

TFL SITE INVESTIGATIONS: SMALL SITES INITIATIVE LAND AT LONG LANE, BARNET, LONDON, N2 8JP

Geotechnical and Geo-Environmental Desk Study

FEBRUARY 2019

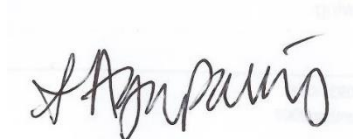


LAND AT LONG LANE, BARNET, LONDON, N2 8JP

Geotechnical and Geo-Environmental Desk Study



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Approver Tony Windsor

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Version	Date	Author	Changes
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02	October 2017	Rojalin Mishra	Final Issue
03	February 2019	Andrew Watts	2019 Update

This report dated 28 February 2019 has been prepared for Transport for London (TfL) (the "Client") in accordance with the terms and conditions of appointment dated 02 May 2017 (the "Appointment") between the Client and **Arcadis Consulting (UK) Limited** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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1 Introduction

1.1 Terms of Reference

Arcadis Consulting (UK) Limited (Arcadis) has been commissioned by Transport for London (TfL) 'the Client' to undertake a Geotechnical and Geo-Environmental desk study report for a Site located on Long Lane, in Barnet, London N2 8JP ('the Site').

TfL is aiming to divest a number of small sites to enable positive regeneration. The objective of this review is to identify potential development constraints due to geotechnical and geo-environmental conditions on Site based on the findings of this desk study.

The objectives of this review are to:

- Review geo-environmental information regarding the Site and its surrounding area; and
- Provide outline information on potential geo-environmental and geotechnical constraints which may impact on the land value or redevelopment potential for the site.

The site location is shown in Figure 1 below.



Figure 1: Site Location Plan provided by TfL

1.2 Sources of Information

As part of this desk study report various sources of information have been used and are detailed below:

- The on-line British Geological Survey (BGS) 1:50 000 scale geological map comprising the Site (Ref. 1);
- Historical borehole records available through BGS website and viewed;
- Historical Ordnance Survey maps (included in Appendix A);
- Groundsure datasheets (GeolInsight and EnviroInsight) in Appendix B;
- The Environment Agency (EA) What's in Your Backyard Website (Ref. 2);
- Google maps (Ref. 3);
- Zetica Regional Unexploded Ordnance Map (Appendix C); and
- National Archives (www.bombsight.org) (Ref. 4).
-

1.3 Limitations and Expectations

This report has been prepared for the Client in accordance with the terms and conditions of appointment. Arcadis cannot accept any responsibility for any use of or reliance on the contents of this report by any third party. The copyright of this document, including the electronic format shall remain the property of Arcadis.

This report has been compiled from a number of sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. The report is based on information available at the time. Consequently, there is a potential for further information to become available, which may change this report's conclusion and for which Arcadis cannot be responsible.

2 Site Setting and History

2.1 Site Location

Table 2.1 Details relating to Site Location

Site Location / Address	Long Lane, Barnet, London, N2 8JP
National Grid Reference	526207, 190250
Approximate Site Area	The Site is rectangular and covers an area of approximately 0.04 hectares.
Description of Site	The site is a vacant open space overgrown with trees and shrubs.
Topography	The Site is assumed to be relatively level.
Surrounding Area	<p>The Site is located within a largely residential area of Barnet surrounded by housing with local amenities and parks.</p> <p>To the north is North Circular Road with Long Lane Pastures (open space) and Finchley (A39) Fire Station beyond. To the east is Long Lane with residential properties beyond; Long Lane extends below the North Circular Road to the north. To the south are further residential properties fronting onto Long Lane and to the west/south-west is further open space and houses and approximately 150m west is the overground section of the Northern Line Underground.</p>

2.2 Site History

A review of the available historical Ordnance Survey maps (Appendix A) has been undertaken to assess the historical development of the Site and surrounding areas.

It is not the intention of this report to provide a full history, but to identify those past uses on and within the vicinity of the Site that could have resulted in contamination of the soils and/or waters. Significant changes to the land use of the Site and surrounding areas are summarised in Table 2.2 below.

Table 2.2 History of Site and Surrounding Area

Date	Historical Development (Site and Surrounding Area)
1863-1864	<p>The maps show the Site and immediate surrounding area are largely undeveloped fields / wooded areas with Long Lane present along the eastern boundary running in a north-western to south-eastern direction.</p> <p>Green Lane runs roughly southwest to northeast approximately 90m to the south with Green Lane Cottage approximately 200m south-west of the Site. There is a small watercourse / stream near to the Site approximately 10m north (at its closest) and 50m south is a footpath. Two small ponds (west and south-east) are also noted within 200m of the Site. By 1964, the Edgware Highgate and London Line had established running south-east to north-west approximately 150m to the west of the Site.</p>
1896	<p>The map shows a property had developed within the Site as part of the row of houses on Rochester Terrace (to the south fronting onto Long Lane). Elsewhere, other properties including Manor Cottages approximately 40m south-west of the Site had developed.</p>

Date	Historical Development (Site and Surrounding Area)
	Further away, Alexandra Villas are shown approximately 100m north of the Site and further row houses are shown approximately 180-250m south of the Site and beyond. A footbridge over railway is shown approximately 130m northwest.
1913-1914	<p>The map shows that the row of houses (Rochester Terrace) extended into the northern part with 3 houses are now recorded within the Site. The row of houses continued northerly to meet the southern side of the watercourse approximately 10m north. Residential expansion is also noted within 50m of the Site on Long Lane, Chamberlain Road, Richmond Road and Brighton Road (100-200m south).</p> <p>A large nursery had developed approximately 120m northwest of the Site.</p>
1935-1936	<p>The map shows the North Circular Road on an embankment had developed by this time approximately 10m north of the Site running east-west; it crosses over the railway line approximately 150m west of the Site. At this time, the North Circular and Long Lane meet at a 'T' Junction.</p> <p>In the surrounding area, a fire station had developed on the northern side of the North Circular (approximately 80m north), allotment gardens are shown approximately 80m north-west, 100-110m east and southeast of the Site. A motor accessory works is shown approximately 120m southeast. The wider mapping shows the general expansion of residential areas of Barnet.</p>
1951-1954	<p>The map shows the layout of 6 northern most properties of Rochester Terrace to have altered; it is not clear whether the properties were extended or have been demolished and re-built.</p> <p>No other significant changes are noted on-site or in the immediate vicinity.</p>
1967-1968	No significant changes are noted on-site or in the immediate vicinity. However, the fire station is shown to be developed into a Fire Brigade Training School and Fire Station and the allotment gardens east and south-east are no more shown on the map, having been developed into Vale Farm House, low rise flats and Drummond House.
1969	No significant changes are noted on-site or in the immediate vicinity.
1981, 1987	<p>No significant changes are noted on-site, however a cluster of terraced houses and residential properties are shown to have been developed immediately east of the Site.</p> <p>By 1987, the structure previously occupied by the motor accessory works approximately 120m away had expanded but its use is no longer stated.</p>
2002, 2010, 2014, 2019	<p>The 2002 map (1:10,000 scale) shows the Site and surrounding area roughly in its current day layout. The properties within the Site had been demolished. The property north of the Site had been demolished to allow for the re-configuration of the North Circular which is now located on a flyover along the northern boundary, with Long Lane extending below the North Circular. Much of the surrounding area is residential and the former motor accessory works building had also been redeveloped into properties by this time.</p> <p>No significant changes are noted on the 2010 and 2014 maps within the Site or immediate surrounding area.</p>

Date	Historical Development (Site and Surrounding Area)
	The 2019 Google satellite imagery records no significant changes to the site or immediate surrounding area.

2.3 Unexploded Ordnance

With reference to the Zetica Regional Unexploded Bomb Risk of North London (Appendix C), the Site is designated as lying within an area denoted as “low” bomb risk area. Further reference has been made to the National Archives (www.bombsight.org – Ref. 4) which shows high explosive bombs have not been recorded within the close proximity of the Site, the closest is recorded over 1km from the Site at Station Road (north-west) and Church End (north-west).

Therefore, based on the information provided by Zetica and the National Archives, the Site may not have been affected by Second World War bombing.

3 Physical and Environmental Setting

3.1 Published Geology, Hydrogeology and Hydrology

With reference to the sources of information summarised in Section Sources of Information, the following information has been obtained.

Table 3.1 Information regarding geology, hydrogeology and hydrology

Geology / Aquifer Status	<p>Superficial Deposit: Lowestoft Formation (or Lowestoft Till) described as diamicton chalky till together with outwash sand and gravels, silts and clays characterised by chalk and flint content. It is classified as Secondary (Undifferentiated) Aquifer.</p> <p>The Dollis Hill Gravel Member is mapped close to the northern boundary of the Site and could potentially be present within the Site. It is described as sand and gravel, clayey in part with some laminated silty beds and are classified as a Secondary A Aquifer.</p> <p>Solid Geology: London Clay Formation described as clay, silt and sand and are classified as an Unproductive Strata.</p> <p>There are no geological faults recorded within 500m of the Site.</p>
BGS Boreholes (within 100m of the site)	<p>There are no records within the Site. The closest four are located within 75m radius east and west of the Site (TQ29SE148 & TQ29SE44 east and TQ29SE135 & TQ29SE42 west) for the North Circular road.</p> <p>Topsoil was recorded at one location (TQ29SE148) and was 0.3m thick. Made Ground was recorded from the surface in the remaining holes or underlying the Topsoil and was described as firm clay with rubble including brick, flint, coal and chalk in some areas noted as rubble) and ranged between 0.9m and 1.2m thick. The Made Ground was underlain by 'Boulder Clay' (which is likely to be the Lowestoft Formation) comprising firm to stiff mottled grey brown silty sandy clay with stones and chalk fragments. This was underlain by a Glacial Sand and Gravel (likely to be the Dollis Hill Gravel Member) described as a grey brown sand and gravel to depths of between 5.8m (TQ29SE42) and 8.7m (TQ29SE44); the base was not proven in TQ29SE148 as the trial pit terminated at 3m. In the remaining holes, it was in turn underlain by stiff fissured silty clay with partings of sand with occasional claystones, rootlets, selenite and pyrite to the termination of the boreholes at 14.9m to 30.1m.</p> <p>Groundwater was encountered at one location at 8.9m associated with the Dollis Hill Gravel Member.</p>
Within a Source Protection Zone	There are no SPZs recorded within 500m of the Site.
Licensed Groundwater Abstraction Points	There are no groundwater abstraction points noted within 500m of the Site.
Surface Water Feature	N/A
Likely Groundwater Flow Direction	Unknown

3.2 Environmental Public Registers

Public register information from the Groundsure Report (Appendix B) for the Site and the surrounding area (within 250m radius) has been summarised in Table 3.2 below.

It is not the purpose of this section to provide a comprehensive account of the environmental data but only to detail those factors that are or could impact the Site.

Table 3.2. Environmental Data

Data type	Description	Distance (m) and Direction
Radon	The Site is not in a radon affected area, as less than 1% of properties are above the Action Level.	N/A
Landfill sites	None identified within 250m of the Site.	N/A
Current Industrial Data	There are twelve industrial land uses listed within a 250m radius of the Site. Four relate to electricity substations, four are industrial product stores, one fire station, one baking and confectionery facility and two hire services facilities for vehicles and construction tools.	35-240 m east, west, north, southeast and northwest.
Part A(2) and Part B Activities	None are recorded within 250m of the Site.	N/A

The Site and immediate surrounding area have been subject to various phases of redevelopment. Notably the Site has been the subject of redevelopment, therefore, Made Ground is likely to be present within the Site and adjacent to the Site.

4 Preliminary Conceptual Site Model

Geo-environmental assessments are required, in accordance with current regulatory guidance (CIRIA C552 – Ref. 5 and CLR11 – Ref. 6), to consider the significance of potential contamination in terms of plausible contaminant source-pathway-receptor contaminant linkages. As part of this process, it is necessary to develop a conceptual model of these potential contaminant linkages by identifying the potential contamination sources, sensitive receptors and potential exposure pathways. A risk assessment is then undertaken to determine the likelihood and significance of these potentially complete contaminant linkages

4.1 Potential Contaminant Sources

Based on the information obtained from the existing data and information obtained from historical and environmental research and the Site information, there are a number of potential contaminative sources identified on and off-site. These are summarised in Table 4.1 below.

It should be noted that it is considered unlikely that all these substances would be present at significant concentrations within the Site.

Table 4.1: Potential Sources of Contamination On-Site

Source	Potential Contaminants
On Site	
Made Ground associated with redevelopment	Metals, polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPHs), asbestos, ground gas and vapours.
London Clay	Sulphates
Off Site	
Made Ground from redevelopment and realignment of the roads	Metals, PAHs, TPHs, PCBs, asbestos, ground gas and vapours.
Historical uses such as Industrial Tanks, Garage and Motor Vehicle Repair Services	Potential spills and leakage from garage and vehicle servicing within 250m (PAHs, TPHs, vapours)
Electricity substation and local industries/factories	Leakage of oils potentially containing PCBs from the transformers within 250m
Railway	Possible contamination associated with railway such as heavy lubricating oils etc (PAHs, TPHs, vapours)

4.2 Potential Receptors

The proposed land use is currently unknown. As a precautionary approach, the potential receptors detailed below take into consideration the future land use as residential properties with gardens and landscaped areas. It is considered possible that any potential contamination within the soils may be disturbed during the construction phase, or during gardening or landscaping undertaken by any future site users.

4.2.1 Human Health

- Site Users (residents, visitors, maintenance workers and contractors).

Contamination risks to construction workers are not appraised by chronic (long term) exposure human health risk assessments. There are no appropriate published criteria applicable to assessment of potential risks to construction workers. The potential risks should be addressed by a site-specific construction workers risk assessment and implementation of appropriate health and safety measures, to adequately mitigate any potential risks. All works should be conducted in accordance with the CDM Regulations 2015 (Ref. 7) or any other relevant guidance. Construction workers are not considered further in this assessment.

4.2.2 Controlled Waters

- Groundwater beneath the Site – Lowestoft Formation is classified as Secondary (Undifferentiated) Aquifer. The Dollis Hill Gravel Member if present is classified as Secondary A Aquifer,
- There are no surface water features within the vicinity of the Site.
- The Site is not within 500m of a groundwater Source Protection Zone.

4.2.3 Buildings

- Underground structures / services (water pipes, concrete, foundations) including sulphate attack.
- Proposed buildings.
-

4.3 Potential Pathways

Potential pathways are the routes that link the receptor to the contamination. The potential pathways for this Site are summarised in the table below.

Table 4.2: Potential Contaminant Pathways

Receptor	Description
Human Health (residents, visitors and maintenance workers)	Accidental ingestion of contaminants within soil, water and dust Inhalation of dust, vapours and ground gases Dermal contact with contaminants within soil, water and dust Ingestion of contaminated vegetables and soil attached to vegetables
Controlled Waters (Secondary Aquifers)	Leaching of potential contaminants in soil or Made Ground into groundwater Vertical migration of soluble contaminants through the unsaturated zone into groundwater beneath the Site Surface run-off and lateral migration
Buildings	Direct contact of building services or foundations with contaminants in the soil and Made Ground Gas and / or vapour accumulation in confined and poorly ventilated spaces Aerial deposition of windblown dusts / fibres from offsite sources Sulphate attack on buried concrete

4.4 Preliminary Qualitative Risk Assessment

Made Ground is likely to be present which could be a source of contamination including asbestos. Human exposure could occur in future gardens or soft landscaped areas, especially if soils are disturbed by activities such as digging / gardening. Ground gas / vapours could be generated which could accumulate in confined spaces and pose risk to future site users.

Based on the historic use of the Site and surrounding area, gross contamination capable of impacting the built environment is not considered likely to be significant. The risk associated with the electricity substations are not considered to be significant given the distances (closest 82m south-east).

The London Clay is also a source of naturally occurring sulphates which could impact buried concrete.

5 Waste Management and Potential Development Constraints

5.1 Waste Management

Consideration should be given to disposal of waste soils / Made Ground generated by the development. Chemical testing of soils / Made Ground is likely to be required to inform a waste classification assessment and determine the potential disposal options. It should be noted that the waste contractor may require testing of the actual material to be disposed prior to acceptance, and that there is no obligation on a landfill operator to accept the waste.

Soils suspected of being contaminated should be segregated from soils which appear to be 'clean' and should not be used elsewhere on the Site as fill or landscaping unless they can be proven to be fit for purpose.

Imported topsoil for gardens and landscaped areas should be clean, fit for purpose and validated as necessary.

5.2 Potential Development Constraints

The historical review reveals that developments within the Site and surrounding area are generally limited due to the largely residential setting. Within the Site, developments have been limited to residential properties. Therefore, from experience, the potential for the need to undertake remediation should be limited given the Site has not previously been used for industrial or commercial use.

The following potential environmental conditions have been identified that will warrant further consideration and/or implementation:

- Buried obstructions (foundations and services) associated with the former buildings may be present and may require removal prior to redevelopment. Buried services may require removal, protection, diversion or chasing and plugging at the boundary;
- Gross contamination is not anticipated however, provisions should be allowed for the potential for unforeseen contamination (this can be a planning requirement);
- Asbestos protection measures during disturbance of Made Ground (depending on the findings of the ground investigation);
- Provision of gas resistant membrane (depending on the findings of the ground investigation);
- Provision of contaminant resistant water supply pipes (depending on the findings of the ground investigation);
- Sulphate resistant concrete may be required;
- Contaminant resistant water supply pipes may be required;
- Provision of clean cover system in landscaped areas are likely to be required; and
- Design specific ground investigation and consultancy advice to support planning obligations will be required.

6 Geotechnical Considerations

Ground conditions anticipated at the site comprise Made Ground, underlain by the Lowestoft Formation (Till-Diamicton) and in turn by Dollis Hill Gravel Member. The Dollis Hill Gravel Member are mapped close to the site however the BGS borehole logs suggest these may underlie the Lowestoft Formation. The BGS logs also suggest Made Ground is likely to be present and near to the Site is in the region of 1.2m thick.

Potential founding solutions will be dependent on the thickness of Made Ground and the geotechnical properties of the natural deposits. Made Ground is generally considered unsuitable for foundations due to its variable composition and its potential for high total and differential settlement. Below ground structures and services associated may be present and will require removal prior to redevelopment. Ground disturbance caused by the removal of historical structures may increase the thickness of Made Ground already present beneath the site locally. At this stage, conventional shallow foundations maybe appropriate for the site but this would depend on the thickness of the Made Ground and the underlying ground conditions. Deeper trench fill may be possible although the maximum practical extent of this type of foundation is in the region of 2-2.5m. In areas of deeper Made Ground, or where deeper soft / loose bands are recorded either piling or ground treatment e.g. vibro-stone columns should provide a suitable foundation solution. The advice of a specialist ground improvement contractor should be sought to verify the suitability of the ground for treatment.

Consideration will need to be given to the presence of existing trees that are removed, retained or the planting of future trees when considering the depths of the foundations (Ref. 8). In addition, the risks associated with the London Clay include high plasticity clay which are subject to shrinkage and swelling, sulphate attack and the potential for relict shear slip surfaces should considered during the investigation / design. The Lowestoft Formation may also comprise high plasticity clays.

7 Conclusions and Recommendations

The site is a vacant open space overgrown with trees and shrubs, located within a largely residential area of Barnet adjacent to Long Lane. An intrusive site investigation has not been undertaken at this stage, however based upon the historical review Made Ground is anticipated within the Site and surrounding area.

7.1 Design Considerations

Potential risks to human health, controlled waters and the built environment have been identified from potential on site Made Ground and to human health from the off-site sources mentioned above. It is recommended that an intrusive site investigation should be undertaken prior to redevelopment to quantify these risks. This should include for chemical testing of soils, groundwater monitoring and gas monitoring in accordance with CIRIA C665 and CLR11 (Refs. 5 & 6).

7.2 Construction Considerations

During construction works, a watching brief should be undertaken to identify the presence of any unforeseen contamination. If contamination is encountered, all works should cease until the advice of a suitably qualified professional can be sought.

Construction workers should use appropriate PPE and follow the site-specific contractors risk assessment which should include risks to human health from potential contamination. Due to the historic phases of development and demolition, consideration should be given to the presence of asbestos within the Made Ground.

Good site management practices should be adopted during the construction phase such as covering stockpiles to minimise surface runoff/dust creation.

A foundation works risk assessment may be required to assess the risk to the underlying Secondary Aquifer if foundations or piling which penetrate the base of the Made Ground are proposed and contamination is identified.

The Site is located in an area where 'low' risk of encountering unexploded ordnance is present. Further assessment of the potential for encountering UXO may be undertaken and a watching brief for UXO by a qualified professional may be required during the works.

8 References

1. British Geological Survey (BGS) Online Viewer <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>
Accessed August 2017
2. Environment Agency (EA) What's in my backyard http://maps.environment-agency.gov.uk/wiyby/wiybyController?value=E140JP&submit.x=0&submit.y=0&submit=Search%09&lang=_e&ep=map&topic=groundwater&layerGroups=default&scale=9&textonly=off
Accessed August 2017
3. Google maps accessed 17/08/17 <https://www.google.com/maps/@51.5965741,-0.1795809,386m/data=!3m1!1e3>
4. National Archives Bomb Sight <http://www.bombsight.org/#16/51.5966/-0.1748>
5. CIRIA C552, 2001. Contaminated land risk assessment. A guide to good practice.
6. DEFRA and the Environment Agency, 2004. Model Procedures for the Management of Land Contamination, Guidelines for Environmental Risk Assessment and Management, Contaminated Land Report 11 (CLR11).
7. The Construction (Design and Management) Regulations 2015.
8. National House Builders Council (NHBC), March 2007. Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present.

APPENDIX A

Historical Maps

Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1863-1864

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1864
 Revised 1864
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1863
 Revised 1863
 Edition N/A
 Copyright N/A
 Levelled N/A

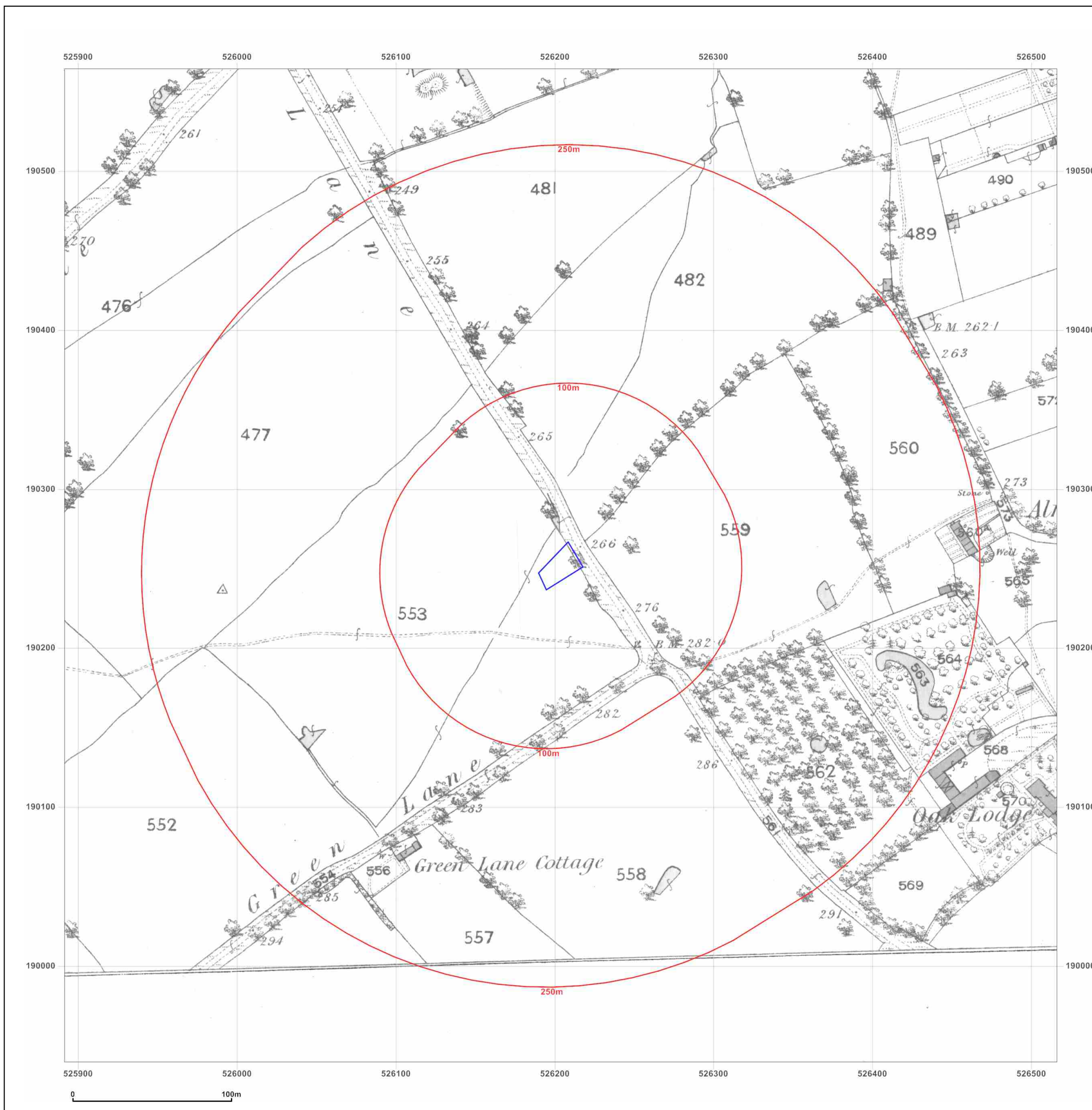


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Production date: 01 August 2017

To view map legend click here [Legend](#)



Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1896

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1896
 Revised 1896
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1896
 Revised 1896
 Edition N/A
 Copyright N/A
 Levelled N/A

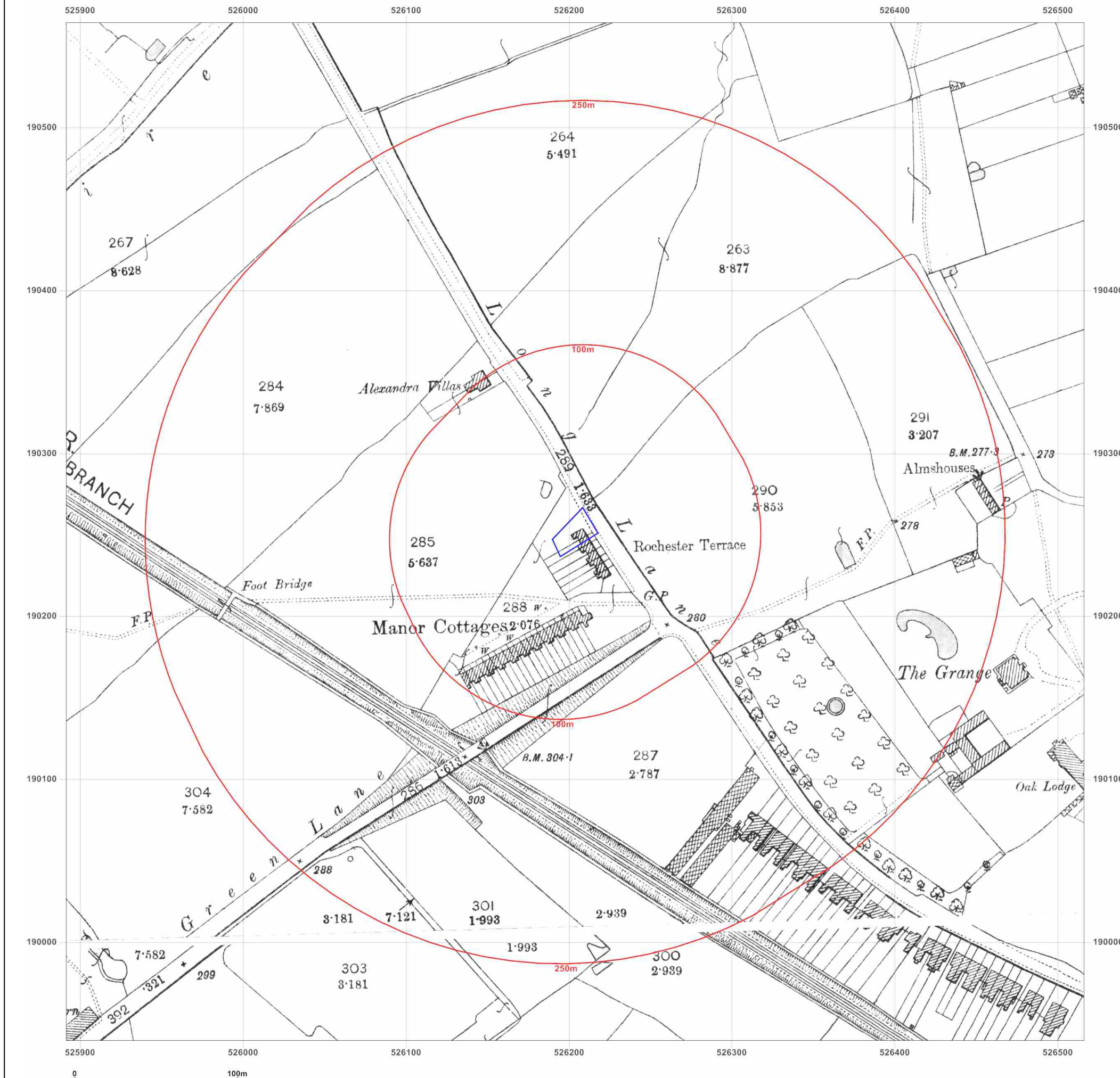


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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1913-1914

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1913
 Revised 1913
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1914
 Revised 1914
 Edition N/A
 Copyright N/A
 Levelled N/A

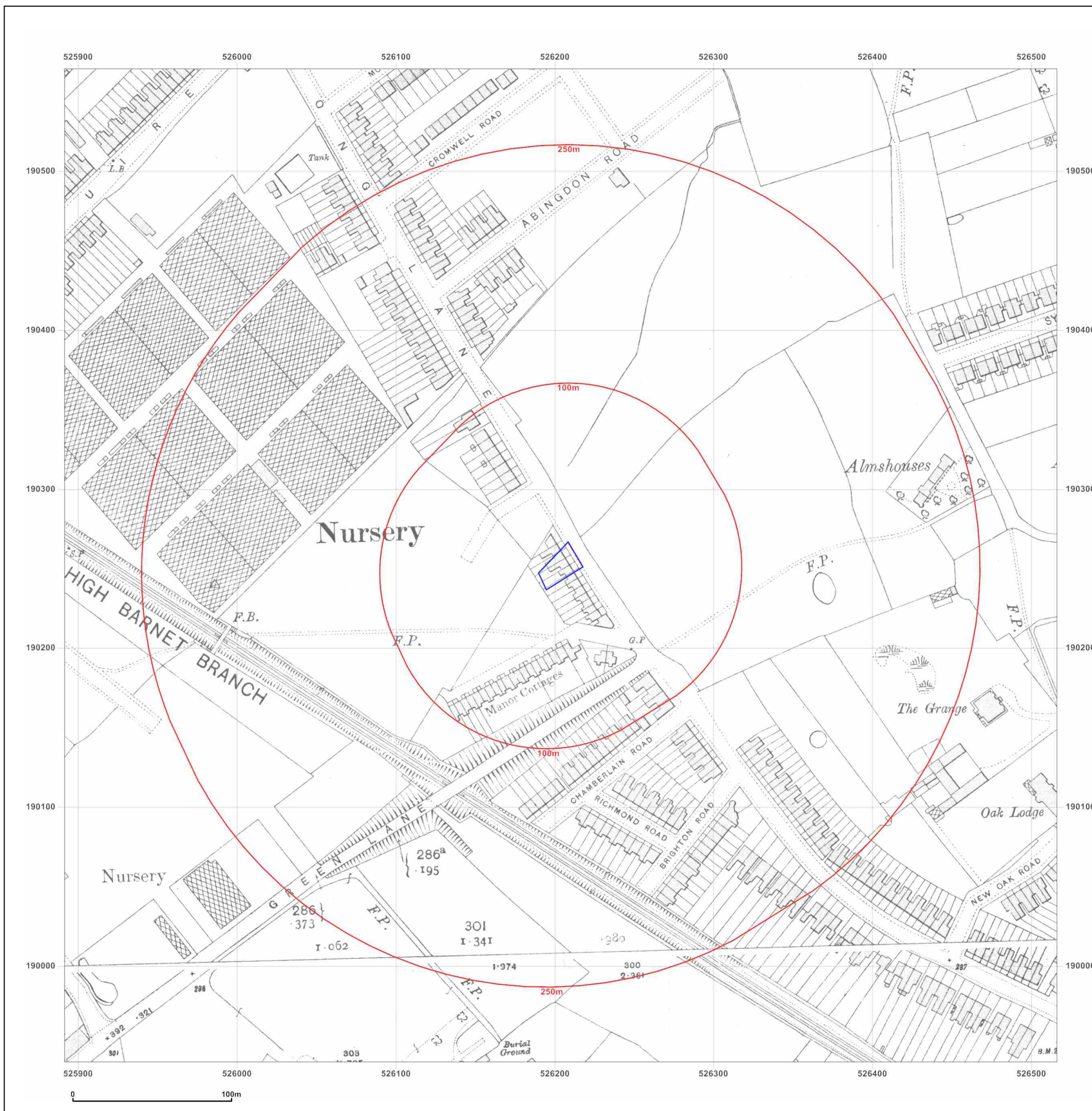


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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1935-1936

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1936
 Revised 1936
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1935
 Revised 1935
 Edition N/A
 Copyright N/A
 Levelled N/A

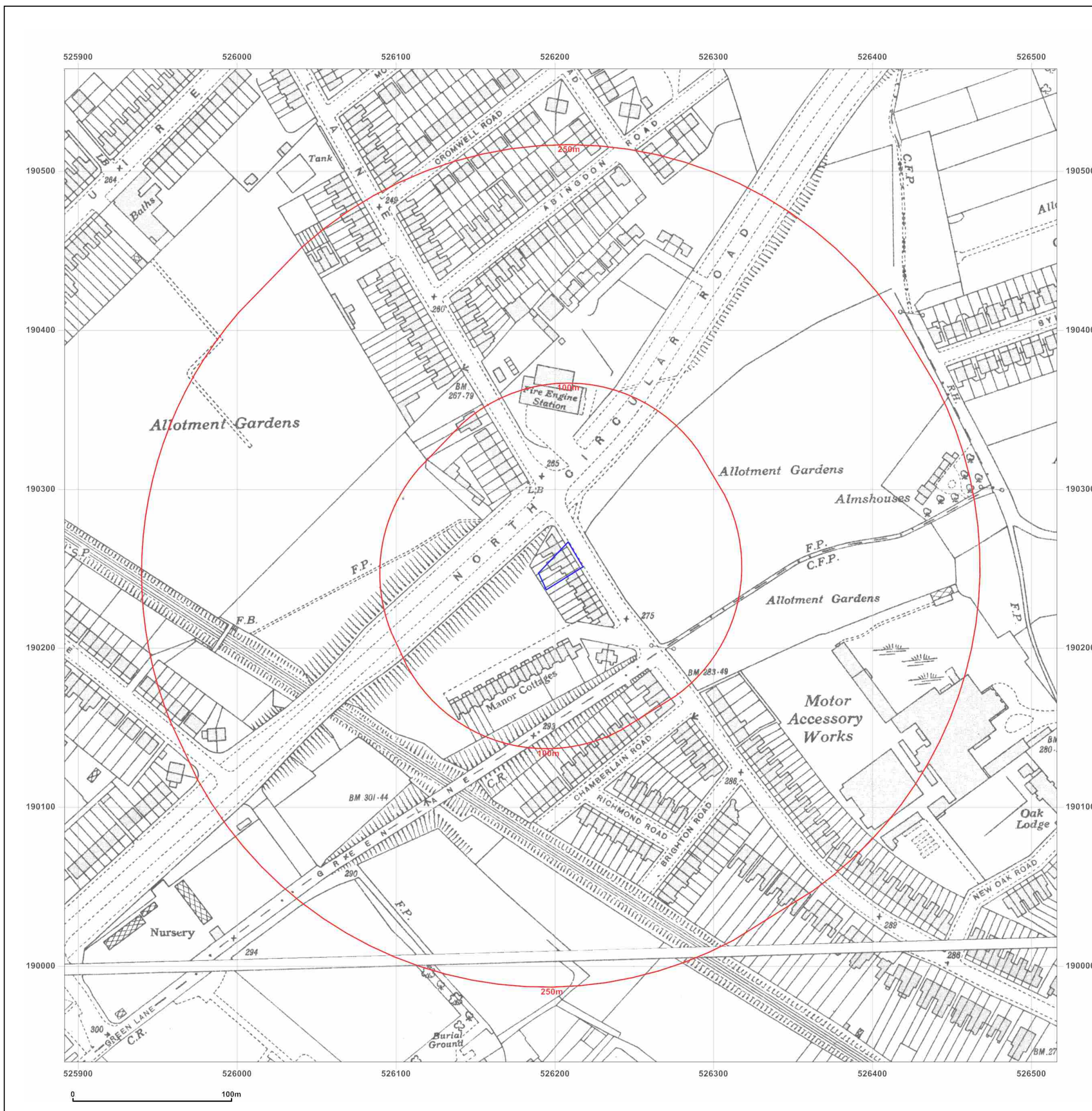


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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1951-1954

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1954
 Revised 1954
 Edition N/A
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 Levelled 1934

Surveyed 1951
 Revised 1951
 Edition N/A
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 Levelled 1934

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 Revised 1954
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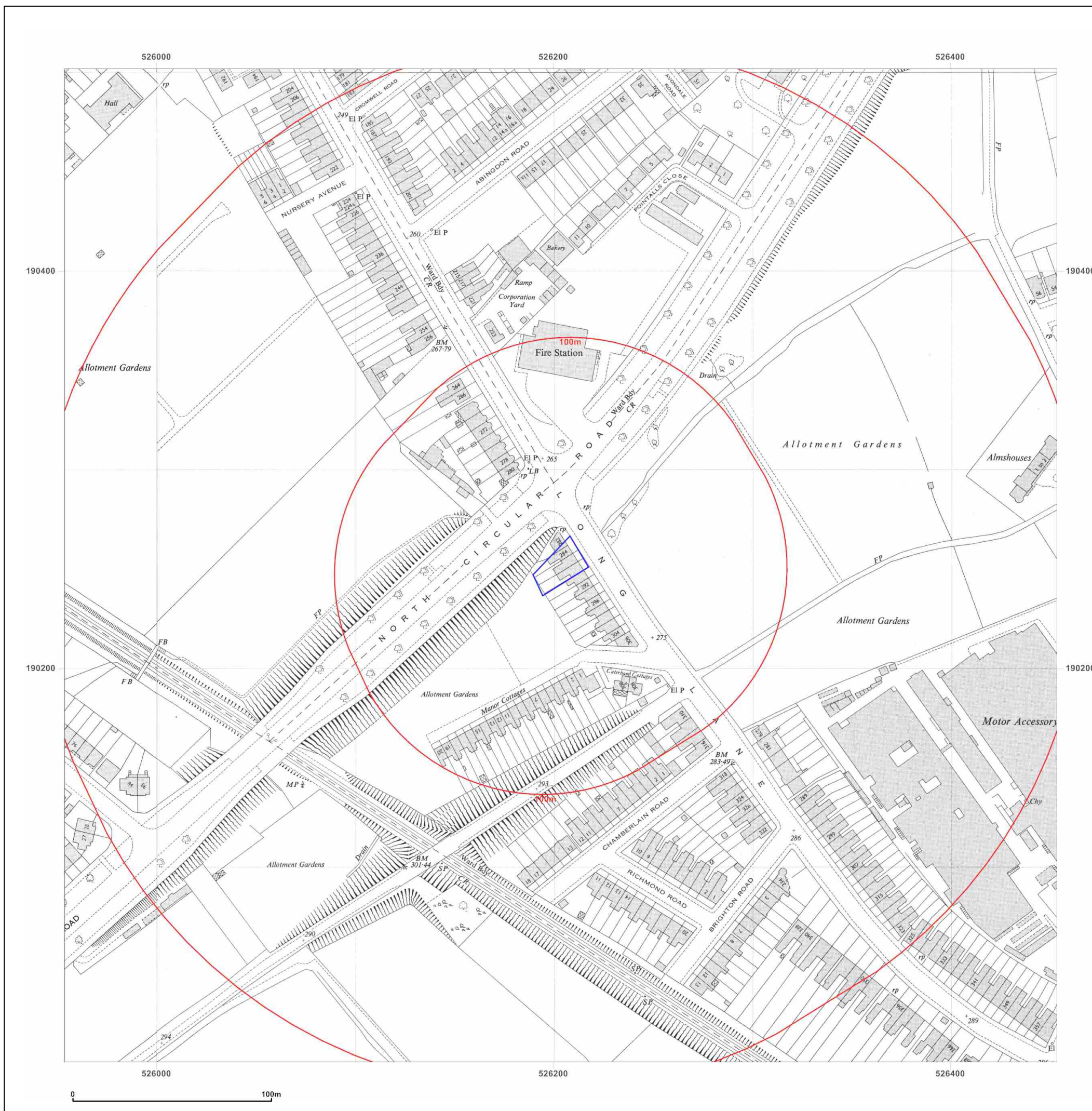


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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1951-1954

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1954
 Revised 1954
 Edition 1955
 Copyright N/A
 Levelled 1934

Surveyed 1951
 Revised 1951
 Edition N/A
 Copyright N/A
 Levelled 1934

Surveyed 1953
 Revised 1953
 Edition 1955
 Copyright N/A
 Levelled 1934

Surveyed 1951
 Revised 1951
 Edition N/A
 Copyright N/A
 Levelled 1933

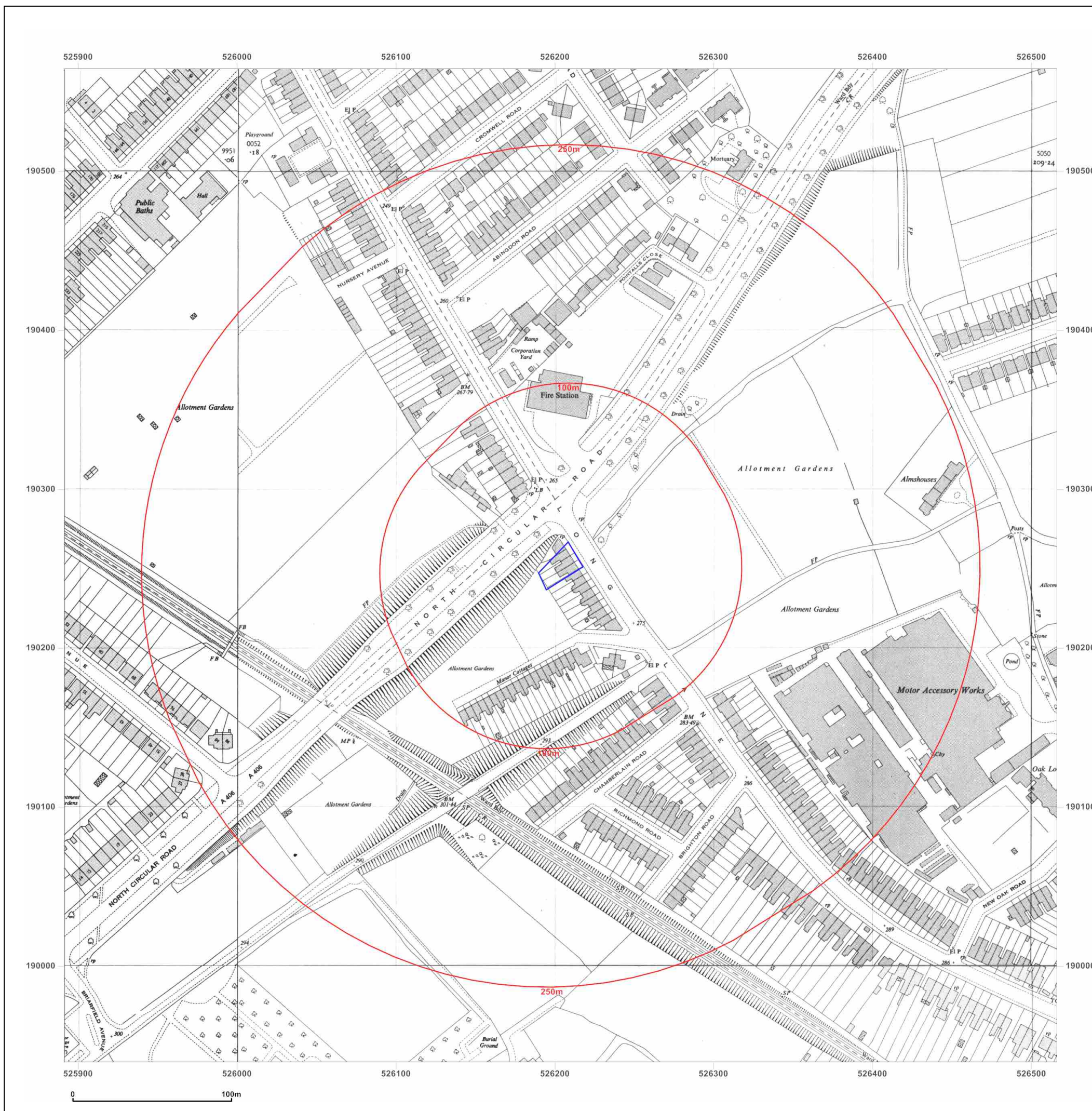


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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1967-1968

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1951
 Revised 1967
 Edition 1968
 Copyright N/A
 Levelled 1956

Surveyed 1954
 Revised 1967
 Edition N/A
 Copyright 1968
 Levelled 1956

Surveyed 1951
 Revised 1967
 Edition N/A
 Copyright 1968
 Levelled 1956

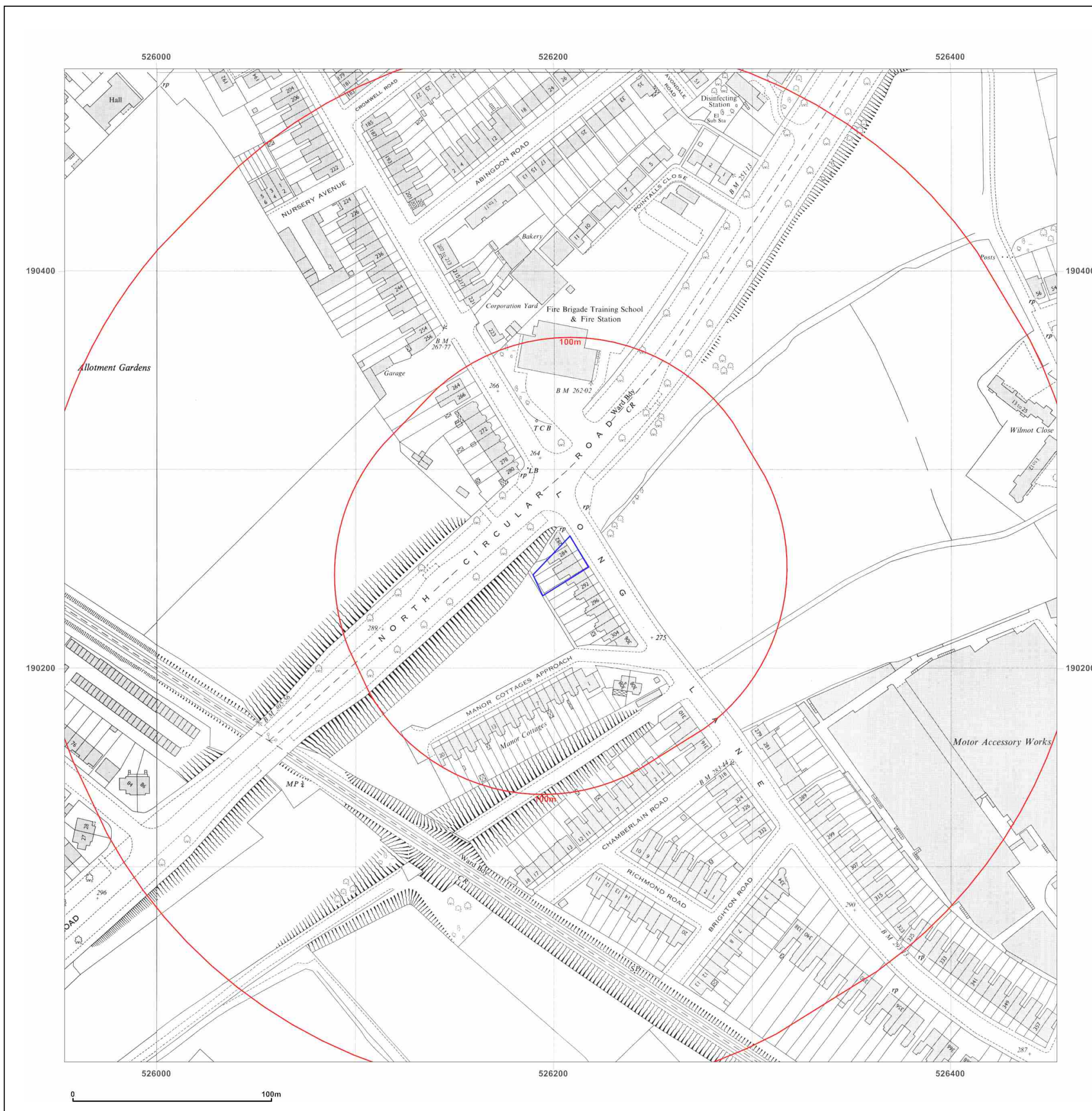


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Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1969

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1969
 Revised 1969
 Edition N/A
 Copyright 1970
 Levelled N/A

Surveyed 1969
 Revised 1969
 Edition N/A
 Copyright 1970
 Levelled 1956

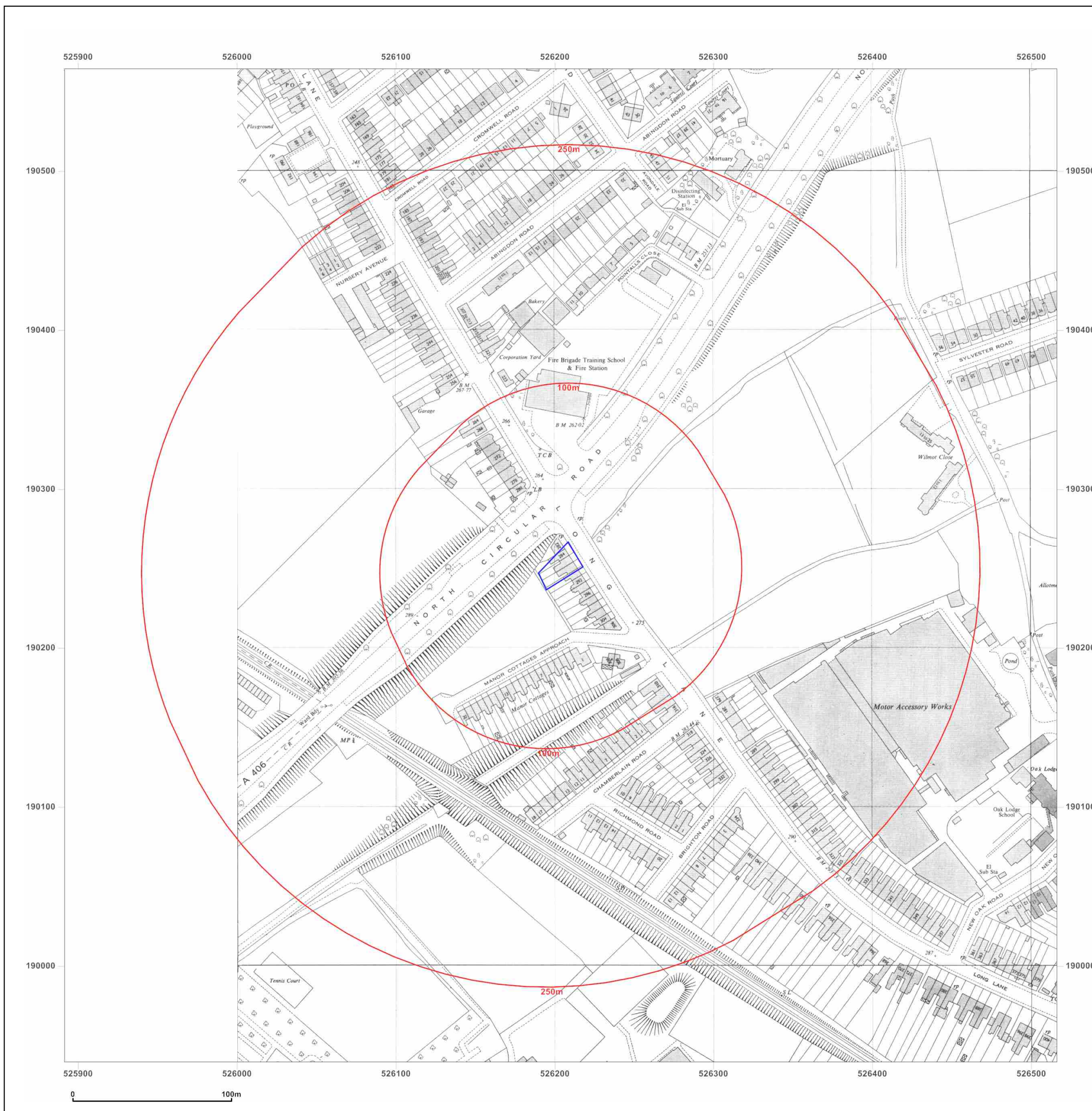


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Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1981

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
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Edition N/A
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Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1991

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1991
 Levelled N/A

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1991
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 Revised N/A
 Edition N/A
 Copyright 1991
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Surveyed N/A
 Revised N/A
 Edition N/A
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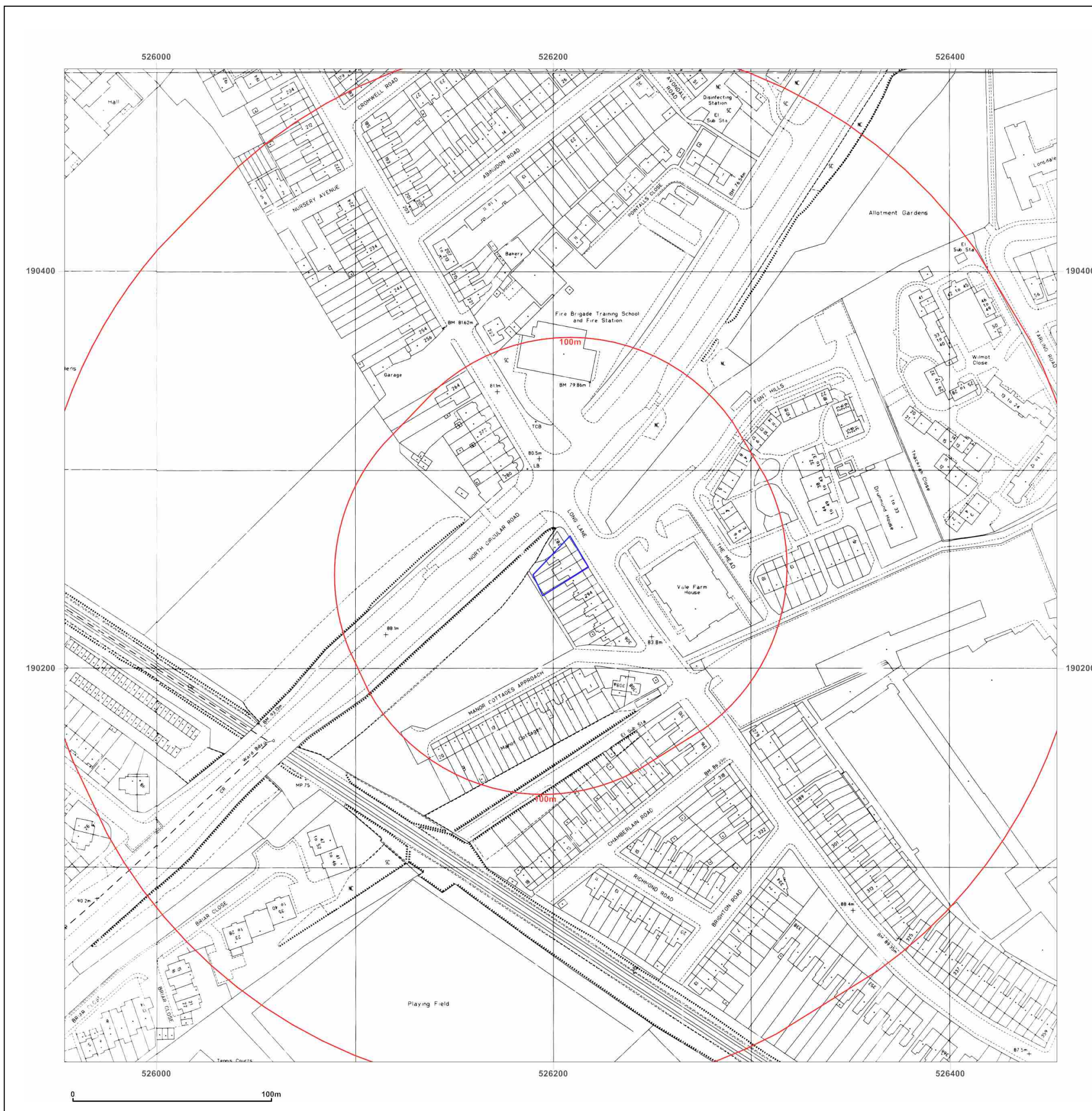


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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1873

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1865
Revised N/A
Edition 1873
Copyright N/A
Levelled N/A

Surveyed 1869
Revised 1869
Edition 1873
Copyright N/A
Levelled N/A

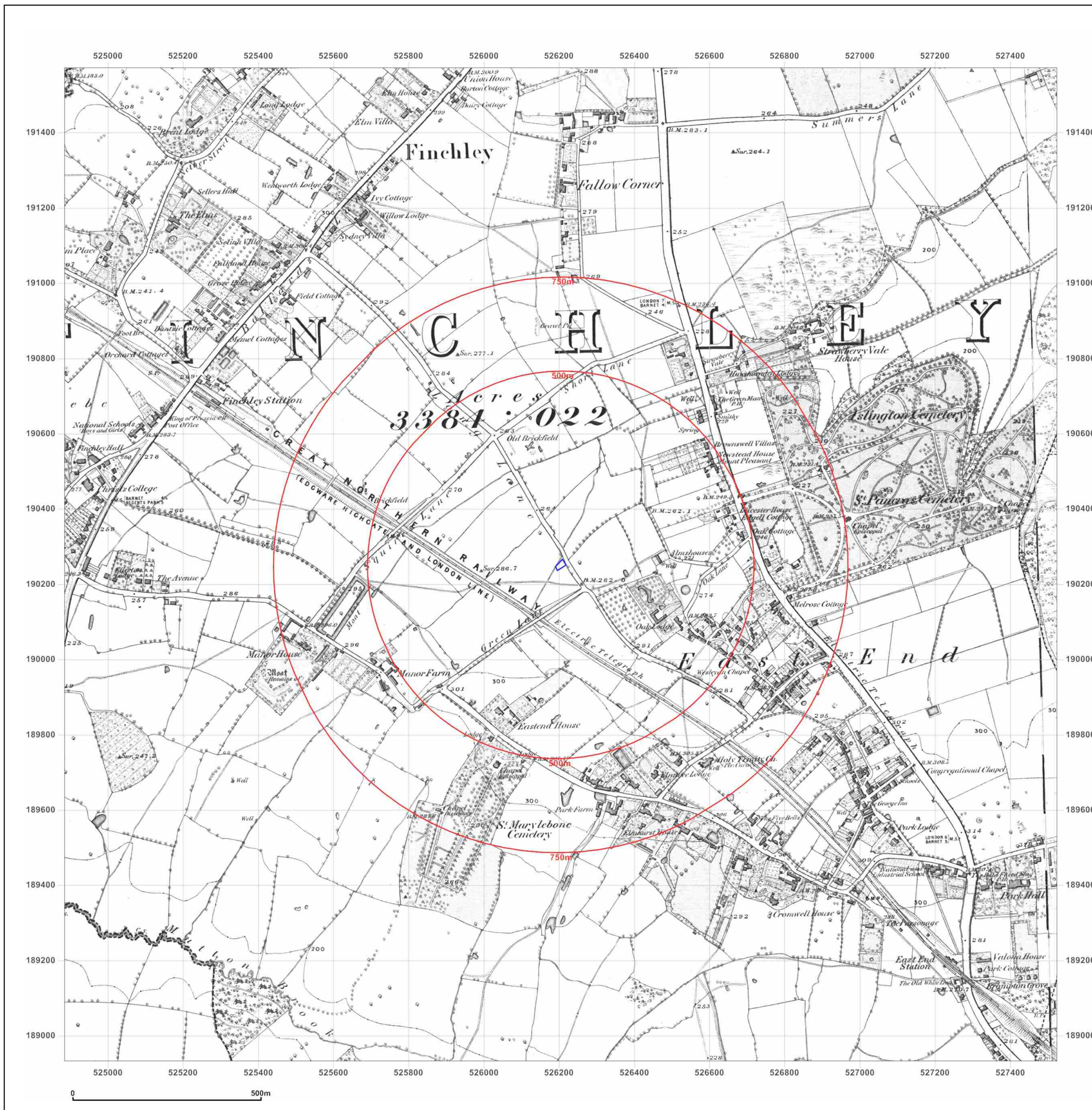


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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1894-1896

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1895
Revised 1895
Edition 1896
Copyright N/A
Levelled N/A

Surveyed 1894
Revised 1894
Edition N/A
Copyright N/A
Levelled N/A

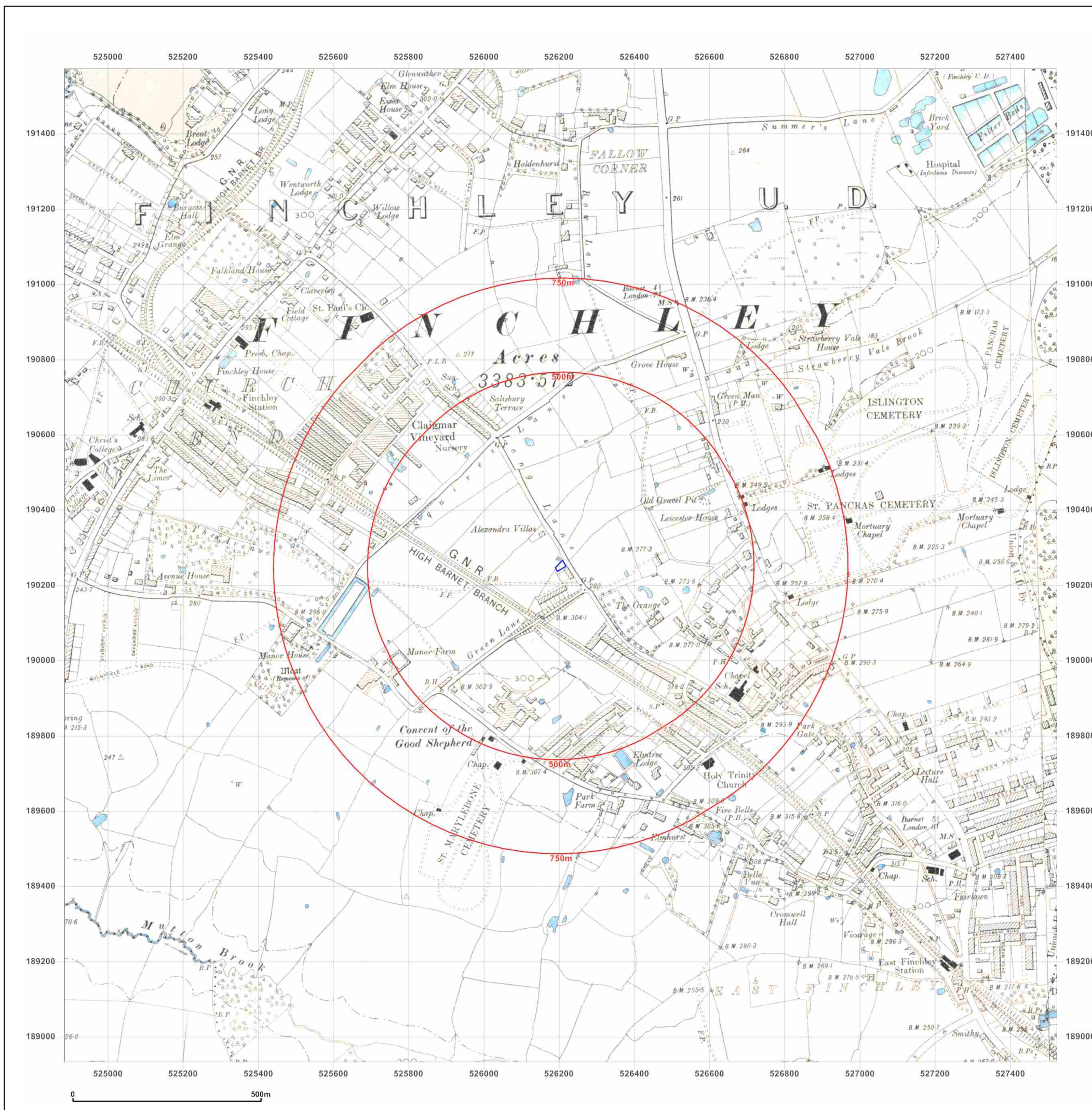


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LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1920

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1865
Revised 1920
Edition N/A
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Surveyed 1869
Revised 1919
Edition 1920
Copyright N/A
Levelled 1913



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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1936-1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1863
Revised 1936
Edition 1935
Copyright N/A
Levelled 1934

Surveyed 1869
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1865
Revised 1938
Edition N/A
Copyright N/A
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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1865
Revised 1938
Edition N/A
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Site Details:

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Grid Ref: 526204, 190252

Map Name: Provisional

Map date: 1951

Scale: 1:10,560

Printed at: 1:10,560



Surveyed N/A
Revised 1950
Edition 1951
Copyright N/A
Levelled N/A

Surveyed N/A
Revised 1951
Edition 1951
Copyright N/A
Levelled N/A

Surveyed 1940
Revised 1949
Edition N/A
Copyright 1951
Levelled 1935

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Revised 1949
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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: Provisional

Map date: 1958-1962

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1962
Revised 1962
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1958
Revised 1958
Edition N/A
Copyright N/A
Levelled N/A

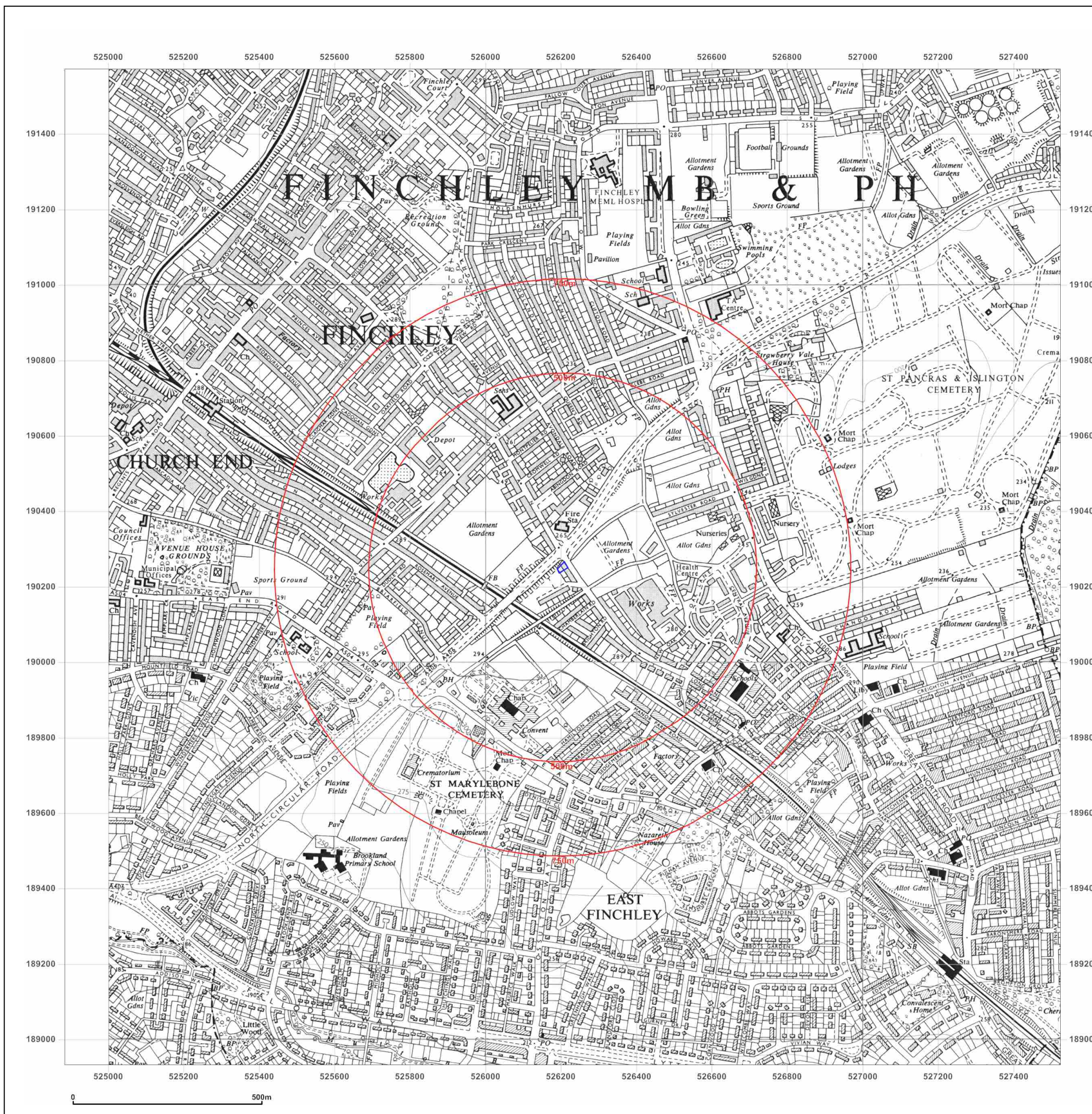


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Site Details:

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Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: Provisional

Map date: 1965-1968

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1968
Revised 1968
Edition N/A
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Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1965
Revised 1965
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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1973-1976

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1973
Revised 1975
Edition N/A
Copyright 1976
Levelled N/A

Surveyed 1972
Revised 1973
Edition N/A
Copyright 1973
Levelled 1972

Surveyed 1975
Revised 1976
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1974
Revised 1974
Edition N/A
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Site Details:

LONG LANE, LONDON

Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 1987

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1982
Revised 1987
Edition N/A
Copyright N/A
Levelled N/A

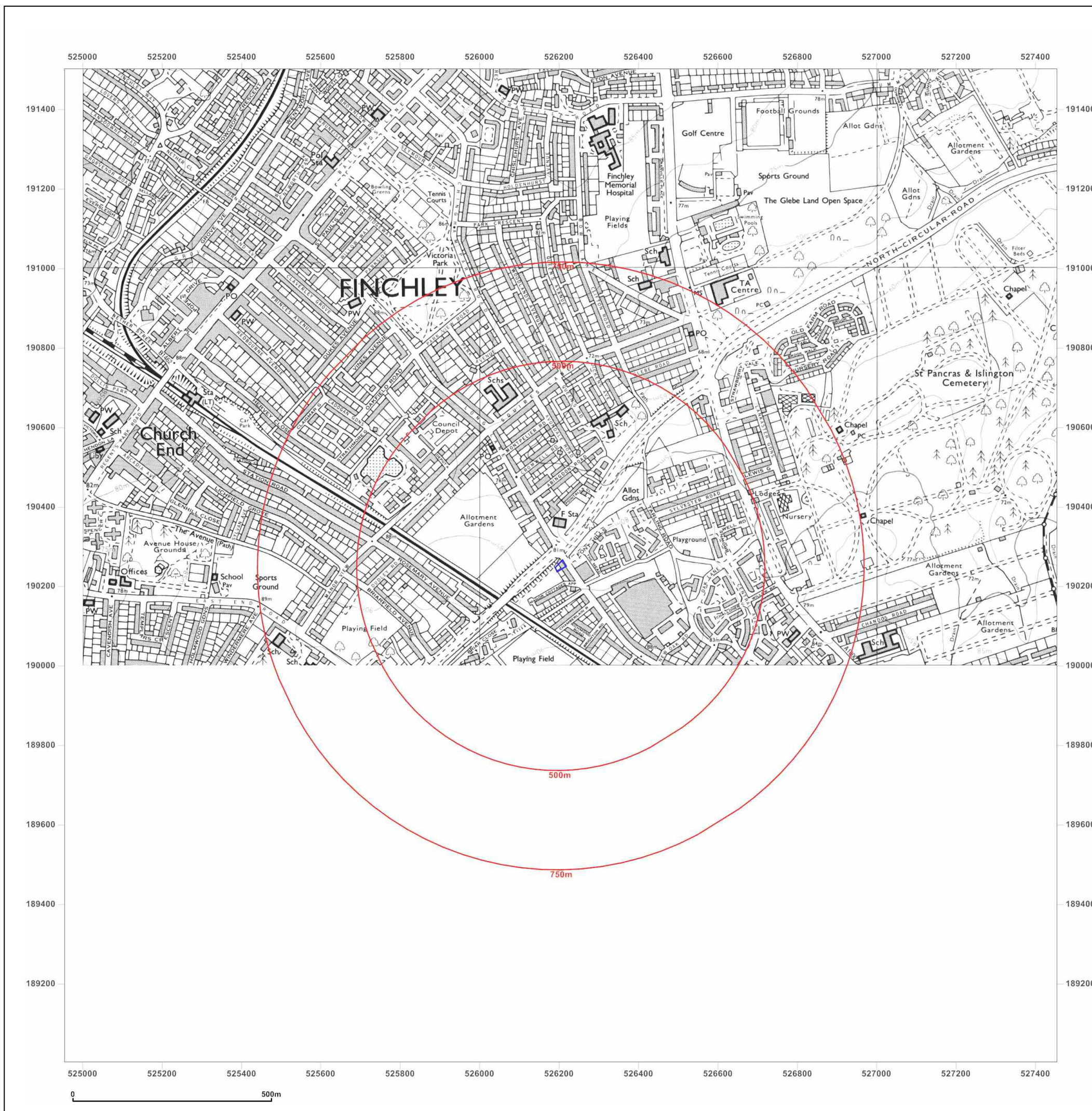


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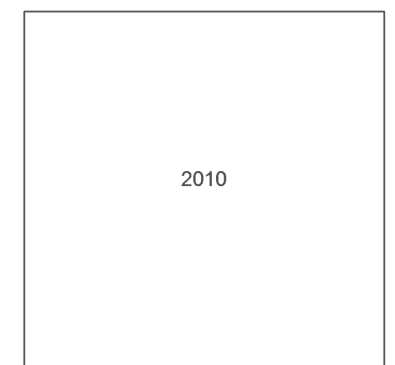
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Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

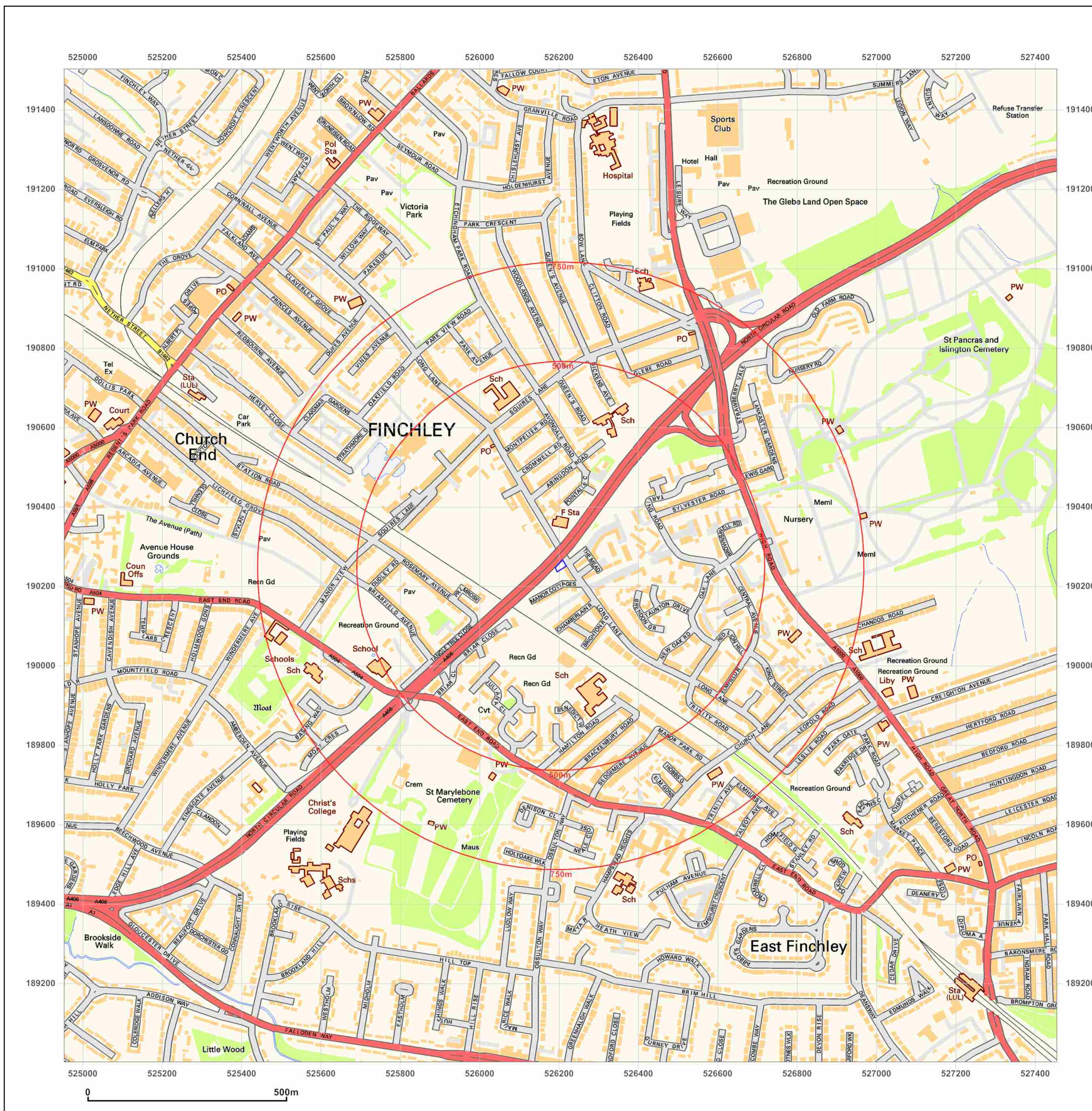


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Site Details:

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Client Ref: PO0067007-1
Report Ref: GS-4141298
Grid Ref: 526204, 190252

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



2014

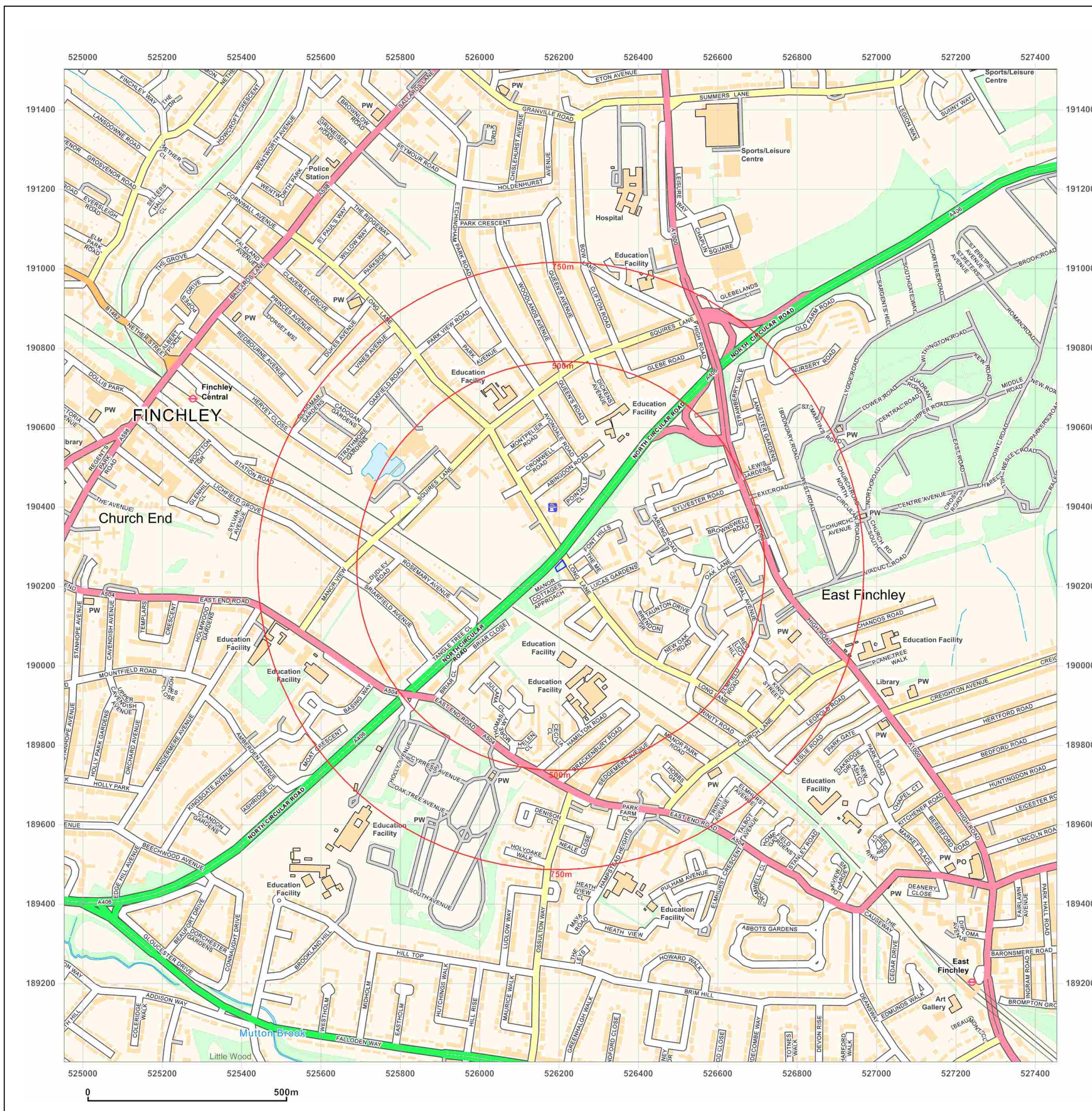


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APPENDIX B
Groundsure Data Sheets



Arcadis

Arcadis, 10, MEDAWAR ROAD,
GUILDFORD, GU2 7AR

Groundsure
Reference:

GS-4141296

Your Reference: PO0067007-1

Report Date 1 Aug 2017

Report Delivery Method: Email - pdf

Enviro Insight

Address: LONG LANE, LONDON,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

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Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Address: LONG LANE, LONDON,

Date: 1 Aug 2017

Reference: GS-4141296

Client: Arcadis

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 28-Apr-2013

Grid Reference: 526207,190250

Site Size: 0.04ha

Report Reference: GS-4141296

Client Reference: PO0067007-1

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Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	25	59
1.2 Additional Information – Historical Tank Database	0	0	1	13
1.3 Additional Information – Historical Energy Features Database	0	0	8	17
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	10	2
1.6 Potentially Infilled Land	0	0	13	52

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	1	0	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	2
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	12	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	8	13
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology				0-500m		
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?				Yes		
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?				Yes		
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	1	0	Not searched	Not searched

Section 6: Hydrogeology and Hydrology	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 7: Flooding						
7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No					
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low					
7.4 Are there any Flood Defences within 250m of the study site?	No					
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No					
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No					
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential					
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High					

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	3
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	2	4
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	1

Section 9: Natural Hazards	
9.1 What is the maximum risk of natural ground subsidence?	Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining	
10.1 Are there any coal mining areas within 75m of the study site?	No
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

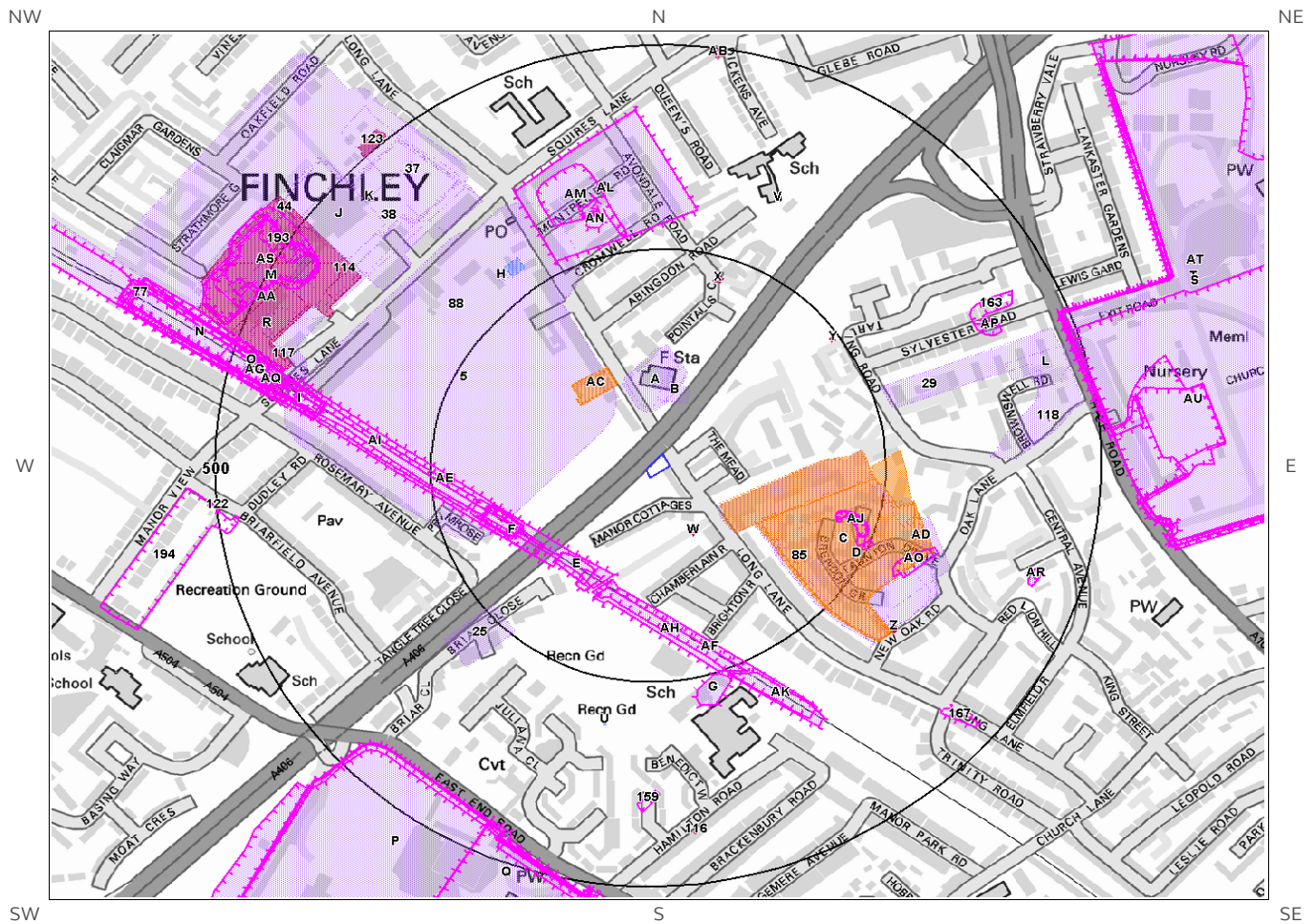
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

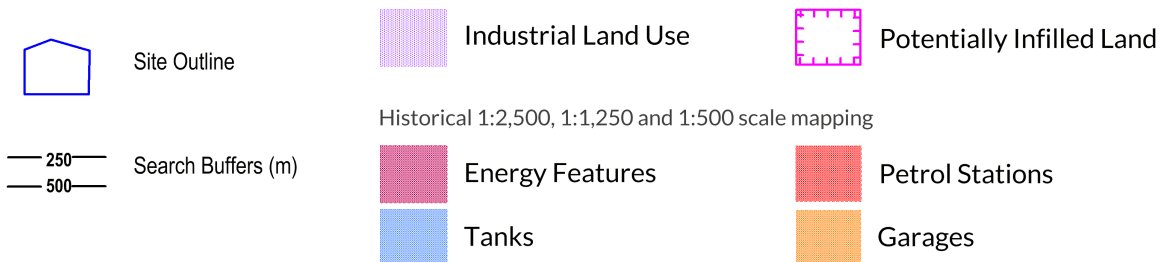
All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



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Historical 1:10,000 and 1:10,560 scale mapping



1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 84

ID	Distance [m]	Direction	Use	Date
1A	52	N	Fire Engine Station	1951
2A	59	N	Fire Engine Station	1936
3B	65	N	Fire Station	1973
4B	65	N	Fire Station	1980
5	69	NW	Nursery	1920
6C	73	SE	Unspecified Commercial/Industrial	1987
7A	79	N	Fire Station	1987
8A	80	N	Fire Station	1962
9D	119	SE	Unspecified Works	1936
10C	121	SE	Motor Accessories Works	1951
11D	123	SE	Unspecified Works	1962
12AE	124	SW	Cuttings	1873
13E	128	SW	Cuttings	1938
14AF	132	S	Cuttings	1936
15E	135	SW	Cuttings	1920
16AG	143	SW	Cuttings	1951
17AH	143	S	Cuttings	1951
18F	149	SW	Cuttings	1920
19D	152	SE	Unspecified Works	1973
20D	152	SE	Unspecified Works	1980
21F	158	SW	Cuttings	1938
22F	158	SW	Cuttings	1938
23F	161	SW	Cuttings	1936
24AI	200	W	Cuttings	1936
25	239	SW	Nursery	1920
26G	252	S	Unspecified Heap	1965
27G	252	S	Unspecified Heap	1974
28AK	256	S	Cuttings	1949
29	263	E	Nurseries	1962
30AL	263	N	Old Brick Field	1873
31AM	269	N	Unspecified Pit	1873
32H	279	NW	Unspecified Tank	1920
33H	280	NW	Unspecified Tank	1938

34H	282	NW	Unspecified Tank	1938
35AN	285	N	Unspecified Heap	1873
36AO	287	SE	Gravel Pit	1873
37	368	NW	Nursery	1895
38	370	NW	Council Depot	1973
39I	382	W	Cuttings	1920
40I	382	W	Cuttings	1938
41I	385	W	Cuttings	1936
42I	385	W	Cuttings	1938
43AP	393	NE	Old Gravel Pit	1895
44	393	NW	Vine Yard	1920
45K	400	NW	Unspecified Depot	1962
46J	400	NW	Council Depot	1987
47J	400	NW	Council Depot	1980
48K	402	NW	Council Depot	1951
49K	404	NW	Council Depot	1936
50L	409	E	Nursery	1973
51L	409	E	Nursery	1980
52AQ	410	W	Cuttings	1973
53M	410	NW	Unspecified Commercial/Industrial	1936
54R	411	W	Electricity Works	1920
55M	426	NW	Unspecified Works	1962
56N	429	W	Cuttings	1873
57N	431	W	Cuttings	1895
58N	436	W	Cuttings	1936
59N	436	W	Cuttings	1938
60N	437	W	Cuttings	1920
61O	437	W	Cuttings	1987
62O	437	W	Cuttings	1980
63AR	438	E	Unspecified Heap	1873
64N	438	W	Cuttings	1962
65N	445	W	Cuttings	1938
66P	448	SW	Cemetery	1965
67P	448	SW	Cemetery	1974
68P	448	SW	Cemetery	1996
69P	448	SW	Cemetery	1958
70P	448	SW	Cemetery	1949
71P	448	SW	Cemetery	1938
72P	448	SW	Cemetery	1936
73P	448	SW	Cemetery	1938
74P	455	SW	Cemetery	1920
75Q	457	SW	Cemetery	1895
76Q	464	SW	Cemetery	1873
77	480	W	Railway Sidings	1962
78R	480	W	Railway Sidings	1920

79AT	487	E	Cemetery	1951
80S	489	E	Cemetery	1920
81S	490	E	Cemetery	1938
82T	491	E	Cemetery	1938
83T	491	E	Cemetery	1936
84AU	496	E	Cemetery	1895

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

14

ID	Distance (m)	Direction	Use	Date
85	182	SE	Unspecified Tank	1913
86H	276	NW	Unspecified Tank	1913
87H	276	NW	Unspecified Tank	1936
88	294	NW	Unspecified Tank	1871
89U	303	S	Unspecified Tank	1914
90U	305	S	Unspecified Tank	1935
91U	305	S	Unspecified Tank	1939
92V	335	NE	Unspecified Tank	1992
93V	337	NE	Unspecified Tank	1967
94R	464	W	Tanks	1936
95R	470	NW	Unspecified Tank	1954
96R	471	NW	Unspecified Tank	1954
97R	471	NW	Unspecified Tank	1954
98R	473	NW	Unspecified Tank	1913

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary:

25

ID	Distance (m)	Direction	Use	Date
99W	82	SE	Electricity Substation	1981
100W	82	SE	Electricity Substation	1996
101X	217	N	Electricity Substation	1981
102X	218	N	Electricity Substation	1968

103X	218	N	Electricity Substation	1969
104X	219	N	Electricity Substation	1996
105Y	239	NE	Electricity Substation	1996
106Y	239	NE	Electricity Substation	1981
107Z	321	SE	Electricity Substation	1981
108Z	322	SE	Electricity Substation	1969
109Z	322	SE	Electricity Substation	1996
110Z	322	SE	Electricity Substation	1968
111M	405	NW	Power Station	1954
112AA	410	NW	Power Station	1954
113AA	410	NW	Power Station	1954
114	422	NW	Electricity Substation	1968
115R	433	W	Electricity Works	1913
116	434	S	Electricity Substation	1951
117	439	W	Electricity Substation	1968
118	440	E	Electricity Substation	1995
119AB	486	N	Electricity Substation	1992
120AB	489	N	Electricity Substation	1967
121AB	489	N	Electricity Substation	1969
122	495	W	Electricity Substation	1968
123	499	NW	Electricity Substation	1997

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 12

ID	Distance (m)	Direction	Use	Date
124C	73	SE	Motor Accessory Works	1981
125AC	98	NW	Garage	1968
126AC	99	NW	Garage	1981
127AC	99	NW	Garage	1996
128AC	99	NW	Garage	1969

129C	122	SE	Motor Accessory Works	1936
130C	124	SE	Motor Accessory Works	1951
131C	124	SE	Motor Accessory Works	1969
132C	125	SE	Motor Accessory Works	1968
133C	125	SE	Motor Accessory Works	1951
134AD	285	E	Motor Accessory Works	1951
135AD	285	E	Motor Accessory Works	1953

1.6 Potentially Infilled Land

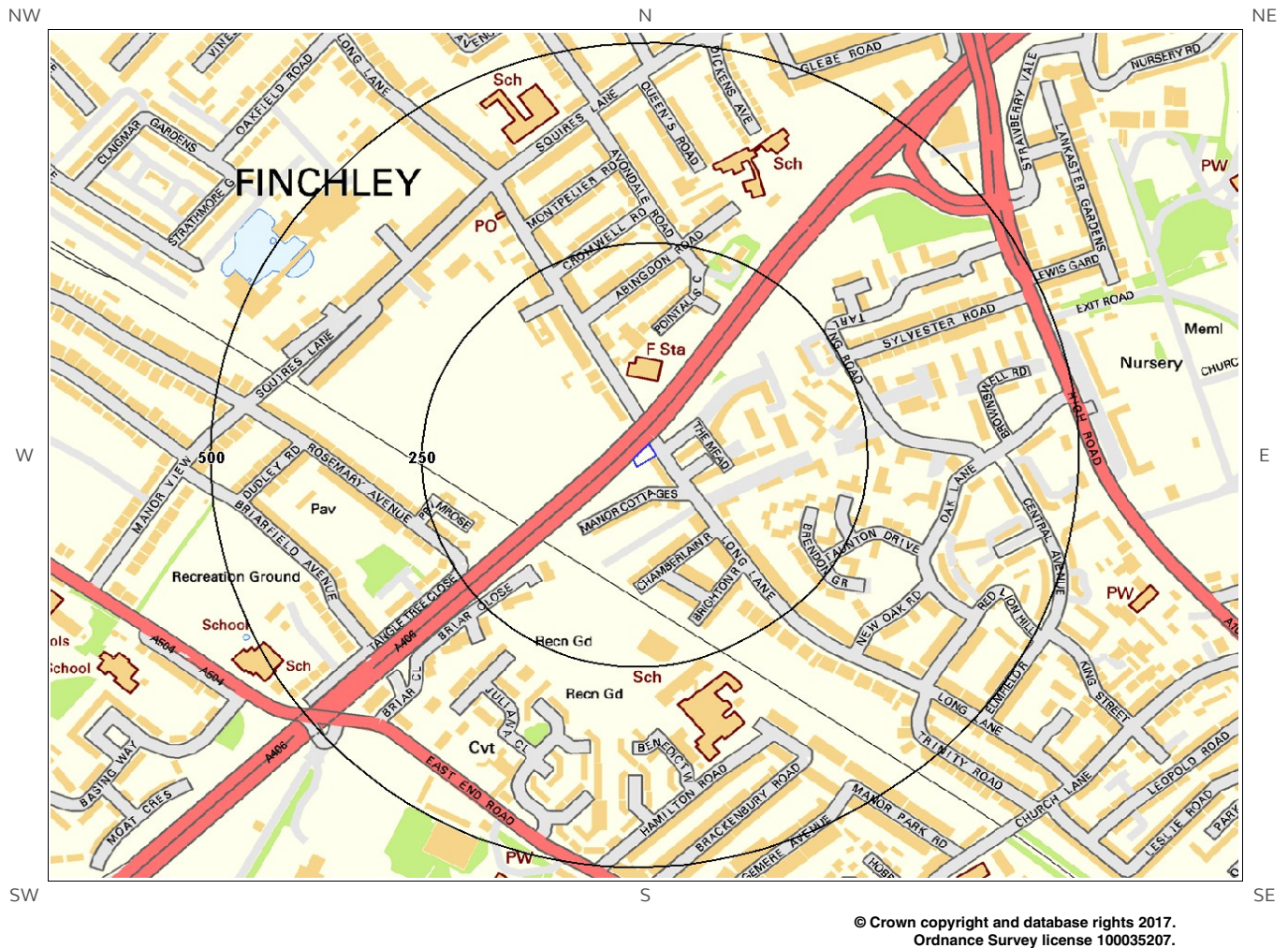
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 65
















The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
136AE	124	SW	Cuttings	1873
137E	128	SW	Cuttings	1938
138AF	132	S	Cuttings	1936
139E	135	SW	Cuttings	1920
140AG	143	SW	Cuttings	1951
141AH	143	S	Cuttings	1951
142F	149	SW	Cuttings	1920
143F	158	SW	Cuttings	1938
144F	158	SW	Cuttings	1938
145F	161	SW	Cuttings	1936
146AI	200	W	Cuttings	1936
147AJ	201	E	Pond	1895
148AJ	201	E	Pond	1873
149G	252	S	Unspecified Heap	1974
150G	252	S	Unspecified Heap	1965
151AK	256	S	Cuttings	1949
152AL	263	N	Old Brick Field	1873
153AM	269	N	Unspecified Pit	1873
154AN	285	N	Unspecified Heap	1873
155AO	287	SE	Gravel Pit	1873
156AM	302	N	Pond	1873
157I	382	W	Cuttings	1920
158I	382	W	Cuttings	1938
159	383	S	Pond	1873
160I	385	W	Cuttings	1936
161I	385	W	Cuttings	1938
162AP	393	NE	Old Gravel Pit	1895
163	393	NE	Pond	1895
164AQ	410	W	Cuttings	1973
165N	429	W	Cuttings	1873
166N	431	W	Cuttings	1895

167	434	SE	Pond	1873
168N	436	W	Cuttings	1936
169N	436	W	Cuttings	1938
170N	437	W	Cuttings	1920
171O	437	W	Cuttings	1980
172O	437	W	Cuttings	1987
173AR	438	E	Unspecified Heap	1873
174N	438	W	Cuttings	1962
175N	445	W	Cuttings	1938
176P	448	SW	Cemetery	1996
177P	448	SW	Cemetery	1965
178P	448	SW	Cemetery	1958
179P	448	SW	Cemetery	1974
180P	448	SW	Cemetery	1949
181P	448	SW	Cemetery	1938
182P	448	SW	Cemetery	1936
183P	448	SW	Cemetery	1938
184AS	452	NW	Pond	1973
185AS	452	NW	Pond	1962
186AS	452	NW	Pond	1936
187M	452	NW	Pond	1920
188AS	454	NW	Pond	1980
189AS	454	NW	Pond	1987
190P	455	SW	Cemetery	1920
191Q	457	SW	Cemetery	1895
192Q	464	SW	Cemetery	1873
193	475	NW	Pond	1895
194	476	W	Ponds	1895
195AT	487	E	Cemetery	1951
196S	489	E	Cemetery	1920
197S	490	E	Cemetery	1938
198S	491	E	Cemetery	1936
199S	491	E	Cemetery	1938
200AU	496	E	Cemetery	1895

2. Environmental Permits, Incidents and Registers Map



- | | | | | | |
|---|--------------------|---|-------------------------------|---|--|
|  | Site Outline |  | Recorded Pollution Incident |  | RAS 3 & 4 Authorisations |
|  | 250 |  | Dangerous Substances (List 1) |  | Part A(1) Authorised Processes and Historic IPC Authorisations |
|  | 500 |  | Dangerous Substances (List 2) |  | Part A(2) and Part B Authorised Processes |
| | Search Buffers (m) |  | Water Industry Referrals |  | COMAH / NIHHS Sites |
| | |  | Licenced Discharge Consents |  | Sites Determined as Contaminated Land |
| | |  | Red List Discharge Consents |  | Hazardous Substance Consents and Enforcements |

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

0

Database searched and no data found.

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

0

Database searched and no data found.

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

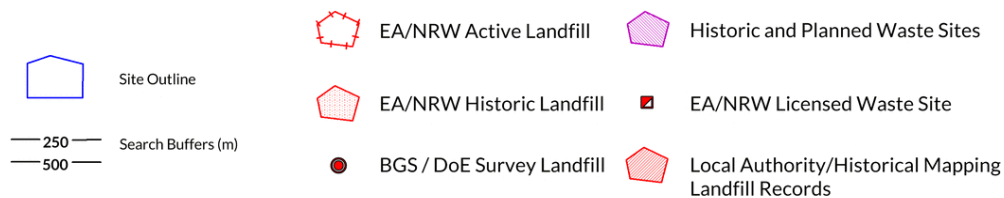
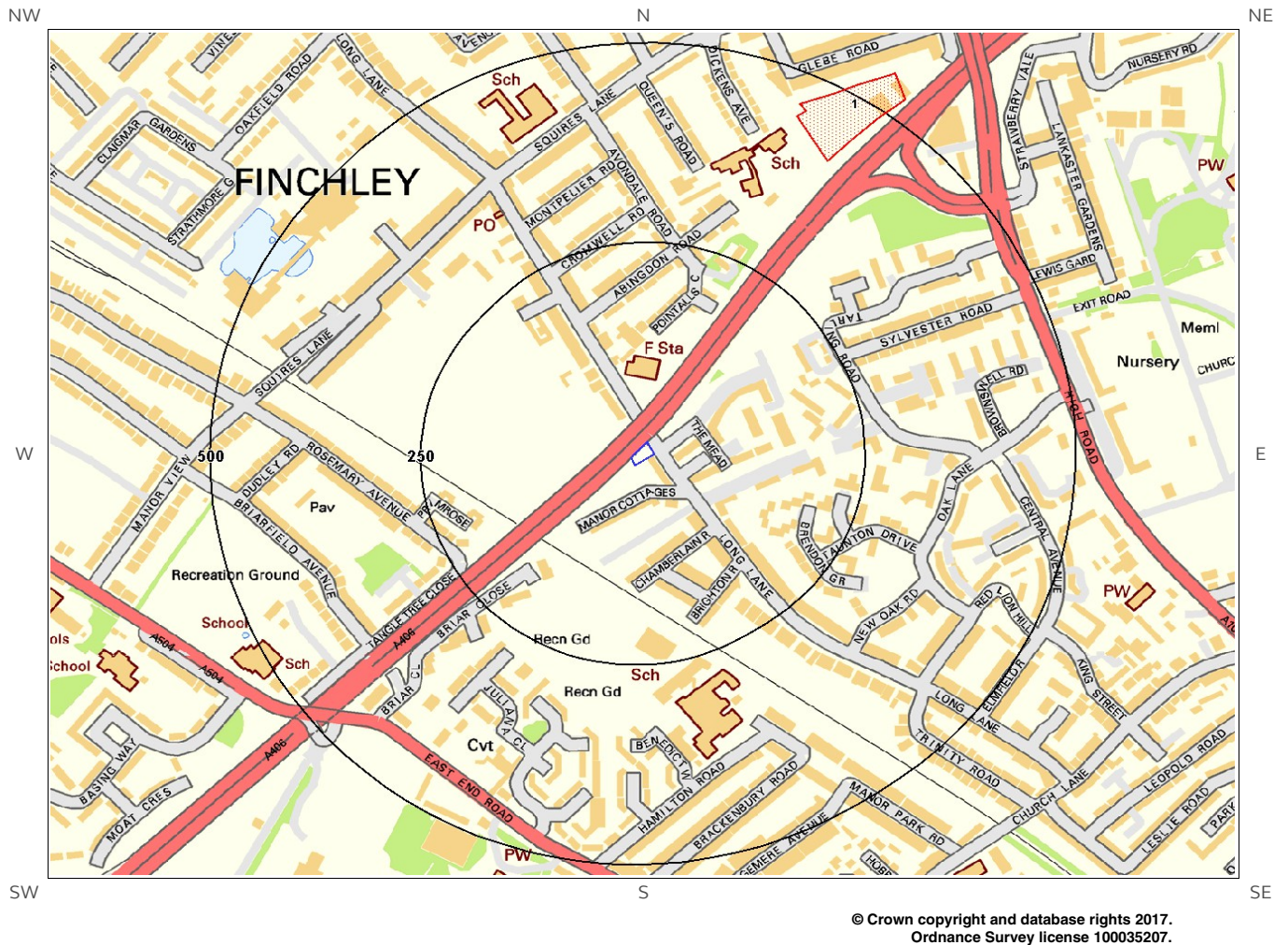
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

1

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
1	412	NE	526400 190600	<div> <div> Site Address: Lonsdale Meadows, Jct. A406/High Road, Finchley, London N3 Waste Licence: Yes Site Reference: DL132, 8BA008 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: - </div> <div> Licence Issue: 05-Aug-1983 Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: London Borough of Barnet First Recorded: 31-Dec-1983 Last Recorded: 31-Dec-1986 </div> </div>

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

2

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	1434	E	527662 190741	Refuse Tip	1964 mapping	Polygon
Not shown	1434	E	527661 190742	Refuse Tip	1969 mapping	Polygon

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

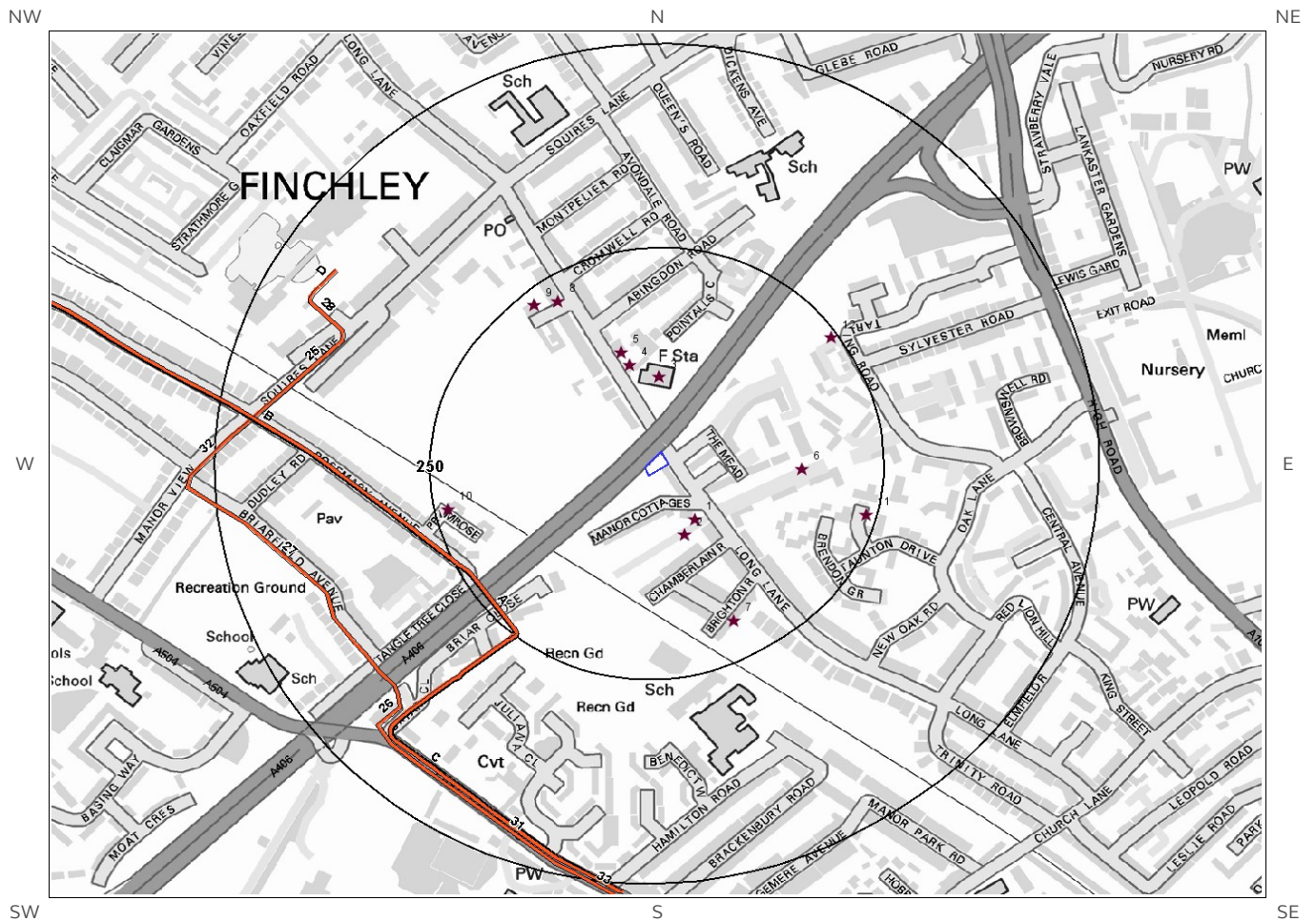
Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

0

Database searched and no data found.

4. Current Land Use Map



4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

12

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	73	SE	Glen Van Hire Ltd	526247 190184	Glen Van Hire Ltd, 308B, Long Lane, London, N2 8JP	Vehicle Hire and Rental	Hire Services
2	82	SE	Electricity Sub Station	526235 190165	Electricity Sub Station, N2	Electrical Features	Infrastructure and Facilities
3	92	N	Finchley Fire Station	526205 190358	Finchley Fire Station, Finchley Fire Station 227, Long Lane, London, N3 2RP	Fire Brigade Stations	Central and Local Government
4	113	N	Stockdomes Talbot Designs	526171 190373	Stockdomes Talbot Designs, 225, Long Lane, London, N3 2RL	Rubber, Silicones and Plastics	Industrial Products
5	131	N	Talbot Designs	526162 190389	Talbot Designs, 221-225, Long Lane, London, N3 2RL	General Construction Supplies	Industrial Products
6	155	E	Electricity Sub Station	526372 190246	Electricity Sub Station, N2	Electrical Features	Infrastructure and Facilities
7	202	SE	P A Music	526292 190059	P A Music, 8, Brighton Road, London, N2 8JU	Electronic Equipment	Industrial Products
8	220	NW	Central Hire Services	526087 190451	Central Hire Services, 222, Long Lane, London, N3 2RA	Construction and Tool Hire	Hire Services
9	233	NW	Signstar Sign & Graphic Solutions	526060 190446	Signstar Sign & Graphic Solutions, 1, Nursery Avenue, London, N3 2RD	Signs	Industrial Products
10	234	W	Funky Fab Cakes Ltd	525960 190196	Funky Fab Cakes Ltd, 1, Primrose Close, London, N3 2RU	Baking and Confectionery	Foodstuffs
11	238	E	Electricity Sub Station	526447 190190	Electricity Sub Station, N2	Electrical Features	Infrastructure and Facilities
12	242	NE	Electricity Sub Station	526406 190407	Electricity Sub Station, N2	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site:

21

The following Underground Electricity Transmission Cable records are represented as linear features on the Current Land Use map:

ID	Distance (m)	Direction	Details	
13A	238	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
14A	238	SW	Cable Route: MILL HILL - ST JOHNS WOOD 1 Cable Set: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
15A	238	SW	Cable Route: MILL HILL - ST JOHNS WOOD 2 Cable Set: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
16A	239	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
17B	245	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
18B	247	SW	Cable Route: MILL HILL - ST JOHNS WOOD 1 Cable Set: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
19B	248	SW	Cable Route: MILL HILL - ST JOHNS WOOD 2 Cable Set: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
20B	249	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
21C	252	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
22C	255	SW	Cable Route: MILL HILL - ST JOHNS WOOD 2 Cable Set: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
23C	255	SW	Cable Route: MILL HILL - ST JOHNS WOOD 1 Cable Set: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -

ID	Distance (m)	Direction	Details	
24C	258	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: PILOT Operating Voltage (kV): - Year of installation: - Cable in tunnel: -
25	385	NW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
26	392	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
27	398	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
28	419	NW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
29D	433	NW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
30D	438	NW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
31	444	SW	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
32	466	W	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -
33	486	S	Cable Set: - Cable Route: - Cable Make: -	Cable Type: DECOMMISSIONED Operating Voltage (kV): 275 Year of installation: - Cable in tunnel: -

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
DHGR-XSV	DOLLIS HILL GRAVEL MEMBER	SAND AND GRAVEL

5.3 Bedrock and Solid Geology

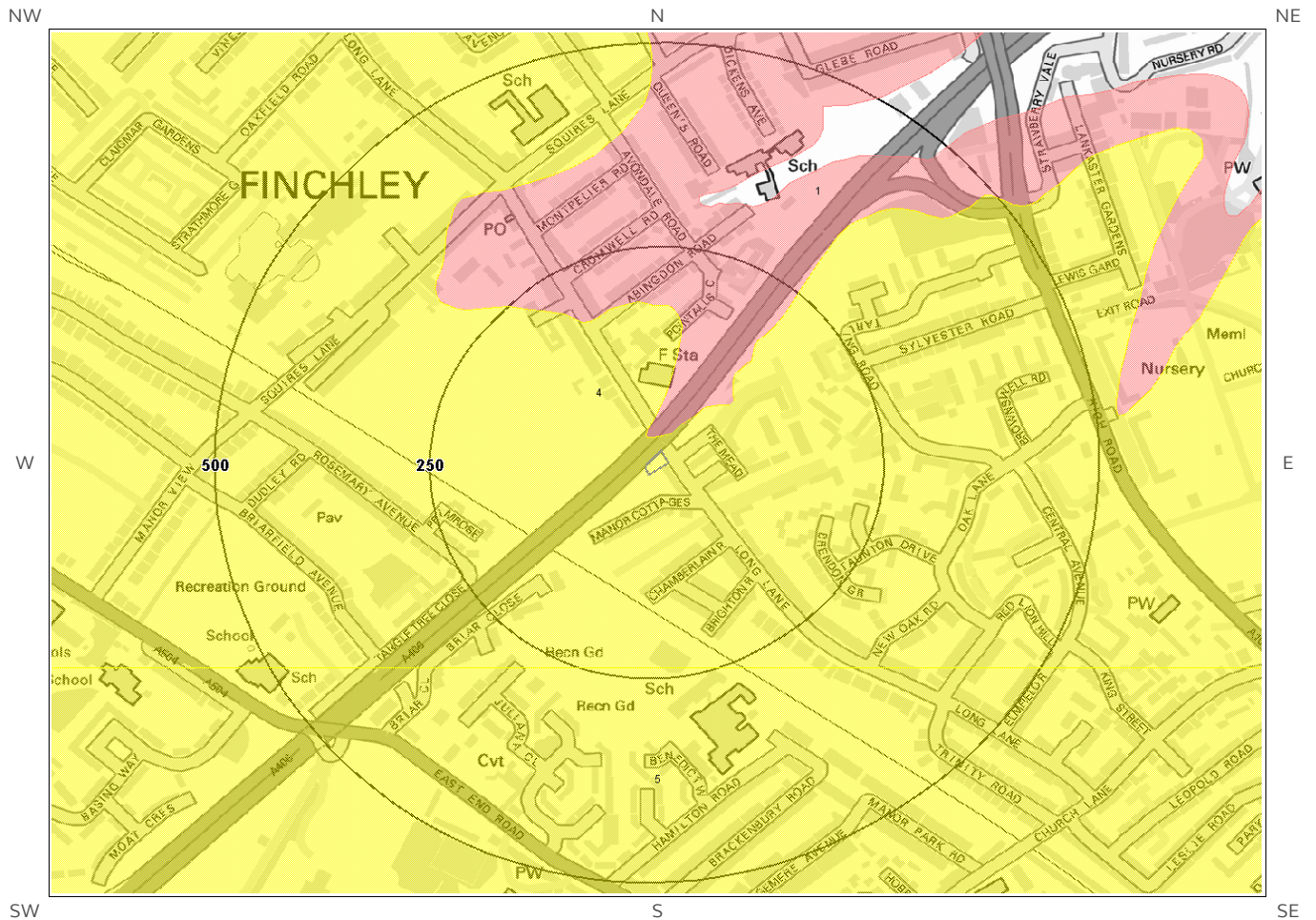
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LC-XCZS	LONDON CLAY FORMATION	CLAY, SILT AND SAND

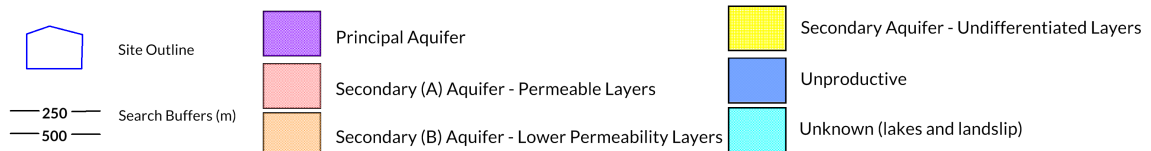
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

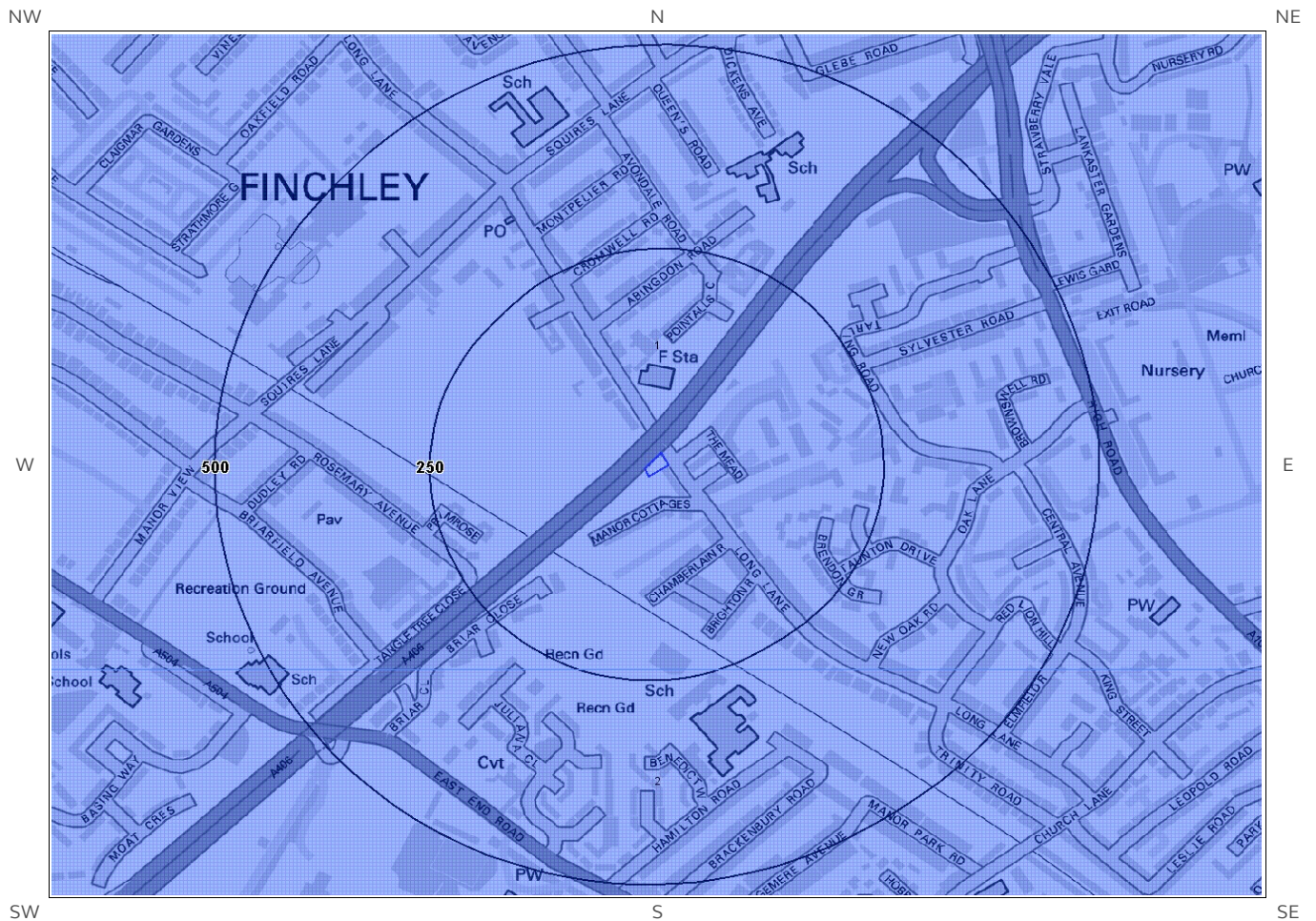
6a. Aquifer Within Superficial Geology



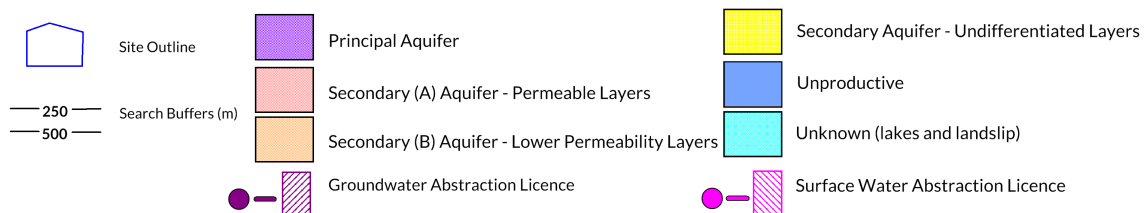
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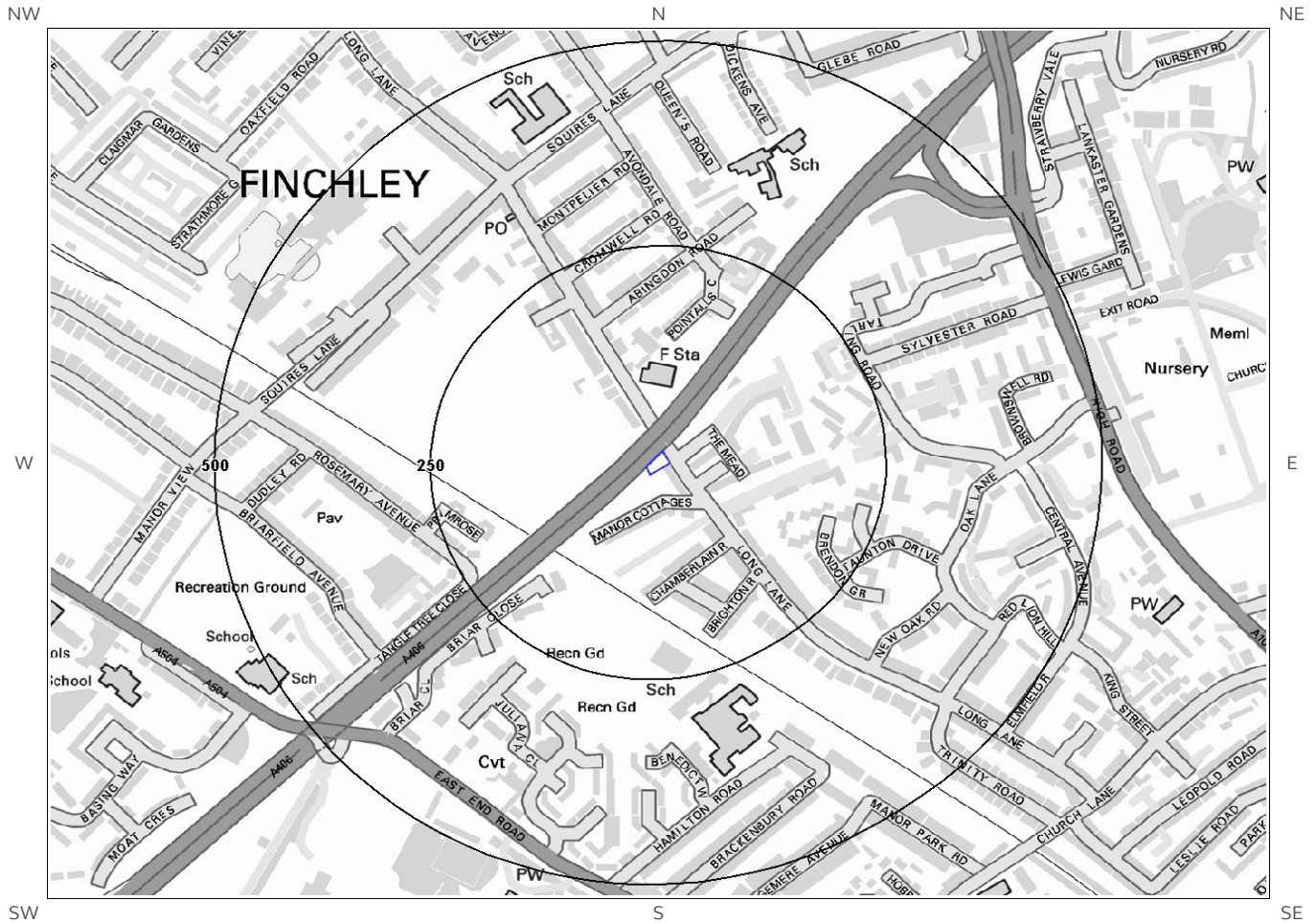
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



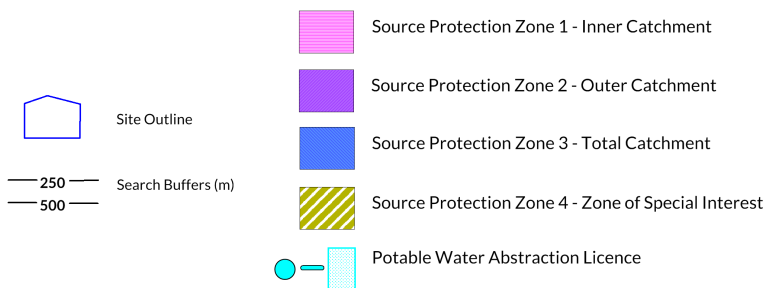
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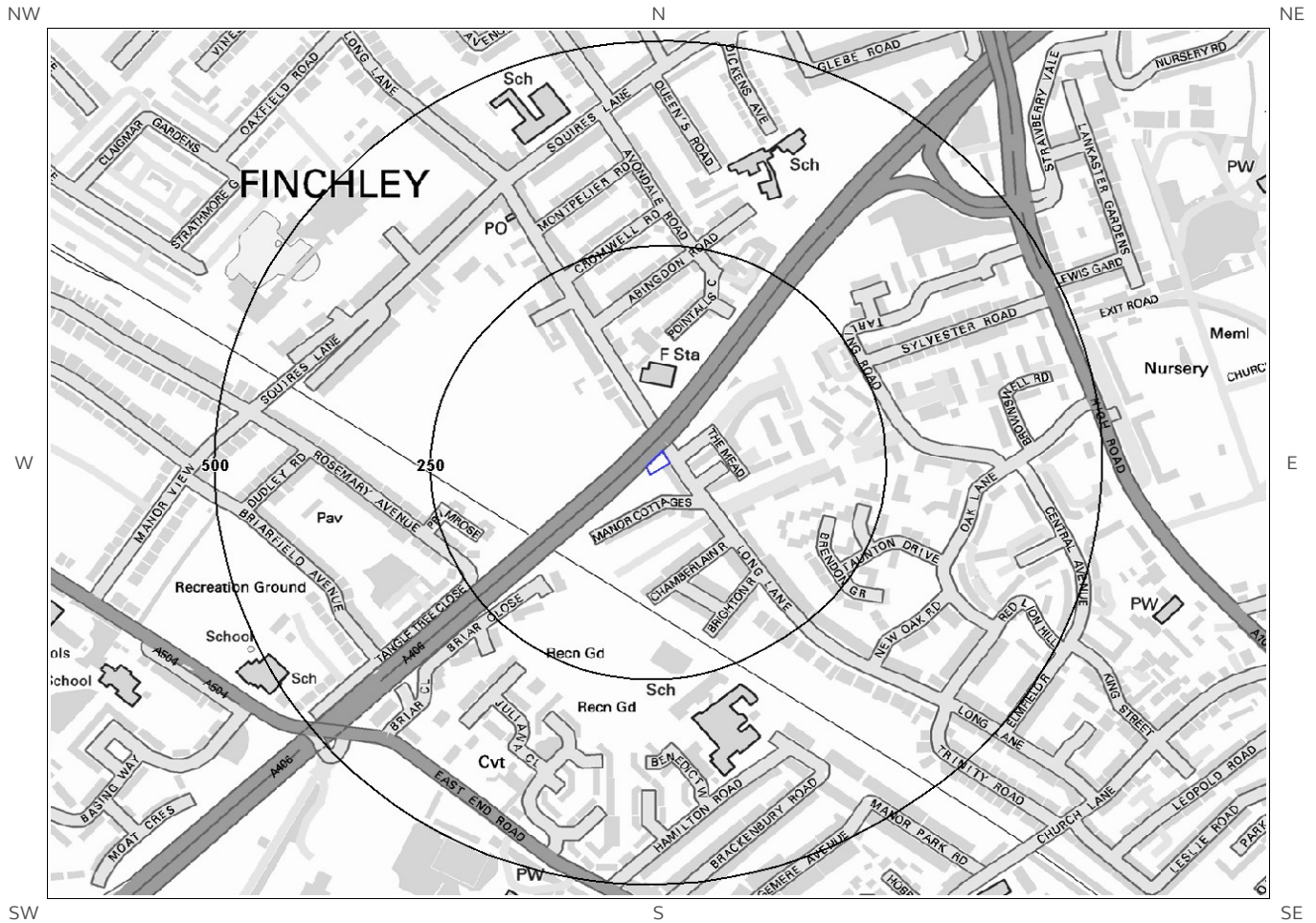
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



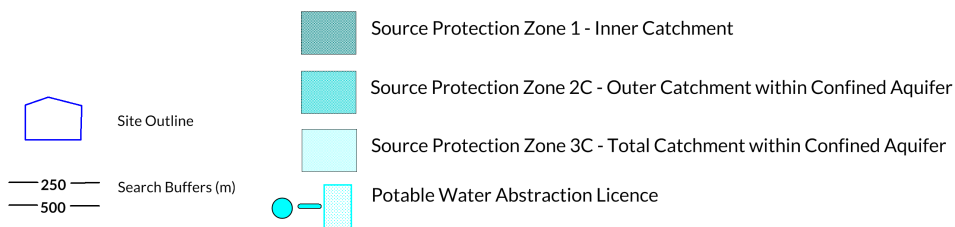
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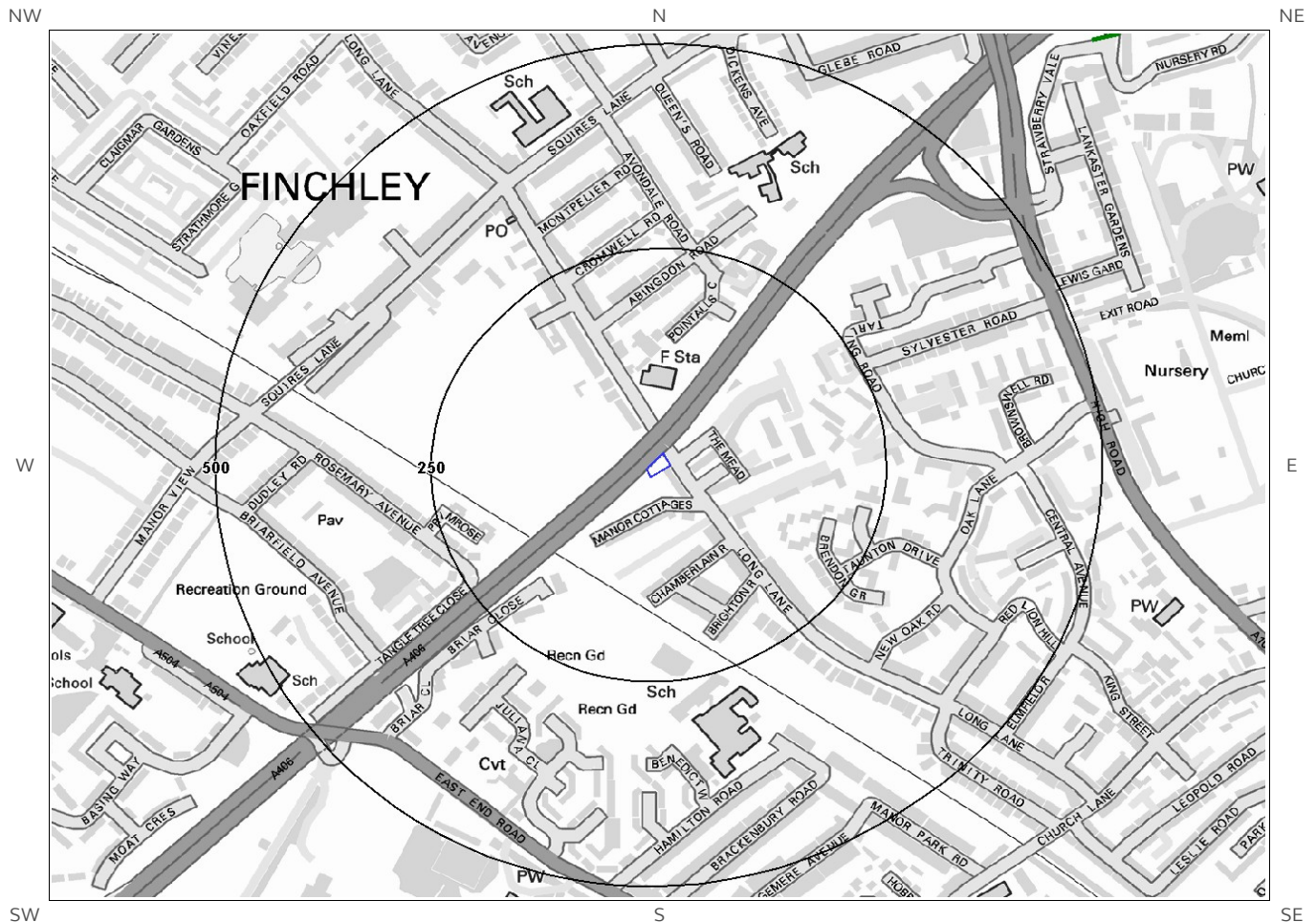
6d. Hydrogeology – Source Protection Zones within confined aquifer



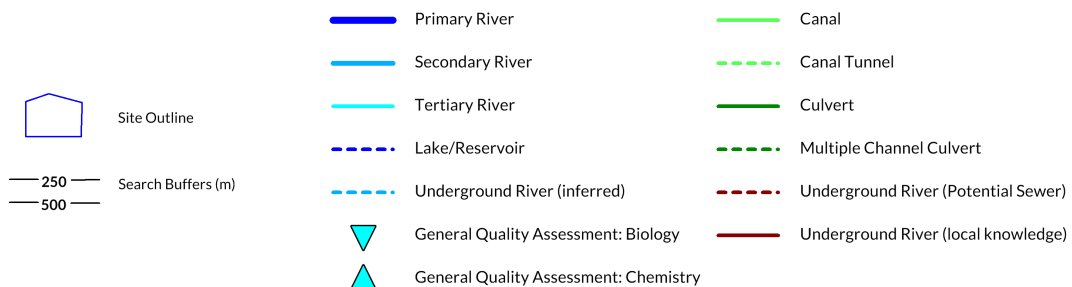
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6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
4	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
1	18	N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	237	S	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	237	S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
97	N	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? No

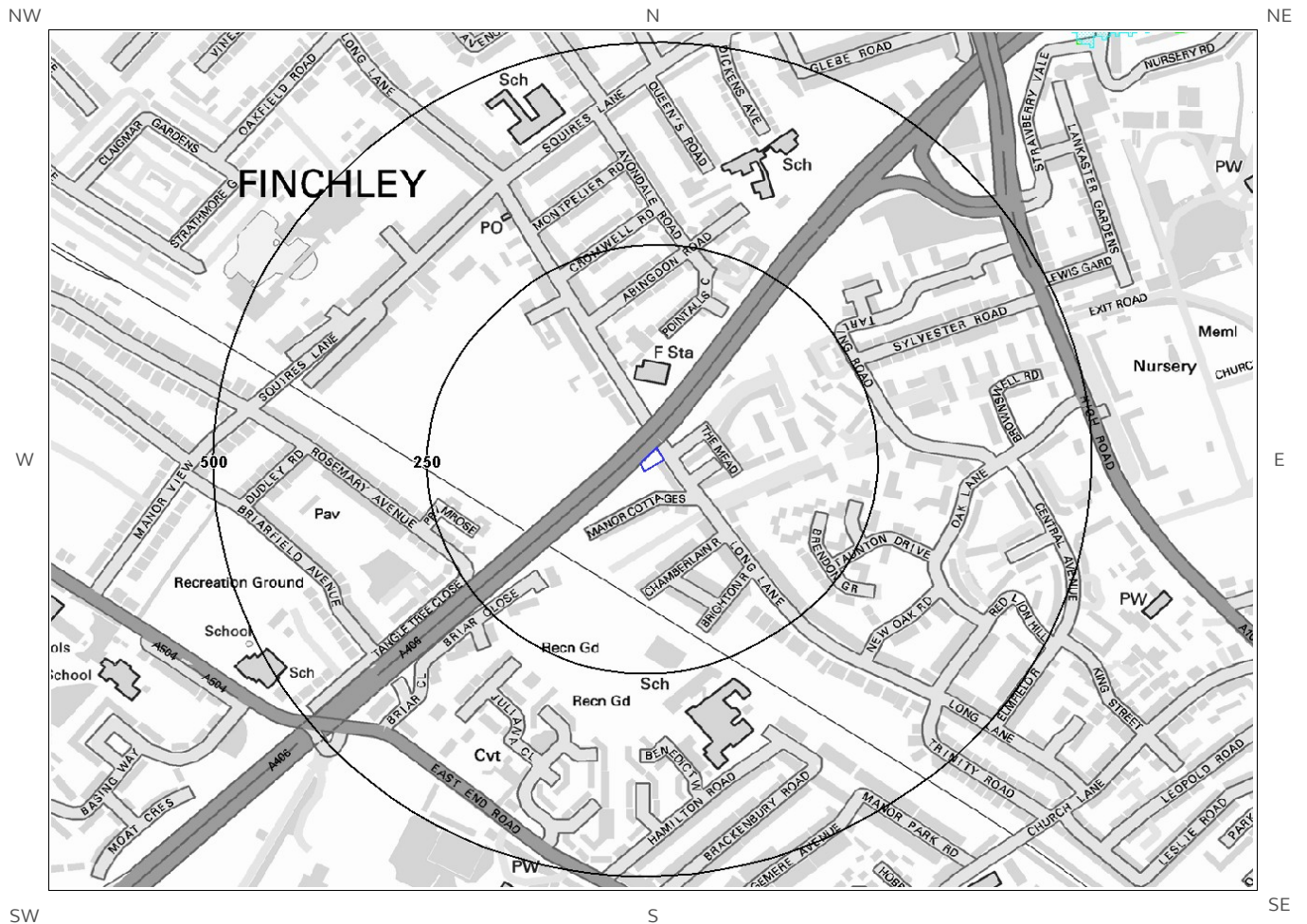
Database searched and no data found.

6.11 Surface Water Features

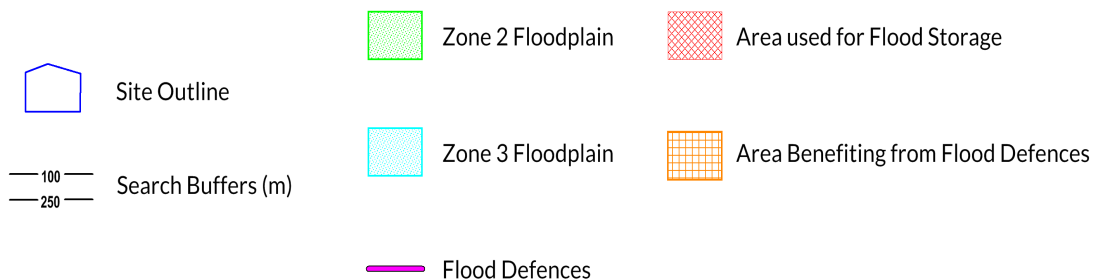
Are there any surface water features within 250m of the study site? No

Database searched and no data found.

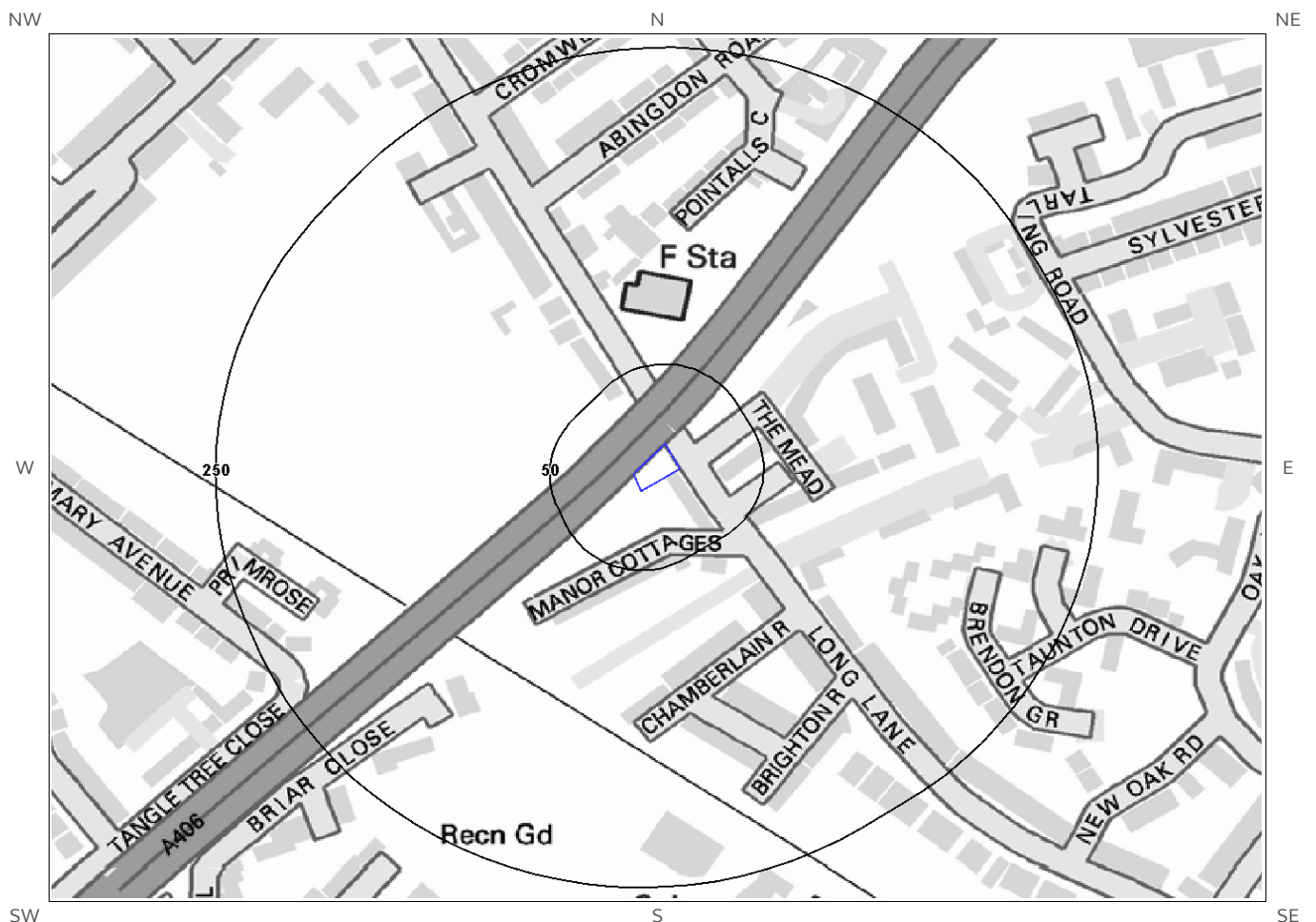
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



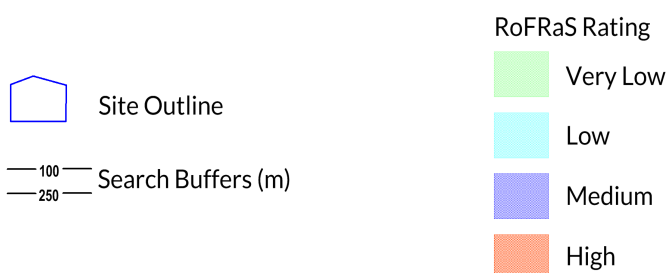
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? No

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? No

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

7.8 Groundwater Flooding Confidence Areas

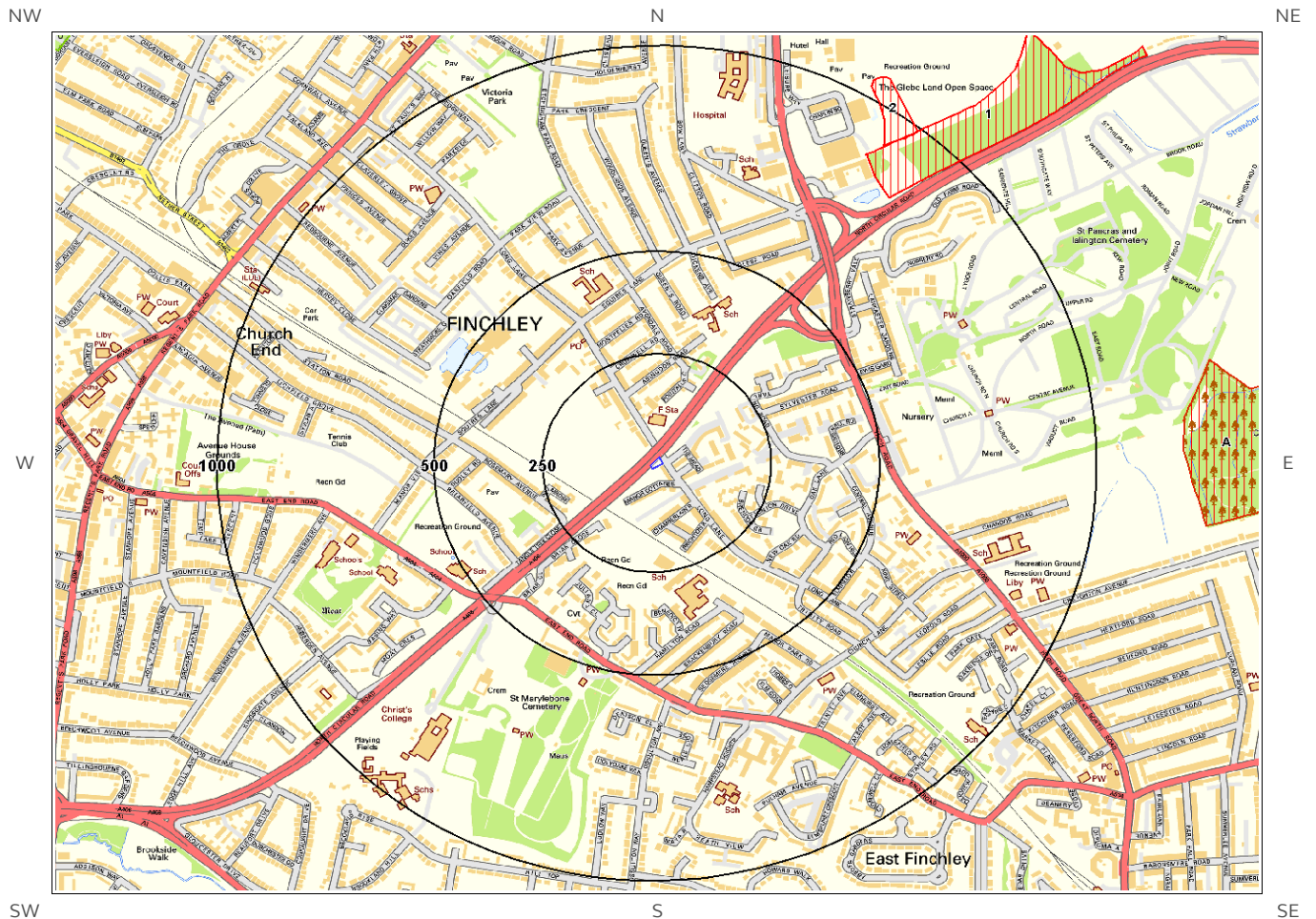
What is the British Geological Survey confidence rating in this result?

High

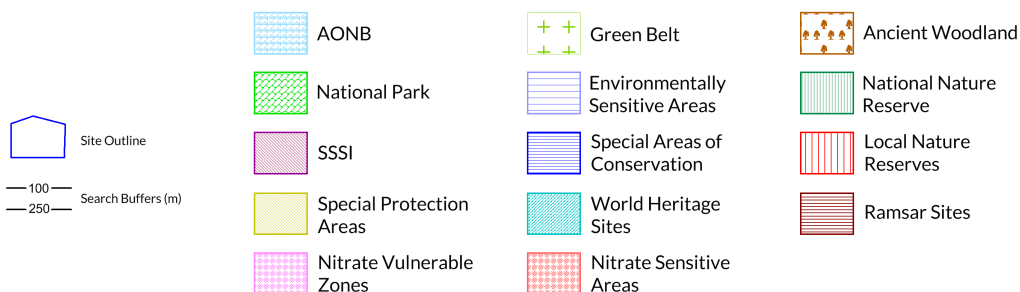
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

3

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
7A	1202	E	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1463	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1758	NE	UNKNOWN	Ancient and Semi-Natural Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

6

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
1	823	NE	Coppetts Wood and Glebelands	Natural England
2	917	NE	Coppetts Wood and Glebelands	Natural England
3A	1202	E	Coldfall Wood	Natural England
Not shown	1412	SW	Big Wood & Little Wood	Natural England
Not shown	1463	S	Big Wood & Little Wood	Natural England
Not shown	1758	NE	Coppetts Wood and Glebelands	Natural England

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

8.14 Records of Green Belt land within 2000m of the study site:

1

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
10	1697	NW	London Area Greenbelt	Barnet London Borough

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **Groundsure Geo Insight**, available from our **website**. The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing

ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? No

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:

Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506

Web: www.environment-agency.gov.uk

Email: enquiries@environment-agency.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe

Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority

Authority: London Borough of Barnet
Phone: 020 8359 2000

Web: <http://www.barnet.gov.uk/>

Address: North London Business Park, Oakleigh Road South, London,

Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444



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<https://www.groundsure.com/terms-and-conditions-sept-2016>

Arcadis

Arcadis, 10, MEDAWAR ROAD,
GUILDFORD, GU2 7AR

Groundsure
Reference:

GS-4141297

Your Reference: PO0067007-1

Report Date 1 Aug 2017

Report Delivery Method: Email - pdf

Geo Insight

Address: LONG LANE, LONDON,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

Address: LONG LANE, LONDON,

Date: 1 Aug 2017

Reference: GS-4141297

Client: Arcadis

NW N NE

W E



SW S SE

Aerial Photograph Capture date: 28-Apr-2013

Grid Reference: 526207,190250

Site Size: 0.04ha

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Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Geology 1:10,000 Scale

1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslide within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of faults within 500m of the study site boundary at 1:10,000 scale?	No

Section 2: Geology 1:50,000 Scale

2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslide within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and Faults

2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.

2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?

Yes

2.3.3 Are there any records of faults within 500m of the study site boundary?

No

Section 3: Radon

3. Radon

3.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection

No radon protective measures are necessary.

Section 4: Ground Workings

	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	11	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	0	0	0	0
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

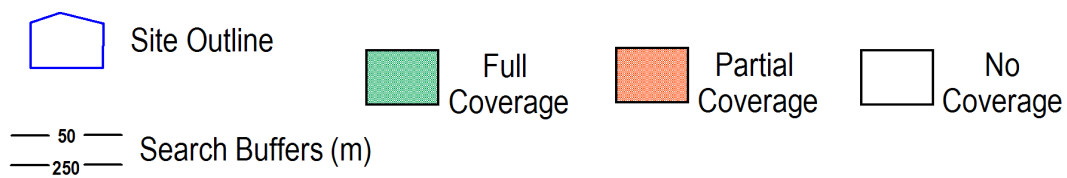
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Low				
6.2 Landslides	Very Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Negligible				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Very Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	6	21		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	1	1	0		
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500	
9.1 Tunnels	0	0	1	Not Searched	
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched	
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	0	0	Not Searched	
9.5 Railway Projects	0	0	0	0	

1:10,000 Scale Availability



1_10,000 Availability Legend

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Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	No coverage
2	237.0	Some deposits are mapped	Full	Full	No coverage
3	1190.0	Some deposits are mapped	Full	Full	No coverage
4	1215.0	Some deposits are mapped	Full	Full	No coverage

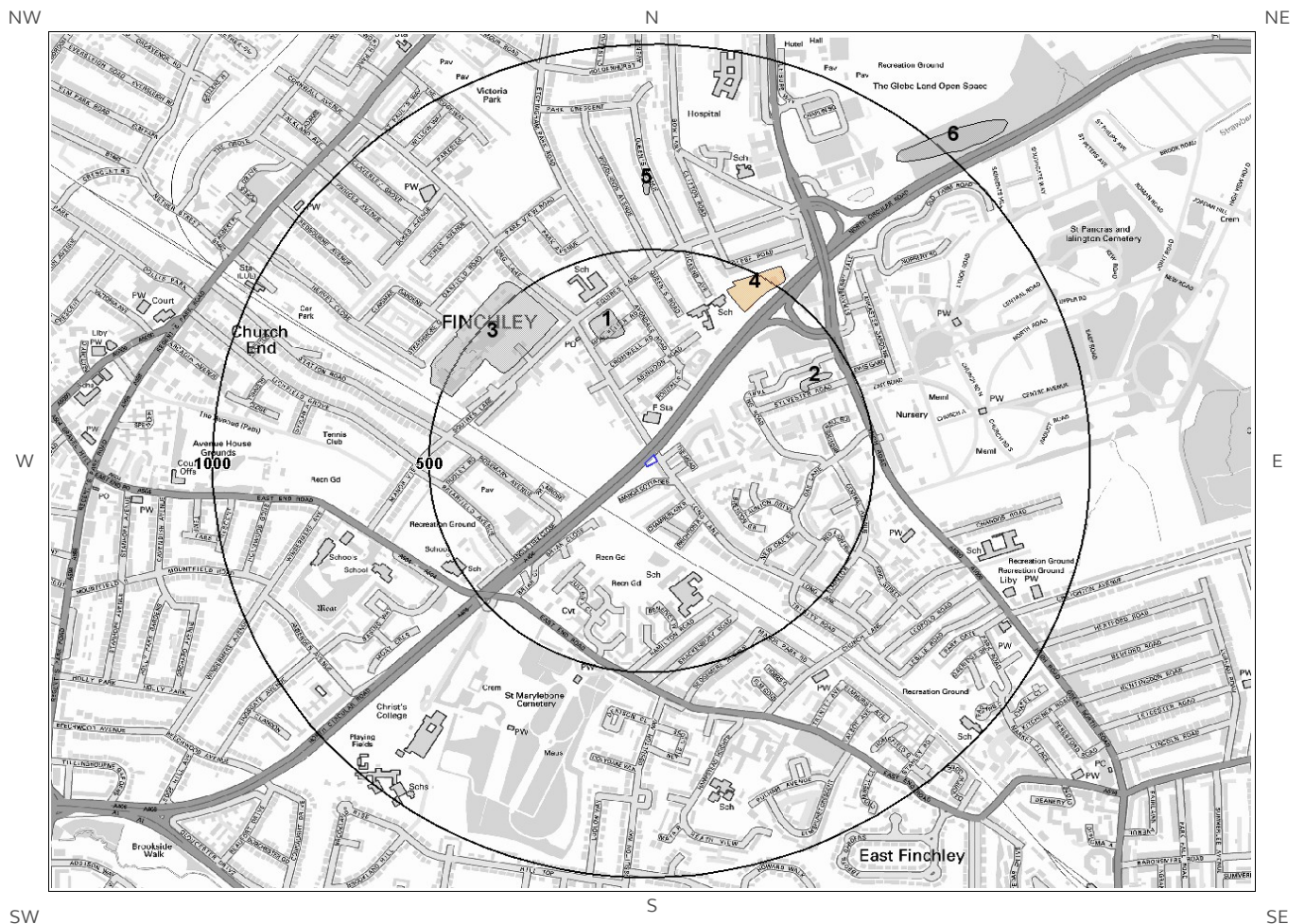
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

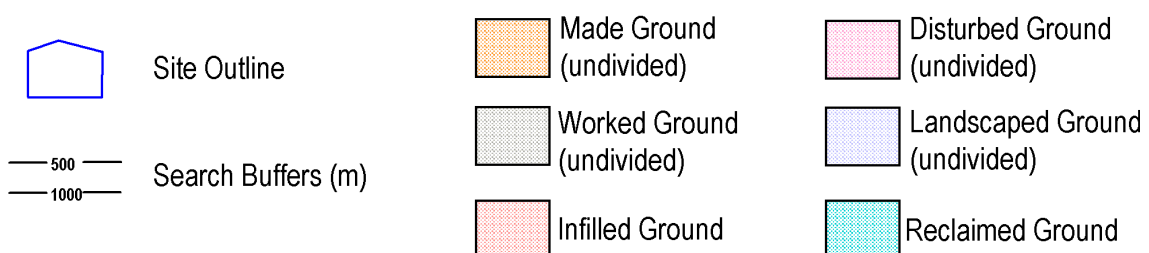
1 Geology (1:10,000 scale).

1.1 Artificial Ground Map (1:10,000 scale)



Artificial Ground Legend

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1. Geology 1:10,000 scale

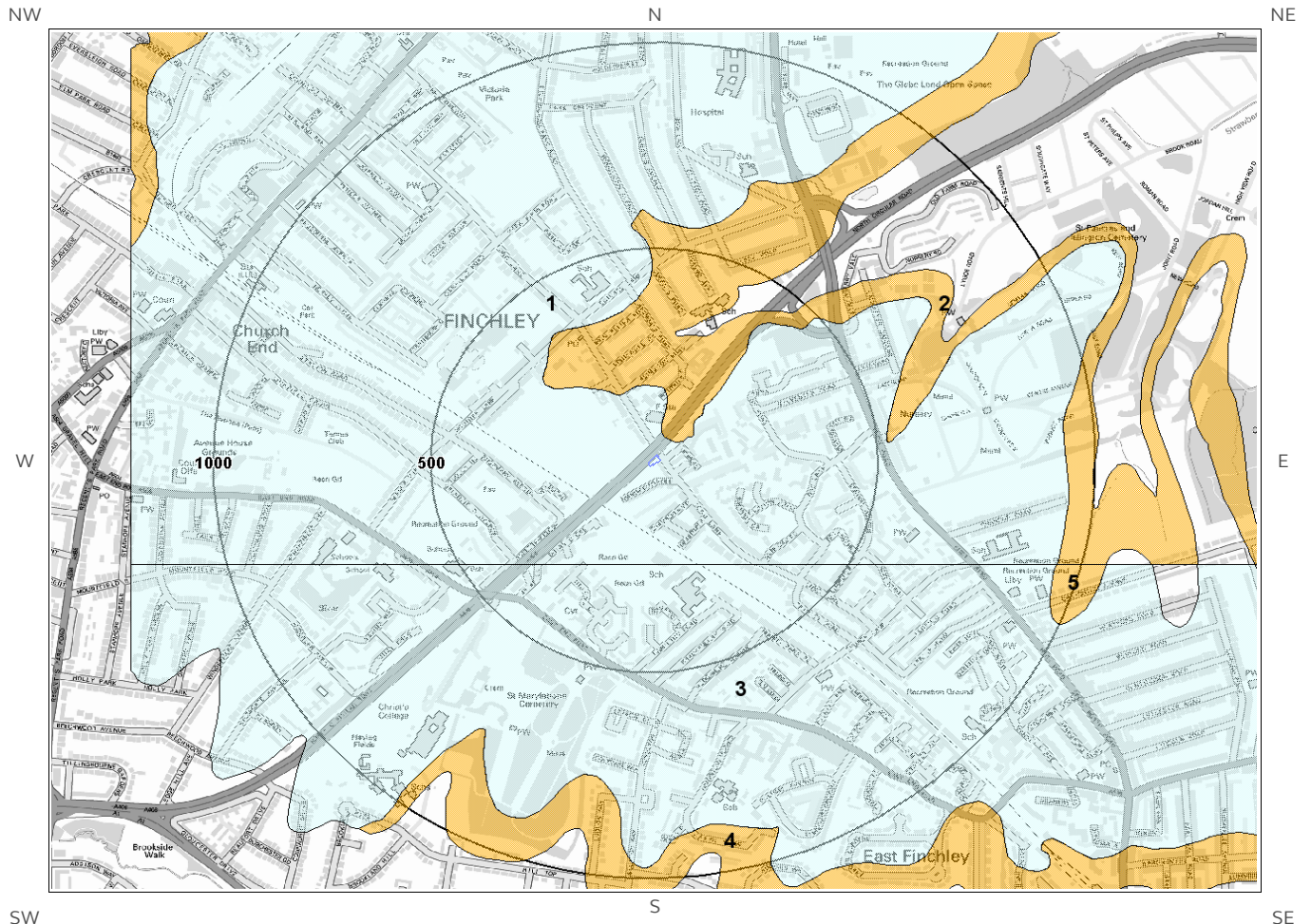
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

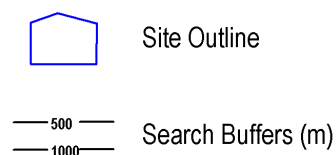
ID	Distance	Direction	LEX Code	Description	Rock Description
1	298.0	N	WGR- UNKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
2	375.0	NE	WGR- UNKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
3	383.0	NW	WGR- UNKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
4	407.0	NE	MGR- UNKNOWN	Made Ground (Undivided)	Unknown/unclassified Entry

1.2 Superficial Deposits and Landslips Map (1:10,000 scale)



Artificial Ground Legend

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1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILL-DMTN	Till - Diamicton	Diamicton
2	46.0	NE	DHGR-XSV	Dollis Hill Gravel Member - Sand And Gravel	Sand And Gravel
3	237.0	S	TILL-DMTN	Till - Diamicton	Diamicton

1.2.2 Landslip

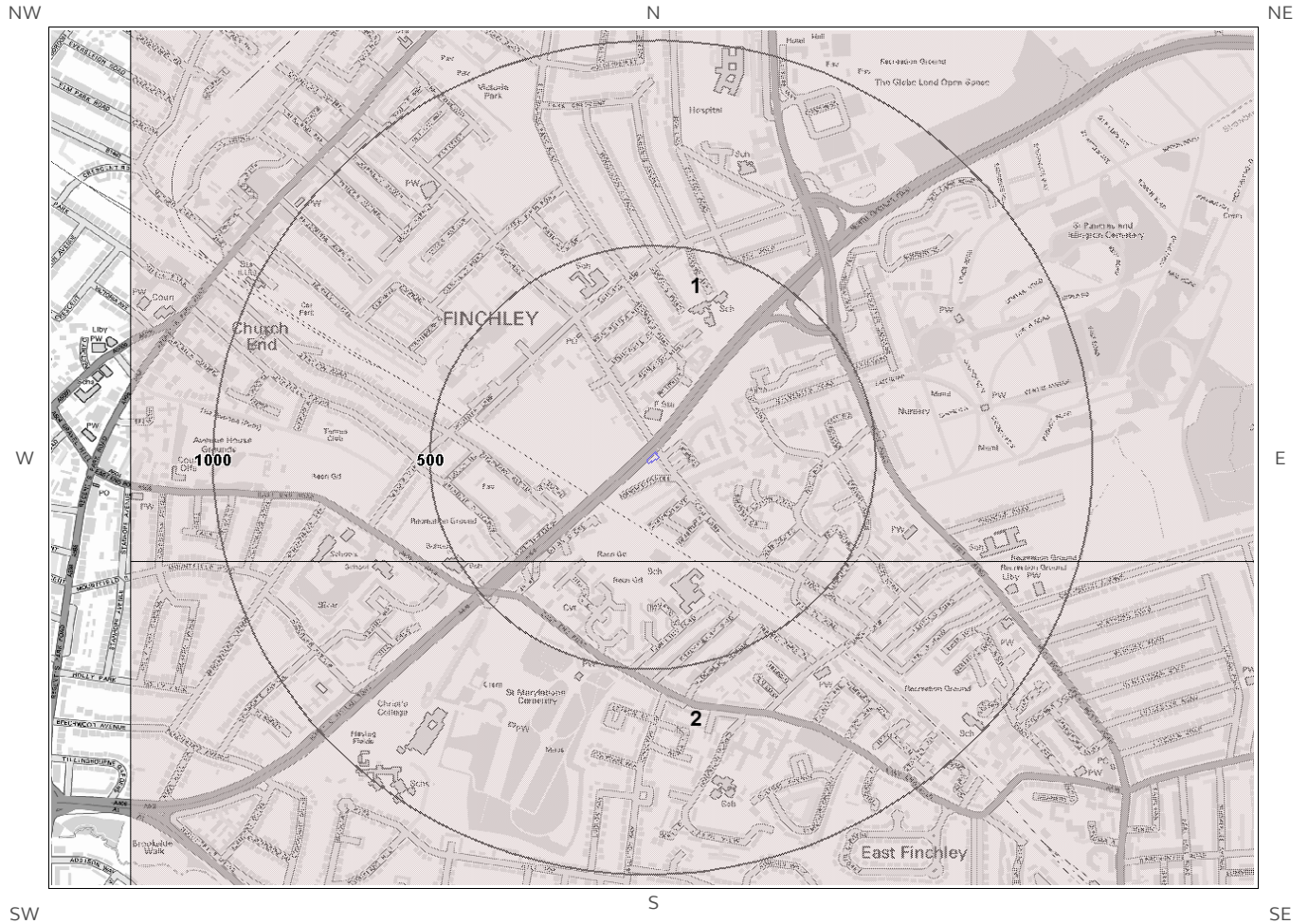
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and Faults Map (1:10,000 scale)

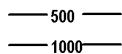


Bedrock and Faults Legend

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Site Outline



Search Buffers (m)

1.3 Bedrock and Faults

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	LC-CLAY	London Clay Formation - Clay	Eocene Epoch
2	237.0	S	LC-CLAY	London Clay Formation - Clay	Eocene Epoch

1.3.2 Faults

Are there any records of Faults within 500m of the study site boundary at 1:10,000 scale? No

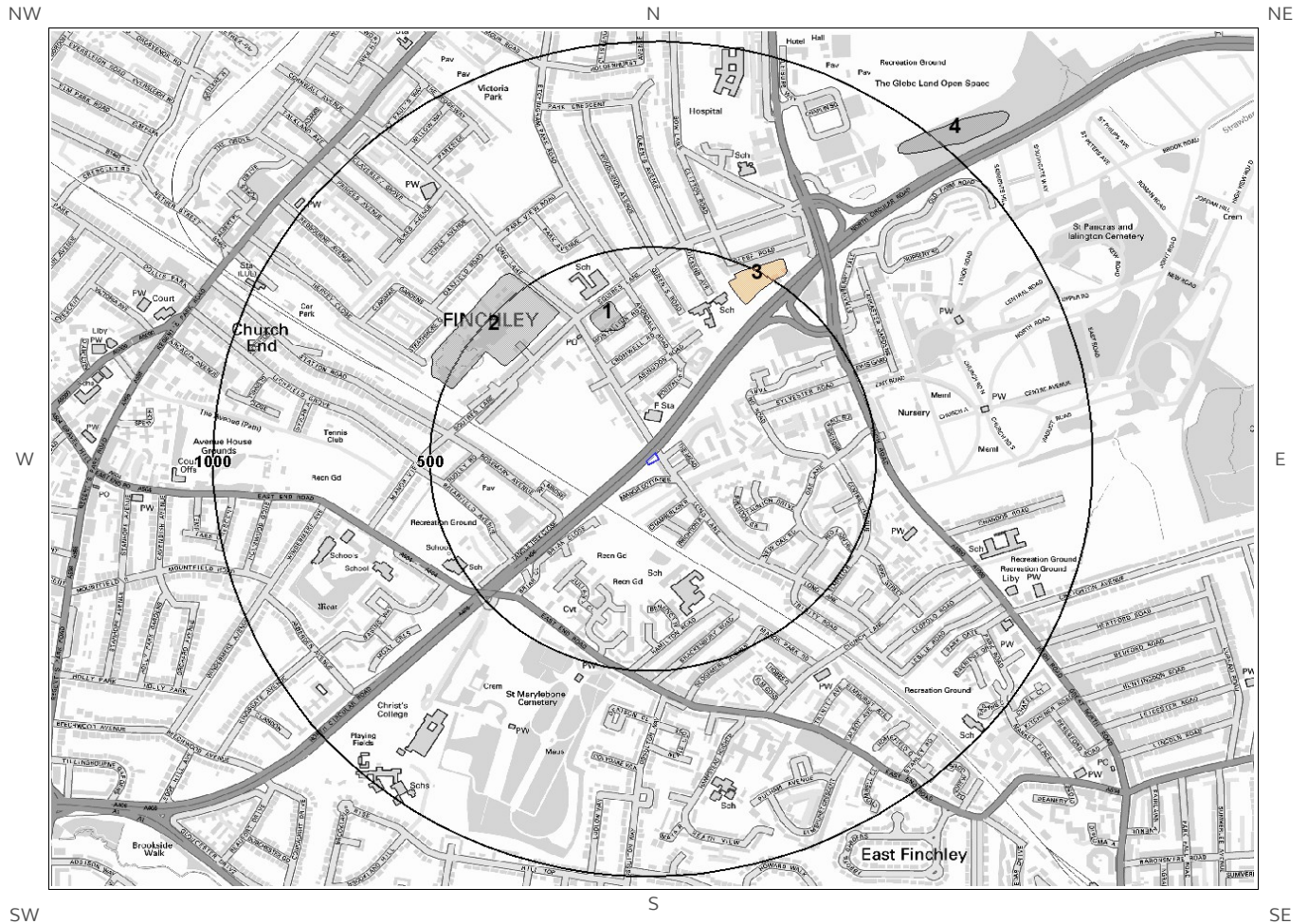
Database searched and no data found at this scale.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

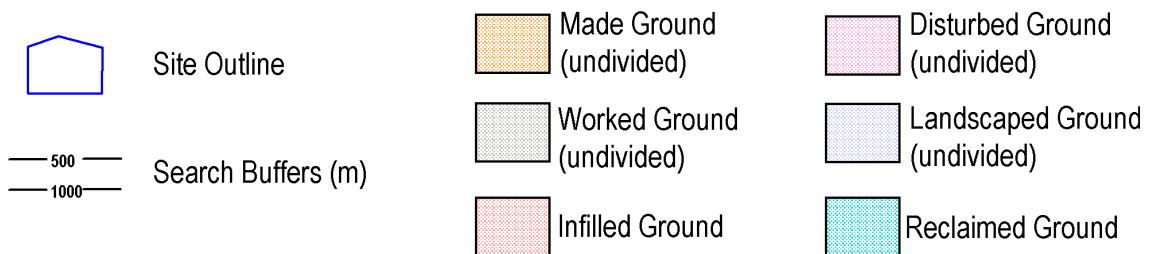
2 Geology 1:50,000 Scale

2.1 Artificial Ground Map



Ground Workings Legend

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2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 256

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

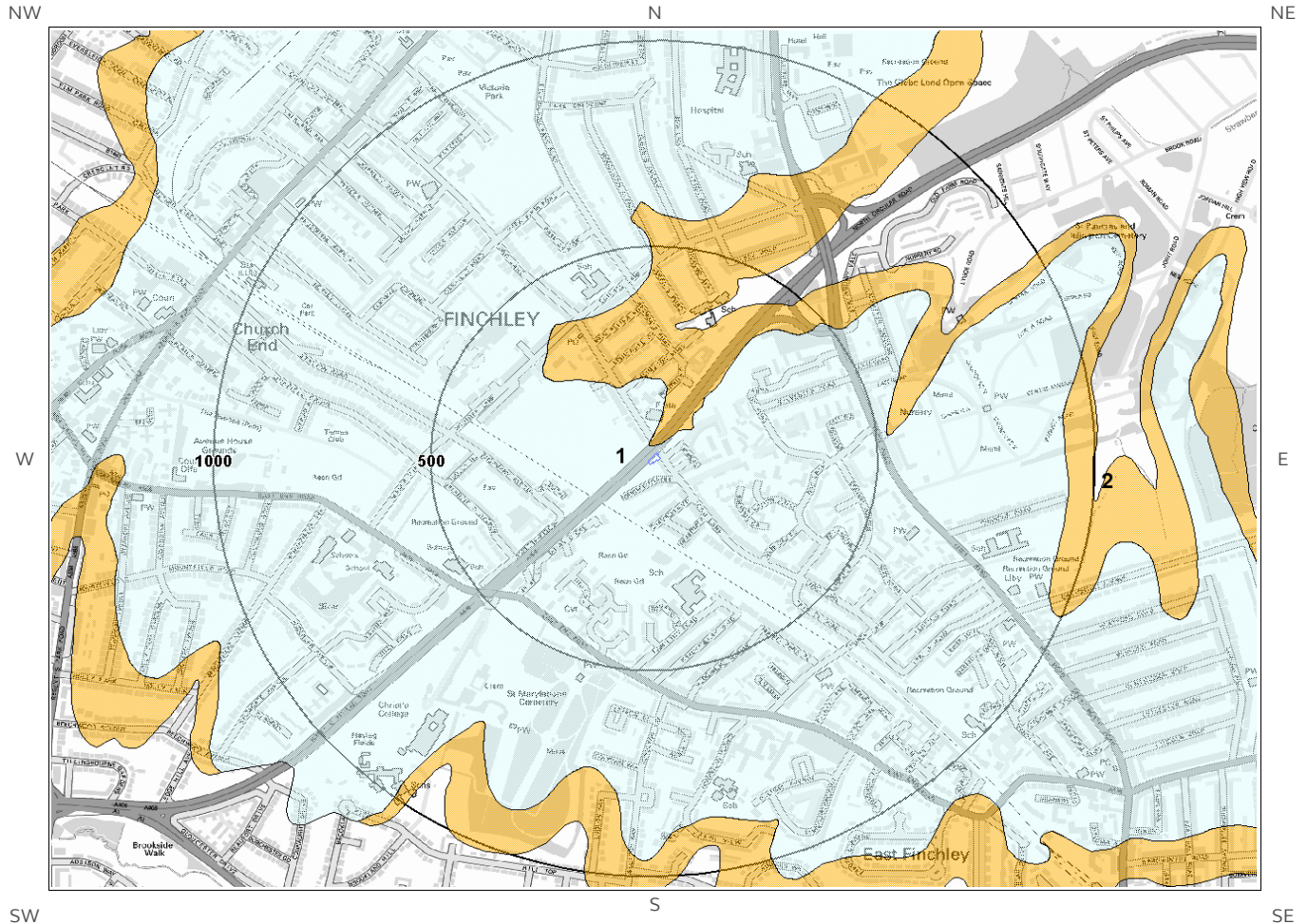
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	311.0	N	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
2	392.0	NW	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
3	418.0	NE	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

2.2 Superficial Deposits and Landslips Map (1:50,000 scale)

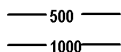


Ground Workings Legend

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Site Outline



Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
2	18.0	N	DHGR-XSV	DOLLIS HILL GRAVEL MEMBER	SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Moderate	Low
18.0	N	Intergranular	Very High	High

2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

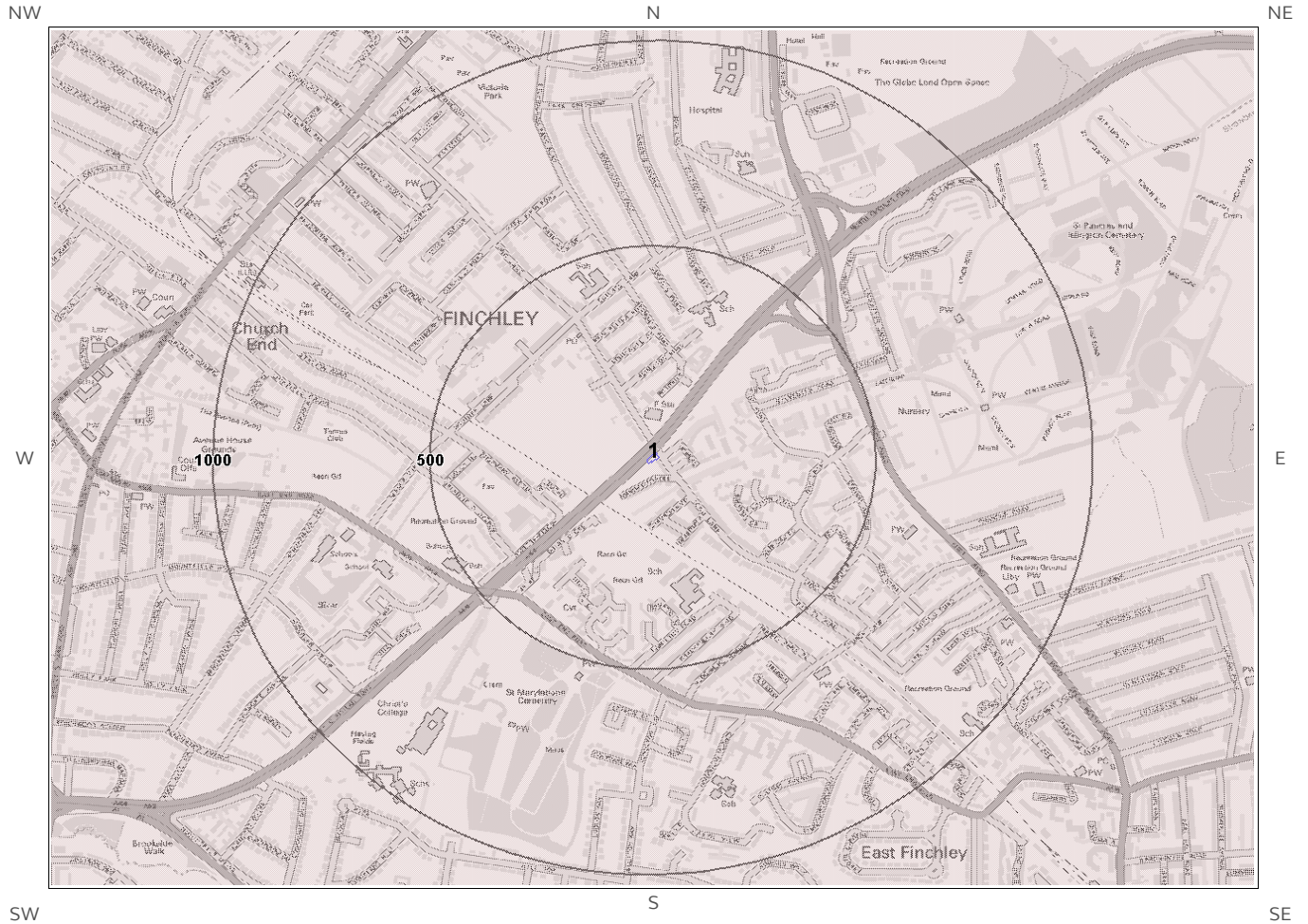
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary? No

Database searched and no data found.

2.3 Bedrock and Faults Map (1:50,000 scale)

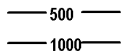


Ground Workings Legend

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Site Outline



Search Buffers (m)

2.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 256

2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	LC-XCZS	LONDON CLAY FORMATION - CLAY, SILT AND SAND	YPRESIAN

2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Moderate	Very Low

2.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

3 Radon Data

3.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection



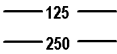


Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

4 Ground Workings Map



Ground Workings Legend

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- | | | | |
|---|--------------------|---|----------------------------------|
|  | Site Outline |  | Historic Surface Ground Workings |
|  | Search Buffers (m) |  | Historic Underground Workings |
| | |  | Current Ground Workings |

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Use	Date
1	124.0	SW	525961 190230	Cuttings	1865
2	132.0	S	526258 190027	Cuttings	1936
3	135.0	SW	526122 190111	Cuttings	1920
4	143.0	SW	525068 190806	Cuttings	1940
5	143.0	S	526217 190051	Cuttings	1940
6	149.0	SW	526034 190169	Cuttings	1920
7A	158.0	SW	526021 190182	Cuttings	1938
8A	161.0	SW	526015 190187	Cuttings	1936
9	200.0	W	525877 190277	Cuttings	1936
10B	201.0	E	526438 190181	Pond	1895
11B	201.0	E	526439 190172	Pond	1865

4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

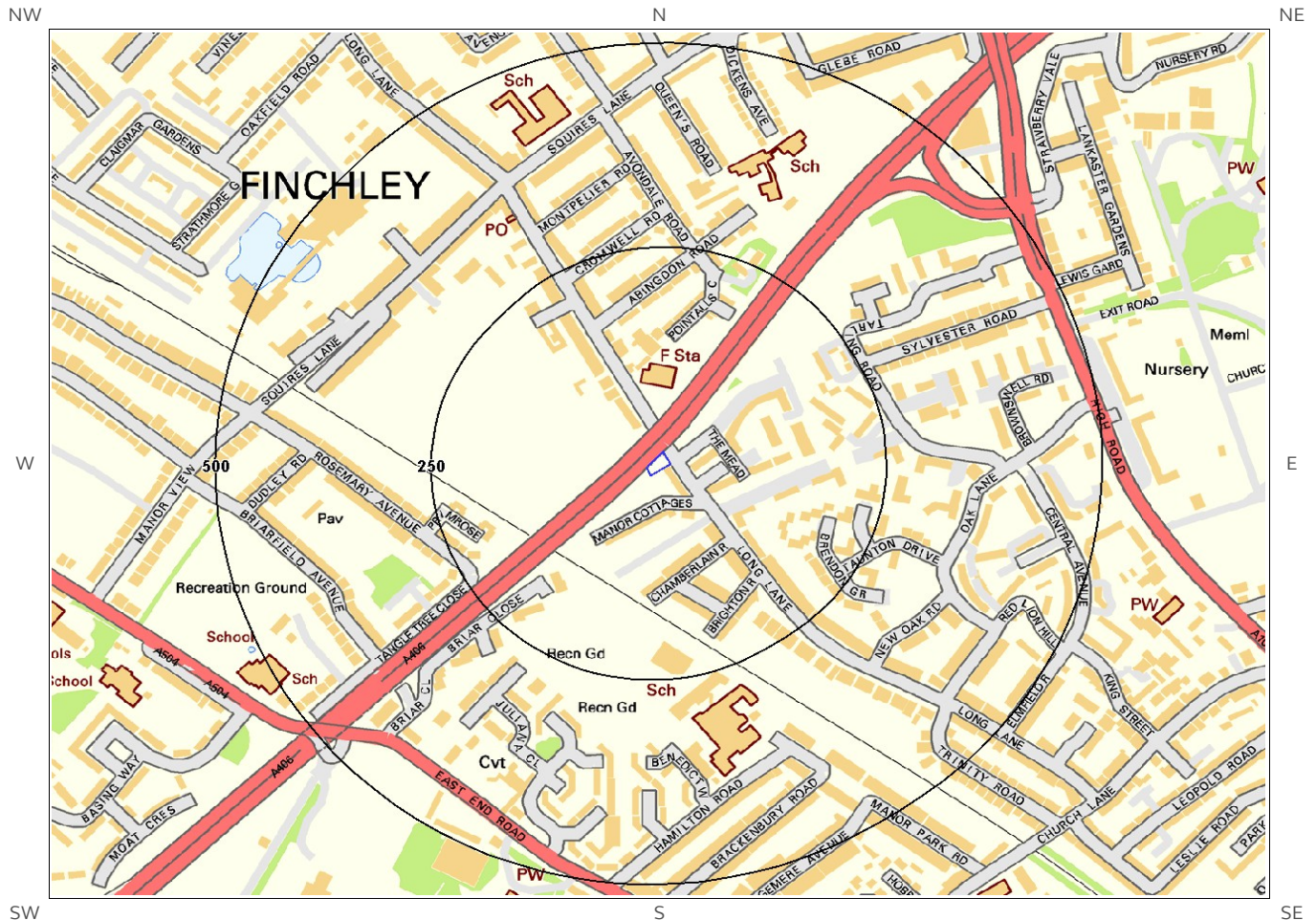
4.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

5 Mining, Extraction & Natural Cavities Map



Mining, Extraction and
Natural Cavities Legend

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5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled “Review of mining instability in Great Britain, 1990” PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

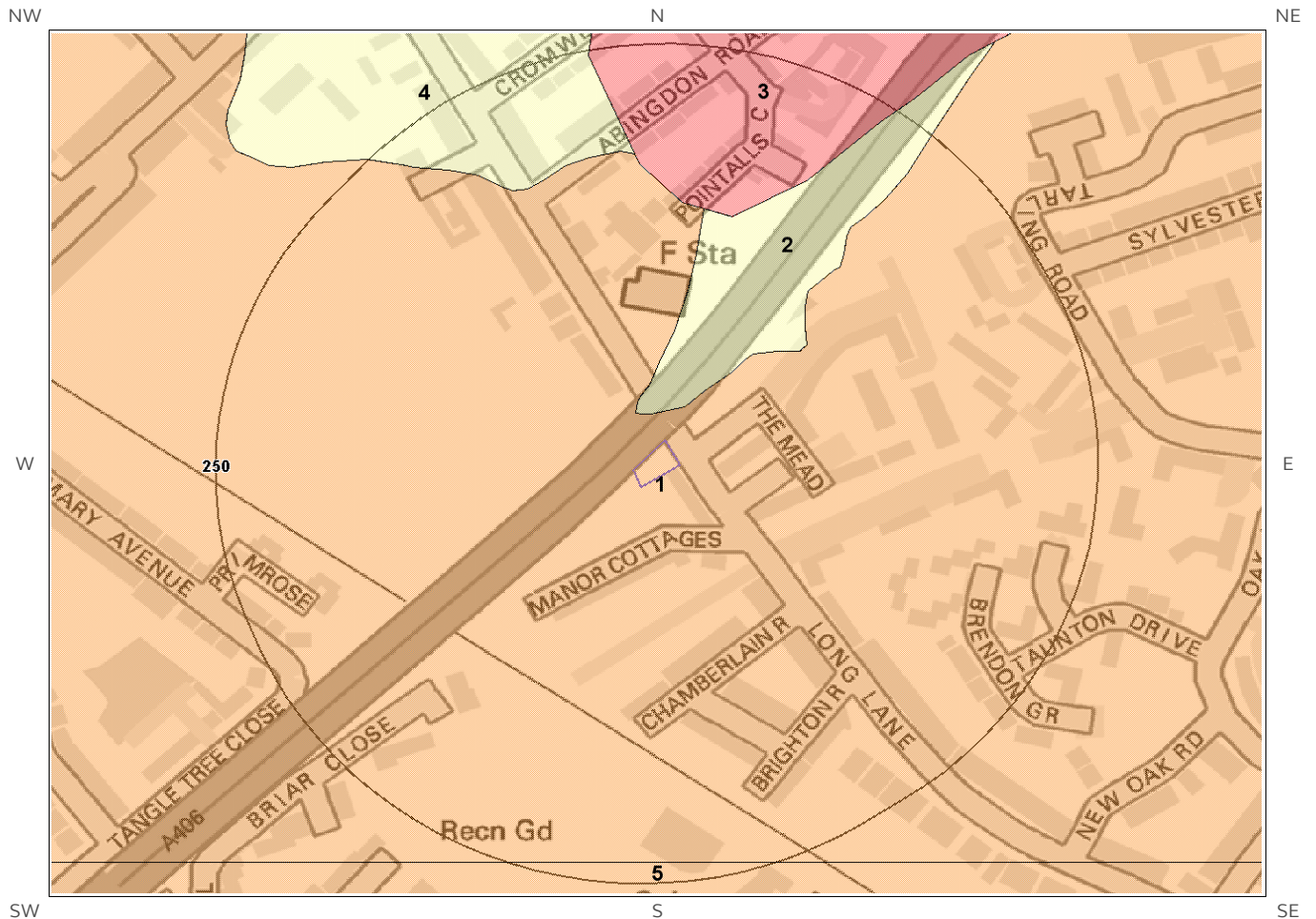
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map

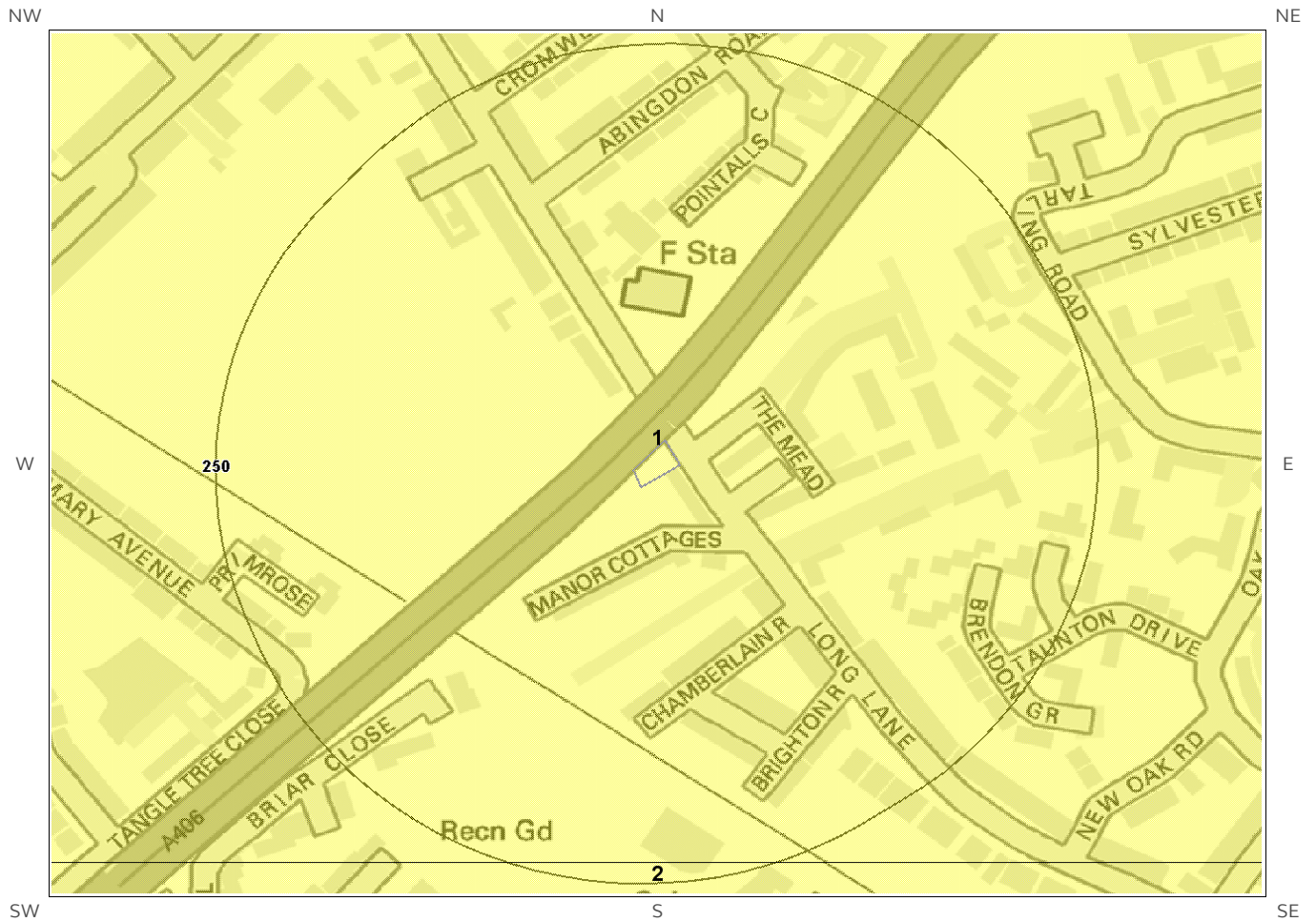


Shrink Swell Clay Legend

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6.2 Landslides Map



Landslides Legend

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6.3 Ground Dissolution of Soluble Rocks Map



Ground Dissolution
Soluble Rocks Legend

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6.4 Compressible Deposits Map



Compressible Deposits Legend

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6.5 Collapsible Deposits Map

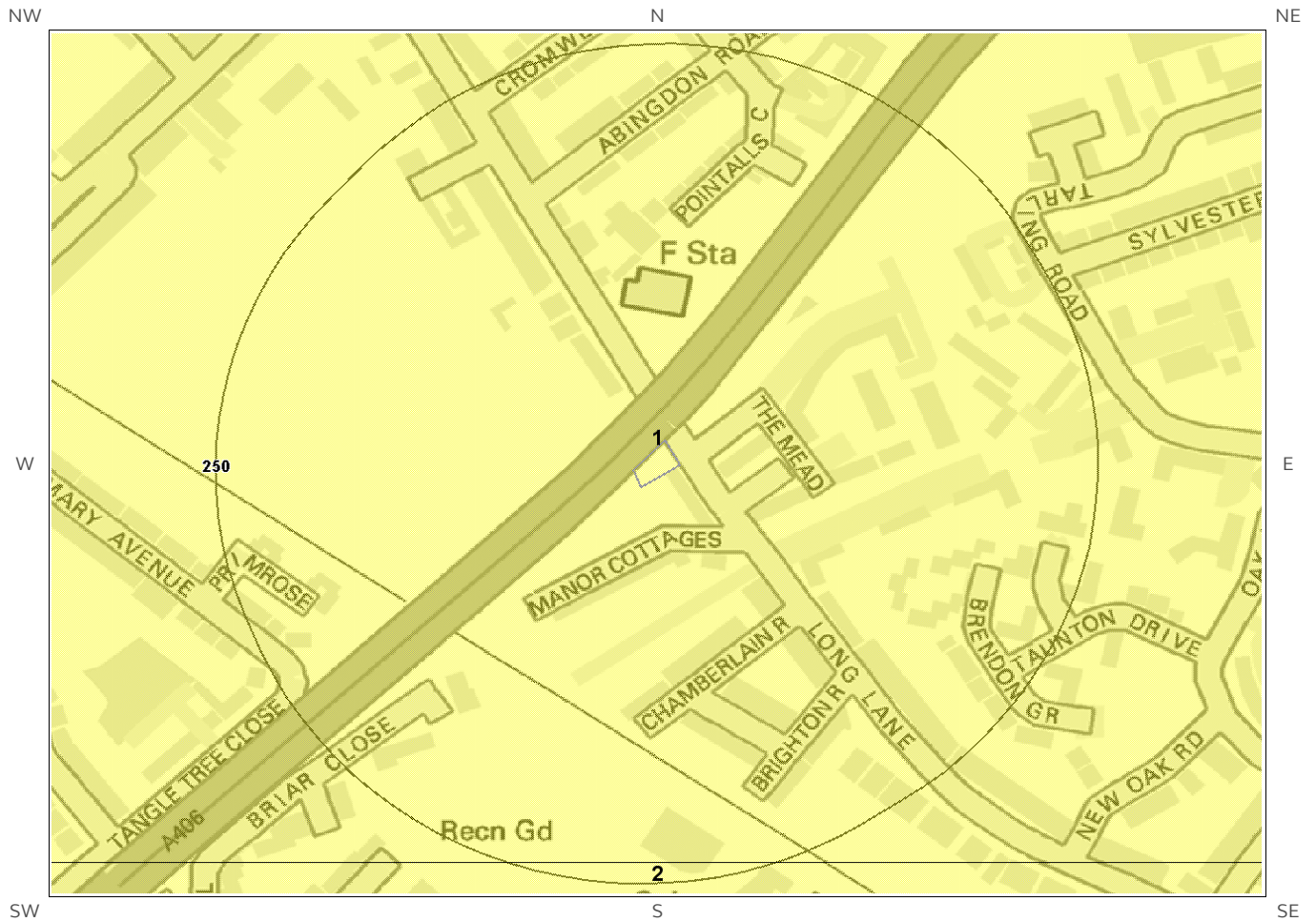


Collapsible Deposits Legend

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6.6 Running Sand Map



Running Sand Legend

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6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? Low

6.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.
2	18.0	N	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with landslides.

* This includes an automatically generated 50m buffer zone around the site

6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

6.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

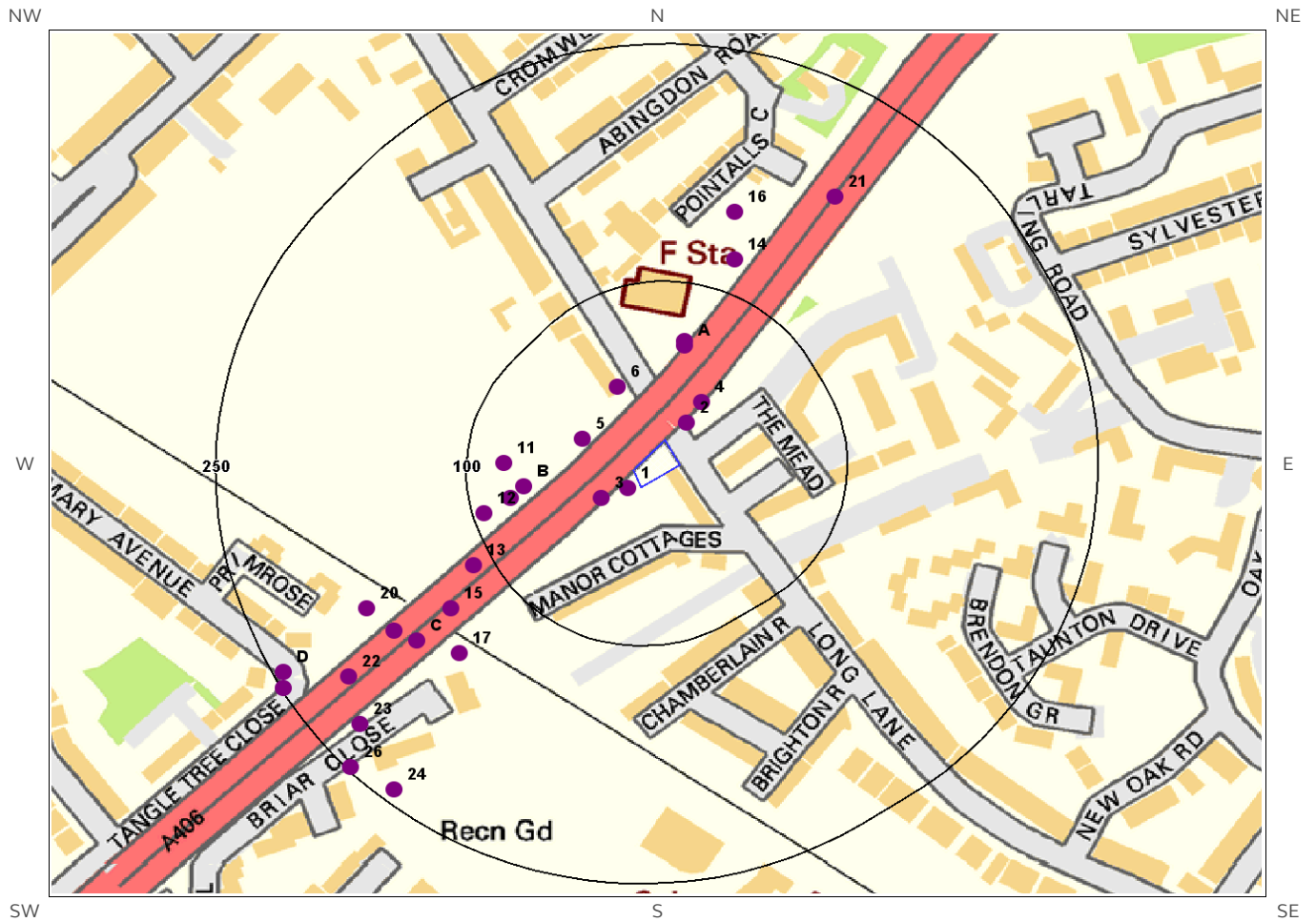
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

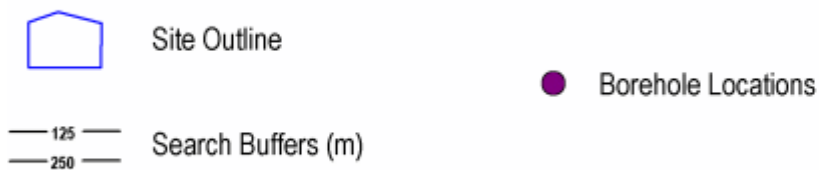
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records Map



Borehole Records Legend

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7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary:

27

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	8.0	SW	526186 190236	TQ29SE135	14.0	A406 NTH CIRC FINCHLEY A19
2	16.0	NE	526221 190277	TQ29SE148	3.0	A406 NTH CIRC FINCHLEY TP 11
3	25.0	SW	526170 190230	TQ29SE42	30.1	NORTH CIRCULAR (A406) BH18
4	32.0	NE	526230 190290	TQ29SE44	30.1	NORTH CIRCULAR (A406) BH20
5	36.0	NW	526159 190267	TQ29SE147	3.0	A406 NTH CIRC FINCHLEY TP 10
6	44.0	NW	526180 190300	TQ29SE43	30.1	NORTH CIRCULAR (A406) BH19
7A	60.0	N	526220 190326	TQ29SE136	40.0	A406 NTH CIRC FINCHLEY A20
8A	63.0	N	526220 190329	TQ29SE149	3.0	A406 NTH CIRC FINCHLEY TP 12
9B	66.0	W	526124 190237	TQ29SE133	20.0	A406 NTH CIRC FINCHLEY A17
10B	76.0	W	526116 190230	TQ29SE146	3.0	A406 NTH CIRC FINCHLEY TP 9
11	78.0	W	526112 190252	TQ29SE134	20.0	A406 NTH CIRC FINCHLEY A18
12	94.0	W	526100 190220	TQ29SE41	15.2	NORTH CIRCULAR (A406) BH17
13	112.0	SW	526094 190187	TQ29SE132	40.0	A406 NTH CIRC FINCHLEY A16
14	121.0	N	526250 190380	TQ29SE45	30.1	NORTH CIRCULAR (A406) BH21
15	138.0	SW	526080 190160	TQ29SE40	30.1	NORTH CIRCULAR (A406) BH16
16	149.0	N	526250 190410	TQ29SE182	12.0	FINCHLEY FIERE STATION 1
17	152.0	SW	526085 190132	TQ29SE131	40.0	A406 NTH CIRC FINCHLEY A15
18C	166.0	SW	526060 190140	TQ29SE39	30.0	NORTH CIRCULAR (A406) BH15
19C	174.0	SW	526046 190146	TQ29SE129	11.0	A406 NTH CIRC FINCHLEY A14
20	181.0	SW	526030 190160	TQ29SE38	15.2	NORTH CIRCULAR (A406) BH14
21	184.0	NE	526310 190420	TQ29SE46	30.1	NORTH CIRCULAR (A406) BH22
22	212.0	SW	526019 190117	TQ29SE130	40.0	A406 NTH CIRC FINCHLEY A14A

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
23	225.0	SW	526026 190087	TQ29SE128	25.0	A406 NTH CIRC FINCHLEY A13
24	242.0	SW	526046 190046	TQ29SE145	3.0	A406 NTH CIRC FINCHLEY TP 8
25D	244.0	SW	525980 190120	TQ29SE257	9.0	ROSEMARY AVENUE BARNET
26	248.0	SW	526020 190060	TQ29SE258	9.0	ROSEMARY AVENUE BARNET
27D	249.0	SW	525980 190110	TQ29SE37	7.0	NORTH CIRCULAR (A406) BH13

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/593953
 #2: scans.bgs.ac.uk/sobi_scans/boreholes/593966
 #3: scans.bgs.ac.uk/sobi_scans/boreholes/593860
 #4: scans.bgs.ac.uk/sobi_scans/boreholes/593862
 #5: scans.bgs.ac.uk/sobi_scans/boreholes/593965
 #6: scans.bgs.ac.uk/sobi_scans/boreholes/593861
 #7A: scans.bgs.ac.uk/sobi_scans/boreholes/593954
 #8A: scans.bgs.ac.uk/sobi_scans/boreholes/593967
 #9B: scans.bgs.ac.uk/sobi_scans/boreholes/593951
 #10B: scans.bgs.ac.uk/sobi_scans/boreholes/593964
 #11: scans.bgs.ac.uk/sobi_scans/boreholes/593952
 #12: scans.bgs.ac.uk/sobi_scans/boreholes/593859
 #13: scans.bgs.ac.uk/sobi_scans/boreholes/593950
 #14: scans.bgs.ac.uk/sobi_scans/boreholes/593863
 #15: scans.bgs.ac.uk/sobi_scans/boreholes/593858
 #16: scans.bgs.ac.uk/sobi_scans/boreholes/594000
 #17: scans.bgs.ac.uk/sobi_scans/boreholes/593949
 #18C: scans.bgs.ac.uk/sobi_scans/boreholes/593857
 #19C: scans.bgs.ac.uk/sobi_scans/boreholes/593947
 #20: scans.bgs.ac.uk/sobi_scans/boreholes/593856
 #21: scans.bgs.ac.uk/sobi_scans/boreholes/593864
 #22: scans.bgs.ac.uk/sobi_scans/boreholes/593948
 #23: scans.bgs.ac.uk/sobi_scans/boreholes/593946
 #24: scans.bgs.ac.uk/sobi_scans/boreholes/593963
 #25D: scans.bgs.ac.uk/sobi_scans/boreholes/594075
 #26: scans.bgs.ac.uk/sobi_scans/boreholes/594076
 #27D: scans.bgs.ac.uk/sobi_scans/boreholes/593855

8 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

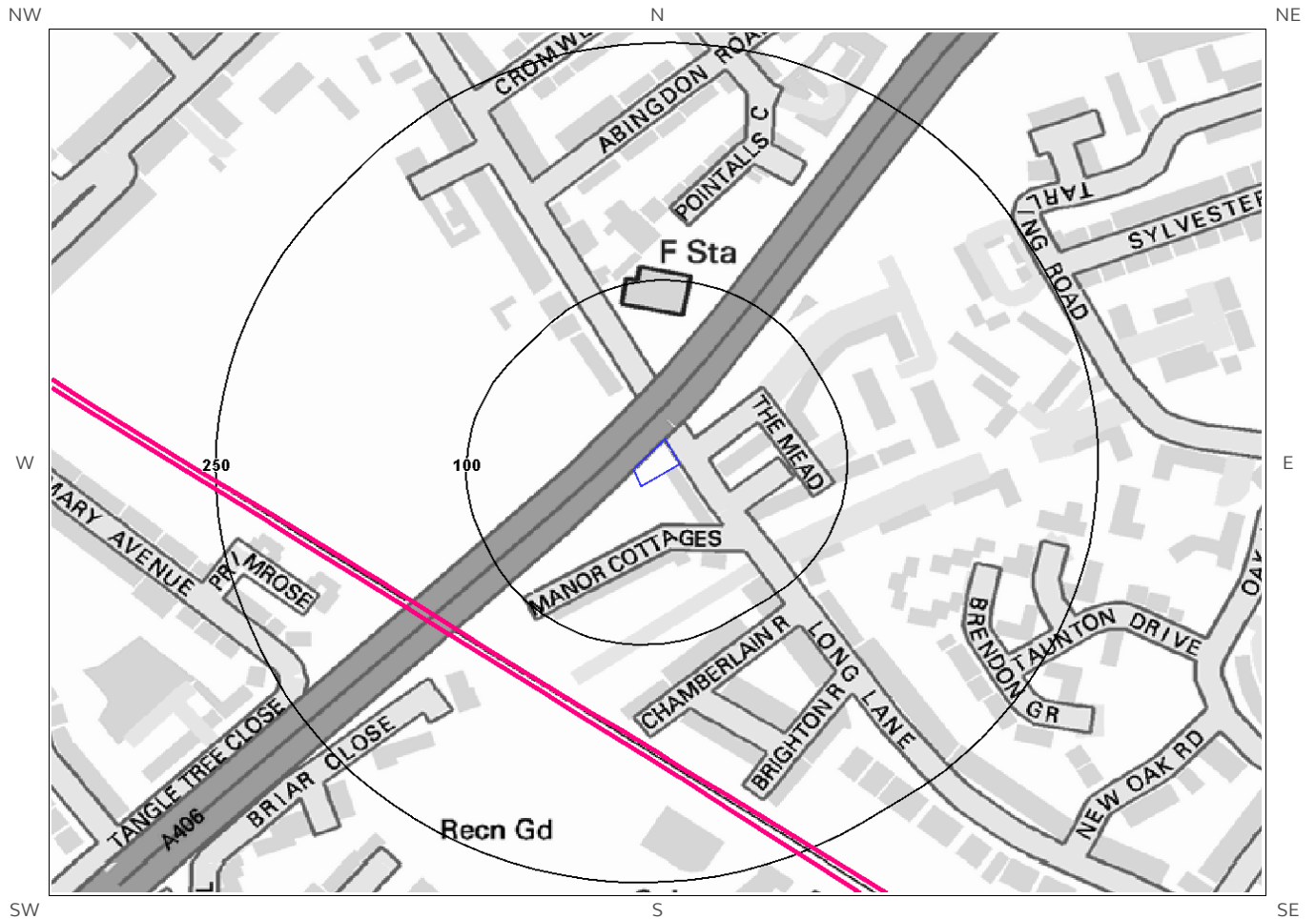
2

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	London	No data	No data	No data	No data	No data
18.0	N	London	No data	No data	No data	No data	No data














*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels Map



Railways and Tunnels Legend

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 © OpenStreetMapContributors

- | | | | | | |
|---|--------------------|---|--|---|---|
|  | Site Outline |  | Underground or Partially Underground Railway / Subway System |  | Railway Track (OpenStreetMap) |
|  | Search Buffers (m) |  | Railway Tunnel (OS Mapping) |  | High Speed 2 |
|  | 250 |  | Abandoned or Dismantled Railway (OpenStreetMap) |  | High Speed 2 Revised Proposed Route |
|  | 500 |  | Railway Track (OS Mapping) |  | Crossrail 1 |
| | | | |  | Railway and/or Tunnel Feature from Historical Mapping |

9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Detail
136	SW	London Underground - Northern Line

The approximate depth value for the nearest London Underground line given in this dataset has been extrapolated from published depths of tube lines at station platforms, and assume a constant gradient between stations. Using this method, topographical variation has resulted in some parts of the line having associated depth values either shallower or deeper than the real-world situation. Depth values are for indication only and should not be relied upon for any calculation or technical purpose and are in no way a substitute for a professional survey.

Line
London Underground Line: Northern Line Depth: 0mbgl Track Type: Surface Track

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com



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Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk



BGS Geological Hazards Reports and general geological enquiries

British Gypsum

British Gypsum Ltd
East Leake
Loughborough
Leicestershire
LE12 6HX



The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
<https://www.gov.uk/government/organisations/public-health-england>
Email: enquiries@phe.gov.uk
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Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
<https://www.groundsure.com/terms-and-conditions-sept-2016/>

APPENDIX C

Zetica UXO Maps

REGIONAL UNEXPLODED BOMB RISK

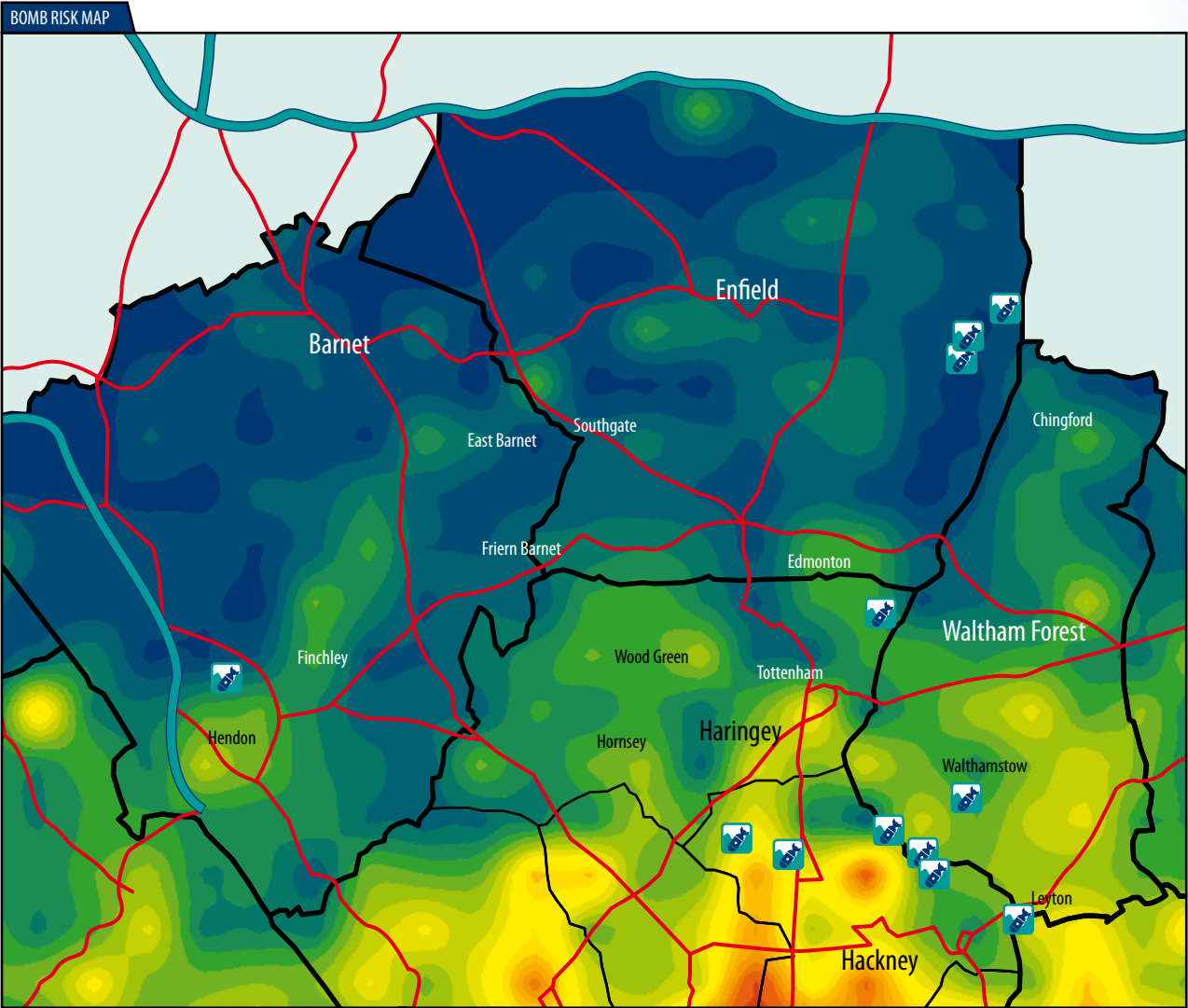
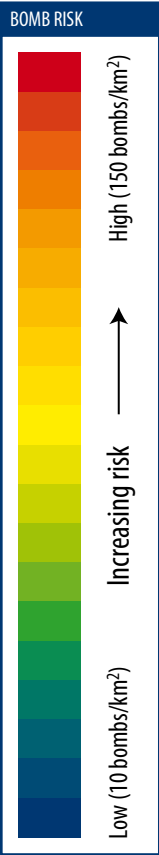
LONDON – North

NUMBER OF BOMBS PER BOROUGH			
Borough	High Explosive	Parachute mines	Incendiary*
Barnet	124	2	8
Chingford	188	4	11
East Barnet	96	2	11
Edmonton	227	8	37
Enfield	375	5	48
Finchley	220	4	11
Frien Barnet	101	1	4
Hendon	467	9	41
Hornsey	292	9	33
Leyton	419	12	46
Southgate	199	7	23
Tottenham	283	4	18
Walthamstow	462	20	36
Wood Green	176	0	19

London and its approaches are renowned for the heavy bombing inflicted on them during WWII. This is reflected in the number of UXB found since the war and so it is accepted that a significant risk from UXB exists across the London area. On average, less than 10% of high explosive and 50% of incendiary bombs failed to explode. This map shows the relative increase in this risk based on bombing densities.

*Larger incendiary devices only. This figure does not include the numerous smaller incendiary devices (eg. 1kg devices).

The information in this UXB risk map is derived from a number of sources and should be read in conjunction with the 'Users' Guide' attached. The often inaccessible nature and changing ground conditions in estuaries and riverbeds (eg. movement of silt that may contain ordnance) means that historical bombing records of these areas may be poor or inaccurate, and further assessment of the bomb risk may be required as part of a site specific study. Zetica cannot guarantee the accuracy or completeness of the information or data.



UXB hazard map

This map can be used as part of a preliminary risk assessment in line with CIRIA guidance (C681).

A FOUR-STEP PROCESS



Risk assessment and method statement from a qualified explosive ordnance clearance (EOC) operative.



Surface geophysical survey to allow shallow groundwork.



MAGCONE detects UXBs and obstructions on piling layout to the no-risk depth.

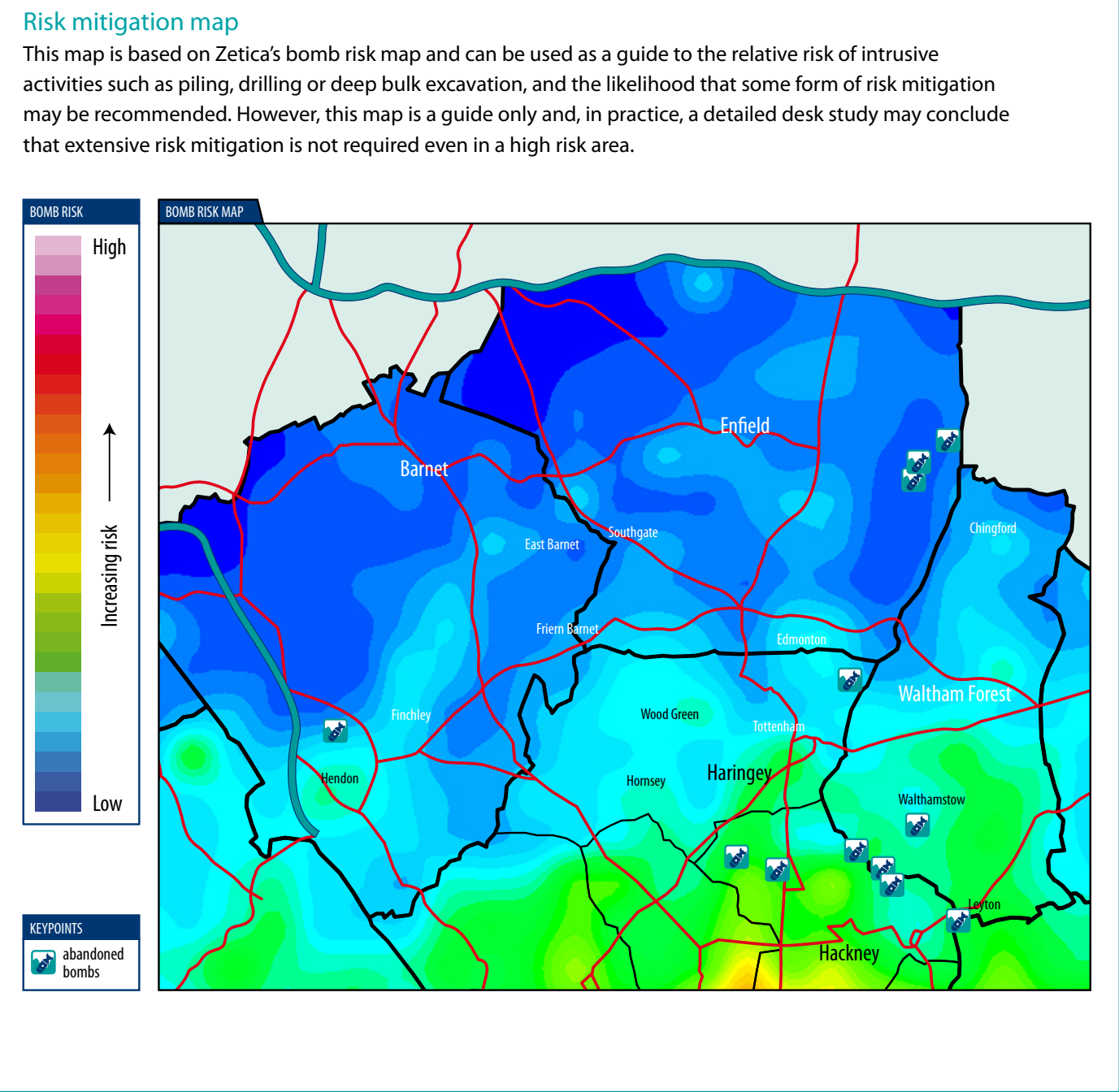


Detected UXBs can be dealt with by our EOC engineers and a Clearance Certificate issued for the site.



RISK MITIGATION AND INVESTIGATION

LONDON – North



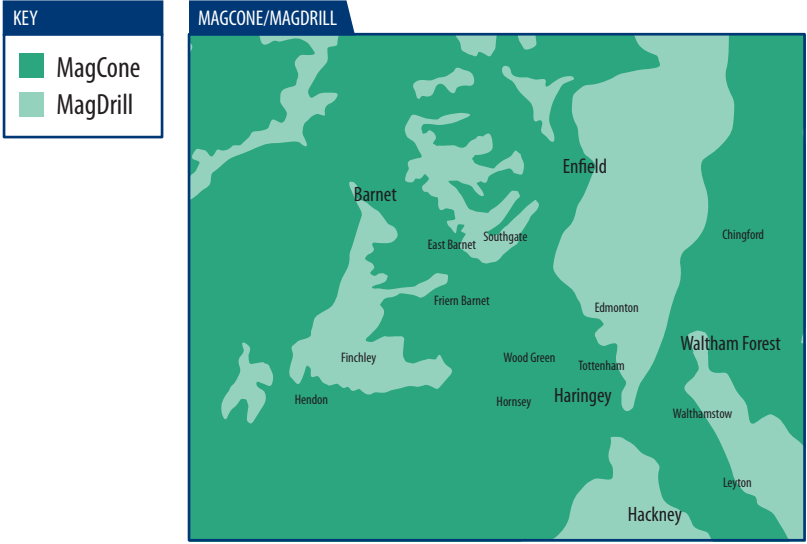
Investigation options

The unexploded bomb (UXB) risk for intrusive site works, such as drilling or piling that usually extend to depths greater than can be mapped from surface, can be effectively managed by clearing borehole or pile locations using MagCone or MagDrill techniques.

For the London area, the geology is extremely complex with a complicated succession that includes several units that are unsuitable for MagCone techniques. To give a first order approximation as to which technique might be appropriate for a site, a simplified map has been produced. This map has been compiled from the BGS Solid and Drift map sheets 256, 257, 270 and 271. The complex geology has been reduced to three areas coloured grey, green and pink. Areas that involve units that are probably only suitable for MagDrill, which include gravels, are shown in



pink. Areas that involve units probably suitable for MagCone, such as London Clay or alluvium, are coloured green. Where chalk crops out at surface or there is negligible soil cover over chalk, it is shown in grey. This map is for indicative purposes only and specific site geology needs to be taken in to account, especially close to the boundaries shown on the map.



MagCone/MagDrill map

This map compilation provides a guide to appropriate intrusive UXB detection methods. The map is based on British Geological Survey maps at 1:50,000 scale. Soft, compressible alluvial materials can typically be investigated using MagCone (CPT-based) methods whereas sands and dense gravels from River Terrace deposits are typically investigated using MagDrill (drilling-based) methods.

The use of an inappropriate method could result in insufficient depth of detection or a less cost effective technique being used.

BOMB MAP USERS' GUIDE

Sources of information and explanation of bomb risk

Why?

Unexploded bombs (UXB) still present a risk to construction projects long after the end of the Second World War (WWII). UXBs often entered the ground unnoticed at high velocity and penetrated to a depth of several metres. Here they remain – vulnerable to disturbances from construction work. Beyond the depth of shallow excavation work, the greatest risk is to piling, drilling and probing crews. A piling rig could repeatedly hit a UXBs with considerable force before the crew realises an obstruction has been impacted. It could then be up to 72 hours before the detonator activates.

Who?

The responsibility for avoiding UXB risk usually lies with construction companies or house builders particularly those who are redeveloping urban sites. In addition, project engineering or environmental consultants are expected to advise their clients of a site's history. Other interested parties include those organisations whose employees are physically at most risk from intrusive works, normally piling companies, drillers or probing operators.

How?

UXB risk should be assessed for every site, but especially those in known heavily bombed areas or those situated near war-time strategic installations that were priority targets for enemy aircraft, for example, airfields. Zetica's regional bomb risk map is therefore a first point of reference from which the relative, potential abundance of UXBs can be judged. Consultants then advise their clients that an ordnance-risk desk study is required, which they may obtain from external sources. Construction companies or house builders who assess their own risk could choose to come direct to Zetica.

When?

Do not wait for the piling or drilling company to be on site before thinking about UXB risk – it will inevitably cause delays and higher costs. Request the regional bomb risk map from Zetica as soon as a site is being considered, and then use it to help you or your clients to decide if an ordnance-risk desk study is required.

Where?

Maps can be obtained for any county in England, Scotland, Wales or Northern Ireland – or for any London borough. They can help determine the areas that were most heavily bombed – but no part of the country should be considered 100% safe from UXB risk. Even remote rural areas can have a high risk if, for example, they were locations for decoy airfields or beacons that were lit to fool enemy pilots into thinking they had located a burning city that had been successfully hit by others in the raid.

How to use this regional map of London

This map is designed to give you an indication of the potential risk from UXBs in your area. If you are conducting work that involves excavation, piling or other disturbance of the ground, then you should use the map to identify the category of risk for your site.

The risk boundaries are a guide, compiled from data based on the political areas for which records are held; being just outside a high-risk area does not mean there is no UXB risk. You should use the map to assist in your decision of whether to investigate the UXB risk further.

Information on the regional risk remaining from UXBs in the UK

Zetica has built the largest UXB database of its kind in the UK. It includes a unique digital library of bomb census data, and maps showing key strategic points and bombing densities from the First and Second World Wars. The main sources of information include records from central government (Public Records Office), the Ministry of Defence, and the German Luftwaffe.

Using information from this database, Zetica has published maps of UXB risk on a regional, county and borough scale. The maps indicate relative degrees of UXB risk based on available records for bombing densities and known targeted areas for regions within the UK. The risk is broken down into individual boroughs, towns or cities. The data are based on the historical boroughs and are then overlaid onto the modern map. It is important to note that more-detailed research may be required for individual sites, particularly where proximity to a potential WWII target means the local risk may be higher.

Relative UXB risk across London

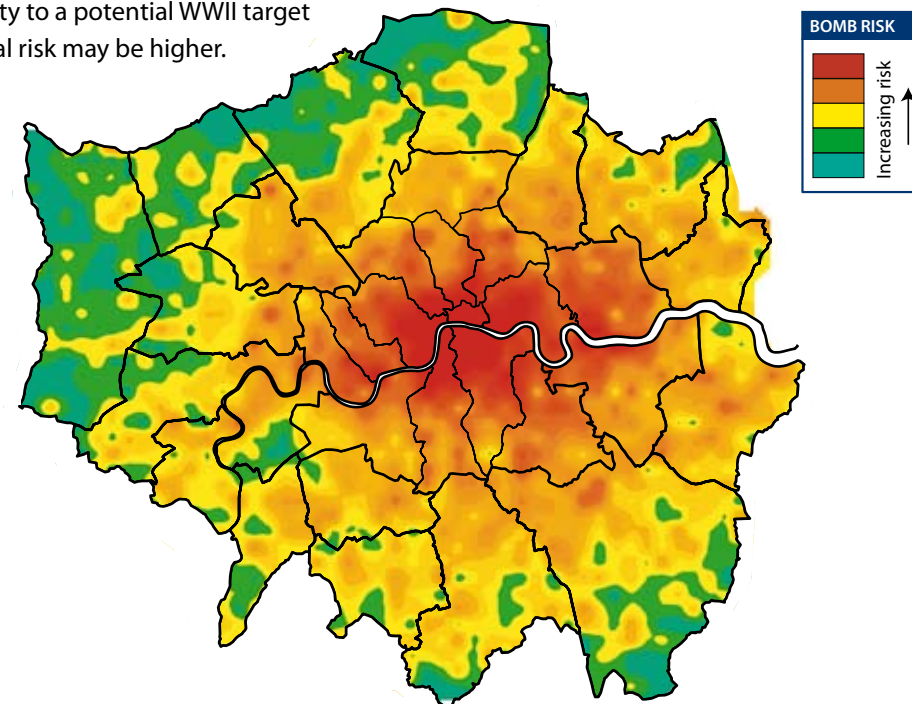
The relative risk for the London area is established by plotting the recorded bombing densities. These are represented as counts of high explosive bombs in km² area.

The areas coloured green represent a record of less than 10 bombs per km². Compared to other areas of the UK, this still represents a significant risk.

However, this is much lower than parts of Central London, where the red colouration indicates in excess of 150 bombs falling per km², representing a very significant UXB risk.

Other WWII targets

Other regions with the risk of UXBs are key strategic points as defined by the government during WWII as representing potential enemy targets. Where these exist outside areas mapped as high, moderate or low risk, a site-specific assessment of the UXB risk may be required.



What to do if...

...you have a site that has a potential UXB risk

In the absence of current legislation requiring you to address the risk from UXBs, your responsibilities under health and safety legislation and regulations such as construction design and management require that you address all identified risks. The first stage is to request further advice from a professional adviser such as Zetica, or to gain more site-specific information by commissioning an ordnance-risk desk study. Then a strategy to deal with the risk can be established that is tailored to your proposed work.

...you find a suspect item or require advice

If during site works you find a suspect (ordnance-related) item, it is very important that you do not touch or move it (even if it has already been moved by an excavator). If it is clearly ordnance related, then dial 999 and ask for the police. Ensure that the area around the item is kept as clear as possible without placing yourself at risk. If you are unsure and do not wish to cause undue alarm, or you just require some advice, then you can call Zetica. We have experienced qualified UXB specialists on hand who can offer support and advice during any site works.

More-detailed procedures should be established in advance if you are in an area where the risk of finding a UXB is shown to be significant (moderate to high).

Site-specific desktop studies

Zetica is able to provide high-quality, site-specific UXB risk information for any residential, industrial or commercial property in the UK. These desktop studies provide details of the bombing density within an area and for the site itself, in order to indicate the risks of UXBs still being present. A risk assessment is provided to facilitate informed decision making on whether any further risk mitigation measures are required.

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