B	0.50	PI/63	31	56	24	32	72	23	CH	59	0.55	26	0.22										
	D	0.50		34																				
	D	1.20		28																				
	D	1.50		33																				
	D	2.50		39																				
	U100	3.00		41													1.77	TL	58	42	21			
	D	3.00		34																				
	D	3.50	PI/63	28	53	26	27	86	23	CH	80	0.53	28	0.07	6									
	D	4.00		32																				
	B	4.50		32																				
	D	4.50		34																				
	D	5.00		31																				
	D	5.50		33																				
	D	6.00		33																				
	D	6.50	PI/63	30	75	26	49	100	49	CV	99	0.40	28	0.08										
	D	7.00		32																				
	D	7.50		33																				
	D	8.00		33																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 104	D	8.50		34																				
	D	9.00		31																				
	U100	9.00		35													1.94	TL	181	100	50			
	D	9.50	PI/63	31	74	26	48	99	47	CV	93	0.42	28	0.10									7.1	1.21
	D	10.00		28																				
	D	11.00		33																				
	B	11.50		28																				
	D	11.50		27																				
	D	12.50		32																				
	D	13.00	PI/63	27	61	25	36	100	36	CH	98	0.44	27	0.06									7.0	0.29
	D	14.00		29																				
	D	14.50		28																				
	D	15.50		29																				
	D	16.00		26																				
	D	17.00	PI/63	28	66	26	40	100	40	CH	99	0.42	28	0.05										
	D	17.50		27																				
	U100	17.50		21													2.05	TL	349	332	166			
	D	18.50		34																				
	D	19.00		25																				
	D	20.00	PI/63	29	58	22	36	93	33	CH	89	0.50	24	0.19										
BH 105	B	0.70		41																				
	D	0.70		31																				
	D	1.20		28																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 105	D	1.70	PI/63	31	61	24	37	90	33	CH	86	0.51	26	0.19										
	D	2.00		30																				
	D	2.50		33																				
	D	3.00		33																				
	D	3.50		30																				
	D	4.00		34																				
	D	4.50	PI/63	32	66	25	41	88	36	CH	83	0.48	27	0.17									7.1	0.63
	D	5.00		37																				
	D	5.45		31																				
	D	6.00		19																				
	D	6.50		31																				
	D	7.00		24																				
	D	7.50		24																				
	D	8.00		27																				
	D	8.50	PI/63	31	67	25	42	90	38	CH	85	0.46	27	0.14										
	D	9.00		26																				
	D	9.50		26																				
	D	10.00		22																				
	B	11.00		30																				
	D	11.00	PI/63	34	75	26	49	98	48	CV	95	0.45	28	0.16									7.4	0.12
	D	11.50		32																				
	D	12.00		32																				
	U100	13.00		26													1.99	TL	260	174	87			

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 105	D	13.95		33																				
	D	14.50		6																				
	D	15.50		28																				
	D	16.00	PI/63	27	65	25	40	100	40	CH	98	0.42	27	0.05										
	B	17.00		34																				
	D	17.00		30																				
	D	17.50		28																				
	D	18.00		36																				
	D	19.00		32																				
	D	20.00	PI/63	40	63	25	38	97	37	CH	94	0.63	27	0.39										
	U100	20.50		28													1.97	TL	410	196	98			
	D	20.95		32																				
	D	22.00		27																				
	D	23.00		32																			7.0	1.00
	D	23.50		28																				
	D	24.00		33																				
	D	24.50	PI/63	27	72	27	45	97	44	CV	95	0.38	29	0.00										
BH 106	B	0.50	PI/63	29	63	26	37	100	37	CH	98	0.46	28	0.08									7.2	0.71
	D	0.50		30																				
	D	1.20		28																				
	D	1.70		30																				
	D	2.00		33																				
	D	2.50		34																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 106	D	3.00		30																				
	D	3.50	PI/63	30	65	24	41	65	27	CH	62	0.46	26	0.15										
	D	4.45		33																				
	D	5.00		28																				
	D	5.50		31																				
	D	6.00		32																				
	D	6.50		30																				
	D	7.00		27																				
	D	7.50		31																				
	D	8.00		30																				
	D	8.50	PI/63	29	69	25	44	98	43	CH	95	0.42	27	0.09									7.3	0.36
	D	9.00		33																				
	D	9.50		28																				
	D	10.00		33																				
	B	10.50		32																				
	D	11.00		40																				
	U100	11.50		33													1.95	TL	231	170	85			
	D	11.95	PI/63	37	66	27	39	100	39	CH	98	0.56	29	0.26										
	D	13.00		28																				
	D	14.00		40																				
	D	14.50		30																				
	B	15.00		34																				
	D	15.00		27																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 106	D	16.45	PI/63	40	65	25	40	100	40	CH	99	0.62	27	0.38										
	D	17.50		27																				
	D	18.50		44																				
	D	19.00		27																				
	D	20.00		40																				
	D	20.50		28																				
	D	21.50	PI/63	37	58	24	34	100	34	CH	99	0.64	26	0.38										
	D	22.45		40																			7.2	1.15
	D	23.50		30																				
	D	24.00		34																				
	D	24.50	PI/63	29	61	24	37	100	37	CH	99	0.48	26	0.14										
BH 107	B	0.50	PI/63	24	71	25	46	89	41	CV	86	0.34	27	-0.02										
	D	0.50		24																				
	D	1.20		34																				
	D	1.70		30																				
	D	2.00		30																				
	D	2.50		30																				
	D	3.00		27																				
	D	3.50		28																				
	D	4.00		24																				
	D	4.50	PI/63	31	71	27	44	98	43	CV	97	0.44	29	0.09									7.4	0.42
	B	5.00		31																				
	D	5.00		32																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 107	D	5.45		31																				
	D	6.00		30																				
	D	6.50		29																				
	D	7.00		31																				
	D	7.50	PI/63	32	68	25	43	92	40	CH	89	0.47	27	0.16										
	D	8.00		30																				
	D	8.50		26																				
	D	9.00	PI/63	28	63	24	39	99	39	CH	97	0.44	26	0.10									7.3	1.42
	B	9.00		29																				
	D	9.45		30																				
	D	10.00		31																				
	D	11.00		31																				
	D	11.50		30																				
	U100	11.50		30													1.94	TL	231	188	94			
	D	12.50	PI/63	31	63	25	38	100	38	CH	97	0.49	27	0.16										
	D	13.00		30																				
	D	14.00		32																				
	D	14.50		32																				
	B	15.50		33																				
	D	15.50		30																				
	D	16.45	PI/63	32	60	24	36	100	36	CH	99	0.53	26	0.22										
	D	17.50		28																				
	D	18.50		30																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 107	D	19.00		30																				
	D	20.00	PI/63	30	65	25	40	100	40	CH	99	0.46	27	0.13									7.2	0.56
	D	20.50		26																				
	D	21.00		40																				
	D	22.45		27																				
	D	23.00		36																				
	D	23.50		26																				
	D	24.00	PI/63	31	66	25	41	100	41	CH	99	0.47	27	0.15										
	D	24.50		25																				
CT 101	D	0.20		11																				
	D	0.50		16																				
	D	1.00		20																				
	D	1.30	PI/63	21	57	25	32	91	29	CH	85	0.37	27	-0.13										
	D	1.50		29																				
	D	2.00		40																				
	D	2.40		34											7								7.0	0.29
	D	3.00	PI/63	32	57	23	34	99	34	CH	98	0.56	25	0.26										
	D	4.00		27																				
CT 102	D	0.20		17																				
	D	0.60		33																				
	D	1.00		35																				
	D	1.50	PI/63	30	55	23	32	42	13	CH	35	0.55	25	0.22										
	D	2.00		35																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
CT 102	D	2.50		30																				
	D	3.00	PI/63	34	63	25	38	93	35	CH	88	0.54	27	0.24										
	D	3.50		31																				
	D	4.00		34																				
	D	4.50	PI/63	30	64	25	39	98	38	CH	96	0.47	27	0.13										
CT 103	D	0.14		13																				
	D	0.50		33																			7.0	0.65
	D	1.00		34																				
	D	1.50		36																				
	D	2.00	PI/63	31	68	25	43	99	42	CH	95	0.46	27	0.14										
	D	2.50		31																				
	D	3.00		15																				
	D	3.50	PI/63	37	70	27	43	81	35	CH	76	0.53	29	0.23										
	D	4.00		26																				
CT 104	D	0.12		22																				
	D	0.40	PI/63	26	51	23	28	57	16	CH	50	0.51	25	0.11										
	D	1.00		31																				
	D	1.50		34																				
	D	2.00	PSD	19																				
	D	3.00		18																				
CT 105	D	0.12		18																				
	D	0.40		37																				
	D	1.00		33																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Reference
15.02.014a

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
CT 105	D	1.50	PI/63	33	71	26	45	100	45	CV	96	0.46	28	0.16										
	D	2.00		32																				
	D	2.50		26																				
	D	3.00		36																				
	D	3.50		32																				
	D	4.00		35																				
	D	4.50	PI/63	32	63	26	37	99	37	CH	98	0.51	28	0.16									7.2	0.23
	D	5.00		33																				
	D	5.50		34																				
CT 106	D	0.10		26																				
	D	0.60		27																				
	D	1.00	PI/63	36	62	24	38	85	32	CH	76	0.58	26	0.32										
	SPT	1.00		26																				
	D	1.50		31																				
	SPT	2.00		30																				
	D	2.00		32																				
	D	2.50		33																				
	D	3.00		36																				
	SPT	3.00		31																				
	D	3.30		33																				
	D	3.50	PI/63	31	71	25	46	99	46	CV	97	0.44	27	0.13										
	D	4.00		30																				
	SPT	4.00		31																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
CT 106	D	4.50		33																				
	D	4.70		35																				
	D	5.00		33																				
	SPT	5.00		28																				
	D	5.50	PI/63	28	68	25	43	100	43	CH	99	0.41	27	0.07									7.5	0.31
CT 107	D	0.10		11																				
	D	0.30		24																				
	D	0.50	PI/63	34	67	24	43	97	42	CH	92	0.51	26	0.23										
	D	1.00		34																				
	SPT	1.00		26																				
	D	1.50		20																				
	D	2.00	PI/63	13		####		75		#######	67		###		3									
	SPT	2.00		23																				
	D	2.50		34																				
	D	3.00		31																				
	SPT	3.00		30																				
	D	3.50		37																				
	D	4.00		42																				
	SPT	4.00		26																				
	D	4.50		25																				
	D	5.00	PI/63	37	65	25	40	96	38	CH	92	0.57	27	0.30										
	SPT	5.00		38																				
	D	5.50		35																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
CT 107	SPT	6.00		32																				
CT 108	D	0.10		11																				
	D	0.40		27																				
	D	1.00	PI/63	32	56	24	32	81	26	CH	72	0.57	26	0.25										
	SPT	1.00		31																				
	D	1.50		32																				
	D	2.00		19											3								7.0	0.29
	SPT	2.00		27																				
	D	2.50		23																				
	D	3.00		40																				
	SPT	3.00		33																				
	D	3.50	PI/63	34	61	24	37	93	34	CH	90	0.56	26	0.27										
	D	4.00		40																				
	SPT	4.00		30																				
	D	4.50		30																				
	D	5.00	PI/63	36	56	24	32	67	22	CH	60	0.64	26	0.38										
	SPT	5.00		33																				
	SPT	6.00		35																				
CT 109	D	0.10		13																				
	D	0.50		24																				
	D	0.80		27																				
	D	1.00		28																				
	SPT	1.00		16																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
CT 109	D	1.50	PI/63	32	51	24	27	76	20	CH	64	0.63	26	0.30										
	SPT	2.00		24																				
	D	2.00		22																				
	D	2.50		21																				
	D	3.00		36																				
	SPT	3.00		31																				
	D	3.50	PI/63	39	59	23	36	86	31	CH	81	0.66	25	0.44										
	D	4.00		39																				
	SPT	4.00		37																				
	D	4.50		41																				
	SPT	5.00		42																				
	D	5.00	PI/63	37	66	24	42	90	38	CH	88	0.56	26	0.31										
	SPT	6.00		39																				
CT 110	D	0.21	PSD	7.2																				
CT 111	D	0.15		4.9																				
	D	0.50		34																				
	SPT	1.00		33																				
	D	1.00		33																				
	D	1.50		47																				
	D	2.00	PI/63	13	31	15	16	76	12	CL	49	0.42	17	-0.13									7.6	0.23
	SPT	2.00		9																				
	D	2.50		39																				
	D	3.00		33																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
CT 111	SPT	3.00		26																				
	D	3.50		33																				
	SPT	4.00		30																				
	D	4.00		36																				
	D	4.50	PI/63	28	63	24	39	100	39	CH	98	0.44	26	0.10										
	SPT	5.00		26																				
	D	5.00		24																				
	D	5.50		28																				
	SPT	6.00		25																				
CT 112	D	0.10		30																				
	D	0.50		39																				
	D	1.00	PI/63	31	72	26	46	99	46	CV	98	0.43	28	0.11										
	SPT	1.00		32																				
	D	1.50		34																				
	D	2.00		31																				
	SPT	2.00		28																				
	D	2.50		26																				
	D	3.00		25																				
	SPT	3.00		17																				
	D	3.50		29																				
	D	4.00	PI/63	30	72	25	47	97	46	CV	95	0.42	27	0.11										
	SPT	4.00		27																				
	D	4.50		35																				

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

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Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	MC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	MC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m3	Test Type	Cell Pressure kN/m2	Deviator Stress kN/m2	Apparent Cohesion kN/m2	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
CT 112	SPT	5.00		30																				
	D	5.00		32																				
	D	5.50	PI/63	32	61	23	38	97	37	CH	93	0.52	25	0.24									7.1	0.42
	SPT	6.00		23																			7.3	0.48

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Reference
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Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured ISO 9001

Site: Pentavia Retail Park, Watford Way, Mill Hill, London

Test Location: BH 101

Sample Depth: 3.00m

Sample Description:

Hydrometer No.:

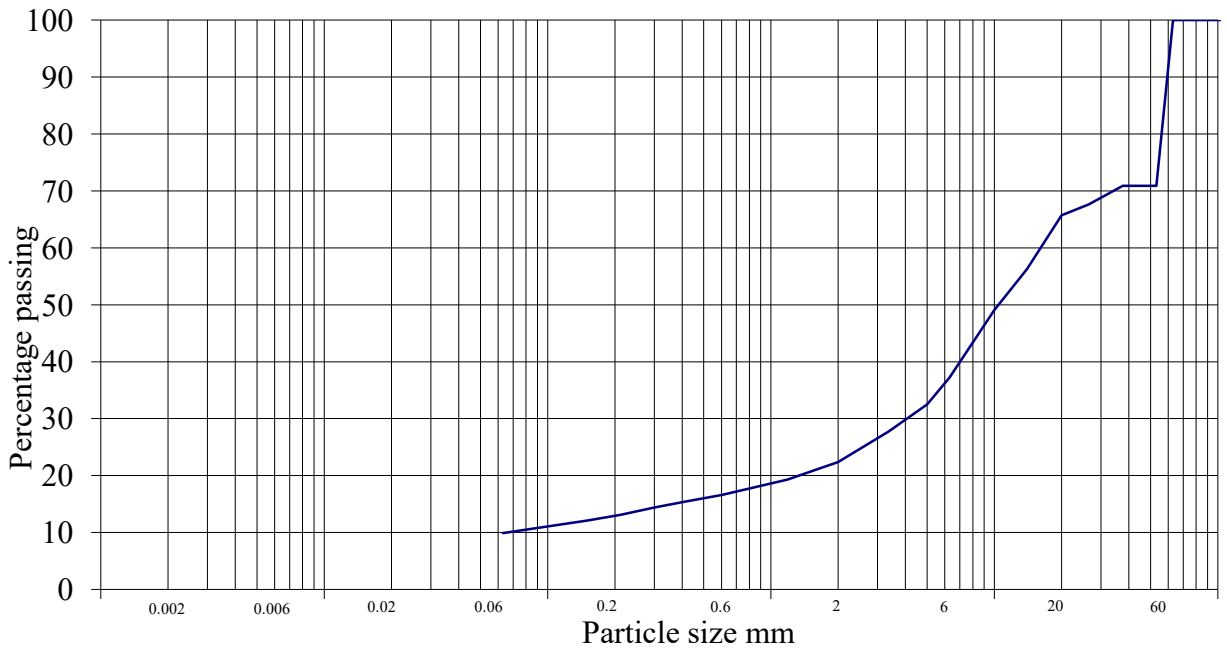
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm	100.00		
63mm	100.00		
50mm	70.90		
37.5mm	70.90		
26.5mm	67.60		
20mm	65.70		
14mm	56.30		
10mm	49.10		
6.3mm	37.20		
5mm	32.50		
3.5mm	27.70		
2mm	22.40		
1.18mm	19.30		
600µm	16.60		
425µm	15.50		
300µm	14.40		
212µm	13.10		
150µm	12.10		
63µm	9.90		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Reference
15.02.014a

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured ISO 9001

Site: Pentavia Retail Park, Watford Way, Mill Hill, London

Test Location: CT 104

Sample Depth: 2.00m -3.00m

Sample Description:

Hydrometer No.:

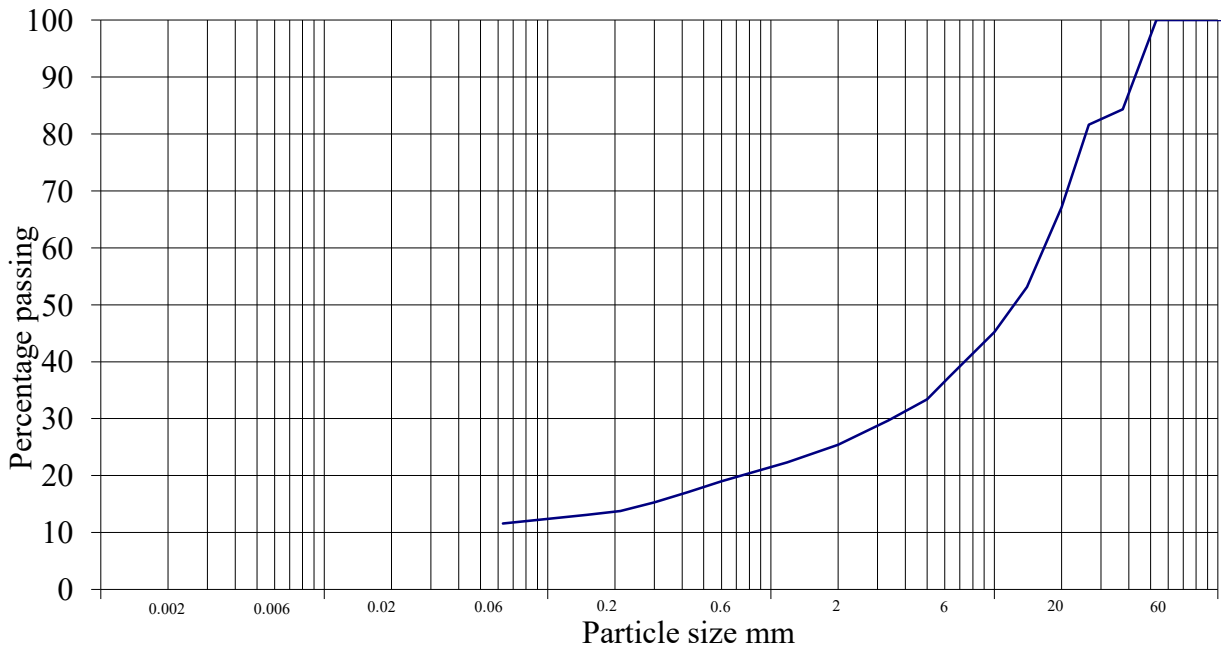
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm	100.00		
63mm	100.00		
50mm	100.00		
37.5mm	84.30		
26.5mm	81.60		
20mm	67.10		
14mm	53.10		
10mm	45.20		
6.3mm	37.40		
5mm	33.40		
3.5mm	29.70		
2mm	25.40		
1.18mm	22.30		
600µm	19.00		
425µm	17.10		
300µm	15.30		
212µm	13.80		
150µm	13.10		
63µm	11.60		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Reference
15.02.014a

GroundTech Laboratories

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Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured ISO 9001

Site: Pentavia Retail Park, Watford Way, Mill Hill, London

Test Location: CT 110

Sample Depth: 0.21m -0.50m

Sample Description:

Hydrometer No.:

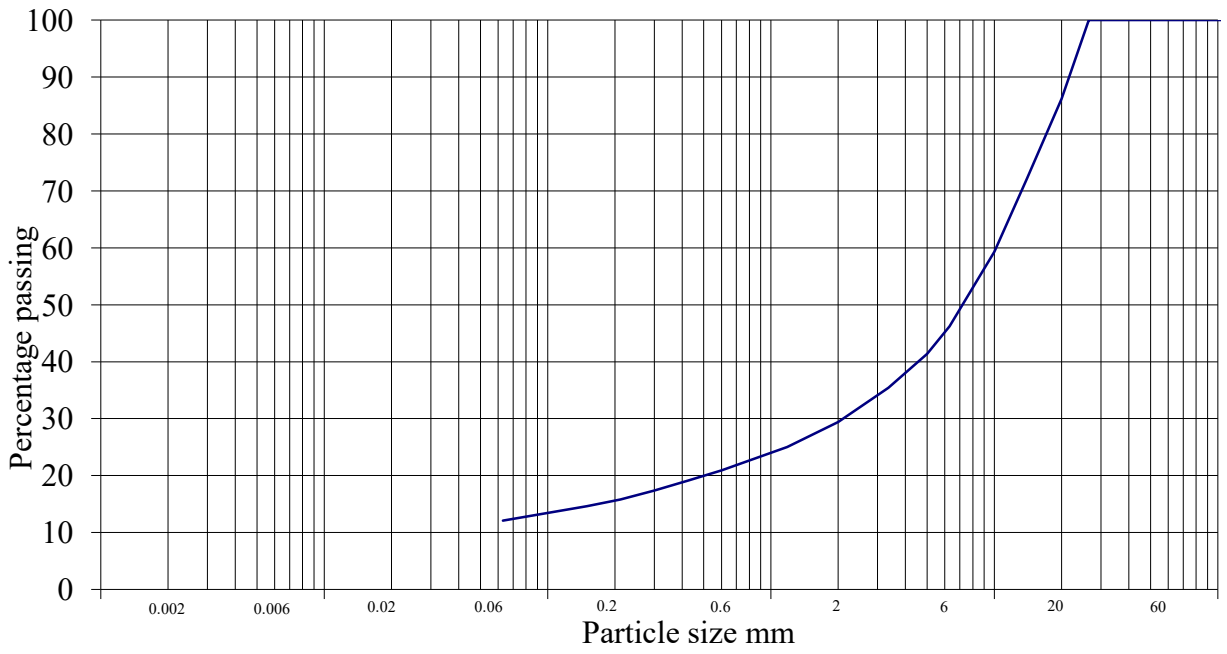
SG Gs:

Water Visc. (N):

Dry Mass of Soil after pretreatment (g):

Test Method: BS 1377 : Part 2 : 1990 : 9.2

BS test sieve	Cumulative Passing - %	Hydrometer Particle Diameter	Cumulative Passing - %
75mm	100.00		
63mm	100.00		
50mm	100.00		
37.5mm	100.00		
26.5mm	100.00		
20mm	86.20		
14mm	72.20		
10mm	59.30		
6.3mm	46.20		
5mm	41.40		
3.5mm	35.40		
2mm	29.40		
1.18mm	25.00		
600µm	20.90		
425µm	19.10		
300µm	17.40		
212µm	15.80		
150µm	14.60		
63µm	12.10		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

PARTICLE SIZE DISTRIBUTION

Project Reference
15.02.014a

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Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430

Test Location	Depth (m)	C.B.R. Value % Top:	Base	Final Moisture Content %	Bulk Density Mg/m3	Dry Density Mg/m3	Remarks
BH 101	0.50	3.0	3.6	26	1.55	1.23	Stiff brown slightly silty slightly gravelly CLAY Gravel is fine to medium sub angular flint concrete and occasional roots The gravel retained on the 20mm sieve is 2%
BH 104	0.50	1.0	1.4	34	1.67	1.24	Soft grey brown silty slightly gravelly CLAY Gravel is fine to medium to occasinal coarse sub angular flint redbrick coal ash with slight boggy smell the ravel retained on the 20mm sieve is 4%
BH 105	0.70	1.1	1.0	41	1.62	1.15	Soft grey brown silty slightly organiic smelling CLAY with rare fine redbrick The gravel retained on the 20mm sieve is 1%
BH 106	0.50	3.7	3.1	29	1.65	1.28	Firm grey brown slightly silty slightly gravelly CLAY Gravel is fine to medium to occasinal coarse sub angular flint and redbrick The gravel retained on the 20mm sieve is 1%
BH 107	0.50	4.1	3.2	24	1.71	1.37	Firm brown slightly silty CLAY with rare fine to medium sub angular flint and redbrick

Samples recompacted using standard compaction
Surcharge 8kg

Date	CALIFORNIA BEARING RATIO	Report No.
23/02/2016		15.02.014a

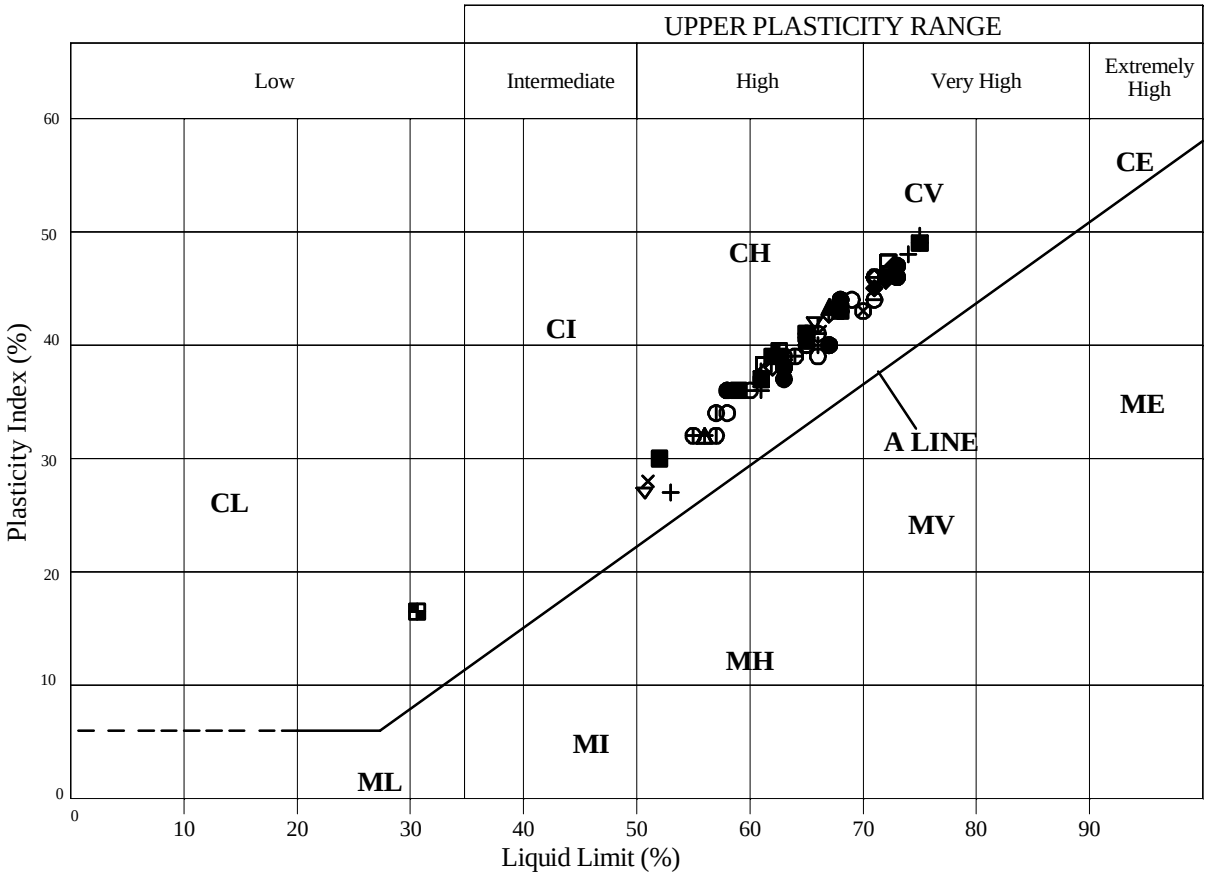
GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone:- 01327 860947/860060 Fax:- 01327 860430

Quality Assured to ISO9001

Site: **Pentavia Retail Park, Watford Way, Mill Hill, London**



- BH 101
- BH 102
- BH 104
- BH 105
- BH 106
- BH 107
- CT 101
- CT 102
- CT 103
- CT 104
- CT 105
- CT 106
- CT 107
- CT 108
- CT 109
- CT 110
- CT 111
- CT 112

PLASTICITY CHART

Lab. Ref. **15.02.014a**

GroundTech Laboratories

Geotechnical Testing Facility

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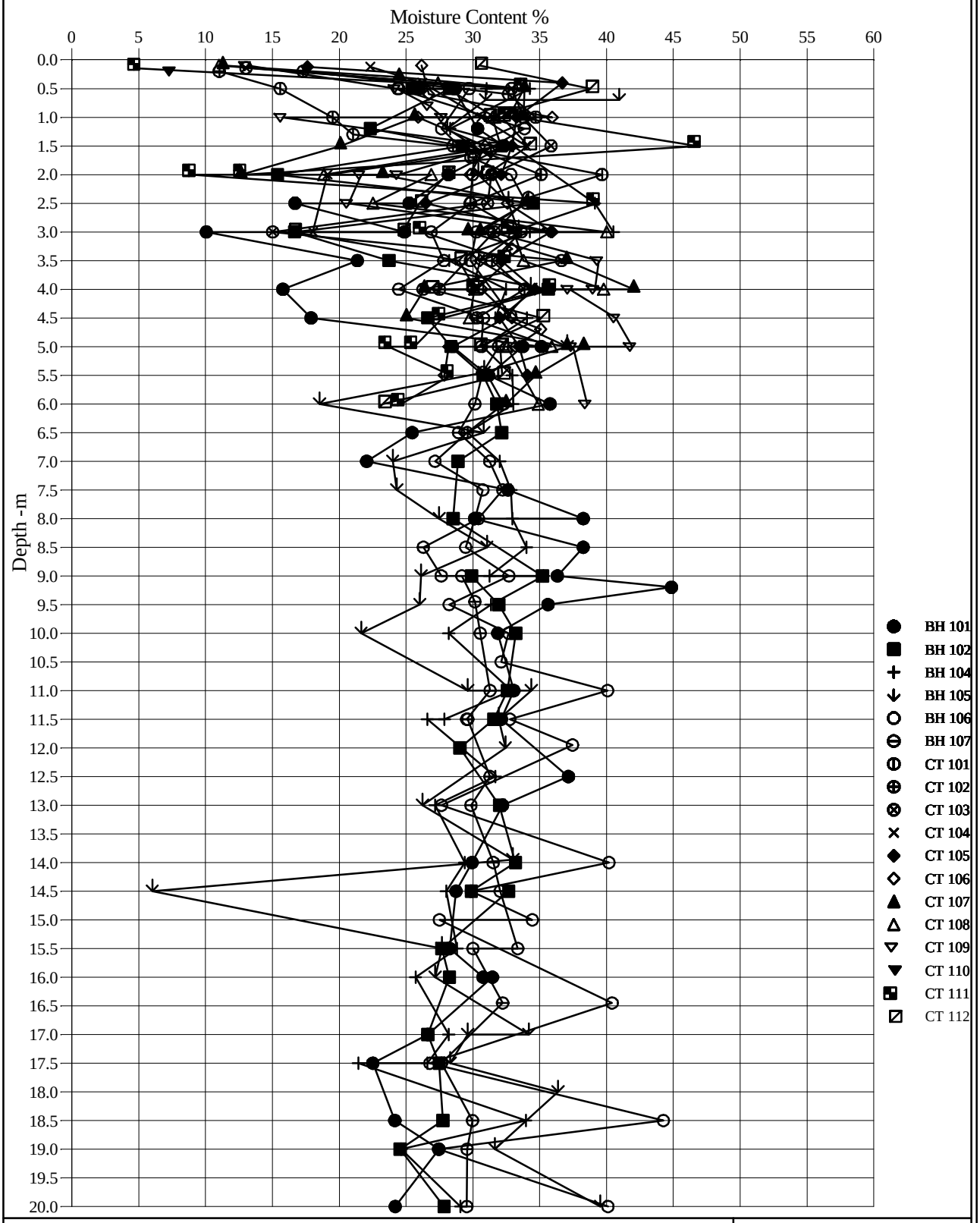
Telephone:- 01327 860947/860060 Fax:- 01327 860430

Quality Assured to ISO9001

Site: **Pentavia Retail Park, Watford Way, Mill Hill, London**



MOISTURE CONTENT v DEPTH

Lab Ref. **15.02.014a**

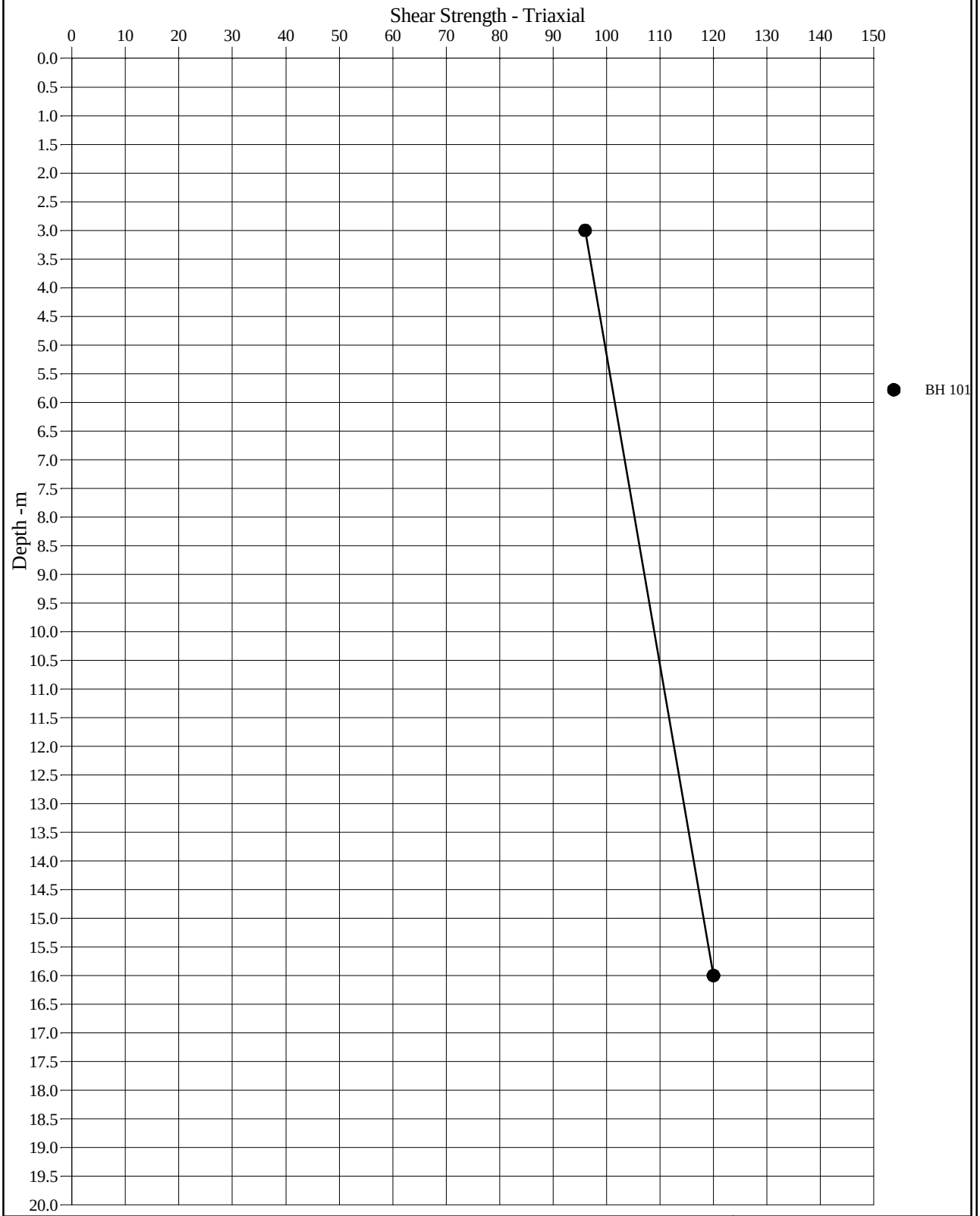
GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone:- 01327 860947/860060 Fax:- 01327 860430

Quality Assured to ISO9001

Site: Pentavia Retail Park, Watford Way, Mill Hill, London



STRENGTH v DEPTH

Lab Ref. 15.02.014a

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	16-02161-1
Initial Date of Issue:	03-Feb-2016
Client	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Lee Chippington
Project	15.02.14a - Mill Hill

Quotation No.:		**Date Received:**	01-Feb-2016
Order No.:	15.02.014a	**Date Instructed:**	01-Feb-2016
No. of Samples:	5	**Target Date:**	03-Feb-2016
Turnaround (Wkdays):	3	**Results Due:**	03-Feb-2016

Date Approved: 03-Feb-2016

Approved By:

Details: Keith Jones, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 15.02.14a - Mill Hill

Client: Listers Geotechnical Consultants		**Chemtest Job No.:**			16-02161	16-02161	16-02161	16-02161	16-02161
Quotation No.:		**Chemtest Sample ID.:**			247903	247904	247905	247906	247907
Order No.: 15.02.014a		Client Sample Ref.:			27/01/2016	27/01/2016	27/01/2016	27/01/2016	27/01/2016
		Client Sample ID.:			CT102	CT103	CT105	CT107	CT108
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.6	0.5	0.4	0.3	0.4
		Date Sampled:			25-Jan-2016	25-Jan-2016	25-Jan-2016	25-Jan-2016	25-Jan-2016
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	22	24	25	23	20
Stones	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.0	1.9	0.94	1.2	2.8
Arsenic	U	2450	mg/kg	1.0	16	20	19	17	17
Cadmium	U	2450	mg/kg	0.10	0.13	< 0.10	< 0.10	< 0.10	0.11
Chromium	U	2450	mg/kg	1.0	44	55	51	38	33
Copper	U	2450	mg/kg	0.50	35	27	28	36	44
Mercury	U	2450	mg/kg	0.10	0.20	< 0.10	< 0.10	< 0.10	0.30
Nickel	U	2450	mg/kg	0.50	44	51	46	43	34
Lead	U	2450	mg/kg	0.50	77	25	120	120	180
Selenium	U	2450	mg/kg	0.20	0.35	0.23	0.32	0.47	< 0.20
Zinc	U	2450	mg/kg	0.50	110	78	83	110	130
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TPH >C5-C6	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C6-C7	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C7-C8	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C12	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C12-C16	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C16-C21	N	2670	mg/kg	1.0	1.0	< 1.0	< 1.0	2.8	2.0
TPH >C21-C35	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total TPH >C5-C35	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.11
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.20
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.19
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.52
Phenanthrene	U	2700	mg/kg	0.10	1.0	< 0.10	< 0.10	< 0.10	3.3
Anthracene	U	2700	mg/kg	0.10	0.30	< 0.10	< 0.10	< 0.10	0.83
Fluoranthene	U	2700	mg/kg	0.10	1.4	< 0.10	0.27	0.94	5.7
Pyrene	U	2700	mg/kg	0.10	1.2	< 0.10	0.21	0.88	4.8
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.68	< 0.10	< 0.10	0.52	2.5
Chrysene	U	2700	mg/kg	0.10	0.80	< 0.10	< 0.10	0.68	2.7
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	0.94	< 0.10	< 0.10	0.74	3.3
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.52	< 0.10	< 0.10	0.20	1.5
Benzo[a]pyrene	U	2700	mg/kg	0.10	0.56	< 0.10	< 0.10	0.59	2.3

Results - Soil

Project: 15.02.14a - Mill Hill

Client: Listers Geotechnical Consultants				**Chemtest Job No.:**	16-02161	16-02161	16-02161	16-02161	16-02161
Quotation No.:				**Chemtest Sample ID.:**	247903	247904	247905	247906	247907
Order No.: 15.02.014a				Client Sample Ref.:	27/01/2016	27/01/2016	27/01/2016	27/01/2016	27/01/2016
				Client Sample ID.:	CT102	CT103	CT105	CT107	CT108
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.6	0.5	0.4	0.3	0.4
				Date Sampled:	25-Jan-2016	25-Jan-2016	25-Jan-2016	25-Jan-2016	25-Jan-2016
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.36	< 0.10	< 0.10	0.26	1.4
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.13	< 0.10	< 0.10	0.10	0.44
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.59	< 0.10	< 0.10	0.47	1.8
Total Of 16 PAH's	U	2700	mg/kg	2.0	8.5	< 2.0	< 2.0	5.4	32

Report Information

Key

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

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	16-02712-1
Initial Date of Issue:	09-Feb-2016
Client	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Lee Chippington
Project	15.02.014a - Mill Hill

Quotation No.:		**Date Received:**	05-Feb-2016
Order No.:	15.002.014a	**Date Instructed:**	05-Feb-2016
No. of Samples:	6	**Target Date:**	09-Feb-2016
Turnaround (Wkdays):	3	**Results Due:**	09-Feb-2016

Date Approved: 09-Feb-2016

Approved By:

Details: Keith Jones, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 15.02.014a - Mill Hill

Client: Listers Geotechnical Consultants		**Chemtest Job No.:**			16-02712	16-02712	16-02712	16-02712	16-02712	16-02712
Quotation No.:		**Chemtest Sample ID.:**			250601	250602	250603	250604	250605	250606
		Client Sample ID.:			CT106	CT109	CT111	CT112	BH105	BH107
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			2.0	1.5	0.5	0.5	2.5	3.0
		Date Sampled:			17-Jan-2016	17-Jan-2016	17-Jan-2016	17-Jan-2016	17-Jan-2016	17-Jan-2016
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
ACM Type	U	2192		N/A	-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	22	21	18	23	23	23
Stones	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	2.0	0.73	1.4	2.3	2.0	1.7
Arsenic	U	2450	mg/kg	1.0	19	21	19	14	16	15
Cadmium	U	2450	mg/kg	0.10	0.28	0.23	0.21	0.13	0.13	0.10
Chromium	U	2450	mg/kg	1.0	38	41	33	49	50	48
Copper	U	2450	mg/kg	0.50	42	67	40	23	28	25
Mercury	U	2450	mg/kg	0.10	0.37	0.29	0.21	< 0.10	0.13	< 0.10
Nickel	U	2450	mg/kg	0.50	36	49	34	47	48	47
Lead	U	2450	mg/kg	0.50	110	180	120	19	42	23
Selenium	U	2450	mg/kg	0.20	0.64	0.81	0.42	0.71	0.79	0.74
Zinc	U	2450	mg/kg	0.50	140	120	83	64	78	67
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TPH >C5-C6	N	2670	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
TPH >C6-C7	N	2670	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
TPH >C7-C8	N	2670	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
TPH >C8-C10	N	2670	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
TPH >C10-C12	N	2670	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
TPH >C12-C16	N	2670	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
TPH >C16-C21	N	2670	mg/kg	1.0	[B] 1.9	[B] < 1.0	[B] 4.4	[B] < 1.0	[B] < 1.0	[B] < 1.0
TPH >C21-C35	N	2670	mg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Total TPH >C5-C35	N	2670	mg/kg	10	[B] < 10	[B] < 10	[B] < 10	[B] < 10	[B] < 10	[B] < 10
Naphthalene	U	2700	mg/kg	0.10	0.55	< 0.10	0.15	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	0.21	< 0.10	0.23	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	2.2	< 0.10	0.37	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	2.3	< 0.10	0.49	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	18	1.8	4.7	< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	3.3	0.33	1.2	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	16	2.6	8.5	0.16	0.66	0.40
Pyrene	U	2700	mg/kg	0.10	15	2.5	7.9	0.25	0.70	0.39
Benzo[a]anthracene	U	2700	mg/kg	0.10	5.1	0.83	3.5	< 0.10	0.20	< 0.10
Chrysene	U	2700	mg/kg	0.10	5.7	0.75	3.7	< 0.10	0.27	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	6.1	1.5	4.5	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	3.0	0.80	2.0	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	4.9	1.1	3.7	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	3.4	0.22	2.6	< 0.10	< 0.10	< 0.10

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 15.02.014a - Mill Hill

Client: Listers Geotechnical Consultants			**Chemtest Job No.:**		16-02712	16-02712	16-02712	16-02712	16-02712	16-02712
Quotation No.:			**Chemtest Sample ID.:**		250601	250602	250603	250604	250605	250606
			Client Sample ID.:		CT106	CT109	CT111	CT112	BH105	BH107
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		2.0	1.5	0.5	0.5	2.5	3.0
			Date Sampled:		17-Jan-2016	17-Jan-2016	17-Jan-2016	17-Jan-2016	17-Jan-2016	17-Jan-2016
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.98	< 0.10	0.68	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	3.0	0.26	2.4	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	90	13	47	< 2.0	< 2.0	< 2.0

Chemtest
The right chemistry to deliver results

Deviations

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

Sample ID:	Sample Ref:	Sample ID:	Sampled Date:	Deviation Code(s):	Containers Received:
250601		CT106	17-Jan-2016	B	Amber Glass 250ml
250601		CT106	17-Jan-2016	B	Plastic Bag
250602		CT109	17-Jan-2016	B	Amber Glass 250ml
250602		CT109	17-Jan-2016	B	Plastic Bag
250603		CT111	17-Jan-2016	B	Amber Glass 250ml
250603		CT111	17-Jan-2016	B	Plastic Bag
250604		CT112	17-Jan-2016	B	Amber Glass 250ml
250604		CT112	17-Jan-2016	B	Plastic Bag
250605		BH105	17-Jan-2016	B	Amber Glass 250ml
250605		BH105	17-Jan-2016	B	Plastic Bag
250606		BH107	17-Jan-2016	B	Amber Glass 250ml
250606		BH107	17-Jan-2016	B	Plastic Bag

Report Information

Key

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

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

APPENDIX D
CONTAMINATION RISK ASSESSMENT WORKSHEETS

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Client/client ref: CPC Project Services Ltd
Project ref: 15.02.04a
Site ref: Pentavia Retail Park, Mill Hill
Data description: Soil
Contaminant(s): Pb, BbF, DahA
Test scenario: Planning
Date: 1 March 2016
User details: LC

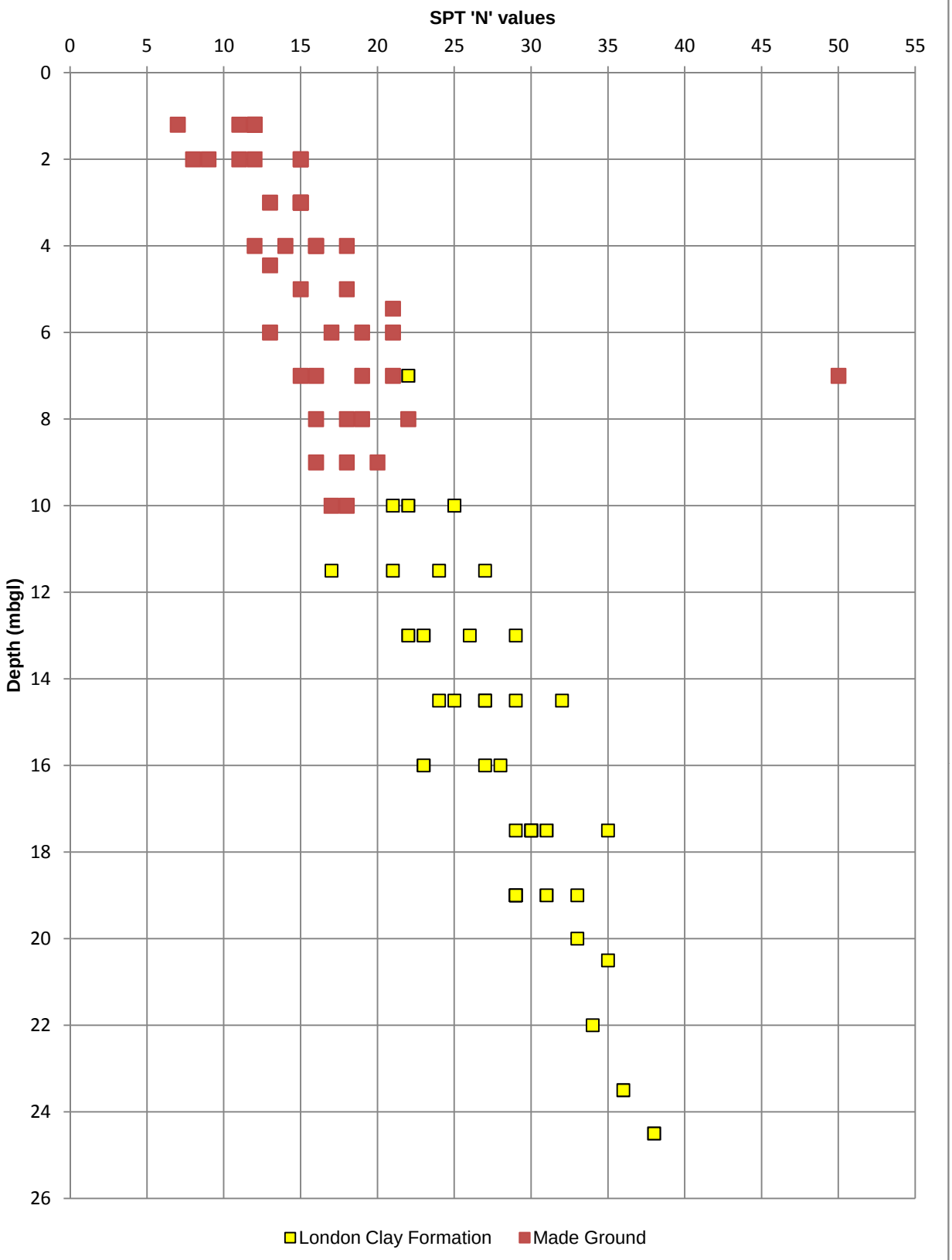
	Lead (mg/kg)	Benzo(b)Fluoranthene (mg/kg)	Dibenzo(a,h)Anthracene (mg/kg)							
Critical concentration, C_c	**200**	**2.6**	**0.24**							
Notes										
Sample size, n	17	17	17	0	0	0	0	0	0	0
Sample mean, $\overline{x}$	97.7058824	1.19	0.20764706	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Standard deviation, s	61.1123604	1.77623197	0.25375996							
Number of non-detects	0	0	0							
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	No	Yes	Yes							
Distribution	Normal	Non-normal	Non-normal							
Statistical approach	Auto: One-sample t-	Auto: Chebychev	Auto: Chebychev	Auto	Auto	Auto	Auto	Auto	Auto	Auto

Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?			**Evidence level required:**			95%	Use Normal distribution to test for outliers		
t statistic, t_0 (or k_0)	-6.901540858	-3.27298407	-0.525672346							
Upper confidence limit (on true mean concentration, μ)	123.583238	3.06781162	0.47591912							
Evidence level	**100%**	**91%**	**22%**							
Base decision on:	evidence level	evidence level	evidence level							
Result	**μ < Cc**	**μ ≈≥ Cc**	**μ ≥ Cc**							
Select dataset	○ Y	◉ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y

Back to data | **Go to outlier test** | **Go to normality test** | **Show individual summary**

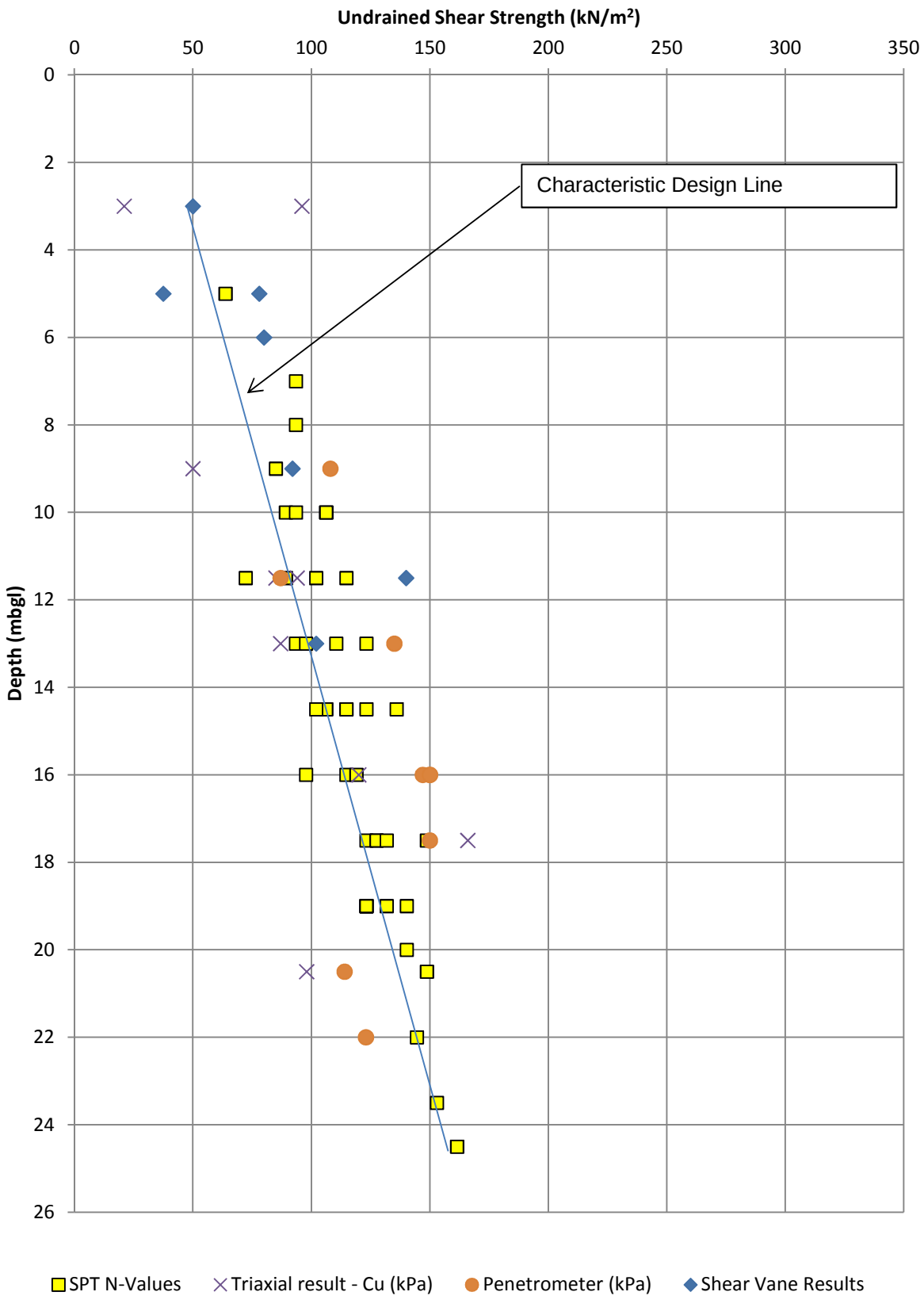
LISTERS GEO
Geotechnical and Geoenvironmental Consultants

APPENDIX E
GEOTECHNICAL PLOTS AND TABLES



SPT 'N' VALUES AGAINST DEPTH

Report Number
15.02.014a



UNDRAINED SHEAR STRENGTH AGAINST DEPTH

Report:
15.02.014a

The working load of a single pile is the sum of the ultimate shaft resistance and the ultimate end bearing resistance, each divided by an appropriate factor of safety. The following unit ultimate values of shaft resistance and end bearing resistance are proposed for preliminary pile design:

Ultimate Skin Friction	**kN**
Made Ground	
From ground level down to an average depth of 9.8m	-5 (minus 5)kN x As
London Clay Formation	
Increasing in a linear fashion;	
From approximately 5m in the southern area of the site	35kN x As
to	
approximately 10m	45kN x As
to	
approximately 25m depth	90kN x As

Ultimate End Bearing	**kN**
London Clay Formation	
Increasing in a linear fashion;	
From approximately 7m in the southern area of the site	630 x Ab
to	
approximately 12m	810 x Ab
To	
Approximately 25m	1,350 x Ab

As – area of the pile shaft (m2). Ab – area of pile base (m2)

A negative Ultimate Skin Friction has been applied to the Made Ground to take account of possible negative skin friction

The above assumes the use of bored piles

The adhesion factor, α of 0.6 in the London Clay has been utilised from guidance provided in '***Guidance notes for the design of straight shafted bored piles in London Clay'*** produced by the London District Surveyors Association. Reference should be made to the document for specific design assumptions and conditions when installing piles in London Clay.

PILE DESIGN DATA	**Report No: 15.02.014a**

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

APPENDIX F
WASTE CLASSIFICATION

HazWasteOnline™

Waste Classification Report

ZWR5K-6WKQF-WQUMX

Job name

15.02.014a Mill Hill

Waste Stream

Suite 6 & chromium VI

Comments

Project

Site

Classified by

Name:
Plant, Andrew
Date:
01/04/2016 10:00 UTC
Telephone:
01327 860060

Company:
Listers Geotechnical Consultants
Slapton Hill Barn, Blakesley Road
Slapton,
Towcester
NN12 8QD

Report

Created by: Plant, Andrew
Created date: 01/04/2016 10:00 UTC

Job summary

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

UKAS TESTING
2183

Final Report

Report No.:	16-02713-1
Initial Date of Issue:	12-Feb-2016
Client	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Lee Chippington
Project	15.02.014a - Mill Hill

Quotation No.:		**Date Received:**	05-Feb-2016
Order No.:	15.002.014a	**Date Instructed:**	05-Feb-2016
No. of Samples:	3	**Target Date:**	11-Feb-2016
Turnaround (Wkdays):	5	**Results Due:**	11-Feb-2016

Date Approved: 12-Feb-2016

Approved By:

Details: Robert Monk, Technical Development Chemist

Results - 2 Stage WAC

Project: 15.02.014a - Mill Hill

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	16-02713								
Chemtest Sample ID:	250607								
Sample Ref:									
Sample ID:	BH101						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Top Depth(m):	0.5								
Bottom Depth(m):	1.0								
Sampling Date:	17-Jan-2016								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.60	3	5	6
Loss On Ignition	2610	U	%			4.9	--	--	10
Total BTEX	2760	U	mg/kg			[B] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			[B] < 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.042	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.013	0.015	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0022	0.0014	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0021	0.025	< 0.050	0.23	0.5	10	30
Nickel	1450	U	0.0012	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	0.0016	< 0.010	0.014	0.06	0.7	5
Selenium	1450	U	0.0062	0.0023	0.012	0.027	0.1	0.5	7
Zinc	1450	U	0.027	0.021	< 0.50	< 0.50	4	50	200
Chloride	1220	U	60	21	120	250	800	15000	25000
Fluoride	1220	U	0.50	0.67	< 1.0	6.5	10	150	500
Sulphate	1220	U	1400	890	2600	9400	1000	20000	50000
Total Dissolved Solids	1020	N	1500	1000	2900	10000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	11	3.8	< 50	< 50	500	800	1000

Soild Information	
Dry mass of test portion/kg	0.175
Moisture (%)	22

Leachate Test Information	
Leachant volume 1st extract/l	0.301
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.177

Results - 2 Stage WAC

Project: 15.02.014a - Mill Hill

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	16-02713								
Chemtest Sample ID:	250608								
Sample Ref:									
Sample ID:	BH104						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Top Depth(m):	2.0								
Bottom Depth(m):	2.5								
Sampling Date:	17-Jan-2016								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			1.4	3	5	6
Loss On Ignition	2610	U	%			6.0	--	--	10
Total BTEX	2760	U	mg/kg			[B] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			[B] < 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			5.0	100	--	--
pH	2010	U				7.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.034	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
Arsenic	1450	U	0.0027	0.0035	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.028	0.024	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0025	0.0023	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.021	0.018	< 0.050	0.18	0.5	10	30
Nickel	1450	U	0.0025	0.0026	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0042	0.0060	< 0.010	0.058	0.06	0.7	5
Selenium	1450	U	0.0018	0.0011	< 0.010	0.011	0.1	0.5	7
Zinc	1450	U	0.0089	0.0027	< 0.50	< 0.50	4	50	200
Chloride	1220	U	18	5.4	35	64	800	15000	25000
Fluoride	1220	U	0.39	0.62	< 1.0	6.0	10	150	500
Sulphate	1220	U	70	49	140	500	1000	20000	50000
Total Dissolved Solids	1020	N	160	140	310	1400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	23	4.7	< 50	61	500	800	1000

Soild Information	
Dry mass of test portion/kg	0.175
Moisture (%)	24

Leachate Test Information	
Leachant volume 1st extract/l	0.296
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.139

Results - 2 Stage WAC

Project: 15.02.014a - Mill Hill

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	16-02713								
Chemtest Sample ID:	250609								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:	BH105								
Top Depth(m):	3.0								
Bottom Depth(m):	3.5								
Sampling Date:	17-Jan-2016								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.85	3	5	6
Loss On Ignition	2610	U	%			5.4	--	--	10
Total BTEX	2760	U	mg/kg			[B] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			[B] < 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				8.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.042	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.016	0.010	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.0010	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0018	< 0.0010	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0041	0.0056	< 0.050	0.055	0.5	10	30
Nickel	1450	U	0.0016	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0031	0.0015	< 0.010	0.016	0.1	0.5	7
Zinc	1450	U	0.022	0.0081	< 0.50	< 0.50	4	50	200
Chloride	1220	U	27	7.2	52	85	800	15000	25000
Fluoride	1220	U	0.64	0.71	1.2	7.0	10	150	500
Sulphate	1220	U	720	360	1400	3800	1000	20000	50000
Total Dissolved Solids	1020	N	740	390	1400	4100	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	14	9.8	< 50	100	500	800	1000

Soild Information	
Dry mass of test portion/kg	0.175
Moisture (%)	23

Leachate Test Information	
Leachant volume 1st extract/l	0.297
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.122

Deviations

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

Sample ID:	Sample Ref:	Sample ID:	Sampled Date:	Deviation Code(s):	Containers Received:
250607		BH101	17-Jan-2016	B	Amber Glass 250ml
250607		BH101	17-Jan-2016	B	Amber Glass 60ml
250607		BH101	17-Jan-2016	B	Plastic Bag
250608		BH104	17-Jan-2016	B	Amber Glass 250ml
250608		BH104	17-Jan-2016	B	Amber Glass 60ml
250608		BH104	17-Jan-2016	B	Plastic Bag
250609		BH105	17-Jan-2016	B	Amber Glass 250ml
250609		BH105	17-Jan-2016	B	Amber Glass 60ml
250609		BH105	17-Jan-2016	B	Plastic Bag

Report Information

Key

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

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

APPENDIX G
DESK STUDY INFORMATION

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
64920000_1_1

Customer Reference:
15.02.014

National Grid Reference:
521850, 191290

Slice:
A

Site Area (Ha):
2.35

Search Buffer (m):
1000

Site Details:

Homebase Ltd, Pentavia Retail Park
Watford Way
LONDON
NW7 2ET

Client Details:

Mr L Chippington
Listers Geotechnical Consultants Ltd
Slapton Hill Barn
Blakesley Road
Slapton
Towcester
Northants
NN12 8QD

Contents

Introduction

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

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

Copyright Notice

Natural England Copyright Notice

Ove Arup Copyright Notice

Peter Brett Associates Copyright Notice

Radon Potential dataset Copyright Notice

Report Version v49.0

Envirocheck®

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents					
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		2		10
Local Authority Pollution Prevention and Control Enforcements	pg 2				2
Nearest Surface Water Feature	pg 2		Yes		
Pollution Incidents to Controlled Waters	pg 3		1	1	7
Prosecutions Relating to Authorised Processes					
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register	pg 4				1
Water Abstractions	pg 4				(*8)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 6	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 6	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Detailed River Network Lines					n/a
Detailed River Network Offline Drainage	pg 7		Yes	Yes	n/a

Envirocheck®

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 8	1		2	1
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Recorded Landfill Sites	pg 8	1		1	2
Registered Landfill Sites	pg 9				2
Registered Waste Transfer Sites	pg 10		1		
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 11	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 11	Yes	Yes		Yes
BGS Recorded Mineral Sites					
BGS Urban Soil Chemistry	pg 12		Yes	Yes	Yes
BGS Urban Soil Chemistry Averages	pg 16	Yes			
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 16	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 16	Yes		n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 16	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 16	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 16	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

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 17	1	7	13	72
Fuel Station Entries	pg 24		2		2
Sensitive Land Use					
Areas of Adopted Green Belt	pg 26		1	1	
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Local Authority Pollution Prevention and Controls** Name: Watford Way Filling Station Location: Watford Way, London, NW7 2ET Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPC47 Dated: 13th January 1999 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	88	3	521945 191117
1	**Local Authority Pollution Prevention and Controls** Name: Watford Way Filling Station Location: Pentavia Retail Park, Watford Way, LONDON, NW7 2PT Authority: London Borough of Barnet, Environmental Health Department Permit Reference: Lapc/Vr/035 Dated: 13th January 1999 Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station **Status: Authorised** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	88	3	521945 191117
2	**Local Authority Pollution Prevention and Controls** Name: Halt Motor Company Location: Avion Crescent, Grahame Park Way, LONDON, NM9 5QY Authority: London Borough of Barnet, Environmental Health Department Permit Reference: Ppc20 Dated: 12th May 2005 Process Type: Local Authority Pollution Prevention and Control Description: PG1/1Waste oil burners, less than 0.4MW net rated thermal input **Status: Permitted** Positional Accuracy: Located by supplier to within 10m	A8SE (S)	630	3	522076 190578
2	**Local Authority Pollution Prevention and Controls** Name: John Frederick Location: Unit 2a Avion Crescent, Grahame Park Way, Colindale, Nw9 5qw Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPCDC061 Dated: 17th October 2006 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A8SE (S)	665	3	522092 190547
3	**Local Authority Pollution Prevention and Controls** Name: Jemca Location: Hendon Station Goods Yard, Station Road, Hendon, LONDON, . Authority: London Borough of Barnet, Environmental Health Department Permit Reference: Ppc15 Dated: 13th May 2005 Process Type: Local Authority Pollution Prevention and Control Description: PG6/34 Respraying of road vehicles **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 10m	A17NE (NW)	709	3	521372 191962
4	**Local Authority Pollution Prevention and Controls** Name: Blue Dragon Dry Cleaners Location: 62 The Broadway, Mill Hill, Nw7 3te Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPCDC062 Dated: 18th October 2006 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	779	3	521533 192128
5	**Local Authority Pollution Prevention and Controls** Name: Gdk Garage Location: 1-3 Hale Lane, Mill Hill, London, Nw7 3nu Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPC056 Dated: 7th August 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG1/1Waste oil burners, less than 0.4MW net rated thermal input **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A17SE (NW)	793	3	521230 191957

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	**Local Authority Pollution Prevention and Controls** Name: Star Filling Station Location: 1-3 Flower Lane, LONDON, NW7 2JA Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPC44 Dated: 13th January 1999 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	796	3	521635 192175
7	**Local Authority Pollution Prevention and Controls** Name: Observatory Service Station Location: Watford Way, London, NW7 2PT Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPC37 Dated: 11th January 1999 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	804	3	521814 192200
7	**Local Authority Pollution Prevention and Controls** Name: Observatory Service StationEsso Petroleum Co Ltd Location: Watford Way, London, Nw7 2pt Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPC37 Dated: 11th January 1999 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Located by supplier to within 10m	A18NW (N)	815	3	521807 192211
8	**Local Authority Pollution Prevention and Controls** Name: Portiacraft Location: 555-561 Watford Way, Mill Hill, LONDON, NW7 4RT Authority: London Borough of Barnet, Environmental Health Department Permit Reference: Ppc13 Dated: 13th May 2005 Process Type: Local Authority Pollution Prevention and Control Description: PG1/1Waste oil burners, less than 0.4MW net rated thermal input **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	822	3	521740 192216
9	**Local Authority Pollution Prevention and Controls** Name: Crystalline Dry Cleaners Location: 129 The Broadway, Mill Hill, Nw7 4rn Authority: London Borough of Barnet, Environmental Health Department Permit Reference: PPCDC093 Dated: 1st March 2013 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A23SW (N)	928	3	521584 192299
10	**Local Authority Pollution Prevention and Control Enforcements** Location: Unit 2a Avion Crescent, Grahame Park Way, Colindale, Nw9 5qw Type: Air Pollution Control Enforcement Notice Reference: PPCDC061 Date Issued: 3rd March 2009 Enforcement Date: Not Supplied Details: Not Supplied Positional Accuracy: Located by supplier to within 10m	A8NE (S)	504	3	522038 190698
10	**Local Authority Pollution Prevention and Control Enforcements** Location: Unit 2a Avion Crescent, Grahame Park Way, Colindale, Nw9 5qw Type: Air Pollution Control Enforcement Notice Reference: PPCDC061 Date Issued: Not Supplied Enforcement Date: Not Supplied Details: 24/04/09 Positional Accuracy: Located by supplier to within 10m	A8NE (S)	504	3	522038 190698
	Nearest Surface Water Feature	A13NE (N)	21	-	521883 191394

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
11	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: MILL HILL Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 9th August 1995 Incident Reference: N1950430 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NW (NW)	210	4	521600 191500
12	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: EDGWARE Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 22nd July 1994 Incident Reference: NE940545 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SW (N)	404	4	521800 191800
13	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: EDGWARE Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 22nd November 1994 Incident Reference: NE940855 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	792	4	521100 191800
14	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: EDGWARE Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 2nd August 1994 Incident Reference: NE940585 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	831	4	521000 191700
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: EDGWARE Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 29th March 1995 Incident Reference: N1950149 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	871	4	521005 191795
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: EDGWARE Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 4th April 1995 Incident Reference: N1950158 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	873	4	521005 191800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: The Meads, EDGWARE Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 24th March 1995 Incident Reference: N1950143 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	875	4	521000 191795
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: BARNET Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 12th October 1994 Incident Reference: NE940769 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	878	4	521000 191800
16	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: HENDON Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Confirmed As A Pollution Incident Incident Date: 11th March 1994 Incident Reference: NE940160 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A15SW (E)	987	4	522900 191000
17	**Substantiated Pollution Incident Register** Authority: Environment Agency - Thames Region, North East Area Incident Date: 20th September 2002 Incident Reference: 109216 Water Impact: Category 2 - Significant Incident Air Impact: Category 4 - No Impact Land Impact: Category 4 - No Impact Positional Accuracy: Located by supplier to within 10m Pollutant: Crude Sewage	A17SW (NW)	821	4	521084 191829
	Water Abstractions Operator: Trustees Of Hendon Golf Club Licence Number: 28/39/38/0046 Permit Version: 1 Location: Hendon Golf Club- Borehole Authority: Environment Agency, Thames Region Abstraction: Golf Courses: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Hendon Golf Club, Saunders Lane, Mill Hill, London. Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 8th September 2005 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A15SE (E)	1424	4	523360 191260

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Trustees Of Hendon Golf Club Licence Number: 28/39/38/0036 Permit Version: 100 Location: Borehole At Hendon Golf Club, Sanders Lane, Mill Hill Authority: Environment Agency, Thames Region Abstraction: Golf Courses: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 100 Yearly Rate (m3): 10000 Details: Hendon Goldf Club, Sanders Lane, Mill Hill Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 7th July 1997 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A15SE (E)	1424	4	523360 191260
	Water Abstractions Operator: The Trustees Of Hendon Golf Club Licence Number: Th/039/0038/016 Permit Version: 1 Location: Borehole At Hendon Golf Club Authority: Environment Agency, Thames Region Abstraction: Golf Courses: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Hendon Golf Club, Ashley Walk, Mill Hill, London. Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 3rd April 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A15SE (E)	1425	4	523361 191269
	Water Abstractions Operator: International Bible Students Association Licence Number: 28/39/38/0034 Permit Version: 101 Location: Watch Tower House, The Ridgeway- Borehole A Authority: Environment Agency, Thames Region Abstraction: Schools and Colleges: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Watch Tower House, The Ridgeway, London. Nw7 Authorised Start: 01 May Authorised End: 30 September Permit Start Date: 13th February 2003 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A20NE (NE)	1763	4	523480 192160
	Water Abstractions Operator: International Bible Students Association Licence Number: 28/39/38/0034 Permit Version: 101 Location: Watch Tower House, The Ridgeway- Borehole A Authority: Environment Agency, Thames Region Abstraction: Schools And Colleges: Drinking; Cooking; Sanitary; Washing; (Small Garden) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Watch Tower House, The Ridgeway, London. Nw7 Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 13th February 2003 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A20NE (NE)	1763	4	523480 192160

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: International Bible Students Association Licence Number: 28/39/38/0034 Permit Version: 100 Location: Borehole At Watch Tower House, The Ridgeway, London. Nw7 Authority: Environment Agency, Thames Region Abstraction: Schools And Colleges: Drinking; Cooking; Sanitary; Washing; (Small Garden) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 436 Yearly Rate (m3): 50006 Details: Watch Tower House, The Ridgeway, London. Nw7 Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 21st December 1990 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A20NE (NE)	1799	4	523500 192200
	Water Abstractions Operator: International Bible Students Association Licence Number: 28/39/38/0034 Permit Version: 100 Location: Borehole At Watch Tower House, The Ridgeway, London. Nw7 Authority: Environment Agency, Thames Region Abstraction: Schools and Colleges: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Watch Tower House, The Ridgeway, London. Nw7 Authorised Start: 01 May Authorised End: 30 September Permit Start Date: 21st December 1990 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A20NE (NE)	1799	4	523500 192200
	Water Abstractions Operator: Anglian Water Services Limited Licence Number: 28/39/38/0041 Permit Version: 1 Location: Borehole 'A' At Bittacy Hill, Mill Hill Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Bittacy Hill, Mill Hill Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 27th September 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(E)	1939	4	523870 191370
	Groundwater Vulnerability Soil Classification: Not classified Map Sheet: Sheet 39 West London Scale: 1:100,000	A13NE (SE)	0	4	521852 191291
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Unproductive Strata	A13NE (SE)	0	2	521852 191291
	Superficial Aquifer Designations No Data Available				
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Detailed River Network Lines None				
18	**Detailed River Network Offline Drainage** River Type: Tertiary River Hydrographic Area: D006	A13NE (N)	21	4	521883 191394
19	**Detailed River Network Offline Drainage** River Type: Tertiary River Hydrographic Area: D006	A13NW (NW)	256	4	521531 191476

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
20	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Bunns Lane, Edgware, Mill Hill NW7 Name: K Garage Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD11387 First Input Date: Not Supplied Last Input Date: 31st December 1965 Specified Waste Type: Not Supplied EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 5090/0010 BGS Ref: Not Supplied Other Ref: 8BA011, BAR011	A13NE (SE)	0	4	521852 191291
21	**Historical Landfill Sites** Licence Holder: Not Supplied Location: The Hyde, Grahame Park NW9 Name: Grahame Park Way - Corner Way Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD11134 First Input Date: 31st December 1977 Last Input Date: 31st December 1978 Specified Waste Type: Deposited Waste included Inert Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 5090/0006 BGS Ref: Not Supplied Other Ref: 8BA012	A8NE (S)	421	4	521885 190752
22	**Historical Landfill Sites** Licence Holder: London Borough of Barnet Location: Grahame Park Estate Name: Lanacre Avenue - Quakers Course Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD11135 First Input Date: Not Supplied Last Input Date: 31st December 1986 Specified Waste Type: Deposited Waste included Inert and Industrial Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 5090/0003 BGS Ref: Not Supplied Other Ref: 8BA009, DL209	A8NW (SW)	488	4	521604 190764
23	**Historical Landfill Sites** Licence Holder: London Borough of Barnet Location: Great Strand, Grahame Park, The Hyde NW9 Name: Grahame Park Way - Great Strand Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD11136 First Input Date: 31st December 1977 Last Input Date: 31st December 1986 Specified Waste Type: Deposited Waste included Inert and Industrial Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 5090/0001 BGS Ref: Not Supplied Other Ref: 8BA010, DL131	A8SE (S)	671	4	521884 190502
	Local Authority Landfill Coverage Name: London Borough of Barnet - Has supplied landfill data		0	5	521852 191291
24	**Local Authority Recorded Landfill Sites** Location: K Garage Site, Watford Way, Nw7 Reference: 14962/11 Authority: London Borough of Barnet **Last Reported Status:** **Closed** Types of Waste: Not Supplied Date of Closure: 31/12/1965 Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A13NE (SE)	0	5	521852 191291

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
25	**Local Authority Recorded Landfill Sites** Location: Corner Mead, Grahame Park Way Reference: 14962/12 Authority: London Borough of Barnet **Last Reported Status:** **Closed** Types of Waste: Not Supplied Date of Closure: 31/12/1978 Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A8NE (S)	424	5	521986 190765
26	**Local Authority Recorded Landfill Sites** Location: Lanacre Avenue, Quakers Course Reference: 14962/9 Authority: London Borough of Barnet **Last Reported Status:** **Closed** Types of Waste: Not Supplied Date of Closure: 31/12/1986 Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A8NW (SW)	535	5	521579 190725
27	**Local Authority Recorded Landfill Sites** Location: St James School, Grahame Park Way Reference: 14962/10 Authority: London Borough of Barnet **Last Reported Status:** **Closed** Types of Waste: Not Supplied Date of Closure: 31/12/1986 Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A8SE (S)	680	5	521893 190493
28	**Registered Landfill Sites** Licence Holder: Barnet L.B.C. Licence Reference: DL209 Site Location: Lanacre Avenue, GRAHAME PARK, London, NW9 Licence Easting: 521500 Licence Northing: 190700 Operator Location: Barnet House, 1255 High Road, Whetstone, Barnet, London, N20 0ej Authority: Environment Agency - Thames Region, North East Area Site Category: Landfill Max Input Rate: Very Large (Equal to or greater than 250,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st June 1985 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Clay Filling & Excav. Earth Construction And Demolition Wastes Excavated Natural Materials $ Prohibited Waste: Biodegradable/Putrescible Waste Clinical Wastes Notifiable Wastes Special Wastes	A7NE (SW)	601	4	521500 190700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
29	**Registered Landfill Sites** Licence Holder: Barnet L.B.C. Licence Reference: DL131 Site Location: adj. St James School, Grahame Park Way, GRAHAME PARK, London, NW9 Licence Easting: 521950 Licence Northing: 190400 Operator Location: Barnet House, 1255 High Road, Whetstone, Barnet, London, N20 0ej Authority: Environment Agency - Thames Region, North East Area Site Category: Landfill Max Input Rate: Very Large (Equal to or greater than 250,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st August 1983 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Construction And Demolition Wastes Excavated Natural Materials $ Ind. Non-Haz. Waste Prohibited Waste: Biodegradable/Putrescible Waste Civic Amenity/Refuse Amenity Waste Clinical Wastes Commercial Waste	A8SE (S)	778	4	521950 190400
30	**Registered Waste Transfer Sites** Licence Holder: Barnet L.B.C. Licence Reference: DL211 Site Location: Grahame Park Depot, Grahame Park Way, GRAHAME PARK, London, NW9 Operator Location: Barnet House, 1255 High Road, Whetstone, Barnet, London, N20 0ej Authority: Environment Agency - Thames Region, North East Area Site Category: Transfer Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st August 1985 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the road within the address or location Boundary Quality: Not Supplied Authorised Waste: Asbestos Prohibited Waste: Biodegradable/Putrescible Waste Clinical Wastes Notifiable Wastes N.O.S Special Wastes N.O.S	A13SE (SE)	106	4	521956 191102

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: London Clay	A13NE (SE)	0	2	521852 191291
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13NE (SE)	0	2	521852 191291
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13NE (E)	63	2	522000 191291
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13SE (S)	173	2	521852 191000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A13SE (SE)	216	2	522000 191000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A18NE (N)	604	2	521852 192000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A18NE (N)	633	2	522000 192000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A19SW (NE)	686	2	522347 191878
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A19SW (NE)	736	2	522489 191807
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A12NW (W)	755	2	521000 191291
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A12SW (W)	833	2	521000 191000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic Concentration: no data Cadmium Concentration: no data Chromium Concentration: no data Lead Concentration: no data Nickel Concentration: no data	A17NW (NW)	990	2	521000 192000
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521690, 191240 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 24.00 mg/kg Cadmium Measured Concentration: 3.40 mg/kg Chromium Measured Concentration: 109.00 mg/kg Lead Measured Concentration: 328.00 mg/kg Nickel Measured Concentration: 39.00 mg/kg	A13SW (W)	115	2	521690 191240

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522194, 191208 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 26.00 mg/kg Cadmium Measured Concentration: 1.40 mg/kg Chromium Measured Concentration: 116.00 mg/kg Lead Measured Concentration: 537.00 mg/kg Nickel Measured Concentration: 54.00 mg/kg	A14SW (E)	257	2	522194 191208
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521744, 191763 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 17.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 104.00 mg/kg Lead Measured Concentration: 143.00 mg/kg Nickel Measured Concentration: 30.00 mg/kg	A18SW (N)	371	2	521744 191763
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521700, 190760 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.00 mg/kg Cadmium Measured Concentration: 0.70 mg/kg Chromium Measured Concentration: 103.00 mg/kg Lead Measured Concentration: 164.00 mg/kg Nickel Measured Concentration: 34.00 mg/kg	A8NW (S)	447	2	521700 190760
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521263, 191251 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 15.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 97.00 mg/kg Lead Measured Concentration: 192.00 mg/kg Nickel Measured Concentration: 28.00 mg/kg	A12SE (W)	502	2	521263 191251
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522248, 191811 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 17.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 106.00 mg/kg Lead Measured Concentration: 146.00 mg/kg Nickel Measured Concentration: 29.00 mg/kg	A19SW (NE)	573	2	522248 191811

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522320, 190781 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 14.00 mg/kg Cadmium Measured Concentration: 1.30 mg/kg Chromium Measured Concentration: 74.00 mg/kg Lead Measured Concentration: 222.00 mg/kg Nickel Measured Concentration: 28.00 mg/kg	A9NW (SE)	579	2	522320 190781
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521261, 191757 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 17.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 95.00 mg/kg Lead Measured Concentration: 118.00 mg/kg Nickel Measured Concentration: 21.00 mg/kg	A17SE (NW)	635	2	521261 191757
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521272, 190753 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 17.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 110.00 mg/kg Lead Measured Concentration: 84.00 mg/kg Nickel Measured Concentration: 44.00 mg/kg	A7NE (SW)	731	2	521272 190753
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521988, 192142 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 15.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 82.00 mg/kg Lead Measured Concentration: 170.00 mg/kg Nickel Measured Concentration: 23.00 mg/kg	A18NE (N)	768	2	521988 192142
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522783, 191258 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 19.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 108.00 mg/kg Lead Measured Concentration: 86.00 mg/kg Nickel Measured Concentration: 27.00 mg/kg	A14SE (E)	847	2	522783 191258

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 521720, 190320 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.00 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 100.00 mg/kg Lead Measured Concentration: 136.00 mg/kg Nickel Measured Concentration: 36.00 mg/kg	A8SW (S)	866	2	521720 190320
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522716, 191817 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 13.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 104.00 mg/kg Lead Measured Concentration: 106.00 mg/kg Nickel Measured Concentration: 22.00 mg/kg	A19SE (NE)	928	2	522716 191817
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522764, 190736 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 98.00 mg/kg Lead Measured Concentration: 110.00 mg/kg Nickel Measured Concentration: 31.00 mg/kg	A9NE (SE)	956	2	522764 190736
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522144, 190250 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 28.00 mg/kg Cadmium Measured Concentration: 2.30 mg/kg Chromium Measured Concentration: 100.00 mg/kg Lead Measured Concentration: 657.00 mg/kg Nickel Measured Concentration: 49.00 mg/kg	A3NE (S)	963	2	522144 190250
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 522318, 192261 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 19.00 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 101.00 mg/kg Lead Measured Concentration: 210.00 mg/kg Nickel Measured Concentration: 24.00 mg/kg	A19NW (NE)	991	2	522318 192261

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Urban Soil Chemistry Averages Source: British Geological Survey, National Geoscience Information Service Sample Area: London Count Id: 7189 Arsenic Minimum Concentration: 1.00 mg/kg Arsenic Average Concentration: 17.00 mg/kg Arsenic Maximum Concentration: 161.00 mg/kg Cadmium Minimum Concentration: 0.30 mg/kg Cadmium Average Concentration: 0.90 mg/kg Cadmium Maximum Concentration: 165.20 mg/kg Chromium Minimum Concentration: 13.00 mg/kg Chromium Average Concentration: 79.00 mg/kg Chromium Maximum Concentration: 2094.00 mg/kg Lead Minimum Concentration: 11.00 mg/kg Lead Average Concentration: 280.00 mg/kg Lead Maximum Concentration: 10000.00 mg/kg Nickel Minimum Concentration: 2.00 mg/kg Nickel Average Concentration: 28.00 mg/kg Nickel Maximum Concentration: 506.00 mg/kg	A13NE (SE)	0	2	521852 191291
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291
	Potential for Compressible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	2	521816 191269
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	2	521816 191269
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291
	Radon Potential - Radon Affected Areas Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	2	521852 191291

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
31	**Contemporary Trade Directory Entries** Name: Comet Location: Unit 1, Pentavia Retail Park, Watford Way, London, NW7 2ET Classification: Electrical Goods Sales, Manufacturers & Wholesalers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	0	-	521834 191316
32	**Contemporary Trade Directory Entries** Name: Goodman Autos Ltd Location: Bunns Lane, London, NW7 2ES Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (E)	134	-	522065 191271
33	**Contemporary Trade Directory Entries** Name: Best Door Striping Location: 44, Rivington Crescent, London, NW7 2LF Classification: Paint & Varnish Stripping **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (W)	137	-	521626 191306
34	**Contemporary Trade Directory Entries** Name: Merlin Interiors Ltd Location: 8, Mill Hill Industrial Estate, Flower Lane, London, NW7 2HU Classification: Office Furniture & Equipment **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	201	-	521708 191575
35	**Contemporary Trade Directory Entries** Name: Diva Distribution Location: 9, Fakenham Close, London, NW7 2SD Classification: Distribution Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	216	-	522145 191159
36	**Contemporary Trade Directory Entries** Name: D Herron Gates & Railings Location: Unit 33/C, Bunns Lane Works, Bunns Lane, Mill Hill, London, NW7 2AJ Classification: Wrought Ironwork **Status: Active** Positional Accuracy: Manually positioned to the address or location	A13NW (NW)	217	-	521647 191553
36	**Contemporary Trade Directory Entries** Name: Bunns Lane Welding Location: Bunns Lane Works, Bunns Lane, London, NW7 2AJ Classification: Car Body Repairs **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	224	-	521657 191571
36	**Contemporary Trade Directory Entries** Name: Deltech Uk Ltd Location: 5, Mill Hill Industrial Estate, Flower Lane, London, NW7 2HU Classification: Lighting Manufacturers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	244	-	521672 191604
37	**Contemporary Trade Directory Entries** Name: W L M G Nissan Location: 517, Watford Way, LONDON, NW7 2QR Classification: Car Dealers **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	287	-	522030 190935
38	**Contemporary Trade Directory Entries** Name: Hurricane M O T Location: 1-2, Mill Hill Industrial Estate, Flower Lane, London, NW7 2HU Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A18SW (NW)	328	-	521600 191657
39	**Contemporary Trade Directory Entries** Name: K'S Of Mill Hill Location: Unit 2A,Hurricane Trading Centre,Grahame Pk Way, London, NW9 5QW Classification: Carpet, Curtain & Upholstery Cleaners **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A8NE (S)	336	-	521954 190848
40	**Contemporary Trade Directory Entries** Name: Madara Location: 14, Bunns Lane, London, NW7 2NE Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14NW (E)	336	-	522255 191366

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
41	**Contemporary Trade Directory Entries** Name: Glenaden Ltd Location: 6, Copthall Gardens, London, NW7 2NG Classification: Distilleries **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14NW (E)	375	-	522278 191446
42	**Contemporary Trade Directory Entries** Name: Sicorps Uk Ltd Location: Flat 3, Wallace, Clayton Field, LONDON, NW9 5SE Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SE (SW)	377	-	521474 191093
43	**Contemporary Trade Directory Entries** Name: Rescom Cleaning Services Location: Flat 9, Nardini, The Concourse, London, NW9 5UP Classification: Cleaning Services - Commercial **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NW (SW)	422	-	521650 190813
44	**Contemporary Trade Directory Entries** Name: Acorn Landscape Supplies Location: Unit 2 Seelander Ho,Grahame Park Way, London, NW9 5QY Classification: Concrete Products **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A8NE (S)	422	-	521995 190770
45	**Contemporary Trade Directory Entries** Name: D & G Cleaning Services Location: 12, Birch Green, London, NW9 5GS Classification: Cleaning Services - Commercial **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SE (SW)	475	-	521410 191010
46	**Contemporary Trade Directory Entries** Name: S & E Brazier & Sons Location: 41, Woodcroft Avenue, London, NW7 2AH Classification: Cash Registers & Check-Out Equipment **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NE (W)	483	-	521282 191449
47	**Contemporary Trade Directory Entries** Name: Weatherwell Ltd Location: Unit 1,Seelander House,Grahame Pk Way, London, NW9 5QY Classification: Fencing Manufacturers **Status: Active** Positional Accuracy: Manually positioned to the road within the address or location	A8NE (S)	483	-	522016 190713
48	**Contemporary Trade Directory Entries** Name: Refresh Psc Location: Flat 7, Caldew Court, 1, Bunns Lane, London, NW7 2AW Classification: Damp & Dry Rot Control **Status: Active** Positional Accuracy: Automatically positioned to the address	A14NW (E)	484	-	522405 191356
49	**Contemporary Trade Directory Entries** Name: Cleaners Of Mill Hill Location: 69, Page Street, London, NW7 2EE Classification: Cleaning Services - Domestic **Status: Active** Positional Accuracy: Automatically positioned to the address	A14SW (E)	499	-	522417 191078
50	**Contemporary Trade Directory Entries** Name: Susvher Developments Location: 7, Larch Green, London, NW9 5GL Classification: Blinds, Awnings & Canopies **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A7NE (SW)	529	-	521410 190912
51	**Contemporary Trade Directory Entries** Name: Barnet Direct Location: 17, Page Street, London, NW7 2EL Classification: Pest & Vermin Control **Status: Active** Positional Accuracy: Automatically positioned to the address	A9NW (SE)	537	-	522307 190826
52	**Contemporary Trade Directory Entries** Name: Lselectricalservices Location: 38, Woodland Way, London, NW7 2JR Classification: Electrical Engineers **Status: Active** Positional Accuracy: Automatically positioned to the address	A17SE (NW)	541	-	521501 191848

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
53	**Contemporary Trade Directory Entries** Name: The Better Hearth Location: 426-428, Watford Way, London, NW7 2QJ Classification: Fireplaces & Mantelpieces **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A9NW (SE)	556	-	522274 190774
53	**Contemporary Trade Directory Entries** Name: Oven Cleaning Mill Hill Location: 420 Watford Way, London, NW7 2QJ Classification: Oven cleaning **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A9NW (SE)	573	-	522288 190763
53	**Contemporary Trade Directory Entries** Name: Auto Alternatives Location: 1-5, Page Street, London, NW7 2EL Classification: Car Customizing Specialists **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A9NW (SE)	581	-	522296 190758
54	**Contemporary Trade Directory Entries** Name: Travis Perkins Trading Co Ltd Location: Grahame Park Way, LONDON, NW9 5QY Classification: Builders' Merchants **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NE (S)	586	-	522078 190625
54	**Contemporary Trade Directory Entries** Name: Technoworld Location: Unit 4,Hurricane Trading Est,Grahame Pk Way, London, NW9 5QY Classification: Electrical Goods Sales, Manufacturers & Wholesalers **Status: Active** Positional Accuracy: Manually positioned within the geographical locality	A8NE (S)	587	-	522078 190625
55	**Contemporary Trade Directory Entries** Name: Koala Cosmetic Location: Flat 48, Mercury, The Concourse, London, NW9 5XN Classification: Perfume Suppliers **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NW (S)	598	-	521618 190631
56	**Contemporary Trade Directory Entries** Name: Hmc Car Care Location: Unit 1, Hurricane Trading Estate, Avion Crescent, London, NW9 5QW Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SE (S)	630	-	522076 190578
56	**Contemporary Trade Directory Entries** Name: John Frederick Ltd Location: Unit 2a, Hurricane Trading Centre, Grahame Park Way, London, NW9 5QW Classification: Carpet, Curtain & Upholstery Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A8SE (S)	665	-	522092 190547
56	**Contemporary Trade Directory Entries** Name: John Frederick Ltd Location: Unit 2a, Hurricane Trading Centre, Grahame Park Way, London, NW9 5QW Classification: Carpet, Curtain & Upholstery Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SE (S)	665	-	522092 190547
56	**Contemporary Trade Directory Entries** Name: Acorn Location: Unit 2, Hurricane Trading Centre, Grahame Park Way, London, NW9 5QW Classification: Concrete Products **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A8SE (S)	665	-	522092 190547
56	**Contemporary Trade Directory Entries** Name: Garner Bennett Office Supplies & Print Location: Unit 5, Hurricane Trading Centre, Grahame Park Way, London, NW9 5QW Classification: Office Furniture & Equipment **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SE (S)	665	-	522092 190547
57	**Contemporary Trade Directory Entries** Name: Scrap Metals Location: Gordon House, 1-6, Station Road, London, NW7 2JU Classification: Scrap Metal Merchants **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17SE (NW)	695	-	521385 191954

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
57	**Contemporary Trade Directory Entries** Name: Dawner Ltd Location: 9, Station Road, London, NW7 2JU Classification: Laundries & Launderettes **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	741	-	521363 191995
57	**Contemporary Trade Directory Entries** Name: Sterling Engineering Location: 2, The Broadway, London, NW7 3LL Classification: Engineers - General **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	762	-	521359 192018
57	**Contemporary Trade Directory Entries** Name: Bright & Beautiful Mill Hill Location: 6, The Broadway, London, NW7 3LL Classification: Cleaning Services - Domestic **Status: Active** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	768	-	521363 192028
57	**Contemporary Trade Directory Entries** Name: Snappy Snaps Mill Hill Location: 6, The Broadway, London, NW7 3LL Classification: Photographic Processors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	768	-	521363 192028
58	**Contemporary Trade Directory Entries** Name: A & S Appliance Repairs Location: 4, Mostyn Road, Edgware, Middlesex, HA8 0JD Classification: Washing Machines - Servicing & Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	711	-	521098 191081
59	**Contemporary Trade Directory Entries** Name: Dave Morgan Blinds Ltd Location: The Old Garages, 54, The Broadway, London, NW7 3LH Classification: Blinds, Awnings & Canopies **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (NW)	741	-	521509 192078
59	**Contemporary Trade Directory Entries** Name: Splash Printing Ltd Location: 54, The Broadway, London, NW7 3LH Classification: Printers **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (NW)	741	-	521509 192078
59	**Contemporary Trade Directory Entries** Name: Phildan Motors Location: 54, The Broadway, London, NW7 3LH Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NW (NW)	741	-	521509 192078
59	**Contemporary Trade Directory Entries** Name: Kwik Film Location: 42a, The Broadway, London, NW7 3LH Classification: Photographic Processors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	770	-	521480 192097
60	**Contemporary Trade Directory Entries** Name: Icy Cooling Enterprise Location: 81, Blundell Road, Edgware, Middlesex, HA8 0JA Classification: Refrigerators & Freezers - Servicing & Repairs **Status: Active** Positional Accuracy: Automatically positioned to the address	A12SW (W)	761	-	521066 191031
61	**Contemporary Trade Directory Entries** Name: Proper Clean Location: Flat 49, Dragonfly Court, 3, Heybourne Crescent, London, NW9 5UW Classification: Cleaning Services - Domestic **Status: Active** Positional Accuracy: Automatically positioned to the address	A7NE (SW)	765	-	521280 190686
62	**Contemporary Trade Directory Entries** Name: Norman James Location: 58, The Broadway, London, NW7 3TE Classification: Hardware **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NW (N)	777	-	521523 192122

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
62	**Contemporary Trade Directory Entries** Name: Blue Dragon Dry Cleaners Ltd Location: 62, The Broadway, London, NW7 3TE Classification: Dry Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	779	-	521533 192129
62	**Contemporary Trade Directory Entries** Name: Firebridge Fireplace Specialists Location: 71, The Broadway, London, NW7 3BU Classification: Fireplaces & Mantelpieces **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (N)	813	-	521508 192155
63	**Contemporary Trade Directory Entries** Name: New Enterprise Pest Control Location: 33, Benningholm Road, Edgware, Middlesex, HA8 9HF Classification: Pest & Vermin Control **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17SW (NW)	783	-	521066 191725
64	**Contemporary Trade Directory Entries** Name: Interior Cleaning Services Location: Flat 7, Galy, Hundred Acre, London, NW9 5FG Classification: Carpet, Curtain & Upholstery Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	787	-	521640 190421
65	**Contemporary Trade Directory Entries** Name: Star Garage Location: Hartley Av, London, NW7 2HX Classification: Mot Testing Centres **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A18NW (N)	789	-	521693 192178
66	**Contemporary Trade Directory Entries** Name: G D K Garages Ltd Location: 1-3, Hale Lane, London, NW7 3NU Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17SE (NW)	794	-	521229 191957
66	**Contemporary Trade Directory Entries** Name: Gdk Garage Ltd Location: 1-3, Hale Lane, London, NW7 3NU Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A17SE (NW)	794	-	521229 191957
66	**Contemporary Trade Directory Entries** Name: Mill Hill Car Co Location: 1-3, Hale Lane, London, NW7 3NU Classification: Car Dealers **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A17SE (NW)	794	-	521229 191957
66	**Contemporary Trade Directory Entries** Name: Independent Living Co Location: 11, Hale Lane, London, NW7 3NU Classification: Disability Equipment - Manufacturers & Suppliers **Status: Active** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	822	-	521213 191980
67	**Contemporary Trade Directory Entries** Name: Star Filling Station Location: 1-3, Flower Lane, London, NW7 2JA Classification: Petrol Filling Stations **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	796	-	521635 192175
67	**Contemporary Trade Directory Entries** Name: Cleaning Services Mill Hill Location: 88a, The Broadway, London, NW7 3TB Classification: Cleaning Services - Domestic **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	843	-	521619 192220
67	**Contemporary Trade Directory Entries** Name: Cleaning Services Mill Hill Location: 88a, The Broadway, London, NW7 3TB Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NW (N)	843	-	521619 192220

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68	**Contemporary Trade Directory Entries** Name: The American Dry Cleaning Co Location: 41, The Broadway, London, NW7 3DA Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	803	-	521423 192106
68	**Contemporary Trade Directory Entries** Name: Harvey J Location: 63, The Broadway, London, NW7 3DA Classification: Jewellery Manufacturers & Repairers **Status: Inactive** Positional Accuracy: Automatically positioned in the proximity of the address	A17NE (NW)	805	-	521421 192106
69	**Contemporary Trade Directory Entries** Name: Esso Location: 520-522, Watford Way, London, NW7 2PT Classification: Petrol Filling Stations **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	805	-	521815 192200
69	**Contemporary Trade Directory Entries** Name: Observatory Service Station Location: 520-522, Watford Way, London, NW7 2PT Classification: Petrol Filling Stations - 24 Hour **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NW (N)	805	-	521815 192200
69	**Contemporary Trade Directory Entries** Name: Bp Location: Photobase House, 518, Watford Way, London, NW7 2PT Classification: Petrol Filling Stations - 24 Hour **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	805	-	521815 192200
70	**Contemporary Trade Directory Entries** Name: Crownguard Ltd Location: A, 15, The Broadway, London, NW7 3LN Classification: Pest & Vermin Control Products **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	805	-	521342 192059
70	**Contemporary Trade Directory Entries** Name: Aaa Abbey Royal Pest Control Location: A, 15, The Broadway, London, NW7 3LN Classification: Pest & Vermin Control **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	805	-	521342 192059
71	**Contemporary Trade Directory Entries** Name: J Haas Location: 8, Featherstone Road, London, NW7 2BN Classification: Optical Goods - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14NE (E)	807	-	522684 191595
72	**Contemporary Trade Directory Entries** Name: Themed Garages Location: 24, Langley Park, London, NW7 2AA Classification: Classic Car Specialists **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17SE (NW)	817	-	521178 191940
73	**Contemporary Trade Directory Entries** Name: Portia Craft Location: 555-557, Watford Way, London, NW7 4RT Classification: Car Dealers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NW (N)	823	-	521734 192217
73	**Contemporary Trade Directory Entries** Name: Bullitt Cars Location: 565-571, Watford Way, LONDON, NW7 4RT Classification: Car Dealers - Used **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	843	-	521714 192235
74	**Contemporary Trade Directory Entries** Name: Tzefira Location: 87, The Broadway, London, NW7 3TG Classification: Jewellery Manufacturers & Repairers **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	824	-	521544 192179

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
75	**Contemporary Trade Directory Entries** Name: Mount Hygiene Location: 33-35, Daws Lane, London, NW7 4SD Classification: Cleaning Materials & Equipment **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NE (N)	861	-	521848 192255
75	**Contemporary Trade Directory Entries** Name: Ad Lib Print & Design Location: 23, Daws Lane, London, NW7 4SD Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NW (N)	866	-	521813 192261
75	**Contemporary Trade Directory Entries** Name: Le Car Centre Ltd Location: 17-19, Daws Lane, London, NW7 4SD Classification: Car Dealers **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	892	-	521810 192288
76	**Contemporary Trade Directory Entries** Name: Axis Dry Cleaning Location: 109, The Broadway, London, NW7 3TG Classification: Dry Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NW (N)	861	-	521578 192228
76	**Contemporary Trade Directory Entries** Name: Xpert Carpets Location: 51, Goodwyn Avenue, London, NW7 3RJ Classification: Carpet, Curtain & Upholstery Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	898	-	521558 192261
77	**Contemporary Trade Directory Entries** Name: Mill Hill Motors Ltd Location: 51-53, Daws Lane, London, NW7 4SD Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NE (N)	871	-	521904 192260
78	**Contemporary Trade Directory Entries** Name: Grahame Park Carpet Cleaners Location: 23, Lanacre Avenue, London, NW9 5FN Classification: Carpet, Curtain & Upholstery Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A7SE (SW)	872	-	521270 190540
79	**Contemporary Trade Directory Entries** Name: Mr Benjamin Applethorn Ltd Location: 9, Barford Close, London, NW4 4XG Classification: Computer Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A9SE (SE)	887	-	522521 190548
80	**Contemporary Trade Directory Entries** Name: J J Chauffeuring Services Uk Ltd Location: Laynes House, 526-528 Watford Way, London, NW7 4RS Classification: Car Engine Tuning & Diagnostic Services **Status: Active** Positional Accuracy: Manually positioned within the geographical locality	A18NW (N)	897	-	521745 192291
80	**Contemporary Trade Directory Entries** Name: L & P Building Services Ltd Location: Laynes House, 526-528, Watford Way, London, NW7 4RS Classification: Asphalt & Coated Macadam Laying Contractors **Status: Active** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	897	-	521745 192291
80	**Contemporary Trade Directory Entries** Name: Airwoolf Air Conditioning Services Ltd Location: Laynes House, 526-528, Watford Way, London, NW7 4RS Classification: Air Conditioning & Refrigeration Contractors **Status: Active** Positional Accuracy: Automatically positioned to the address	A18NW (N)	897	-	521745 192291
80	**Contemporary Trade Directory Entries** Name: A Maid In Heaven Location: Laynes House, 526-528, Watford Way, London, NW7 4RS Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	902	-	521738 192296

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
81	**Contemporary Trade Directory Entries** Name: Perfect Link Solutions (Uk) Location: 15, Grange Road, Edgware, Middlesex, HA8 0PR Classification: Freight Forwarders **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NW (W)	904	-	520874 191557
82	**Contemporary Trade Directory Entries** Name: Cleaners Mill Hill Location: 1, Hammers Lane, London, NW7 4BY Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18NE (N)	912	-	522166 192240
83	**Contemporary Trade Directory Entries** Name: S & S Home Supplies Location: 16-18, Hale Lane, London, NW7 3NX Classification: Wallpapers & Wall Coverings **Status: Active** Positional Accuracy: Automatically positioned to the address	A17NE (NW)	913	-	521180 192073
84	**Contemporary Trade Directory Entries** Name: G I Stewart Services Location: 427, Watford Way, London, NW4 4TR Classification: Laundry & Dry Cleaning Supplies **Status: Active** Positional Accuracy: Automatically positioned to the address	A9SW (SE)	915	-	522416 190436
85	**Contemporary Trade Directory Entries** Name: Green Star Location: 45, Wise Lane, London, NW7 2RN Classification: Engineers - General **Status: Active** Positional Accuracy: Automatically positioned to the address	A19SE (NE)	932	-	522768 191724
86	**Contemporary Trade Directory Entries** Name: Crystalline Dry Cleaners Location: 129 The Broadway, London, NW7 4RN Classification: Dry Cleaners **Status: Active** Positional Accuracy: Manually positioned within the geographical locality	A23SW (N)	958	-	521572 192327
87	**Contemporary Trade Directory Entries** Name: Greenway Pest Control Services Location: 2, Beech Walk, London, NW7 3PH Classification: Pest & Vermin Control **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A17NW (NW)	977	-	521022 192005
88	**Contemporary Trade Directory Entries** Name: Lexus Top Distribution Ltd Location: 2, Winterstoke Gardens, London, NW7 2RA Classification: Distribution Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19NW (N)	985	-	522225 192295
89	**Contemporary Trade Directory Entries** Name: Fairview Blinds Location: 32, Marion Road, London, NW7 4AN Classification: Blinds, Awnings & Canopies **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A23SE (N)	1000	-	522132 192344
90	**Fuel Station Entries** Name: Watford Way Sf Connect Location: Service Station, Pentavia Retail Park, Watford Way, London, NW7 2ET Brand: BP Premises Type: Petrol Station **Status: Open** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	81	-	521942 191123
91	**Fuel Station Entries** Name: Featherstone Garage Location: 77 Bunns Lane, Mill Hill, LONDON, NW7 2DX Brand: Obsolete Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Automatically positioned to the address	A13NE (E)	171	-	522097 191298

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
92	**Fuel Station Entries** Name: Star Garage Location: 1-3, Flower Lane, London, NW7 2JA Brand: Pace Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	796	-	521635 192175
93	**Fuel Station Entries** Name: Observatory Service Station Location: 520-522, Watford Way, London, NW7 2PT Brand: ESSO Premises Type: Petrol Station **Status: Open** Positional Accuracy: Automatically positioned to the address	A18NW (N)	805	-	521815 192200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
94	**Areas of Adopted Green Belt** Authority: London Borough of Barnet Plan Name: London Borough Of Barnet Unitary Development Plan **Status: Adopted** Plan Date: 31st May 2006	A13NW (N)	116	6	521805 191512
95	**Areas of Adopted Green Belt** Authority: London Borough of Barnet Plan Name: London Borough Of Barnet Unitary Development Plan **Status: Adopted** Plan Date: 31st May 2006	A14NW (E)	497	6	522430 191422

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
London Borough of Barnet - Environmental Health Department	January 2015	Annual Rolling Update
London Borough of Haringey - Planning and Environmental Health	October 2014	Annual Rolling Update
London Borough of Harrow - Environmental Health Services	October 2014	Annual Rolling Update
Hertsmere Borough Council - Environmental Health Department	September 2014	Annual Rolling Update
London Borough of Brent - Environmental Health Department	September 2014	Annual Rolling Update
London Borough of Enfield - Environmental Services	September 2014	Annual Rolling Update
Discharge Consents		
Environment Agency - Thames Region	January 2015	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - Thames Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - Thames Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - Thames Region	January 2015	Quarterly
Local Authority Integrated Pollution Prevention And Control		
London Borough of Barnet - Environmental Health Department	April 2013	Annual Rolling Update
London Borough of Harrow - Environmental Health Services	December 2014	Annual Rolling Update
London Borough of Brent - Environmental Health Department	January 2013	Annual Rolling Update
Hertsmere Borough Council - Environmental Health Department	January 2015	Annual Rolling Update
London Borough of Enfield - Environmental Health Department	January 2015	Annual Rolling Update
London Borough of Haringey - Planning and Environmental Health	June 2014	Annual Rolling Update
Local Authority Pollution Prevention and Controls		
London Borough of Barnet - Environmental Health Department	December 2014	Annual Rolling Update
London Borough of Harrow - Environmental Health Services	December 2014	Annual Rolling Update
London Borough of Brent - Environmental Health Department	January 2013	Annual Rolling Update
Hertsmere Borough Council - Environmental Health Department	January 2015	Annual Rolling Update
London Borough of Enfield - Environmental Health Department	January 2015	Annual Rolling Update
London Borough of Haringey - Planning and Environmental Health	June 2014	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
London Borough of Barnet - Environmental Health Department	December 2014	Annual Rolling Update
London Borough of Harrow - Environmental Health Services	December 2014	Annual Rolling Update
London Borough of Brent - Environmental Health Department	January 2013	Annual Rolling Update
Hertsmere Borough Council - Environmental Health Department	January 2015	Annual Rolling Update
London Borough of Enfield - Environmental Health Department	January 2015	Annual Rolling Update
London Borough of Haringey - Planning and Environmental Health	June 2014	Annual Rolling Update
Nearest Surface Water Feature		
Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters		
Environment Agency - Thames Region	September 1999	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - Thames Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - Thames Region	March 2013	As notified
Registered Radioactive Substances		
Environment Agency - Thames Region	January 2015	Quarterly
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually

Agency & Hydrological	Version	Update Cycle
Substantiated Pollution Incident Register Environment Agency - Thames Region - North East Area	January 2015	Quarterly
Water Abstractions Environment Agency - Thames Region	October 2014	Quarterly
Water Industry Act Referrals Environment Agency - Thames Region	January 2015	Quarterly
Groundwater Vulnerability Environment Agency - Head Office	January 2011	Not Applicable
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	October 2012	As notified
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	January 2015	As notified
Source Protection Zones Environment Agency - Head Office	January 2015	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	October 2014	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	October 2014	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	October 2014	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	October 2014	Quarterly
Flood Defences Environment Agency - Head Office	October 2014	Quarterly
Detailed River Network Lines Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage Environment Agency - Head Office	March 2012	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - Thames Region - North East Area	February 2015	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - Thames Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - Thames Region - North East Area	August 2014	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - Thames Region - North East Area	November 2014	Quarterly
Local Authority Landfill Coverage		
Hertfordshire County Council - County Development Unit	May 2000	Not Applicable
Hertsmere Borough Council - Environmental Health Department	May 2000	Not Applicable
London Borough of Barnet	May 2000	Not Applicable
London Borough of Brent - Environmental Health Department	May 2000	Not Applicable
London Borough of Enfield - Environmental Health Department	May 2000	Not Applicable
London Borough of Haringey - Planning Department	May 2000	Not Applicable
London Borough of Harrow - Environmental Health Services	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
London Borough of Enfield - Environmental Health Department	February 2003	Not Applicable
Hertfordshire County Council - County Development Unit	May 2000	Not Applicable
Hertsmere Borough Council - Environmental Health Department	May 2000	Not Applicable
London Borough of Barnet	May 2000	Not Applicable
London Borough of Brent - Environmental Health Department	May 2000	Not Applicable
London Borough of Haringey - Planning Department	May 2000	Not Applicable
London Borough of Harrow - Environmental Health Services	May 2000	Not Applicable
Registered Landfill Sites		
Environment Agency - Thames Region - North East Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - Thames Region - North East Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - Thames Region - North East Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	January 2015	Bi-Annually
Explosive Sites		
Health and Safety Executive	October 2014	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
Hertsmere Borough Council - Planning Department	February 2015	Annual Rolling Update
London Borough of Brent	November 2013	Annual Rolling Update
London Borough of Haringey	November 2014	Annual Rolling Update
Hertfordshire County Council - County Development Unit	October 2014	Annual Rolling Update
London Borough of Barnet	October 2014	Annual Rolling Update
London Borough of Harrow	September 2013	Annual Rolling Update
London Borough of Enfield - Planning Department	September 2014	Annual Rolling Update
Planning Hazardous Substance Consents		
Hertsmere Borough Council - Planning Department	February 2015	Annual Rolling Update
London Borough of Brent	November 2013	Annual Rolling Update
London Borough of Haringey	November 2014	Annual Rolling Update
Hertfordshire County Council - County Development Unit	October 2014	Annual Rolling Update
London Borough of Barnet	October 2014	Annual Rolling Update
London Borough of Harrow	September 2013	Annual Rolling Update
London Borough of Enfield - Planning Department	September 2014	Annual Rolling Update

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	August 1996	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	January 2010	Annually
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	October 2014	Bi-Annually
BGS Urban Soil Chemistry British Geological Survey - National Geoscience Information Service	June 2011	Annually
BGS Urban Soil Chemistry Averages British Geological Survey - National Geoscience Information Service	June 2011	Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Mining Report Service	December 2013	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	July 2014	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	**Version**	**Update Cycle**
Contemporary Trade Directory Entries Thomson Directories	November 2014	Quarterly
Fuel Station Entries Catalist Ltd - Experian	November 2014	Quarterly

Sensitive Land Use	Version	Update Cycle
Areas of Adopted Green Belt		
Hertsmere Borough Council - Planning Department	February 2015	As notified
London Borough of Barnet	February 2015	As notified
London Borough of Enfield	February 2015	As notified
London Borough of Haringey	February 2015	As notified
London Borough of Harrow	February 2015	As notified
Areas of Unadopted Green Belt		
Hertsmere Borough Council - Planning Department	February 2015	As notified
London Borough of Barnet	February 2015	As notified
London Borough of Enfield	February 2015	As notified
London Borough of Haringey	February 2015	As notified
London Borough of Harrow	February 2015	As notified
Areas of Outstanding Natural Beauty		
Natural England	February 2015	Bi-Annually
Environmentally Sensitive Areas		
Natural England	August 2014	Annually
Forest Parks		
Forestry Commission	April 1997	Not Applicable
Local Nature Reserves		
Natural England	October 2014	Bi-Annually
Marine Nature Reserves		
Natural England	July 2013	Bi-Annually
National Nature Reserves		
Natural England	September 2014	Bi-Annually
National Parks		
Natural England	February 2015	Bi-Annually
Nitrate Sensitive Areas		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2012	Not Applicable
Nitrate Vulnerable Zones		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	July 2014	Annually
Ramsar Sites		
Natural England	March 2014	Bi-Annually
Sites of Special Scientific Interest		
Natural England	September 2014	Bi-Annually
Special Areas of Conservation		
Natural England	March 2014	Bi-Annually
Special Protection Areas		
Natural England	September 2014	Bi-Annually

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	Ordnance Survey Licensed Partner
Environment Agency	Environment Agency
Scottish Environment Protection Agency	SEPA Scottish Environment Protection Agency
The Coal Authority	THE COAL AUTHORITY
British Geological Survey	British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
Centre for Ecology and Hydrology	Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL
Natural Resources Wales	Cyfoeth Naturiol Cymru Natural Resources Wales
Scottish Natural Heritage	SCOTTISH NATURAL HERITAGE
Natural England	NATURAL ENGLAND
Public Health England	Public Health England
Ove Arup	ARUP
Peter Brett Associates	pba peterbrett

Useful Contacts

Contact	Name and Address	Contact Details
2	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
3	**London Borough of Barnet - Environmental Health Department** Building 4, North London Business Park, Oakleigh Road South, London, N11 1NP	Telephone: 020 8359 2000 Fax: 020 8359 4999 Website: www.barnet.gov.uk
4	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
5	**London Borough of Barnet - Land Charges** The Town Hall, The Burroughs, Hendon, LONDON, NW4 4BQ	Telephone: 0208 3592482 Fax: 0208 3592493 Website: www.barnet.gov.uk
6	**London Borough of Barnet** Barnet House, 1255 High Road, Whetstone, London, N20 0EJ	Telephone: 020 8359 4000 Fax: 020 8359 4616 Website: www.barnet.gov.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

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

Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Holocene - Holocene
	WGR	Worked Ground (Undivided)	Void	Holocene - Holocene
	SLIP	Landslide Deposit	Unknown/Unclassified Entry	Quaternary - Quaternary

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Flandrian
	DHGR	Dollis Hill Gravel Member	Sand and Gravel	Anglian - Cromerian
	STGR	Stanmore Gravel Formation	Sand and Gravel	Pleistocene - Pleistocene
	RTDU	River Terrace Deposits (Undifferentiated)	Sand and Gravel	Quaternary - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LC	London Clay Formation	Clay, Silt and Sand	Eocene - Eocene
	CLGB	Claygate Member	Clay, Silt and Sand	Eocene - Eocene

Envirocheck® Geology

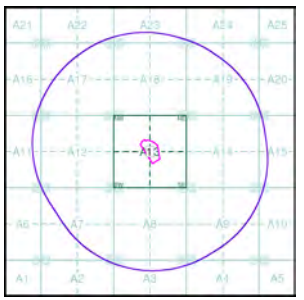
Geology 1:50,000 Maps

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

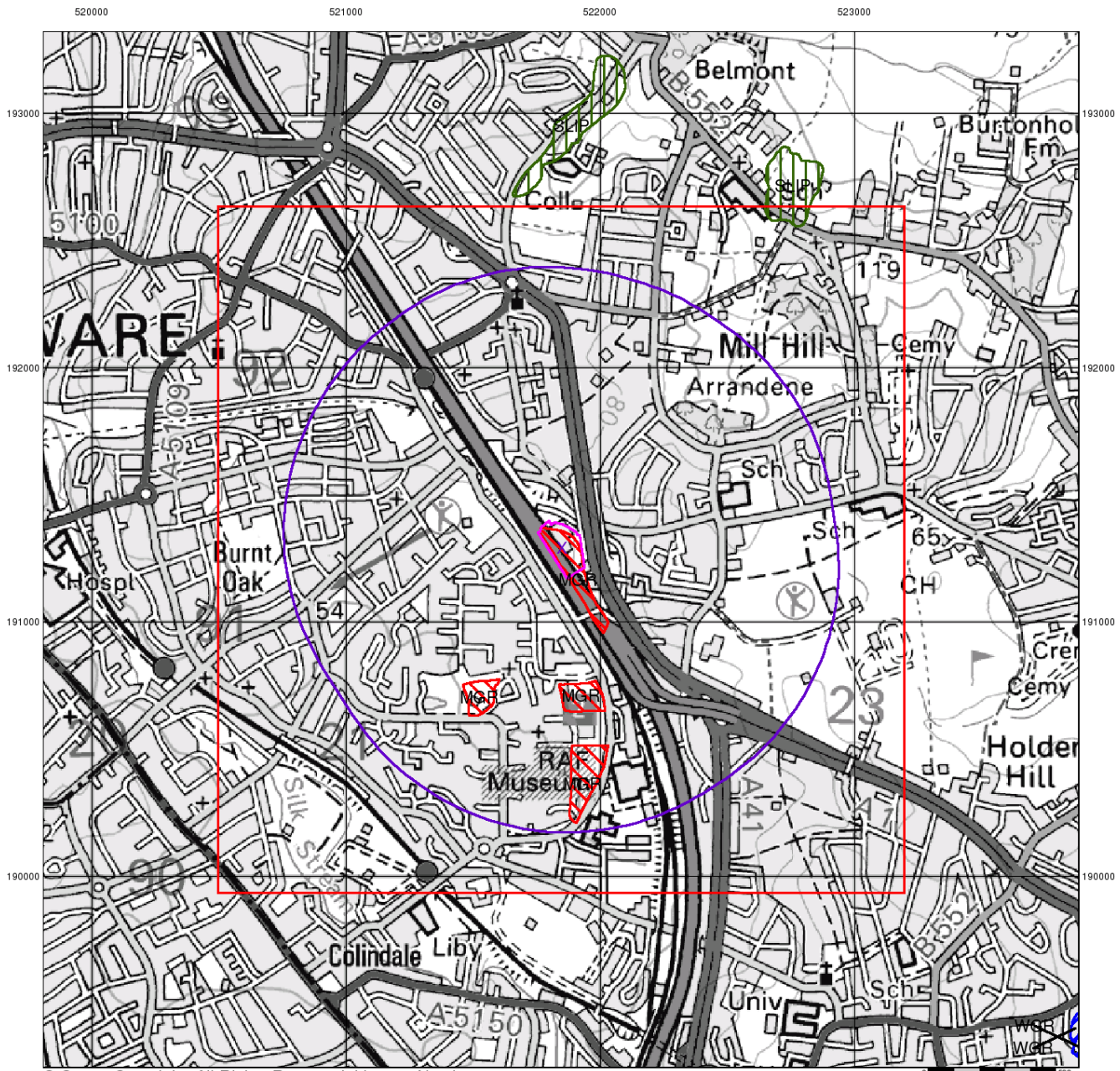


Order Details:

Order Number:	64920000_1_1
Customer Reference:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

Site Details:

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET



Envirocheck® Geology

Artificial Ground and Landslip

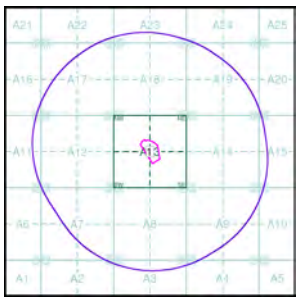
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions 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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Customer Reference:	15.02.014
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Slice:	A
Site Area (Ha):	2.35
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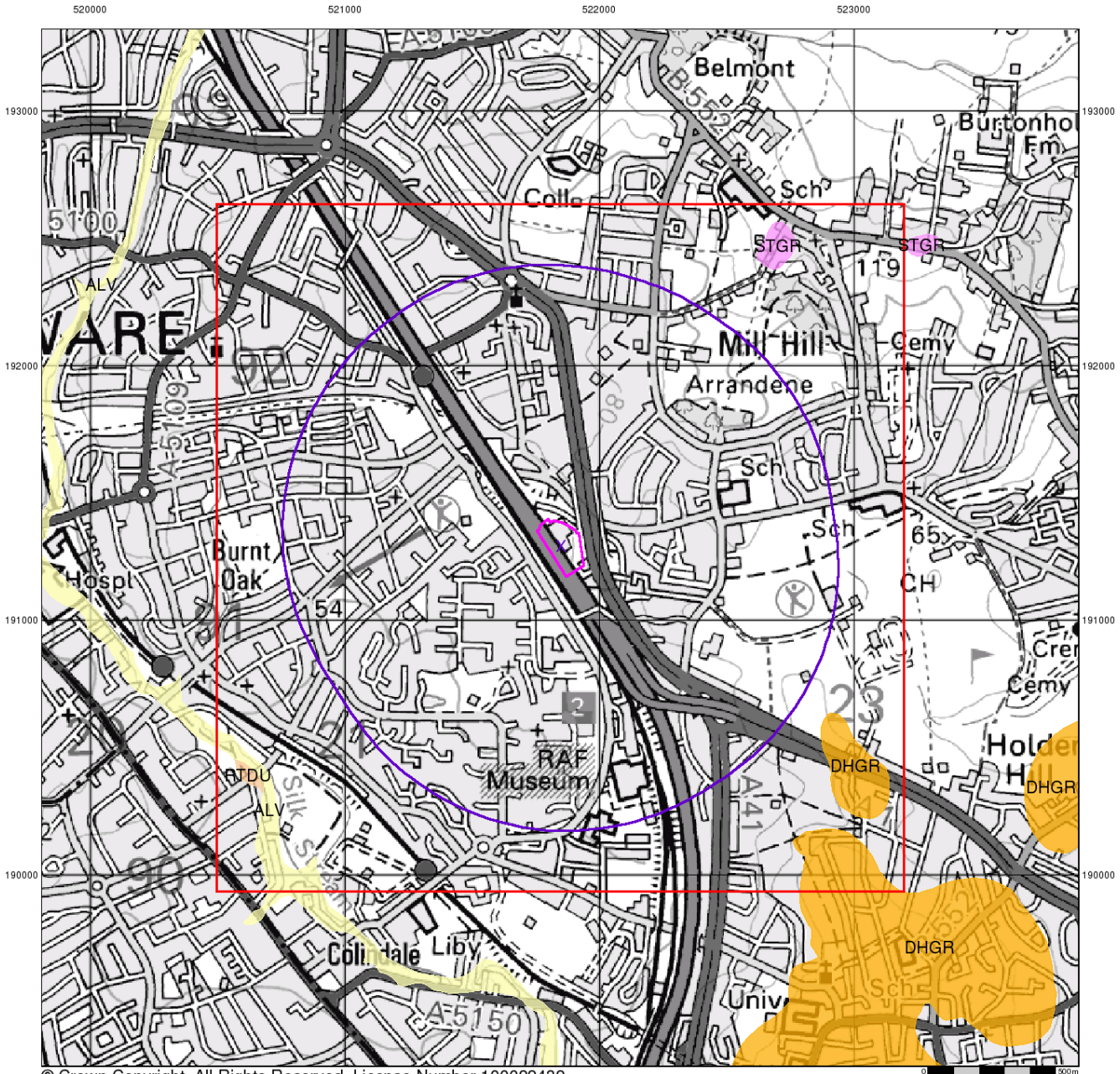
Site Details:

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

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



Envirocheck® Geology

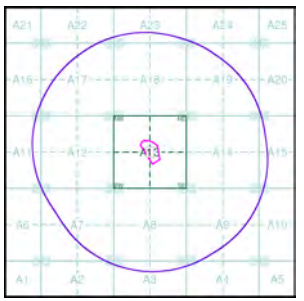
Superficial Geology

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



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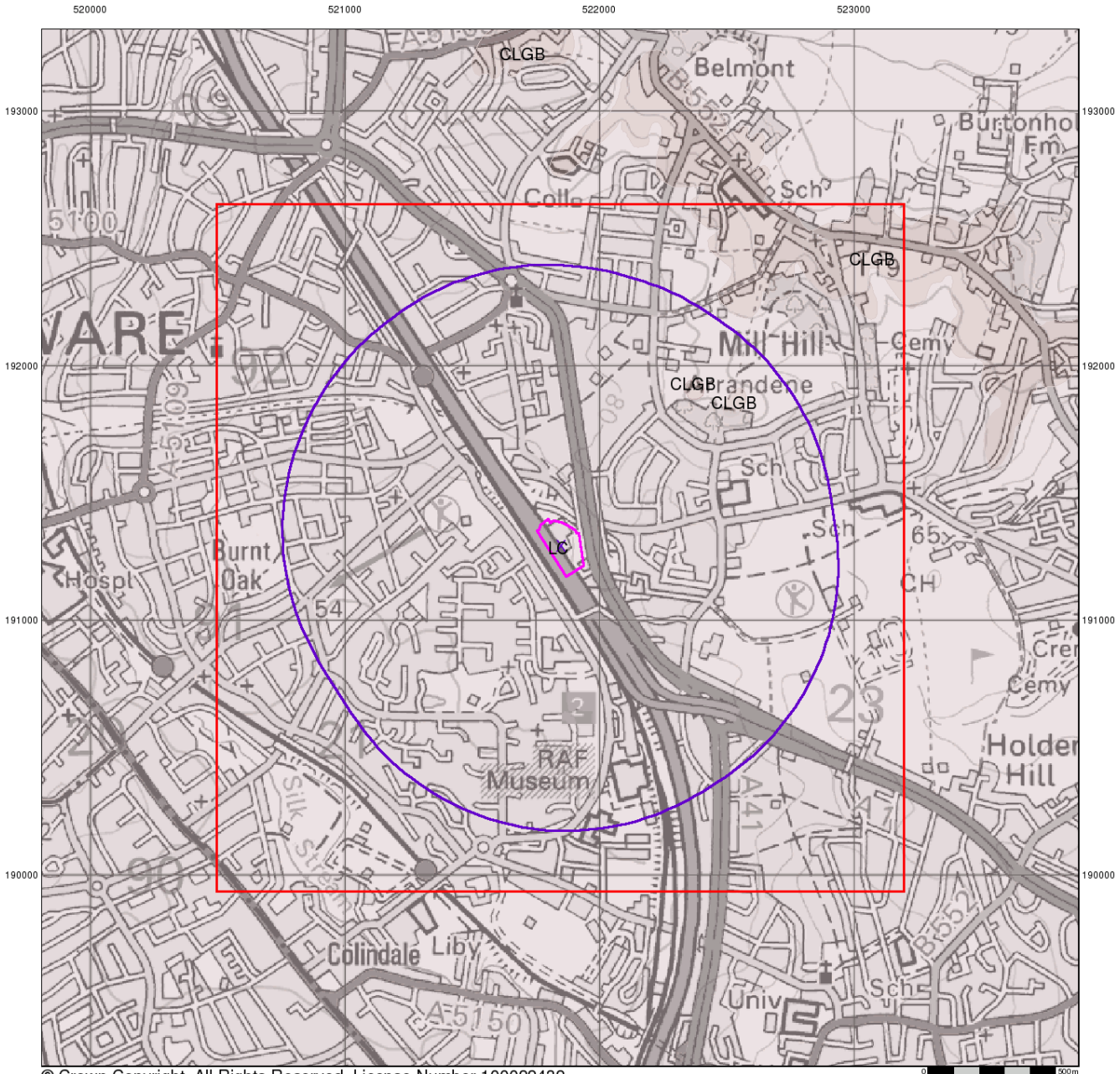


Envirocheck® Geology

Bedrock and Faults

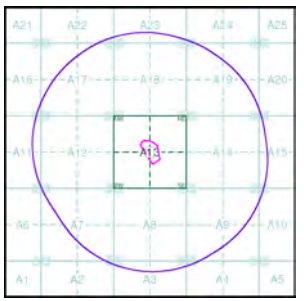
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

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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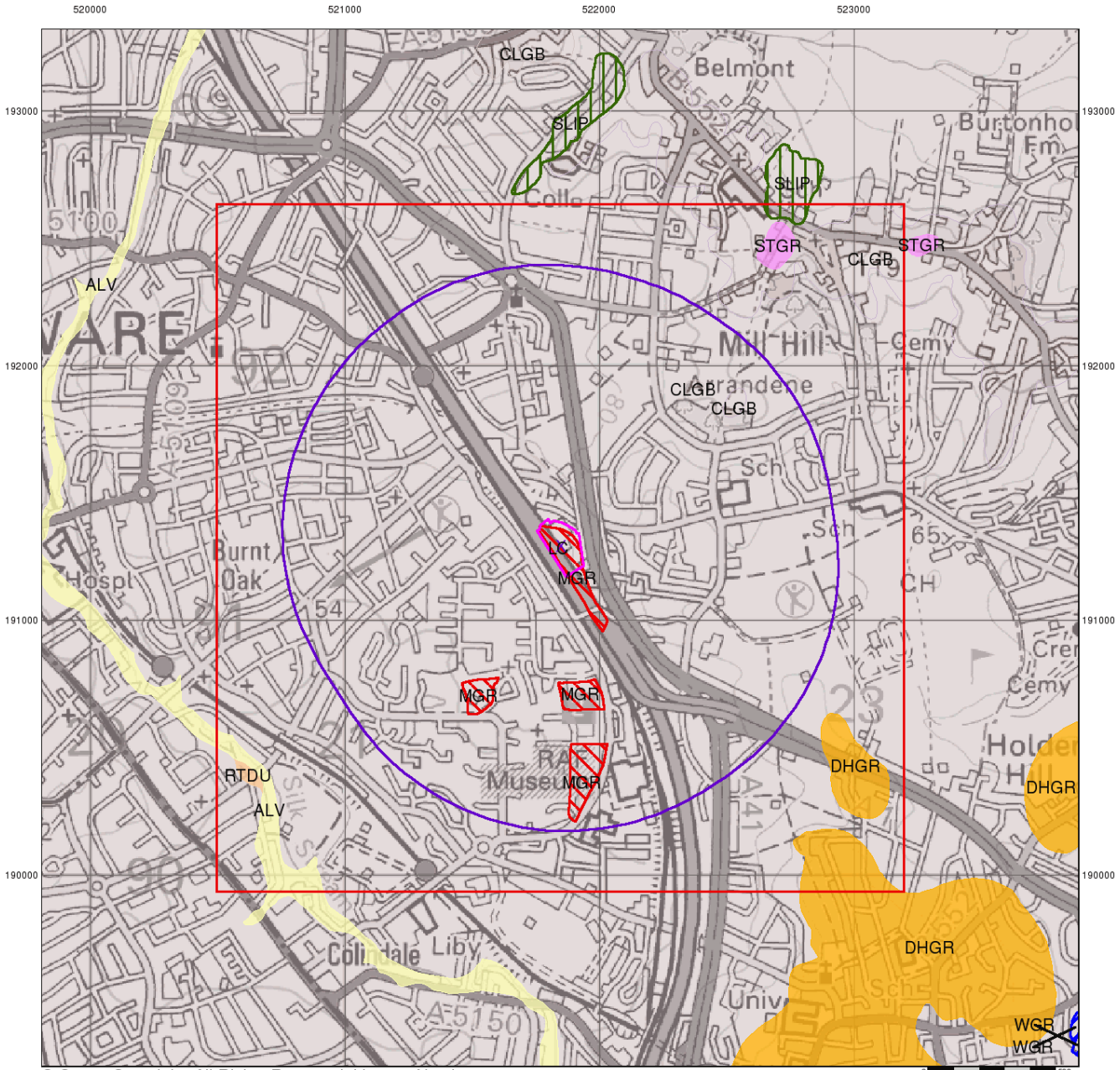

Envirocheck® Geology

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

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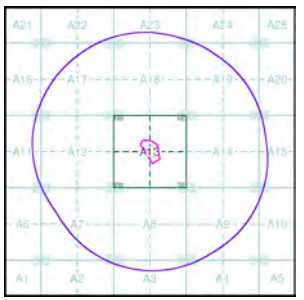
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number:	64920000_1_1
Customer Reference:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

Site Details:

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Electricity Transmission Line
Pole
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

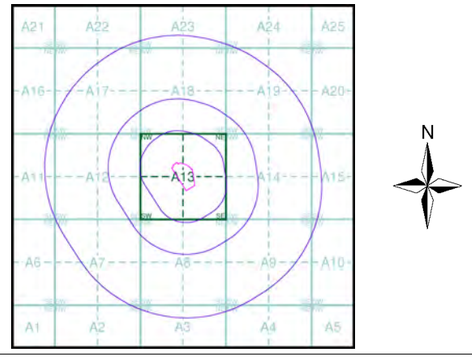
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

Envirocheck®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Middlesex	1:10,560	1868 - 1873	3
London	1:10,560	1896	4
Middlesex	1:10,560	1897	5
Hertfordshire	1:10,560	1919 - 1920	6
London	1:10,560	1920	7
Middlesex	1:10,560	1936	8
Middlesex	1:10,560	1938 - 1939	9
Hertfordshire	1:10,560	1938	10
Historical Aerial Photography	1:10,560	1948 - 1950	11
Historical Aerial Photography	1:10,560	1948	12
Ordnance Survey Plan	1:10,000	1951	13
Ordnance Survey Plan	1:10,000	1968	14
Ordnance Survey Plan	1:10,000	1976 - 1978	15
London	1:25,000	1985	16
Ordnance Survey Plan	1:10,000	1993	17
10K Raster Mapping	1:10,000	2006	18
VectorMap Local	1:10,000	2014	19

Historical Map - Slice A



Order Details

Order Number: 64920000_1_1
Customer Ref: 15.02.014
National Grid Reference: 521850, 191290
Slice: A
Site Area (Ha): 2.35
Search Buffer (m): 1000

Site Details

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Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Fireproof Building
- Prominent Fireproof Building
- Non-fireproof Building
- Non-fireproof Building (non-dwelling)
- Factory, mill, and flour mill, with chimneys
- Factory, mill, and flour mill, without chimneys
- Power Station, drawn to scale
- Hydroelectric Power Station
- Radio Station, drawn to scale
- Telephone Station, drawn to scale
- Abandoned Open-pit Mine or Quarry
- Open-pit Salt Mine
- Pit
- Oil Deposit or Well
- Oil Seepage
- Tailings Pile
- Fuel Storage Tanks
- Natural Gas Tank
- Bench Mark
- Drill Hole
- Burial Mound
- Triangulation Point on Burial Mound
- Single-track Railroad
- Double-track Railroad and Station Building
- Coniferous Forest
- Deciduous Forest
- Mixed Forest
- Lawns
- Citrus Orchard
- Wet Ground
- Scattered Vegetation

243,8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0,2 Velocity of the current, width of river bed, depth of river

Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	ъ (–)
Д д (D)	Л л (L)	У у (U)	ы (Y)
Е е (E)	М м (M)	Ф ф (F)	ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
			Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Partly Demolished Buildings
- Demolished Buildings
- Built-Up Area with Fireproof Buildings Predominant
- Built-Up Area with Non-Fireproof Buildings Predominant
- Individual Fireproof Building
- Prominent Industrial Building
- Individual Dwelling, Fireproof
- Ruins of an Individual Dwelling
- Factory or Mill Chimney
- Factory or Mill with Chimney
- Factory or Mill without Chimney
- Mine or Open Pit Mine
- Operating Shaft or Mine
- Non-Operating Shaft or Mine
- Salt Mine
- Tailings Pile
- Pit
- Stone Quarry
- Gas Pump or Service Station
- Fuel Storage or Natural Gas Tank
- Oil or Natural Gas Derrick
- Small Hydroelectric Power Station
- Power Station
- Transformer Station
- Cemetery
- Burial Mound (height in metres)
- Triangulation Point on Burial Mound
- Triangulation Point
- Bench Mark
- Bench Mark (monumented)
- Telegraph Office
- Telephone Station
- Radio Station
- Radio Tower
- Airfield or Seaplane Base
- Landing Strip
- Main Highway
- Highway under Construction
- Improved Dirt Road (former truck road)
- Double-track Railroad with First Class Station
- Dismantled Railroad
- Railroad Under Construction
- Shore Embankment
- River or Ditch with Embankment
- Direction and velocity of current
- Well
- Water Reservoir or Rain Water Pit
- Spring
- Isobath with value
- Heavy (Index) Contour Line
- Contour Line and Value
- Half Contour Line
- Spot Elevation Value
- Coniferous
- Deciduous
- Mixed
- Scrub

Key to Numbers on Mapping

Envirocheck®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Middlesex	1:10,560	1868 - 1873	3
London	1:10,560	1896	4
Middlesex	1:10,560	1897	5
Hertfordshire	1:10,560	1919 - 1920	6
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Middlesex	1:10,560	1938 - 1939	9
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Historical Aerial Photography	1:10,560	1948 - 1950	11
Historical Aerial Photography	1:10,560	1948	12
Ordnance Survey Plan	1:10,000	1951	13
Ordnance Survey Plan	1:10,000	1968	14
Ordnance Survey Plan	1:10,000	1976 - 1978	15
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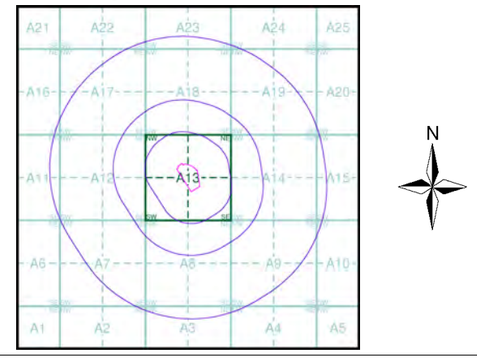
Ordnance Survey Plan	1:10,000	1993	17
10K Raster Mapping	1:10,000	2006	18
VectorMap Local	1:10,000	2014	19

Russian Map - Slice A



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

Site Details

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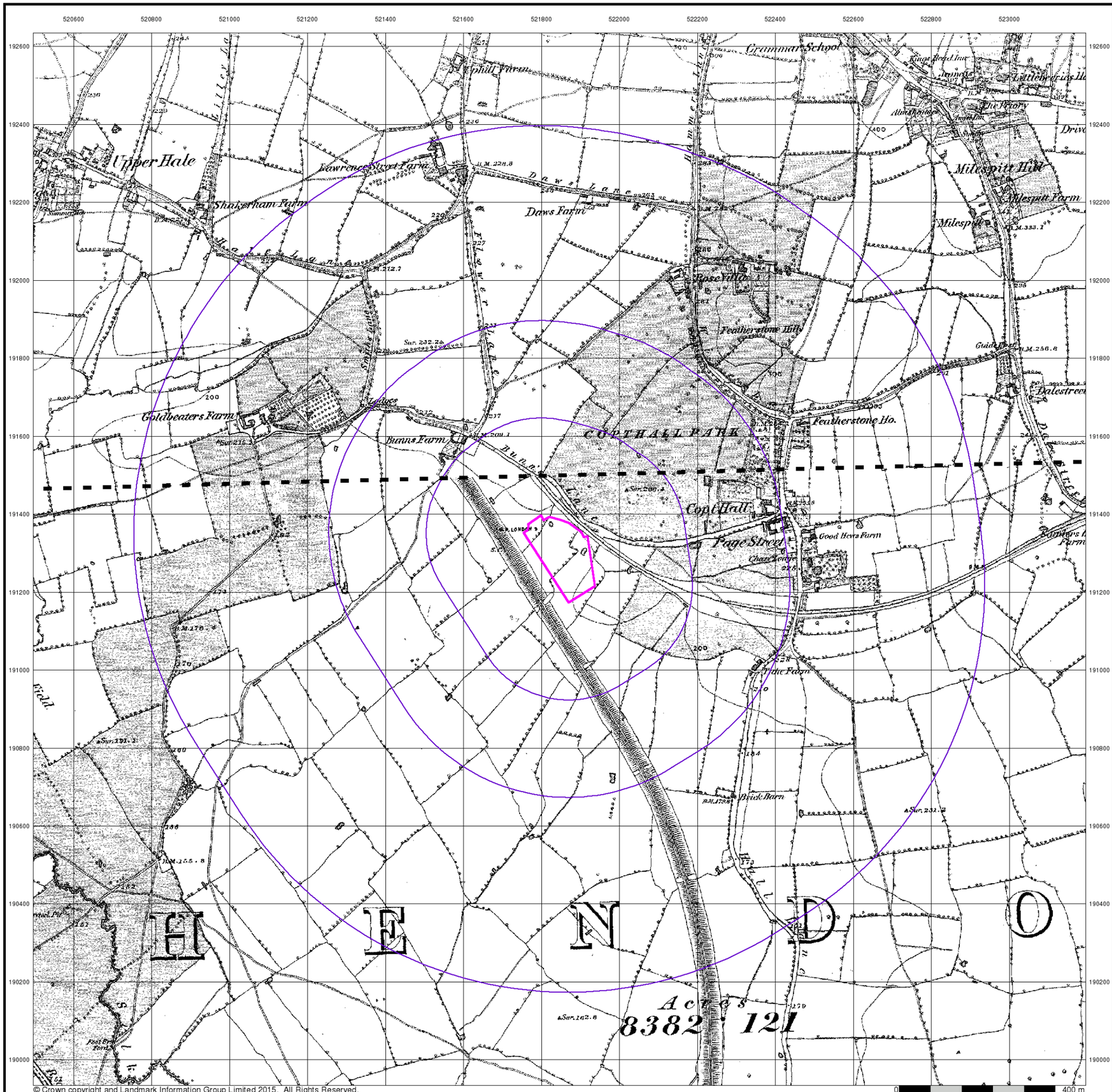


Envirocheck®

Middlesex

Published 1868 - 1873

Source map scale - 1:10,560

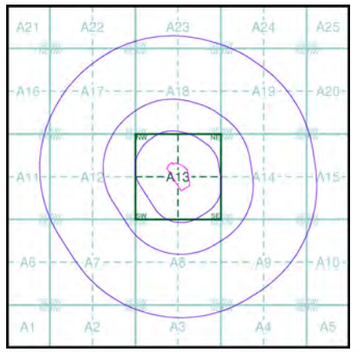
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

00600
1868
1:10,560

01100
1873
1:10,560

Historical Map - Slice A



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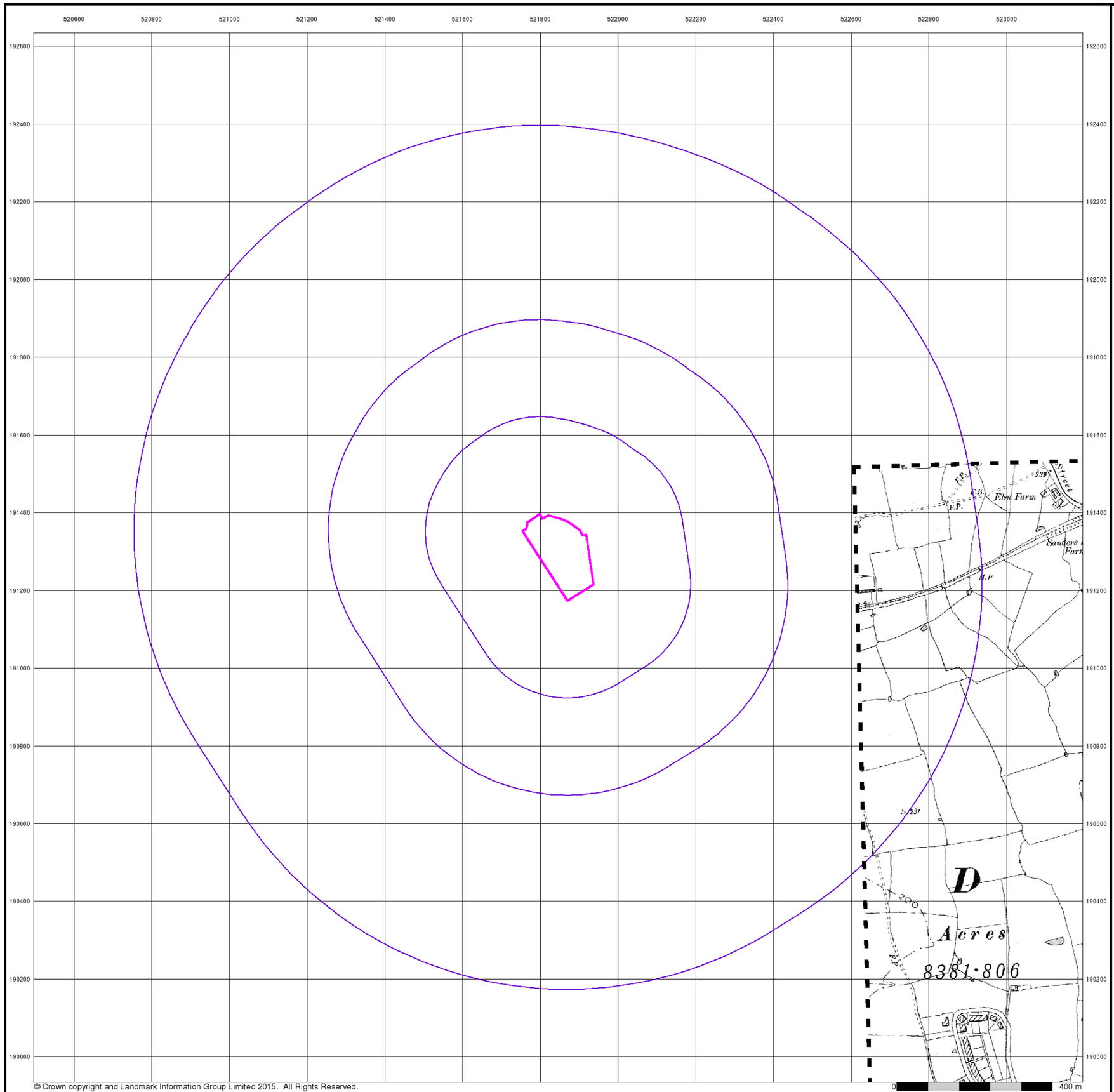


Envirocheck®

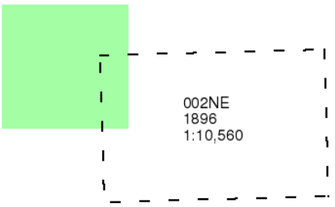
London

Published 1896

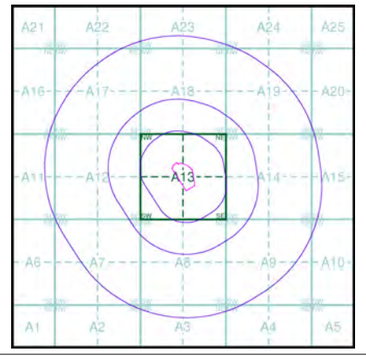
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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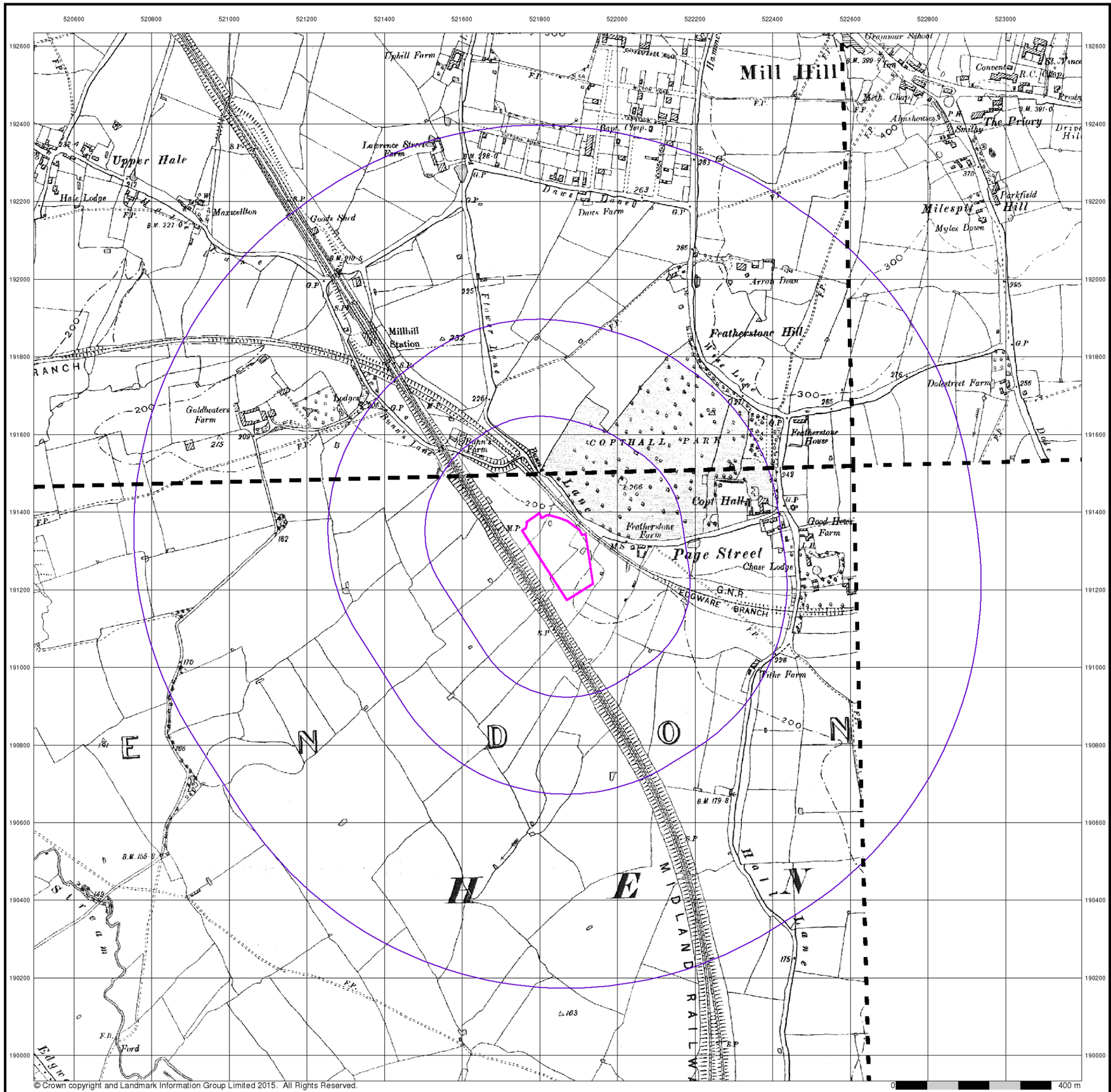

Envirocheck®

Middlesex

Published 1897

Source map scale - 1:10,560

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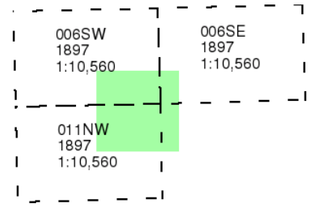
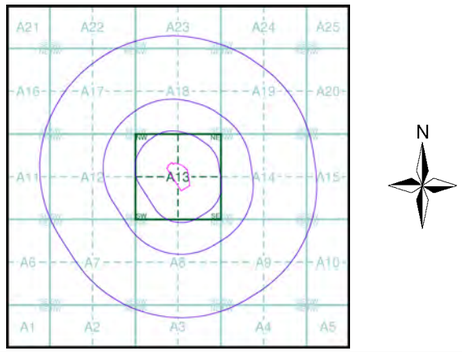
Map Name(s) and Date(s)



Historical Map - Slice A



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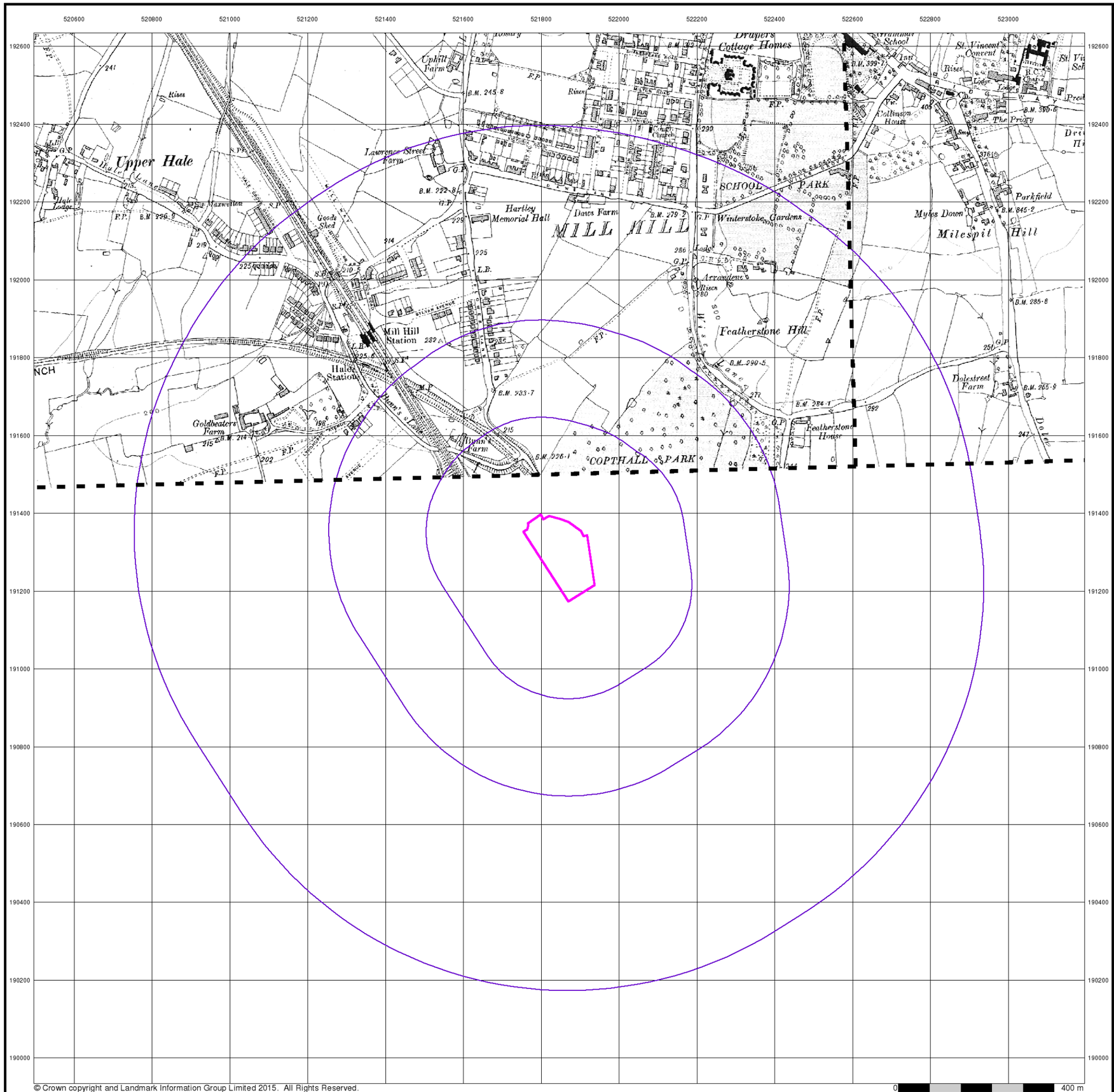

Envirocheck®

Hertfordshire

Published 1919 - 1920

Source map scale - 1:10,560

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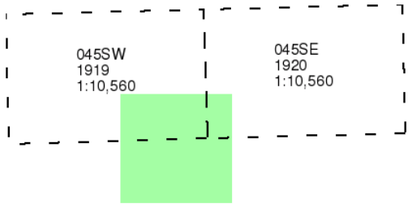
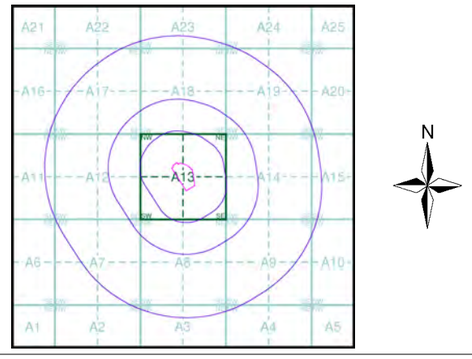
Map Name(s) and Date(s)



Historical Map - Slice A



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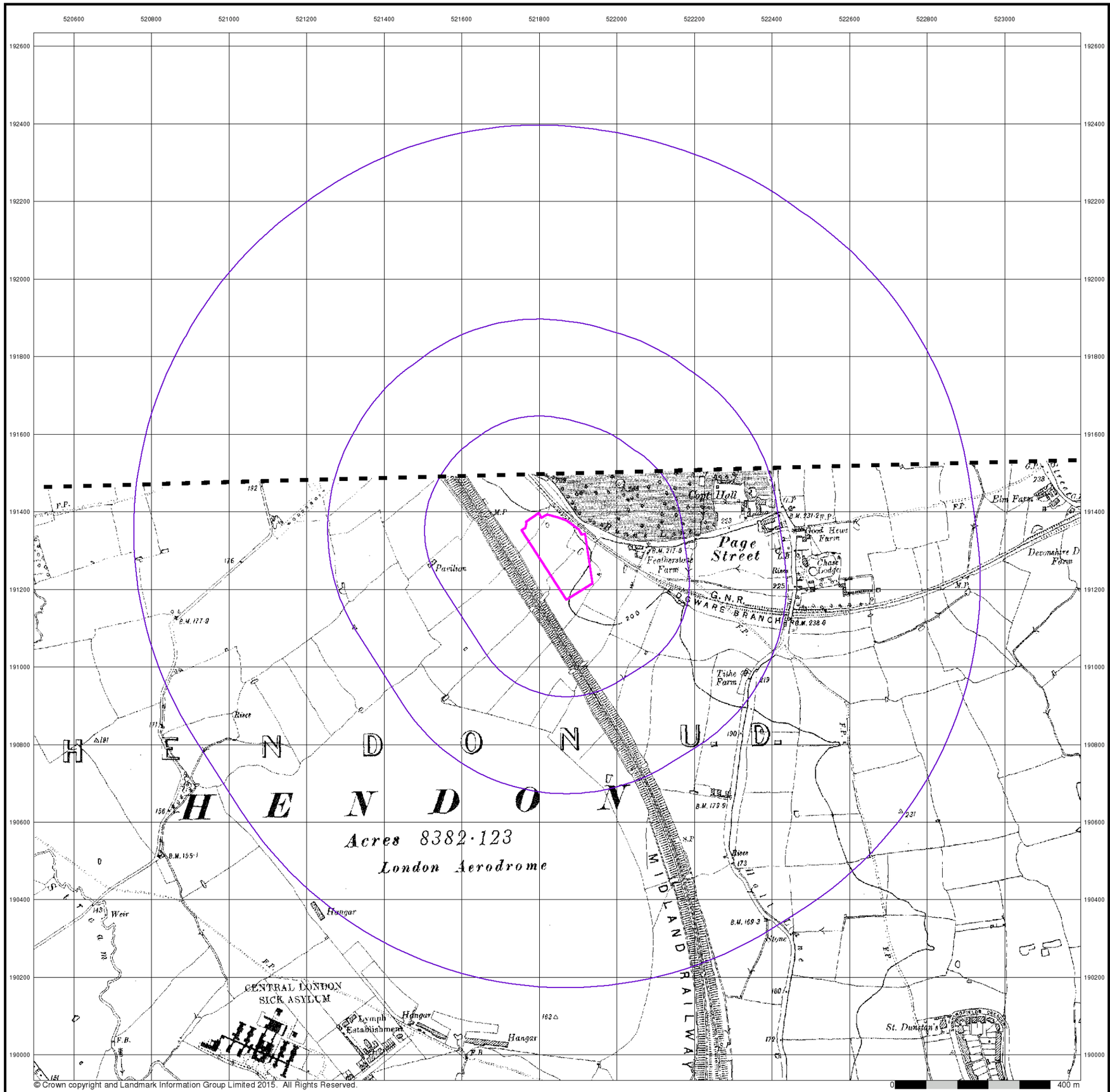

Envirocheck®

London

Published 1920

Source map scale - 1:10,560

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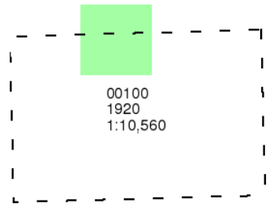
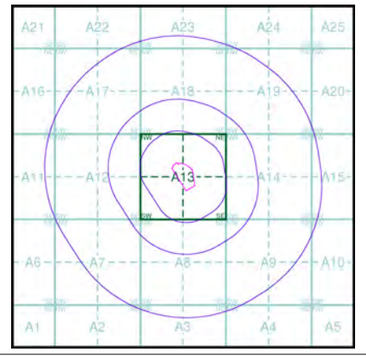
Map Name(s) and Date(s)



Historical Map - Slice A



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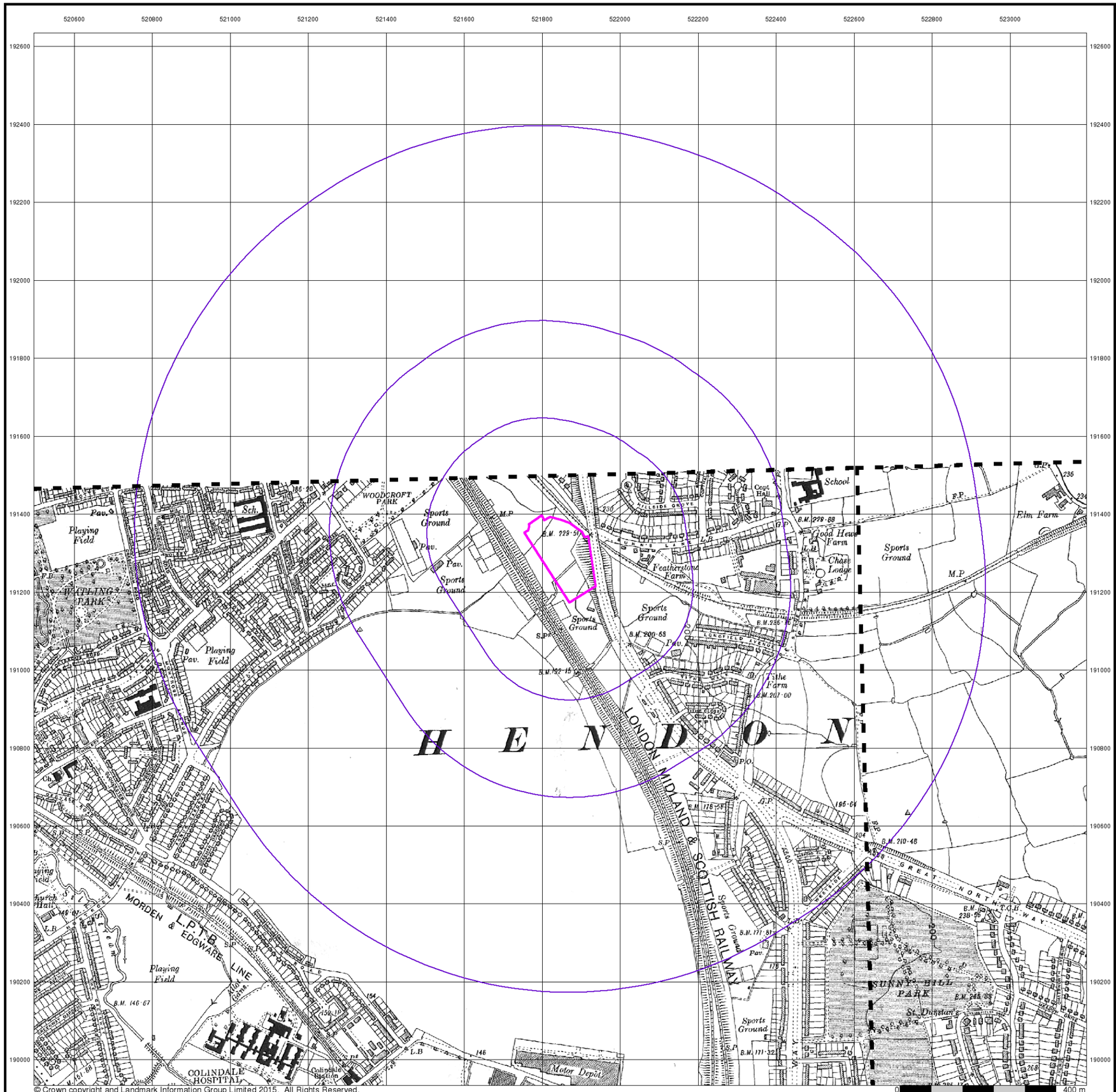

Envirocheck®

Middlesex

Published 1936

Source map scale - 1:10,560

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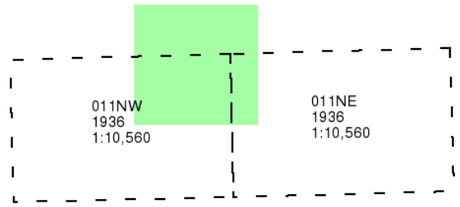
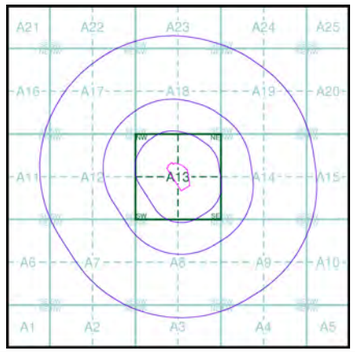
Map Name(s) and Date(s)



Historical Map - Slice A



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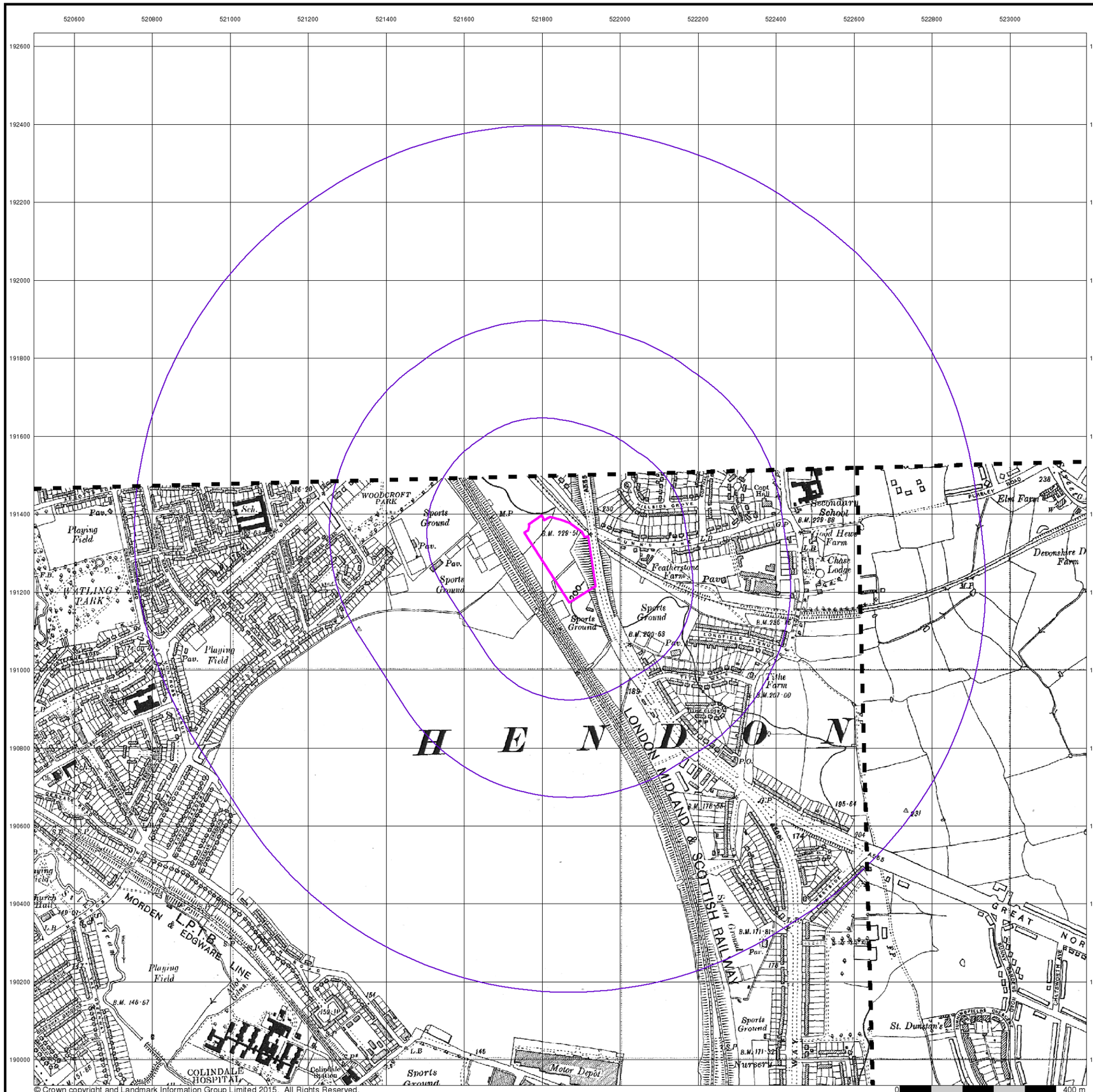
Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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



Envirocheck®

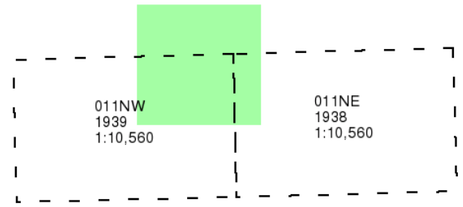
Middlesex

Published 1938 - 1939

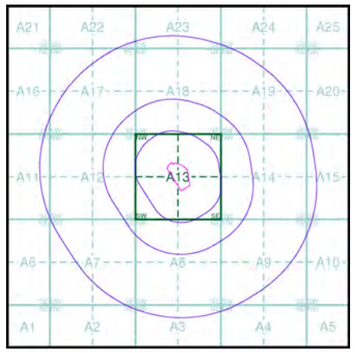
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

Site Details

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Hertfordshire

Published 1938

Source map scale - 1:10,560

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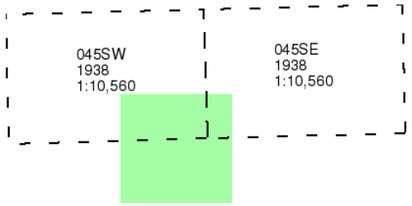
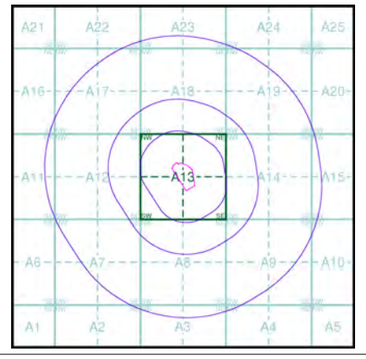
Map Name(s) and Date(s)



Historical Map - Slice A



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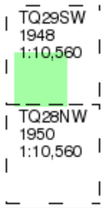
Historical Aerial Photography

Published 1948 - 1950

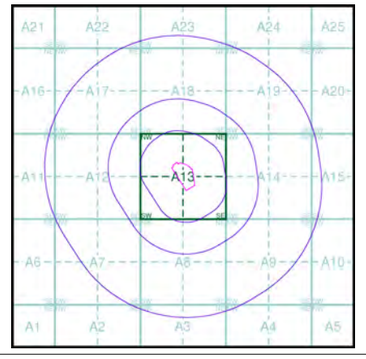
Source map scale - 1:10,560

The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



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Order Details

Order Number:	64920000_1_1
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National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
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Historical Aerial Photography

Published 1948

Source map scale - 1:10,560

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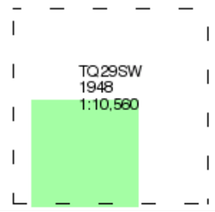
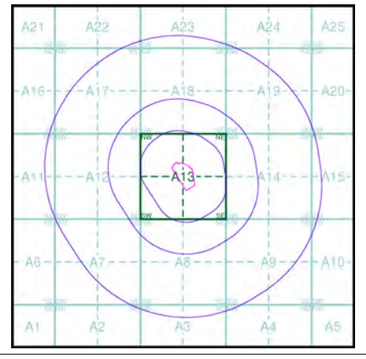


Historical Aerial Photography - Slice A



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Ordnance Survey Plan

Published 1951

Source map scale - 1:10,000

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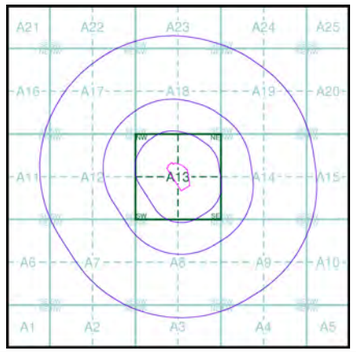
Map Name(s) and Date(s)

TQ29SW
1951
1:10,560

TQ28NW
1951
1:10,560

Historical Map - Slice A



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

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Ordnance Survey Plan

Published 1968

Source map scale - 1:10,000

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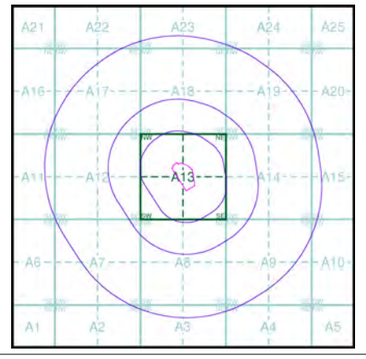
Map Name(s) and Date(s)

TQ29SW
1968
1:10,560

TQ28NW
1968
1:10,560

Historical Map - Slice A



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

Site Details

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Ordnance Survey Plan

Published 1976 - 1978

Source map scale - 1:10,000

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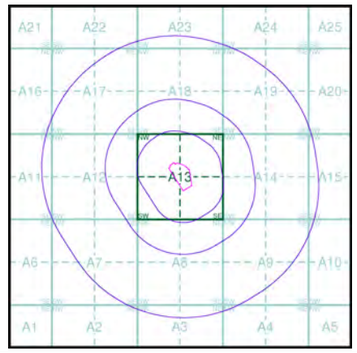
Map Name(s) and Date(s)

TQ29SW
1976
1:10,000

TQ28NW
1978
1:10,000

Historical Map - Slice A



N

Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

Site Details

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Web: www.envirocheck.co.uk

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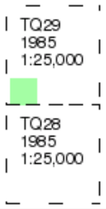
London

Published 1985

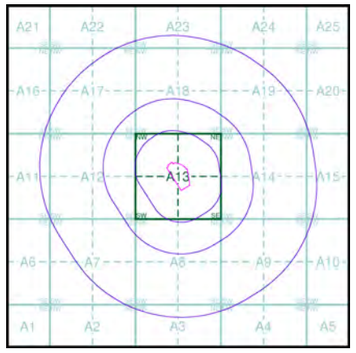
Source map scale - 1:25,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.
They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)



Russian Map - Slice A



Order Details

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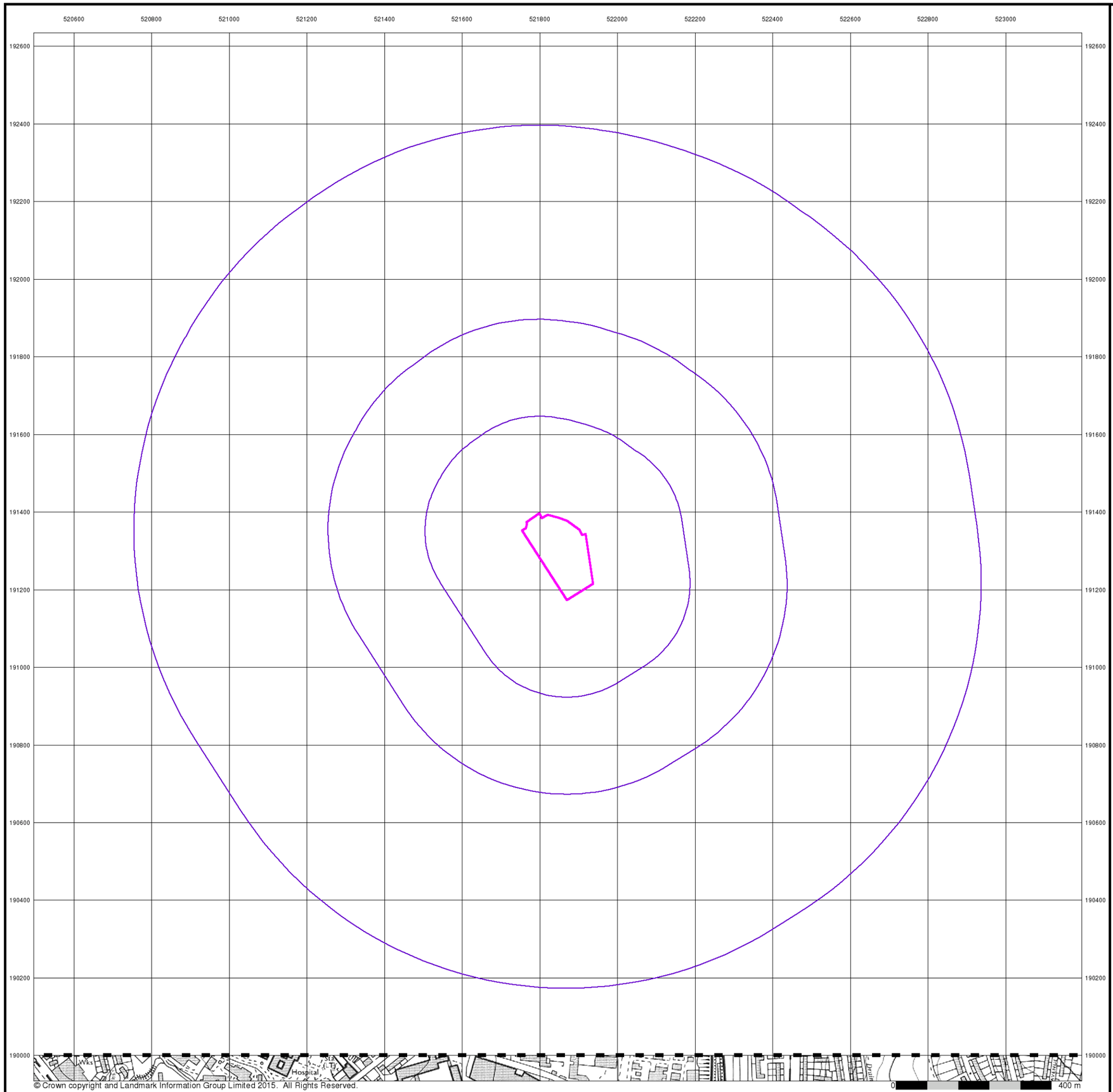

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Ordnance Survey Plan

Published 1993

Source map scale - 1:10,000

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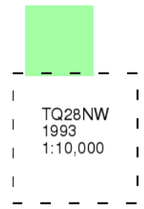
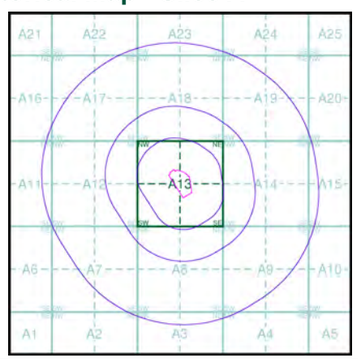
Map Name(s) and Date(s)



Historical Map - Slice A



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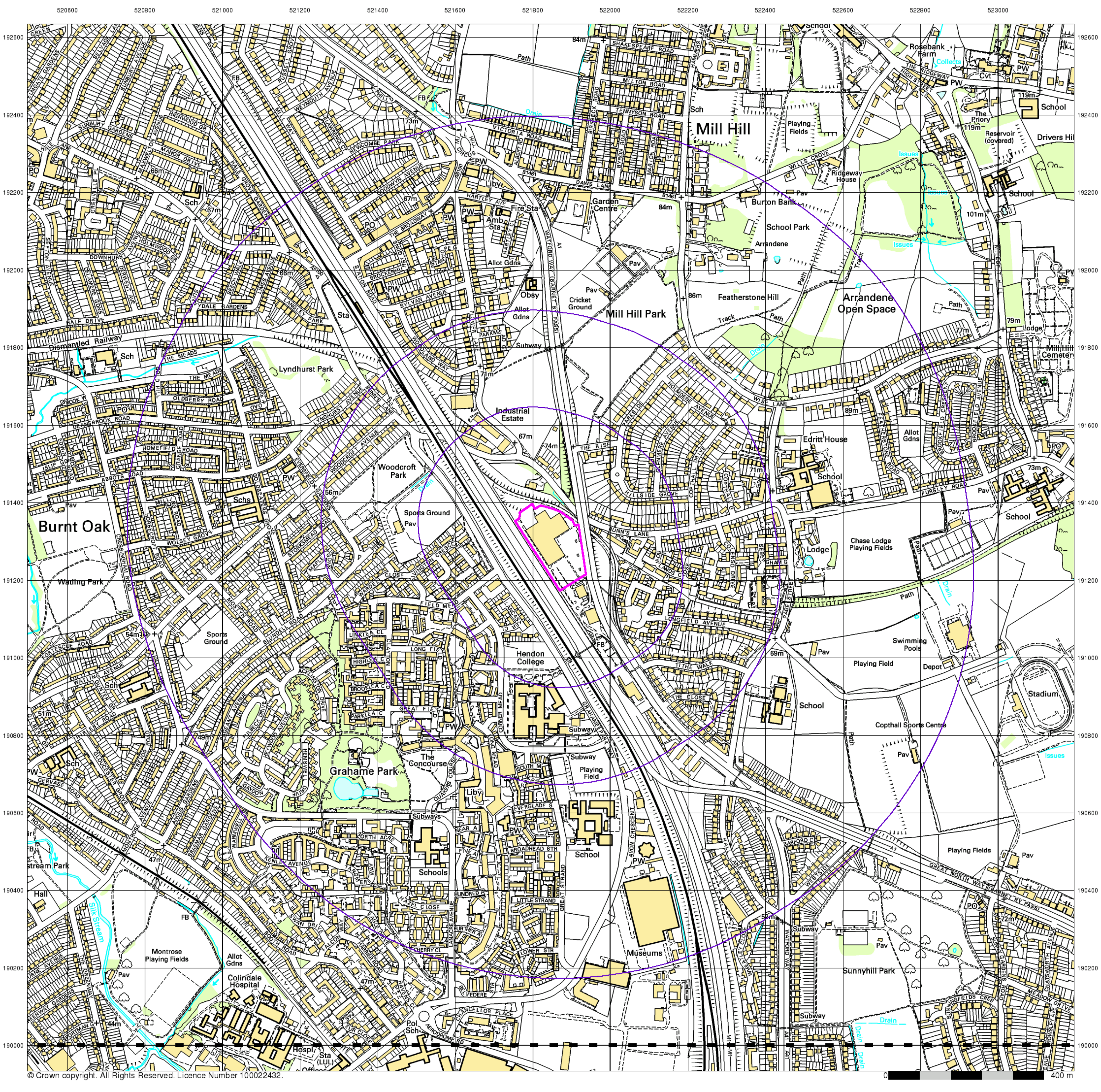


Envirocheck®

10k Raster Mapping

Published 2006

Source map scale - 1:10,000

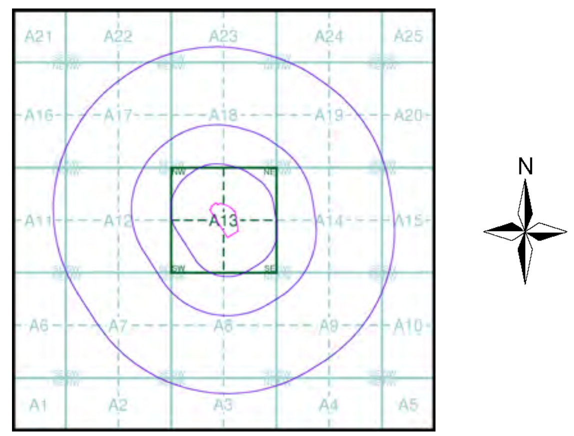
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

TQ29SW
2006
1:10,000

TQ28NW
2006
1:10,000

Historical Map - Slice A



Order Details

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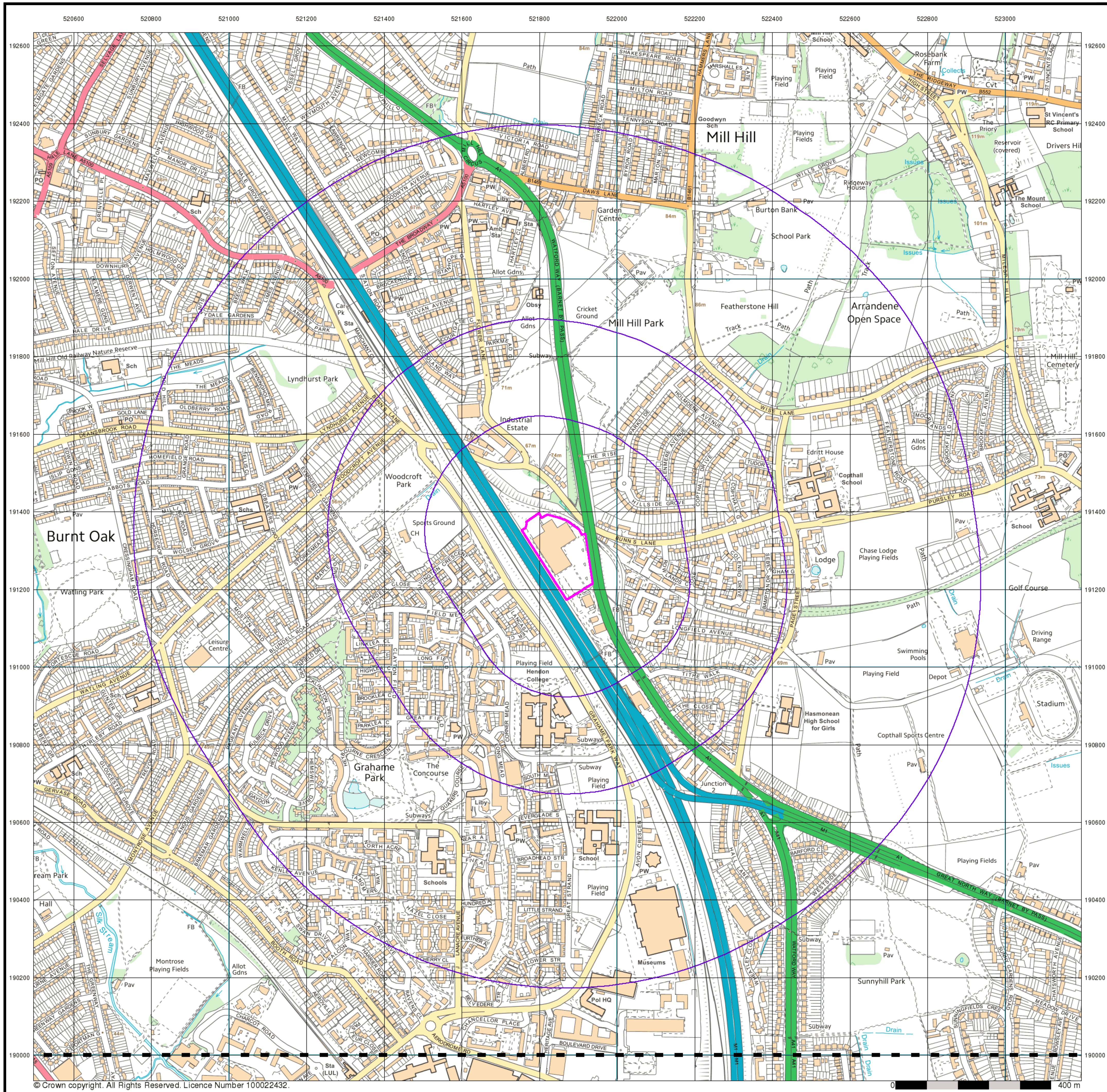


Envirocheck®

VectorMap Local

Published 2014

Source map scale - 1:10,000

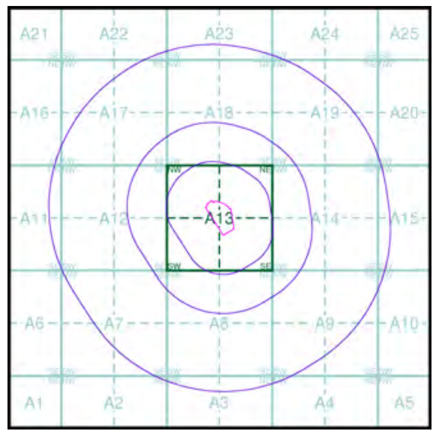
VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

TQ29SW
2014
Variable

TQ28NW
2014
Variable

Historical Map - Slice A



N

Order Details

Order Number:	64920000_1_1
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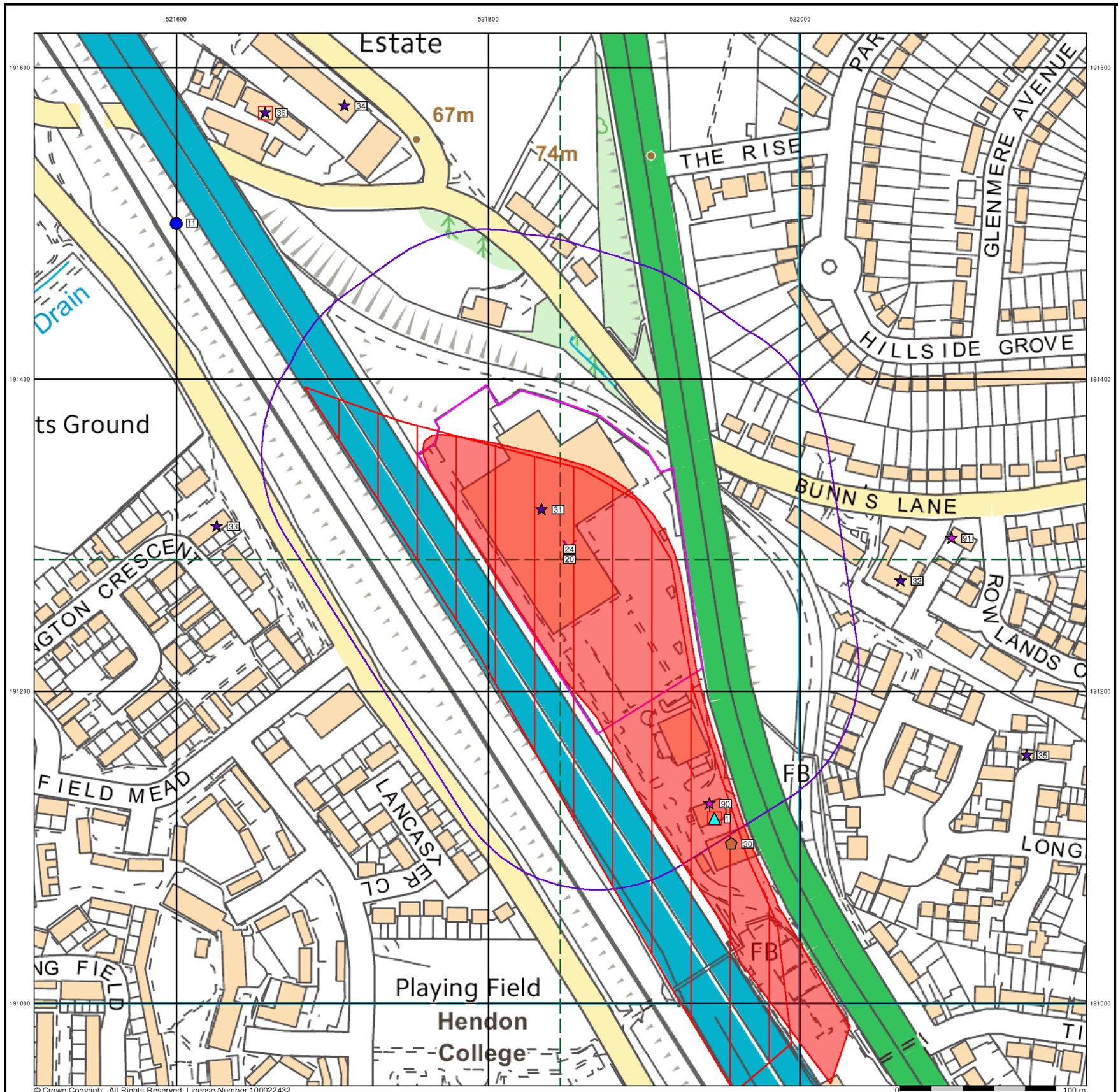


0 100 m

Envirocheck®

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

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
- 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

Geological

- BGS Recorded Mineral Site

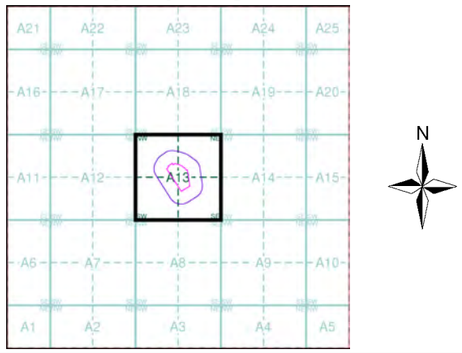
Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Site Sensitivity Map - Segment A13



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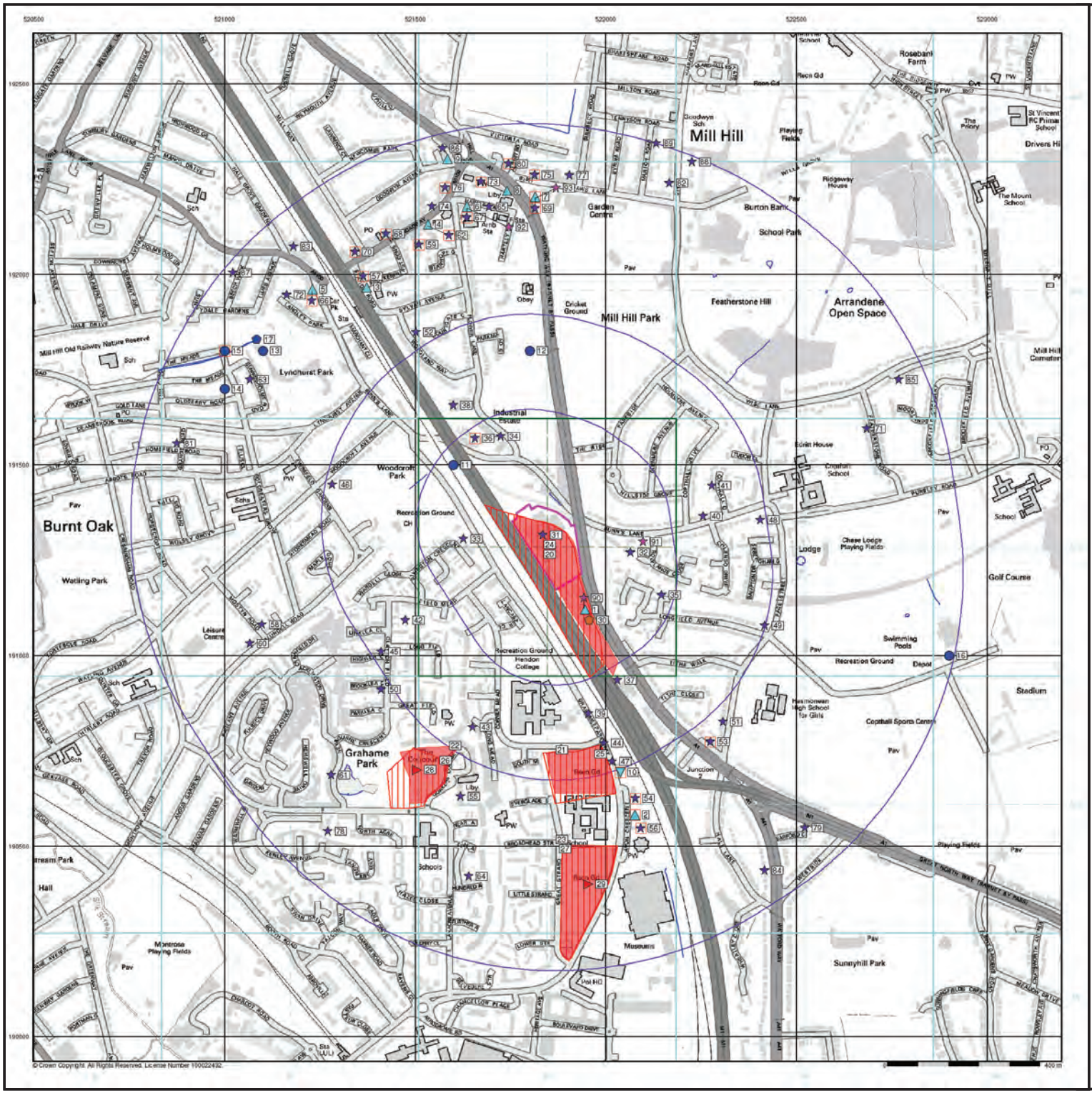

Envirocheck

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)
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- Prosecution Relating to Controlled Waters
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- River Network or Water Feature
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- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- 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

Geological

- BGS Recorded Mineral Site

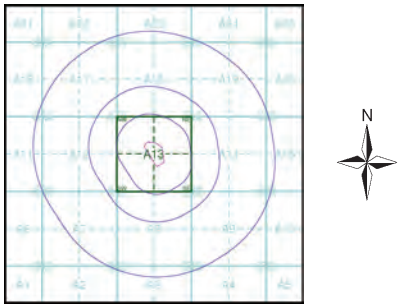
Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Site Sensitivity Map - Slice A



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	1000

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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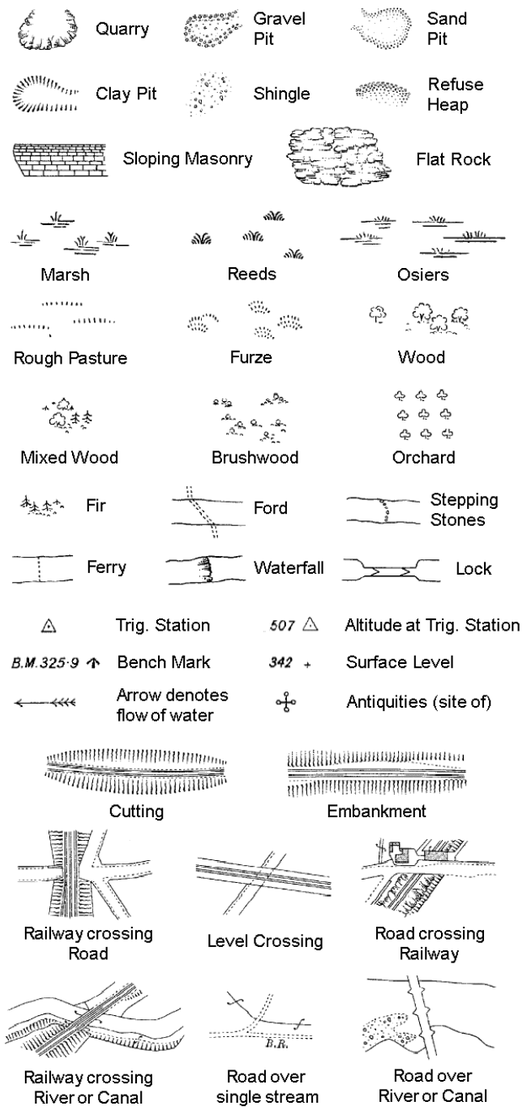
Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)

County & Civil Parish Boundary

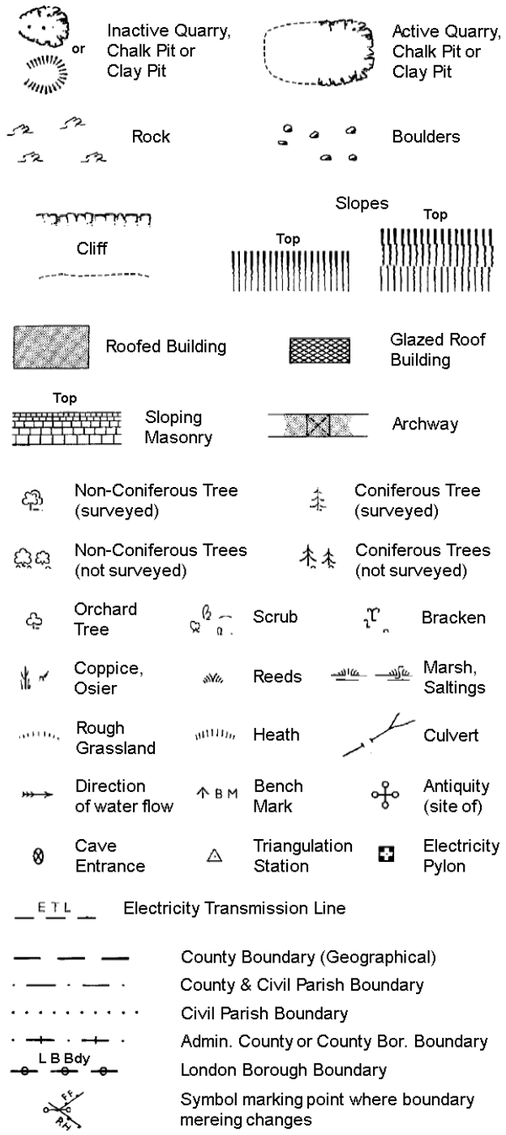
Administrative County & Civil Parish Boundary

Co. Boro. Bdy. County Borough Boundary (England)

Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)

County & Civil Parish Boundary

Civil Parish Boundary

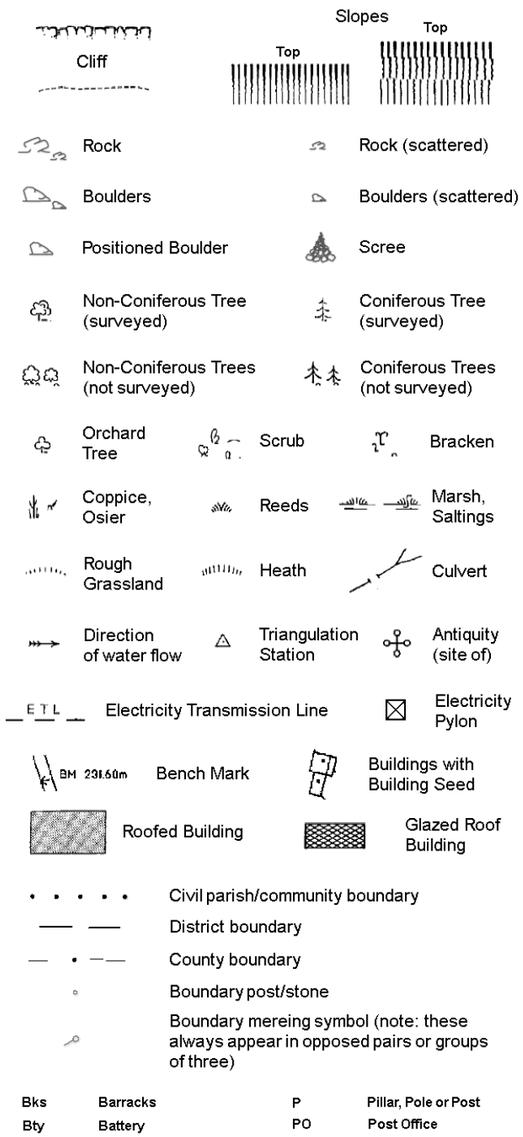
Admin. County or County Bor. Boundary

L B Bdy London Borough Boundary

Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary

District boundary

County boundary

Boundary post/stone

Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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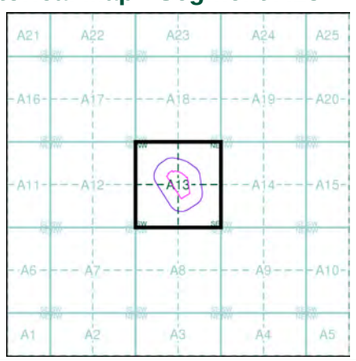
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Middlesex	1:2,500	1882 - 1883	2
Middlesex	1:2,500	1896	3
Middlesex	1:2,500	1913 - 1914	4
Middlesex	1:2,500	1932 - 1935	5
Ordnance Survey Plan	1:2,500	1962 - 1964	6
Ordnance Survey Plan	1:1,250	1962	7
Additional SIMs	1:1,250	1962 - 1981	8
Ordnance Survey Plan	1:1,250	1971 - 1975	9
Supply of Unpublished Survey Information	1:1,250	1974 - 1975	10
Ordnance Survey Plan	1:1,250	1980 - 1986	11
Additional SIMs	1:1,250	1990	12
Large-Scale National Grid Data	1:1,250	1991	13
Large-Scale National Grid Data	1:1,250	1992 - 1995	14
Large-Scale National Grid Data	1:1,250	1996	15
Large-Scale National Grid Data	1:1,250	1996	16
Large-Scale National Grid Data	1:1,250	1996	17

Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

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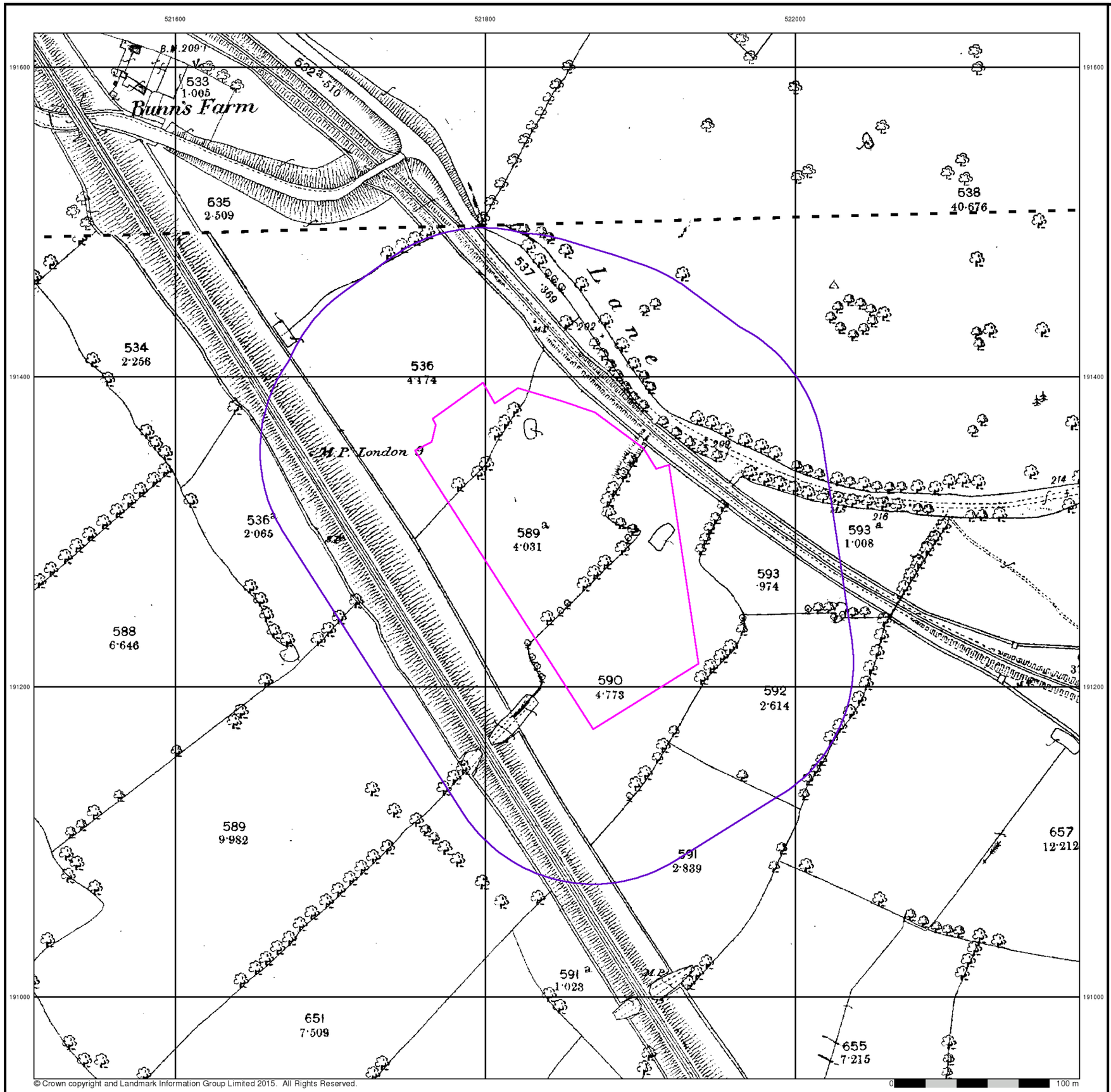

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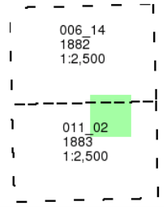
Middlesex

Published 1882 - 1883

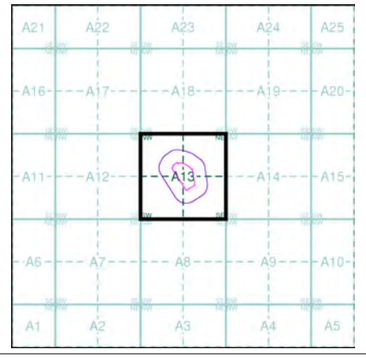
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
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National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

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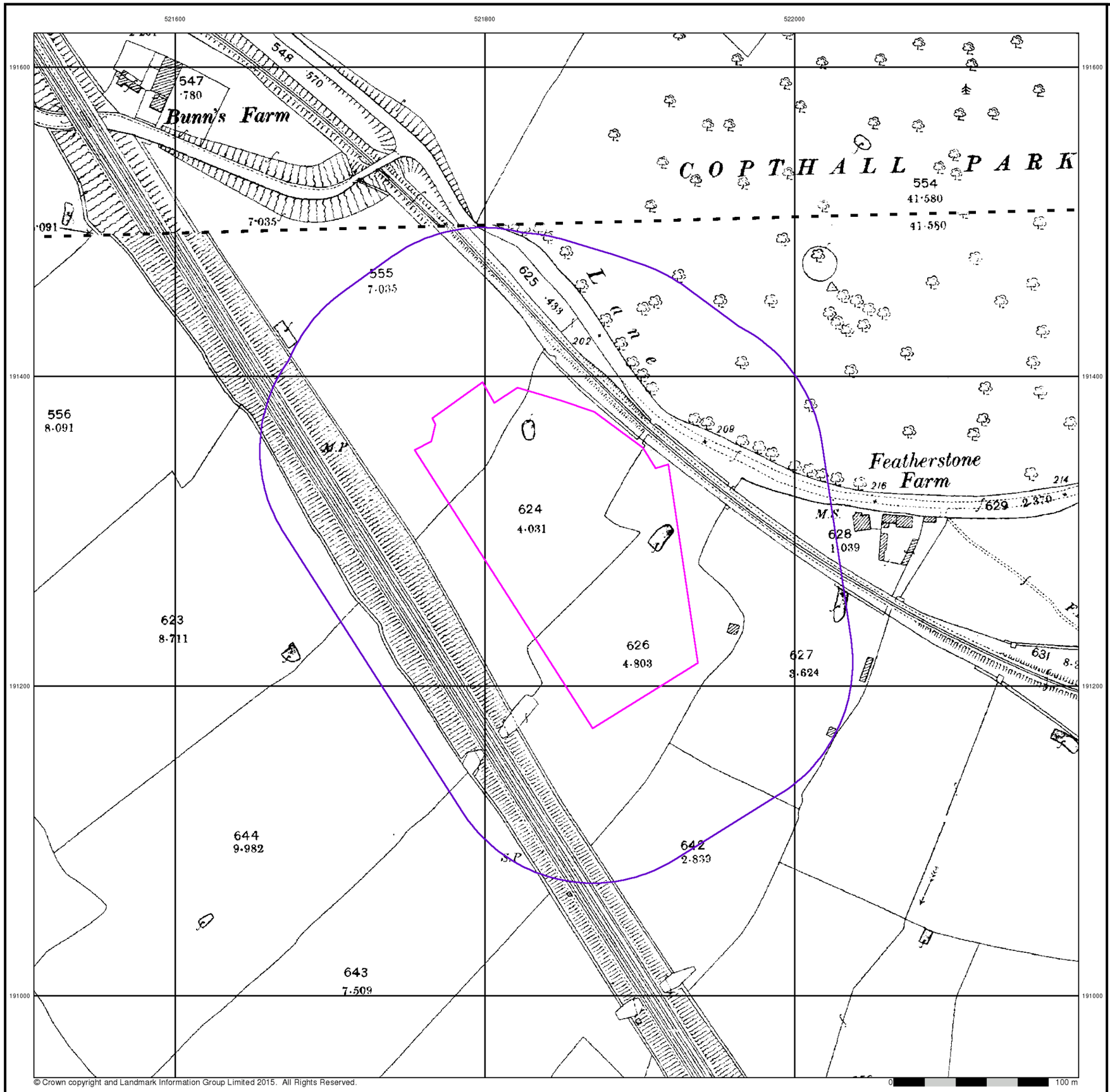


Envirocheck®

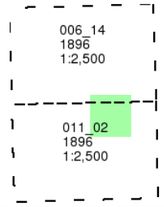
Middlesex

Published 1896

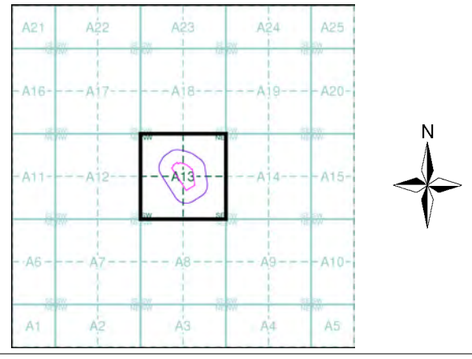
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

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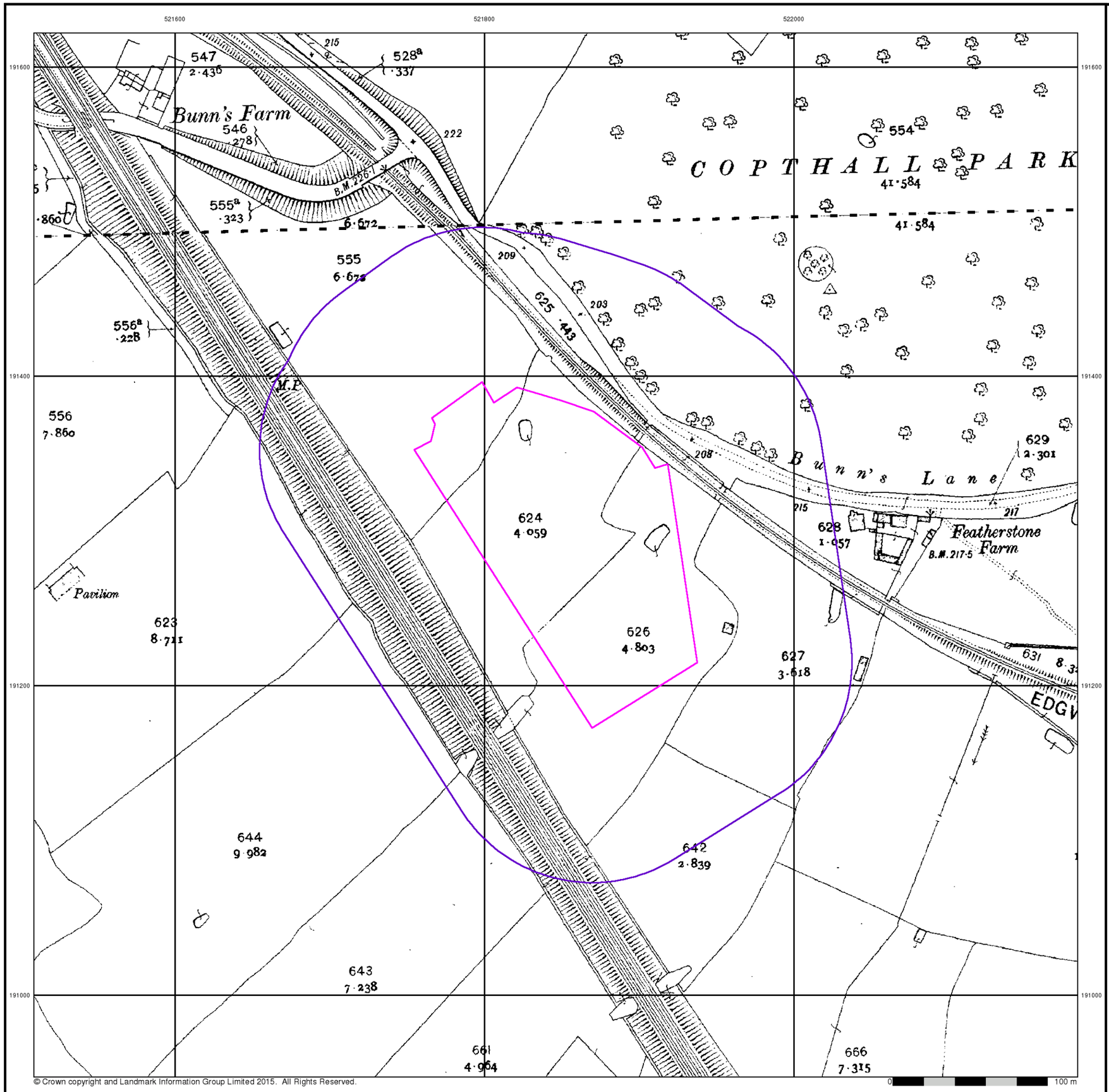

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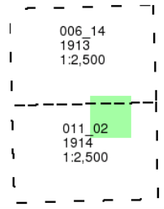
Middlesex

Published 1913 - 1914

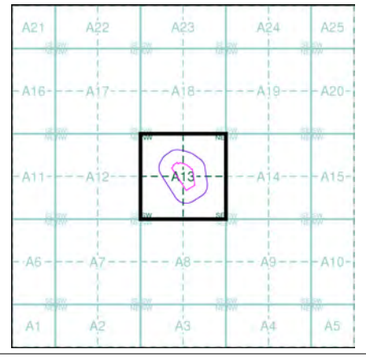
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

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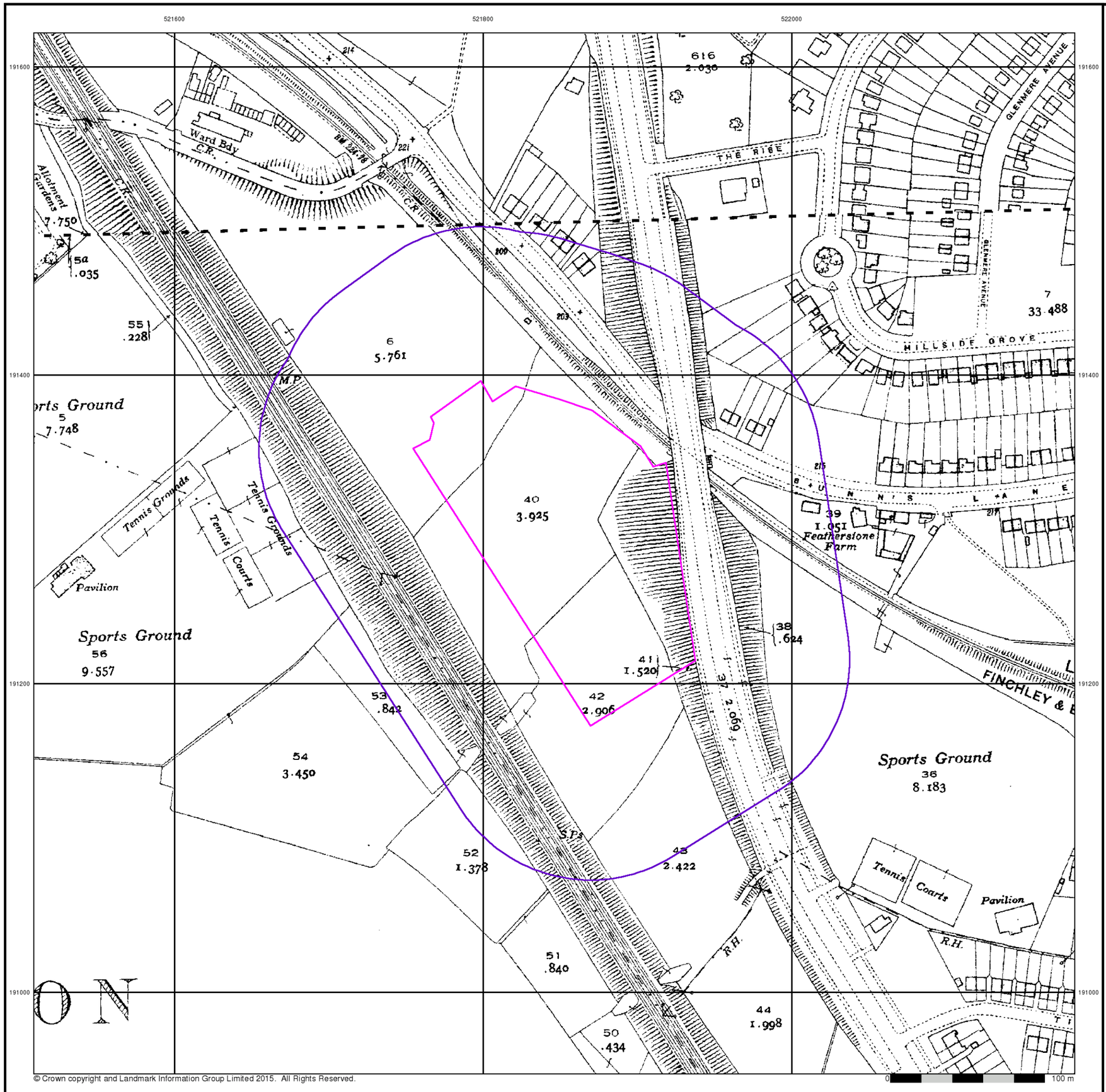


Envirocheck®

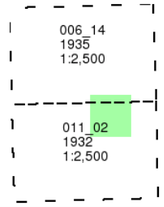
Middlesex

Published 1932 - 1935

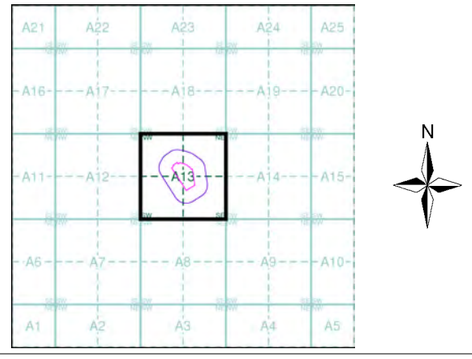
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group
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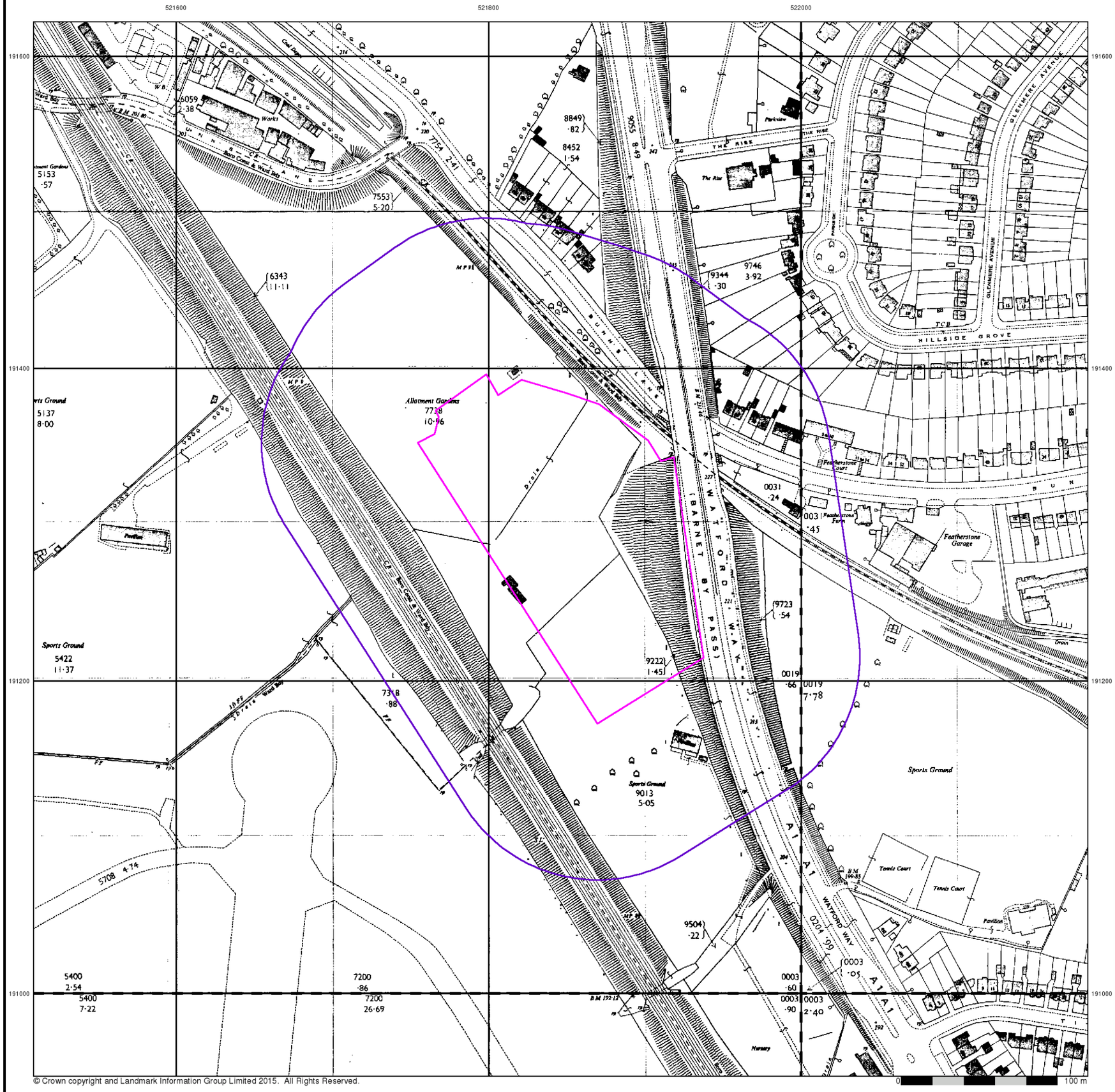

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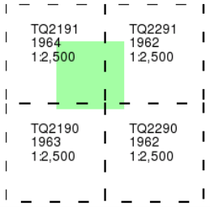
Ordnance Survey Plan

Published 1962 - 1964

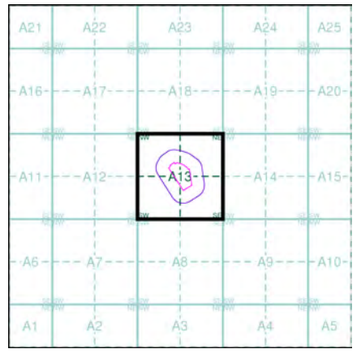
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
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Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

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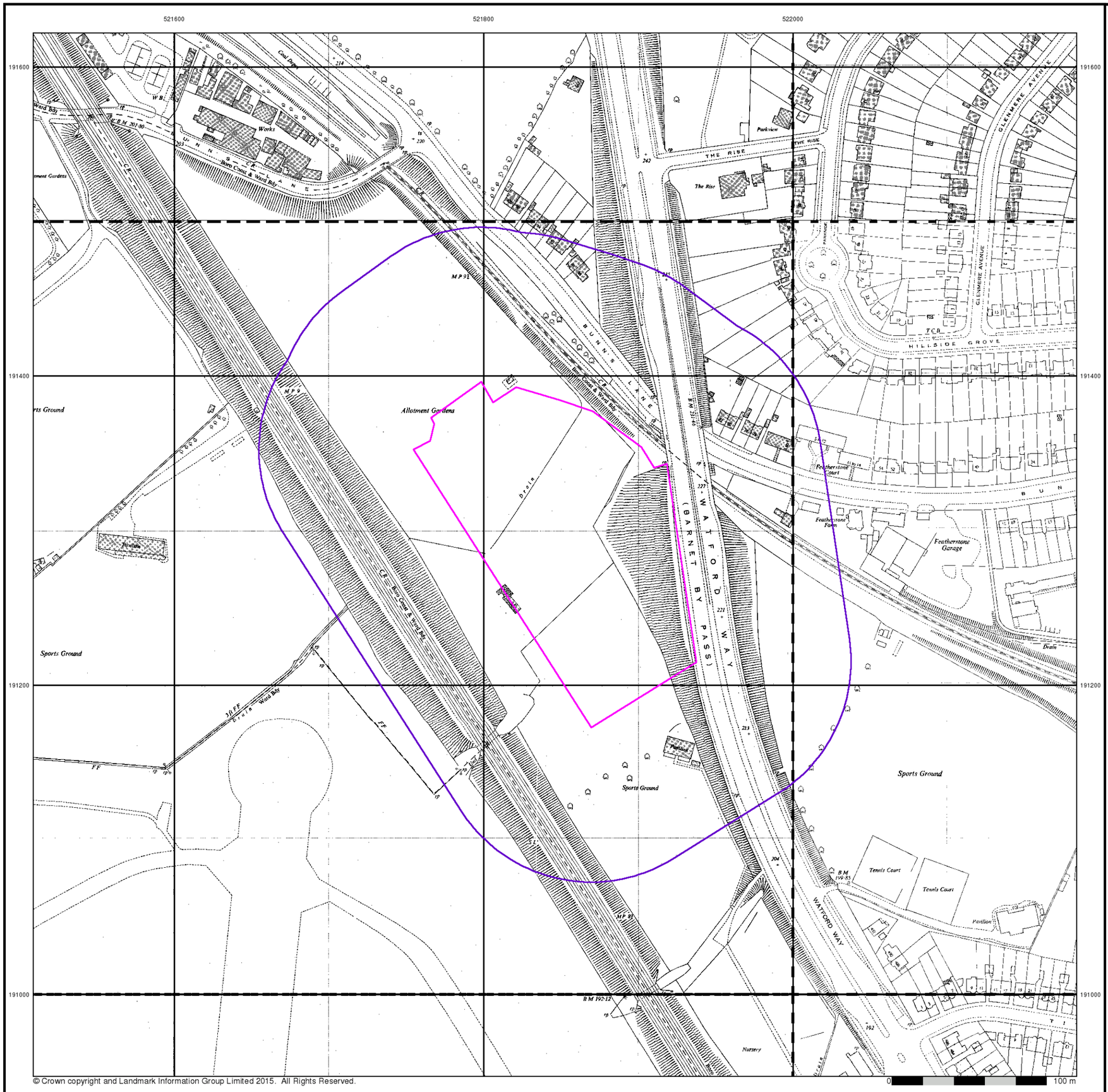


Envirocheck®

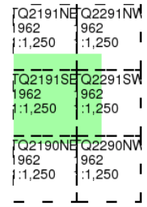
Ordnance Survey Plan

Published 1962

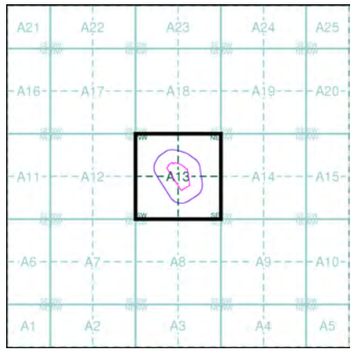
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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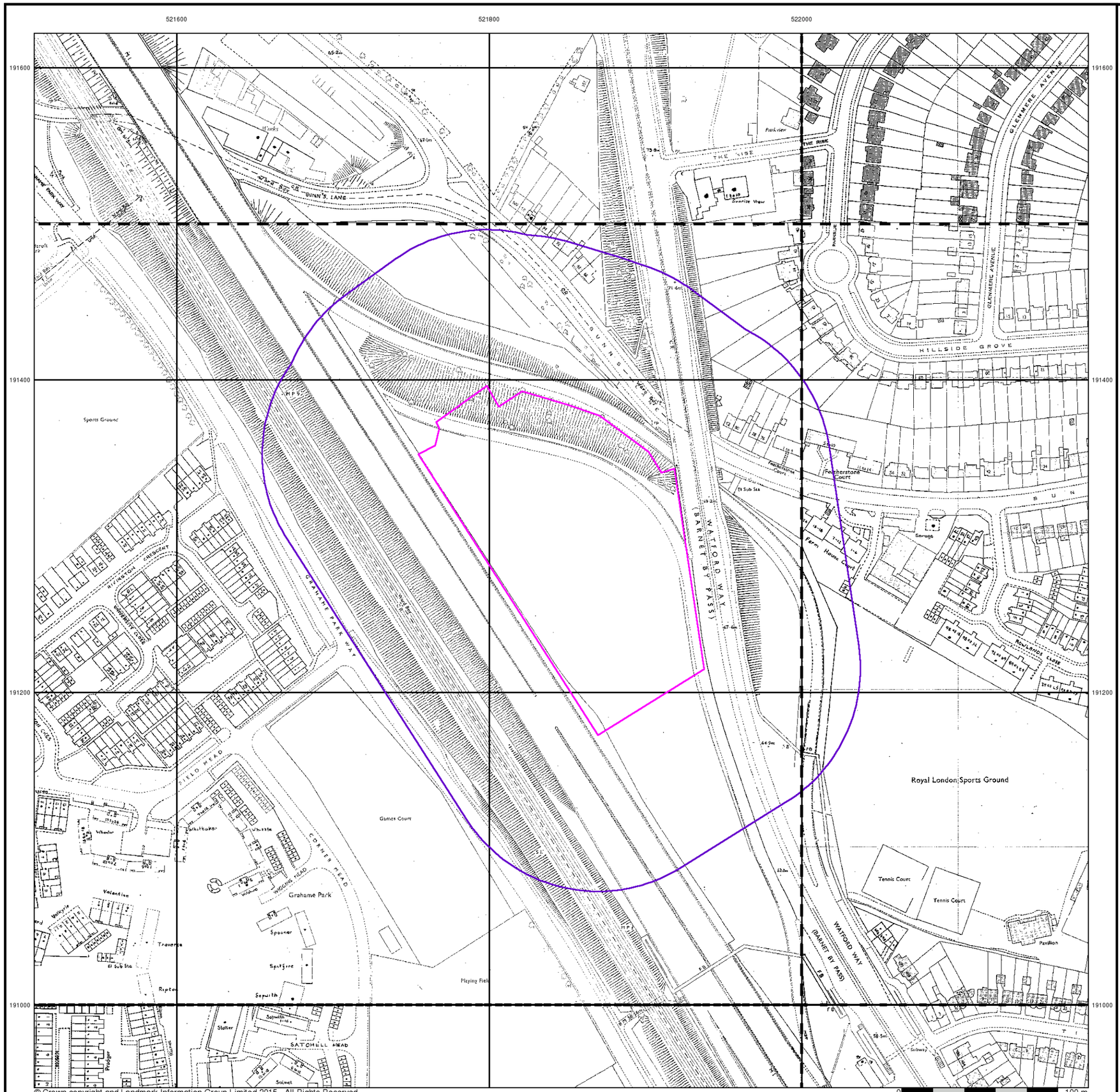

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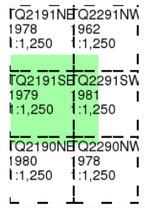
Additional SIMs

Published 1962 - 1981

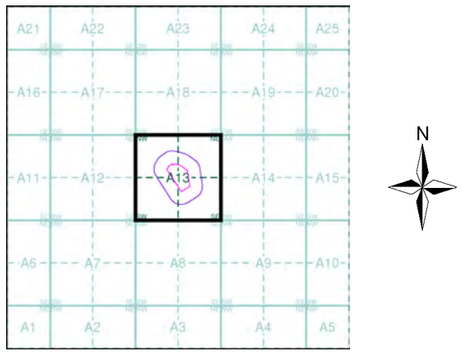
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
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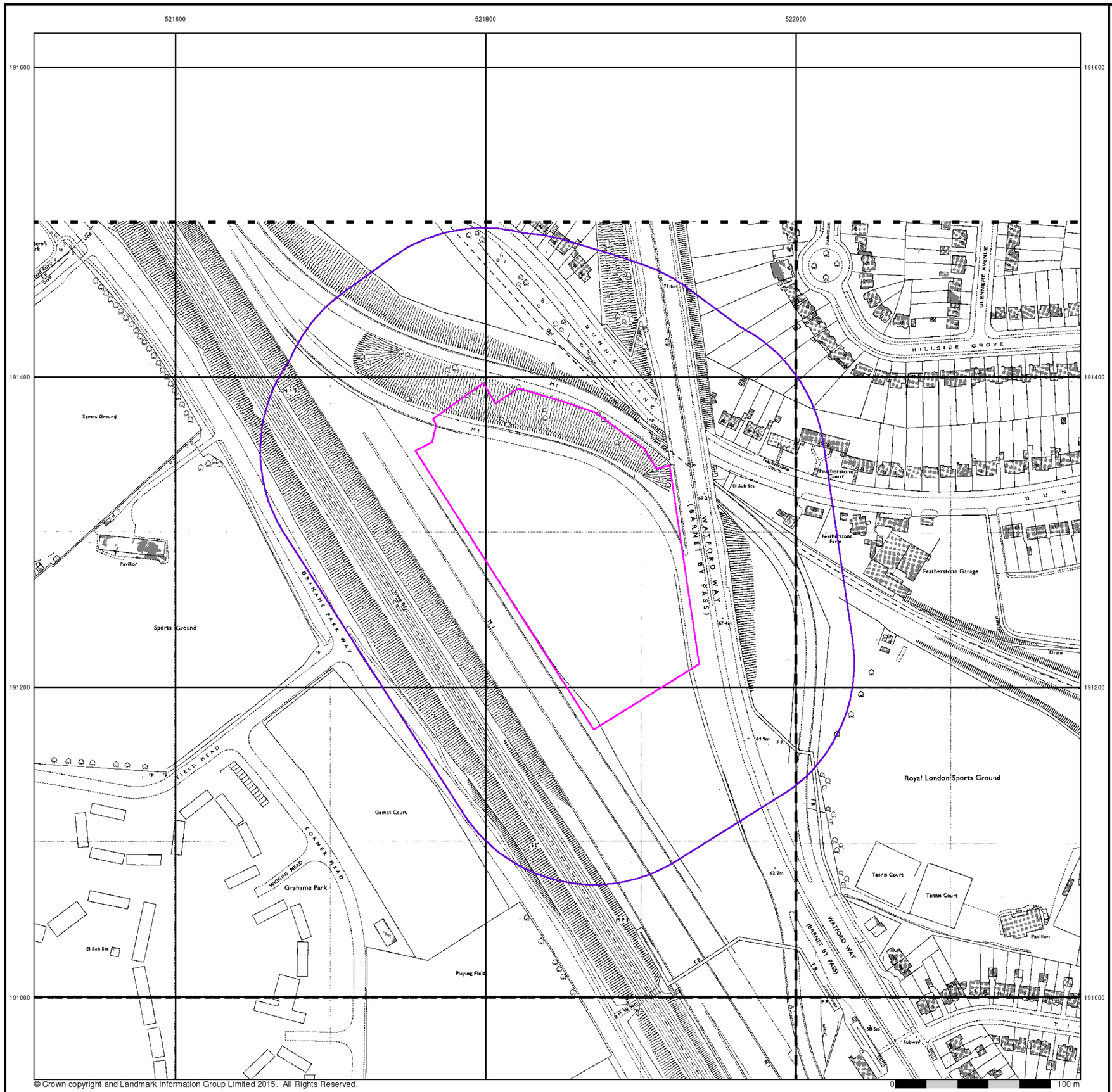

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Ordnance Survey Plan

Published 1971 - 1975

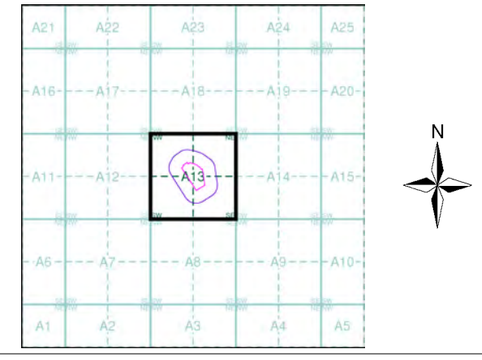
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

TQ2191SE 1975 1:1,250	TQ2291SW 1971 1:1,250
TQ2190NE 1975 1:1,250	TQ2290NW 1972 1:1,250

Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
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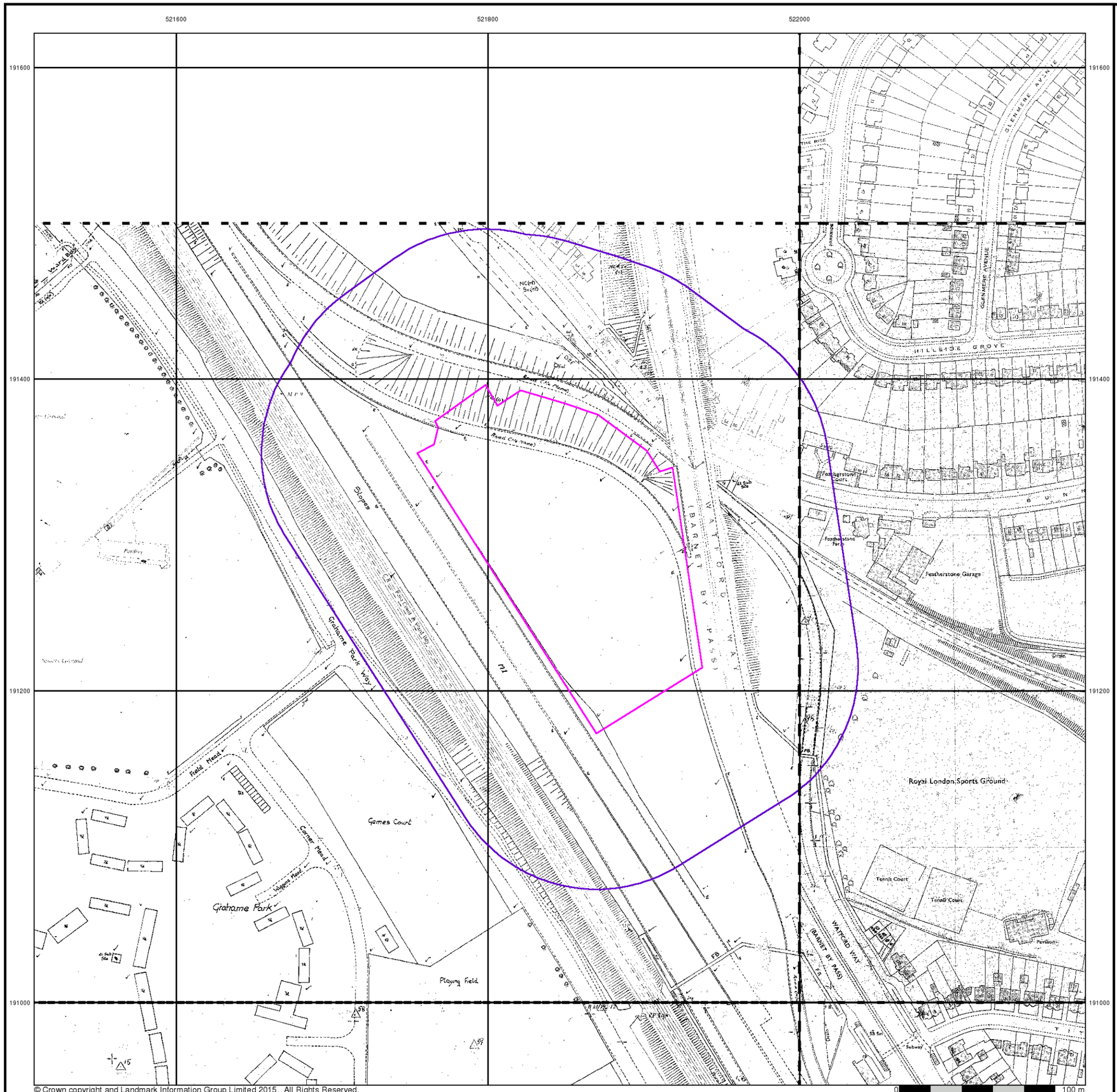

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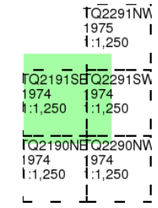
Supply of Unpublished Survey Information

Published 1974 - 1975

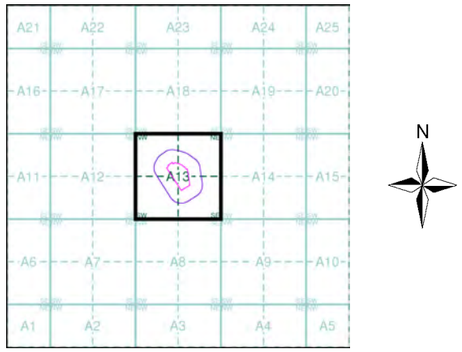
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

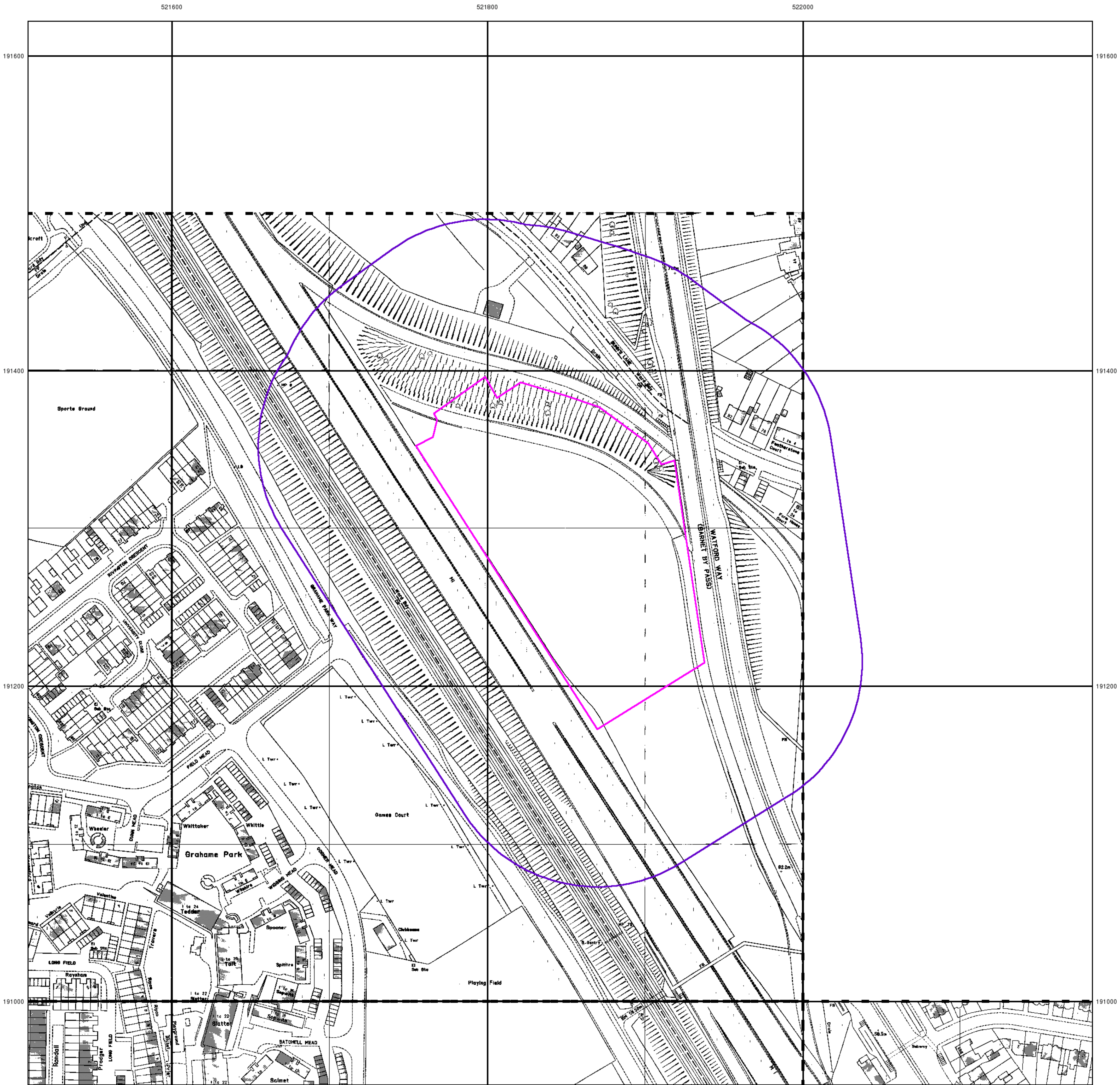
Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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



Envirocheck®

Ordnance Survey Plan

Published 1980 - 1986

Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

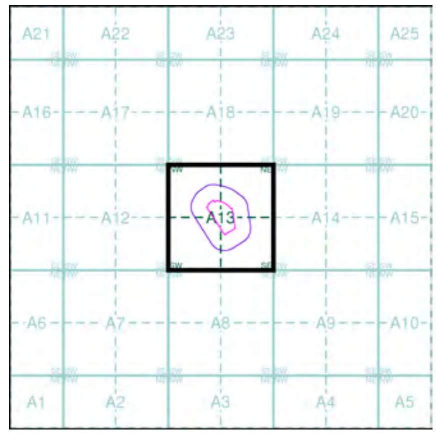
Map Name(s) and Date(s)

TQ2191SE
1983
1:1,250

TQ2190NE
1986
1:1,250

TQ2290NW
1980
1:1,250

Historical Map - Segment A13



N

Order Details

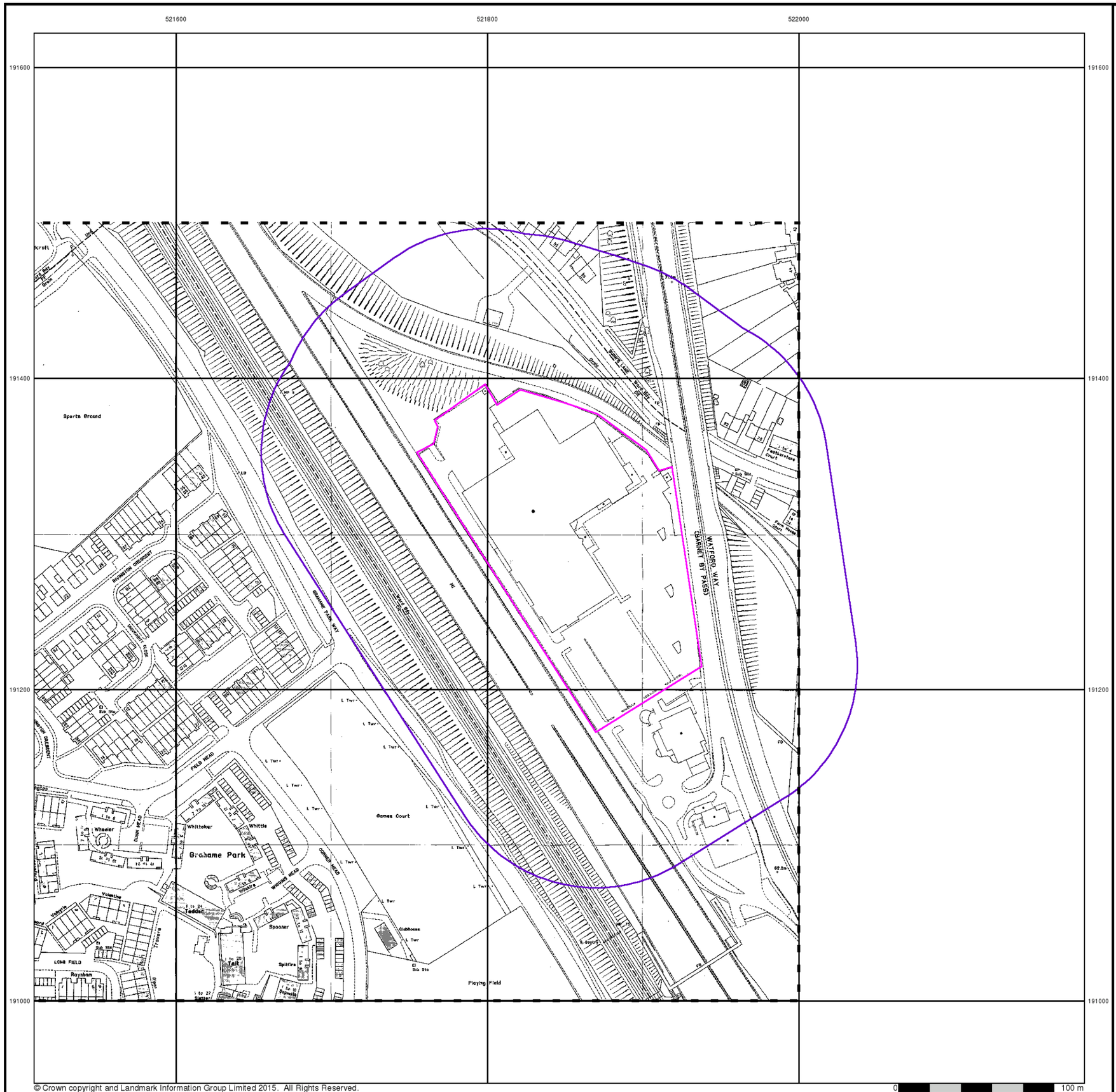
Order Number: 64920000_1_1
Customer Ref: 15.02.014
National Grid Reference: 521850, 191290
Slice: A
Site Area (Ha): 2.35
Search Buffer (m): 100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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



0 100 m

Envirocheck®

Additional SIMs

Published 1990

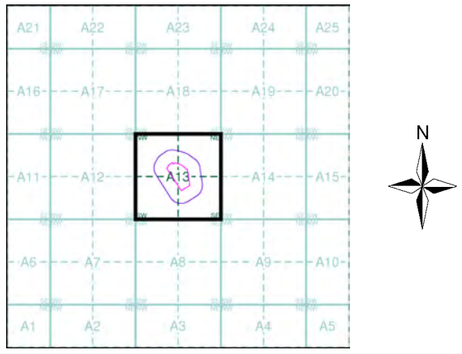
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TQ2191SE
1990
1:1,250

Historical Map - Segment A13



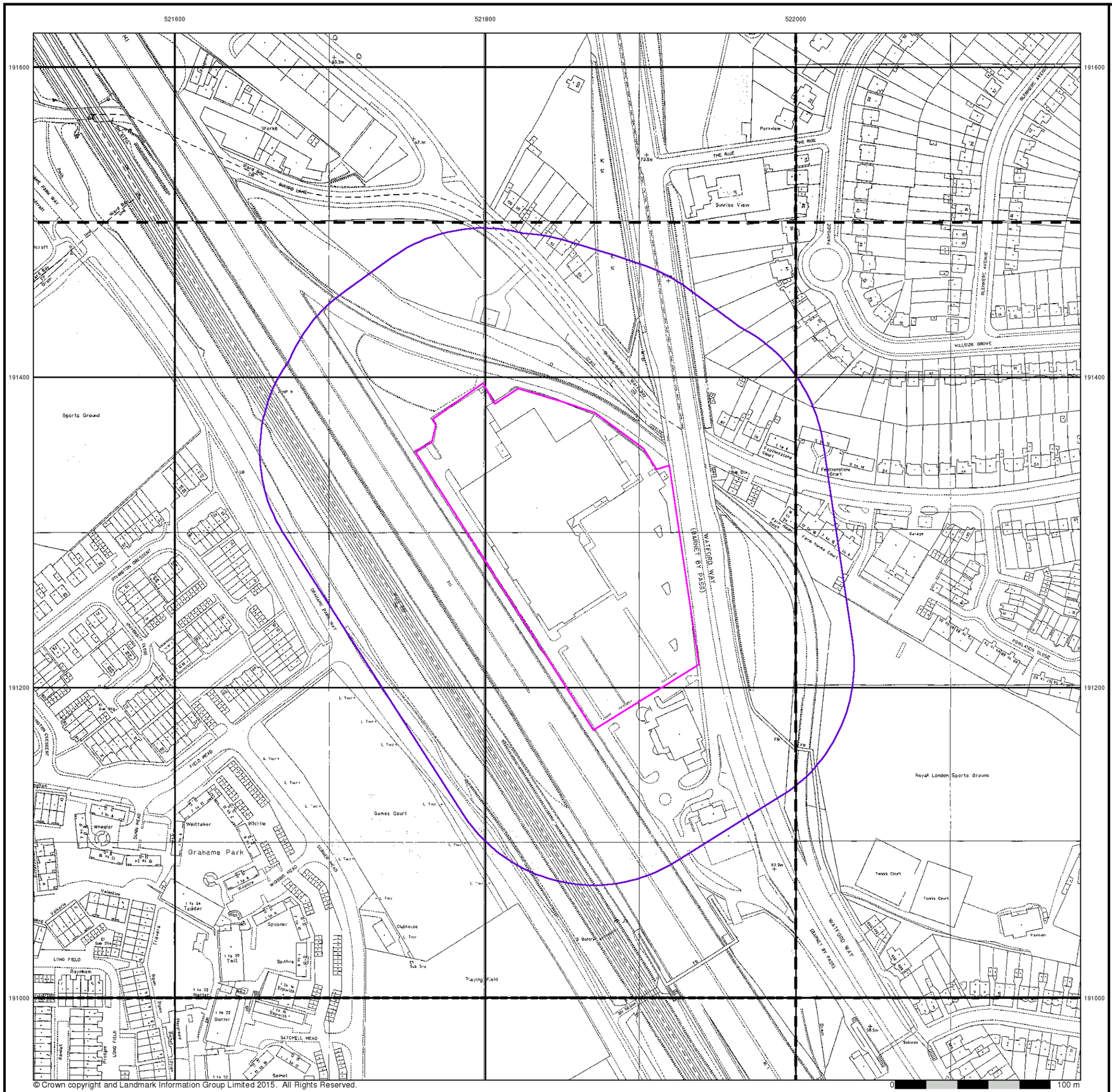
Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

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



Envirocheck®

Large-Scale National Grid Data

Published 1991

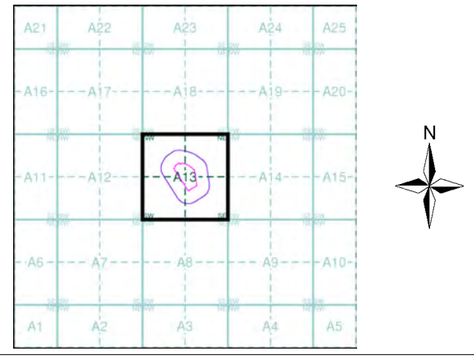
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TQ2191NE 1991 1:1,250	TQ2291NW 1991 1:1,250
TQ2191SE 1991 1:1,250	TQ2291SW 1991 1:1,250
TQ2190NE 1991 1:1,250	TQ2290NW 1991 1:1,250

Historical Map - Segment A13



Order Details

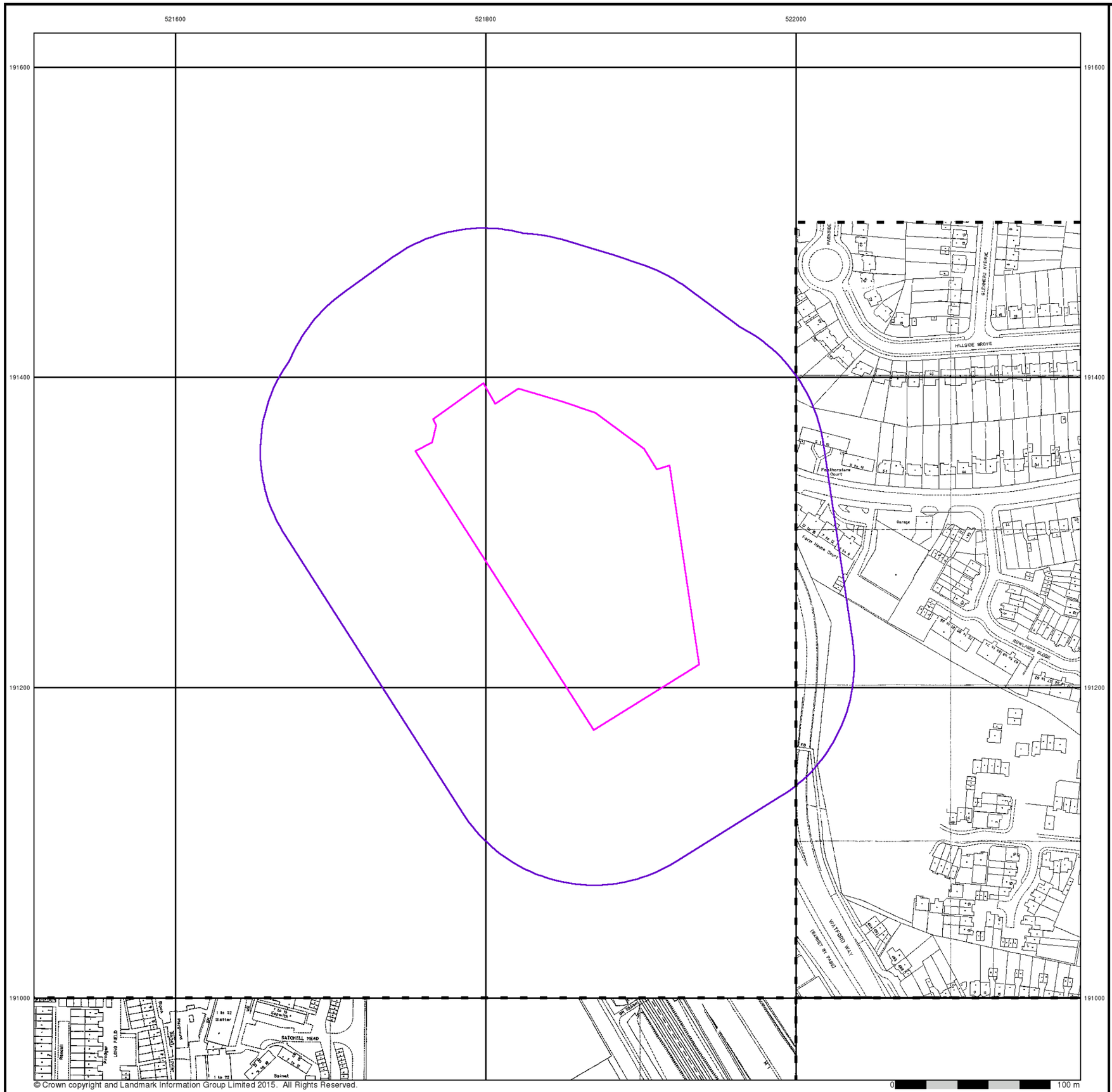
Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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



Envirocheck®

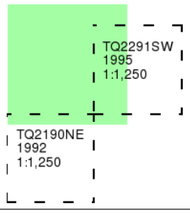
Large-Scale National Grid Data

Published 1992 - 1995

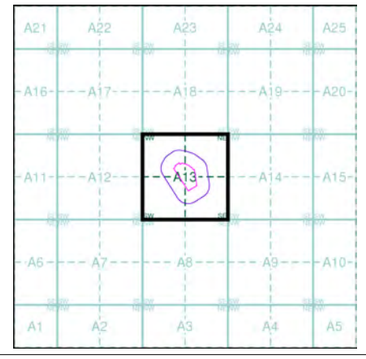
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

Tel: 0844 844 9952
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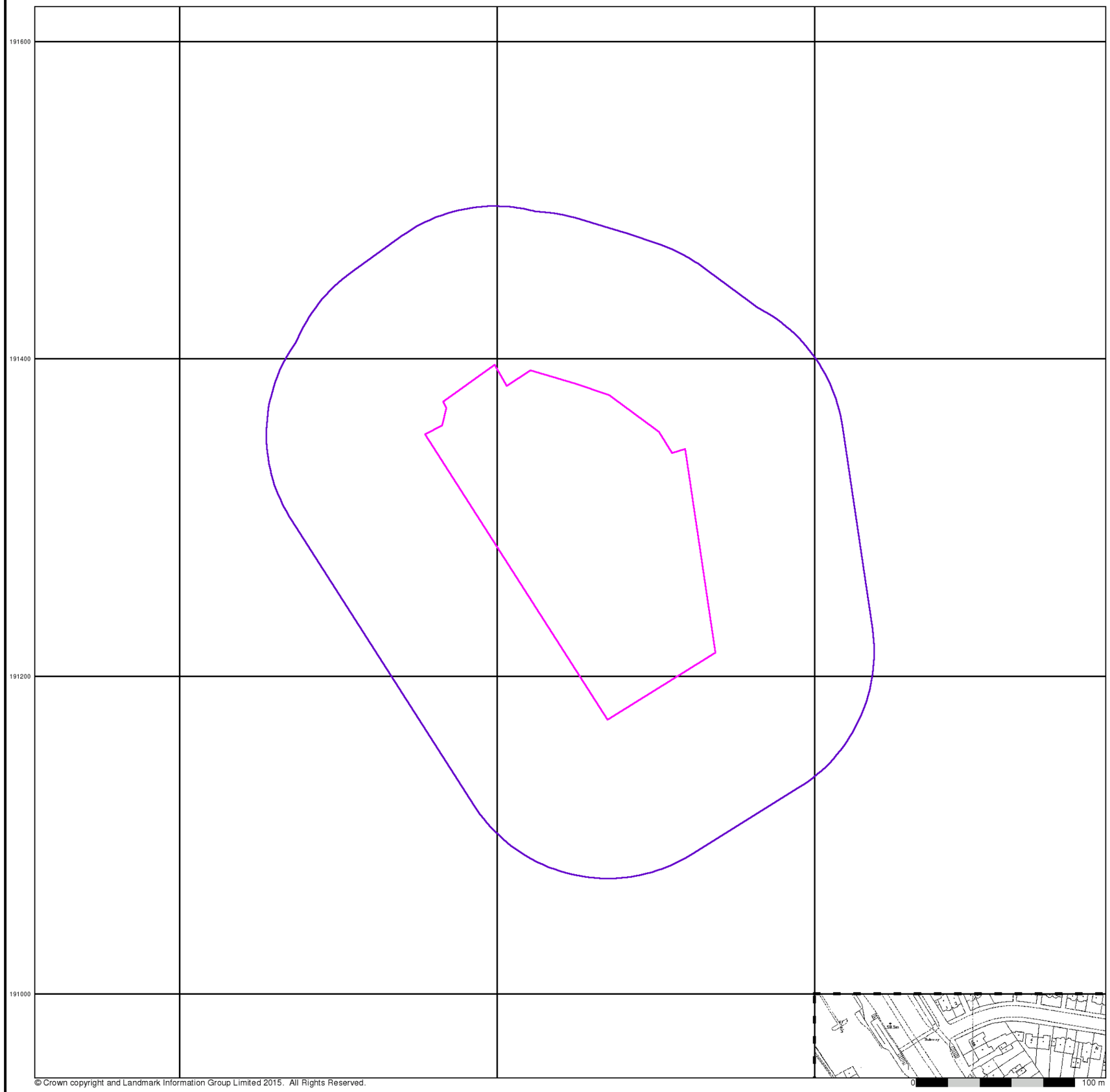


Envirocheck®

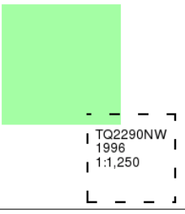
Large-Scale National Grid Data

Published 1996

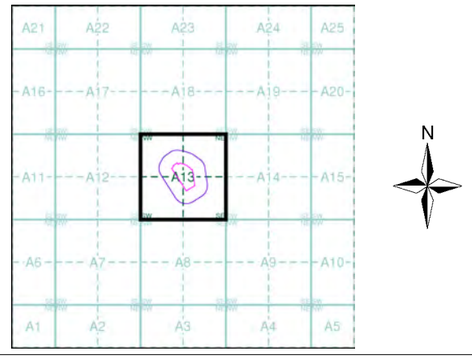
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

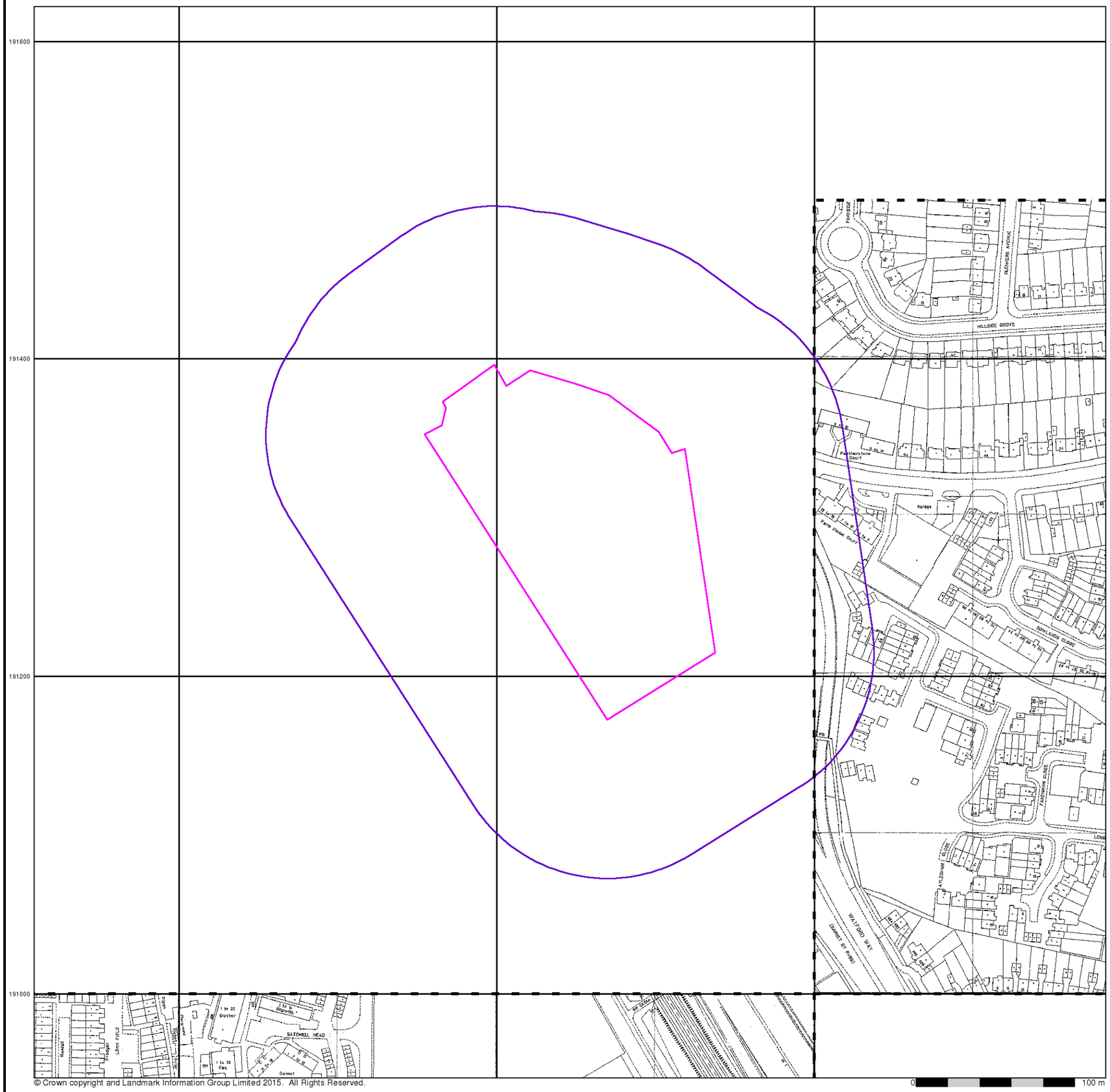
Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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



Envirocheck®

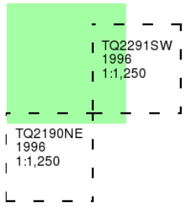
Large-Scale National Grid Data

Published 1996

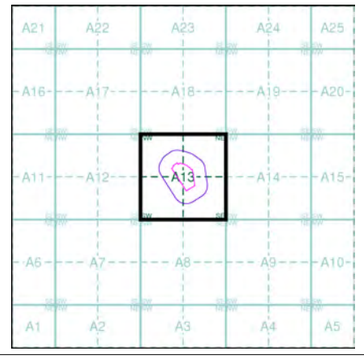
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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

Envirocheck®

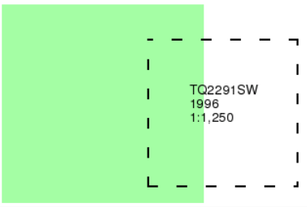
Large-Scale National Grid Data

Published 1996

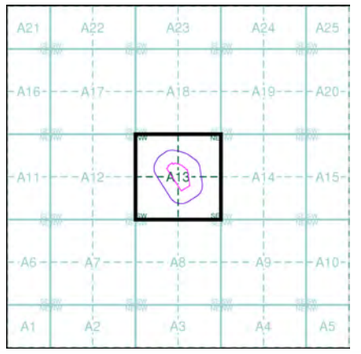
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	64920000_1_1
Customer Ref:	15.02.014
National Grid Reference:	521850, 191290
Slice:	A
Site Area (Ha):	2.35
Search Buffer (m):	100

Site Details

Homebase Ltd, Pentavia Retail Park, Watford Way, LONDON, NW7 2ET

Landmark Information Group

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

APPENDIX H
DATE FROM PREVIOUS INVESTIGATION REFERNCE 15.02.014

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Client/client ref: CPC
Project ref: 15.02.014
Site ref: Pentavia Park, Mill Hill
Data description: Soil
Contaminant(s): Lead
Test scenario: Planning
Date: 27 March 2016
User details: LC

	Lead (mg/kg)									
Critical concentration, C_c	**200**									
Notes										
Sample size, n	6	0	0	0	0	0	0	0	0	0
Sample mean, $\overline{X}$	107.5	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Standard deviation, s	68.4097946									
Number of non-detects	0									
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	No									
Distribution	Normal									
Statistical approach	Auto: One-sample t-	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto

Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?				**Evidence level required:**		95%	Use Normal distribution to test for outliers		
t statistic, t_0 (or k_0)	-3.312066678									
Upper confidence limit (on true mean concentration, μ)	163.776637									
Evidence level	**99%**									
Base decision on:	evidence level									
Result	**μ < Cc**									
Select dataset	◉ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y

Back to data | **Go to outlier test** | **Go to normality test** | **Show individual summary**

HazWasteOnline™

Waste Classification Report

P9G3W-R6SLS-TXNJP

Job name

15.02.014 Mill Hill

Waste Stream

Listers Suite 6 PAH in CAS order and no pH

Comments

Project

Site

Classified by

Name:
Plant, Andrew
Date:
10/04/2015 08:15
Telephone:
01327 860060

Company:
Listers Geotechnical Consultants
Slapton Hill Barn, Blakesley Road
Slapton,
Towcester
NN12 8QD

Report

Created by: Plant, Andrew
Created date: 10/04/2015 08:15

Job summary

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

Final Report

Report Number:	15-05257 Issue-1
Initial Date of Issue:	11-Mar-2015
Client:	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Lee Chippington
Project:	15.02.014/777 - Mill Hill
Quotation No.:	
Order No.:	15.02.014
No. of Samples:	2
Turnaround: (Wkdays)	3
Date Approved:	11-Mar-2015
Approved By:	
Details:	Keith Jones, Technical Manager

Date Received:	09-Mar-2015
Date Instructed:	09-Mar-2015
Results Due Date:	11-Mar-2015

Results Summary - Soil

Project: 15.02.014/777 - Mill Hill

Client: Listers Geotechnical Consultants			**Chemtest Job No.:**		15-05257	15-05257
Quotation No.:			**Chemtest Sample ID.:**		112324	112325
Order No.: 15.02.014			Client Sample Ref.:			
			Client Sample ID.:		TP5	TP6
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.5	0.5
			Bottom Depth(m):		0.7	
			Date Sampled:		04-Mar-15	04-Mar-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192			-	Fibres/Clumps
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Chrysotile
Moisture	N	2030	%	0.02	16	19
Stones	N	2030	%	0.02	< 0.020	< 0.020
Boron (Hot Water Soluble)	U	2120	mg/kg	0.4	0.96	0.67
Arsenic	U	2450	mg/kg	1	20	18
Cadmium	U	2450	mg/kg	0.1	0.36	0.20
Chromium	U	2450	mg/kg	1	39	42
Copper	U	2450	mg/kg	0.5	66	50
Mercury	U	2450	mg/kg	0.1	0.62	0.31
Nickel	U	2450	mg/kg	0.5	36	40
Lead	U	2450	mg/kg	0.5	140	100
Selenium	U	2450	mg/kg	0.2	0.22	< 0.20
Zinc	U	2450	mg/kg	0.5	180	150
Chromium (Hexavalent)	N	2490	mg/kg	0.5	< 0.50	< 0.50
TPH >C5-C6	N	2670	mg/kg	1	< 1.0	< 1.0
TPH >C6-C7	N	2670	mg/kg	1	< 1.0	< 1.0
TPH >C7-C8	N	2670	mg/kg	1	< 1.0	< 1.0
TPH >C8-C10	N	2670	mg/kg	1	< 1.0	< 1.0
TPH >C10-C12	N	2670	mg/kg	1	< 1.0	< 1.0
TPH >C12-C16	N	2670	mg/kg	1	< 1.0	< 1.0
TPH >C16-C21	N	2670	mg/kg	1	< 1.0	< 1.0
TPH >C21-C35	N	2670	mg/kg	1	< 1.0	< 1.0
Total TPH >C5-C35	N	2670	mg/kg	10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.1	< 0.10	< 0.10

Results Summary - Soil

Project: 15.02.014/777 - Mill Hill

Client: Listers Geotechnical Consultants			**Chemtest Job No.:**		15-05257	15-05257
Quotation No.:			**Chemtest Sample ID.:**		112324	112325
Order No.: 15.02.014			Client Sample Ref.:			
			Client Sample ID.:		TP5	TP6
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.5	0.5
			Bottom Depth(m):		0.7	
			Date Sampled:		04-Mar-15	04-Mar-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Benzo[a]anthracene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.1	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2	< 2.0	< 2.0

Report Information

Key

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

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

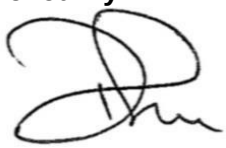
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report Number:	15-05657 Issue-1
Initial Date of Issue:	16-Mar-2015
Client:	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Lee Chippington
Project:	15.02.014/777- Pentavia Retail Park, Mill Hill

Quotation No.:		**Date Received:**	12-Mar-2015
Order No.:	15.02.014	**Date Instructed:**	12-Mar-2015
No. of Samples:	8		
Turnaround: (Wkdays)	3	**Results Due Date:**	16-Mar-2015
Date Approved:	16-Mar-2015		

Approved By:



Details: Darrell Hall, Laboratory Director

Chemtest
The right chemistry to deliver results

Results Summary - Soil

Project: 15.02.014/777- Pentavia Retail Park, Mill Hill

Client: Listers Geotechnical Consultants												
				Chemtest Job No.:	15-05657	15-05657	15-05657	15-05657	15-05657	15-05657	15-05657	15-05657
Quotation No.:				**Chemtest Sample ID.:**	114287	114288	114289	114290	114291	114292	114293	114294
Order No.: 15.02.014				Client Sample Ref.:								
				Client Sample ID.:	BH1B	BH1B	BH1B	BH2	BH2	BH3	BH3	BH3
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.5	4.0	16.0	3.0	6.0	0.8	6.0	11.95
				Bottom Depth(m):								
				Date Sampled:	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192			-			-		-	-	
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected			No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	
Moisture	N	2030	%	0.02	16	14	20	21	19	21	22	23
Stones	N	2030	%	0.02	< 0.020			< 0.020		< 0.020	< 0.020	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.4	1.7			0.90		1.4	1.5	
Total Sulphur	U	2175	%	0.01		0.30	0.30		1.5			0.26
Sulphate (Total)	U	2430	%	0.01		1.1	1.1		2.5			1.0
Arsenic	U	2450	mg/kg	1	19			15		18	16	
Cadmium	U	2450	mg/kg	0.1	0.34			< 0.10		0.18	< 0.10	
Chromium	U	2450	mg/kg	1	28			26		33	29	
Copper	U	2450	mg/kg	0.5	40			27		42	30	
Mercury	U	2450	mg/kg	0.1	0.23			0.14		0.30	0.38	
Nickel	U	2450	mg/kg	0.5	28			35		42	32	
Lead	U	2450	mg/kg	0.5	210			29		130	36	
Selenium	U	2450	mg/kg	0.2	< 0.20			0.25		< 0.20	< 0.20	
Zinc	U	2450	mg/kg	0.5	110			82		98	78	
Chromium (Hexavalent)	N	2490	mg/kg	0.5	< 0.50			< 0.50		< 0.50	< 0.50	
TPH >C5-C6	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
TPH >C6-C7	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
TPH >C7-C8	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
TPH >C8-C10	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
TPH >C10-C12	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
TPH >C12-C16	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
TPH >C16-C21	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
TPH >C21-C35	N	2670	mg/kg	1	< 1.0			< 1.0		< 1.0	< 1.0	
Total TPH >C5-C35	N	2670	mg/kg	10	< 10			< 10		< 10	< 10	
Naphthalene	U	2700	mg/kg	0.1	< 0.10			< 0.10		< 0.10	< 0.10	
Acenaphthylene	U	2700	mg/kg	0.1	< 0.10			< 0.10		0.15	< 0.10	
Acenaphthene	U	2700	mg/kg	0.1	< 0.10			0.17		0.18	< 0.10	
Fluorene	U	2700	mg/kg	0.1	< 0.10			0.11		0.39	< 0.10	
Phenanthrene	U	2700	mg/kg	0.1	< 0.10			1.0		3.6	< 0.10	
Anthracene	U	2700	mg/kg	0.1	< 0.10			0.20		0.79	< 0.10	

Results Summary - Soil

Project: 15.02.014/777- Pentavia Retail Park, Mill Hill

Client: Listers Geotechnical Consultants												
			Chemtest Job No.:		15-05657	15-05657	15-05657	15-05657	15-05657	15-05657	15-05657	15-05657
Quotation No.:			**Chemtest Sample ID.:**		114287	114288	114289	114290	114291	114292	114293	114294
Order No.: 15.02.014			Client Sample Ref.:									
			Client Sample ID.:		BH1B	BH1B	BH1B	BH2	BH2	BH3	BH3	BH3
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	4.0	16.0	3.0	6.0	0.8	6.0	11.95
			Bottom Depth(m):									
			Date Sampled:		06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15	06-Mar-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Fluoranthene	U	2700	mg/kg	0.1	0.56			1.4		3.5	0.40	
Pyrene	U	2700	mg/kg	0.1	0.80			1.4		3.2	0.59	
Benzo[a]anthracene	U	2700	mg/kg	0.1	0.12			0.40		0.81	< 0.10	
Chrysene	U	2700	mg/kg	0.1	0.38			0.54		1.0	< 0.10	
Benzo[b]fluoranthene	U	2700	mg/kg	0.1	0.35			0.60		1.4	< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.1	0.20			0.18		0.66	< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.1	0.16			0.23		0.77	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.1	< 0.10			< 0.10		< 0.10	< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.1	< 0.10			< 0.10		< 0.10	< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.1	< 0.10			< 0.10		< 0.10	< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2	2.6			6.2		17	< 2.0	

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Sample Deviation Codes

A - Date of sampling not supplied
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D - Broken Container

Sample Retention and Disposal

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

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

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

Final Report

Report Number:	15-05902 Issue-1
Initial Date of Issue:	25-Mar-2015
Client:	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Lee Chippington
Project:	15.02.014/777 - Mill Hill
Quotation No.:	
Order No.:	15.02.014
No. of Samples:	1
Turnaround: (Wkdays)	3
Date Approved:	25-Mar-2015
Approved By:	
Details:	Keith Jones, Technical Manager

Date Received:	16-Mar-2015
Date Instructed:	16-Mar-2015
Results Due Date:	18-Mar-2015

Results Summary - Soil

Project: 15.02.014/777 - Mill Hill

Client: Listers Geotechnical Consultants			**Chemtest Job No.:**		15-05902
Quotation No.:			**Chemtest Sample ID.:**		115595
Order No.: 15.02.014			Client Sample Ref.:		
			Client Sample ID.:		TP6
			Sample Type:		SOIL
			Top Depth (m):		0.5
			Bottom Depth(m):		
			Date Sampled:		04-Mar-15
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192			Fibres/Clumps
Asbestos Identification	U	2192	%	0.001	Chrysotile
Asbestos by Gravimetry	U	2192	%	0.001	<0.001
Total Asbestos	N	2192	%	0.001	<0.001

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customerservices@chemtest.co.uk

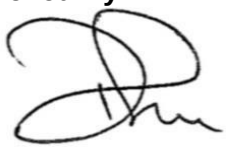
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report Number:	15-05254 Issue-1
Initial Date of Issue:	13-Mar-2015
Client:	Listers Geotechnical Consultants
Client Address:	Slapton Hill Barn, Blakesley Road Slapton Towcester Northamptonshire NN12 8QD
Contact(s):	Lee Chippington
Project:	15.02.014/777 - Mill Hill
Quotation No.:	
Order No.:	15.02.014
No. of Samples:	1
Turnaround: (Wkdays)	5
Date Approved:	13-Mar-2015

Date Received:	09-Mar-2015
Date Instructed:	09-Mar-2015
Target Due Date:	11-Mar-2015
Results Due Date:	13-Mar-2015

Approved By:



Details: Darrell Hall, Laboratory Director

Results Summary - 2 Stage WAC

Project: 15.02.014/777 - Mill Hill

Chemtest Job No: 15-05254 Chemtest Sample ID: 112284 Sample Ref: Sample ID: TP5 Top Depth(m): 0.5 Bottom Depth(m): 0.7 Sampling Date: 04-Mar-2015							Landfill Waste Acceptance Criteria Limits		
							Inert Waste Landfill	Stable Non-reactive Hazardous waste in non-hazardous	Hazardous Waste Landfill
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.96	3	5	6
Loss on Ignition	2610	U	%			3.2	--	--	10
Total BTEX	2760	U	mg/kg			< 0.01	6	--	--
Total PCBs (7 congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (of 17) PAHs	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.089	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
Arsenic	1450	U	0.002	0.002	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.017	0.008	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.0005	< 0.0001	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.001	< 0.001	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.006	0.002	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.0005	< 0.0005	< 0.001	< 0.005	0.01	0.2	2
Molybdenum	1450	U	0.017	0.004	< 0.050	0.051	0.5	10	30
Nickel	1450	U	< 0.001	< 0.001	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.001	0.005	< 0.010	0.045	0.5	10	50
Antimony	1450	U	0.003	< 0.001	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.002	< 0.001	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.001	0.01	< 0.50	< 0.50	4	50	200
Chloride	1220	U	16	3	32	42	800	15000	25000
Fluoride	1220	U	0.63	0.3	1.2	3.3	10	150	500
Sulphate	1220	U	35	7.6	69	100	1000	20000	50000
Total Dissolved Solids	1020	N	220	77	430	900	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	N	47	12	93	150	500	800	1000

Soild Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.319
Leachant volume 2nd extract/l	1.4
Eluant recovered from 1st extract/l	0.16

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