


TFL_PSF_9131 SITE INVESTIGATIONS: SMALL SITES INITIATIVE 46 BRENTMEAD PLACE, BARNET, NW11 9LJ

Site Ref:1633


Geotechnical and Geo-Environmental Desk Study

OCTOBER 2017

46 Brentmead Place, Barnet, NW11 9LJ
Geotechnical and Geo-Environmental Desk Study



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Report No 701-UA009686-UP32R-02

Date OCTOBER 2017

VERSION CONTROL

Version	Date	Author	Changes
01	June 2017	Shante Drummond	1 st Issue
02	October 2017		Final Issue

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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 (Ref. 1);
- Historical Ordnance Survey maps (included in Appendix A);
- Groundsure GeoInsight Report (GeoInsight and EnviroInsight) (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

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2 SITE SETTING AND HISTORY

2.1 Site Location

Table 2.1: Details relating to Site Location

Site Location / Address	46, Brentmead Place, London, NW11 9LJ
National Grid Reference	523830,188206
Approximate Site Area	The Site is roughly rectangular in shape and covers an area of approximately 0.03 hectares.
Description of Site	<p>The Site is vacant parcel of land located between properties No. 44 and No. 48 fronting onto the North Circular (Brentmead Place) in the Brent Cross area of North London. The Site, whilst currently vacant was most recently occupied by a residential property which has since been demolished (sometime after 2010). There is an area of hardstanding in the approximate centre with scrub and scattered trees noted within the front and rear gardens of the former property. There is hoarding present along the south-eastern boundary of the Site.</p> <p>The River Brent runs in a north-easterly to south-westerly direction along the north-western boundary.</p>
Topography	Slopes down slightly in a westerly direction towards the river by approximately 1m.
Surrounding Area	The Site is located within the London Borough of Barnet and is located approximately 0.55km north of Brent Cross tube station. The Site lies in a predominantly residential area with a railway line approximately 230m south-west, Hendon Park approximately 260m to the north and Brent Cross Flyover approximately 400m south-west with Brent Cross Shopping Centre beyond.

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)
1863-64 & 1865	<p>The Site is an undeveloped field, located west of Golders Green. The Brent River is recorded within the north-western boundary of the Site, flowing in a south-westerly direction. Waterfalls are recorded approximately 100m and 180m south-west of the Site.</p> <p>Much of the surrounding area are fields. There is an icehouse associated with Shirehall recorded approximately 170m north-west and occasional houses / farms and ponds are present within 250m (south-west / west) of the Site. Further away, Hendon sewage works had developed approximately 450m south-west of the Site.</p>
1896 & 1895	The map shows the Brent River had been narrowed and is no longer recorded within the Site.

Date	Historical Development (Site and Surrounding Area)
	<p>A sluice gate is recorded approximately 60m north and the waterfalls to the south-east are no longer shown. Developments within the surrounding area remain limited but now include The Homestead (presumably a farm) 120m south-east, Brook Lodge at Brent Bridge approximately 250m north and aqueduct and additional properties approximately 300m to the south-west had developed.</p>
1914-15 & 1920	<p>The map shows no developments within the Site although the mapping suggests the river now encroaches onto the Site boundary (although this could be mapping error as there appears to be no other obvious changes noted). The map shows Brentmead Place adjacent to the south-eastern boundary of the Site.</p> <p>Other estate roads are demarcated within 200m east of the Site by this time and the expansion of Golders Green is evident with houses shown within 250m south of the Site. Further away, Hendon Way had been recorded (approximately 400m south-west).</p>
1936 & 1940	<p>The 1936 map shows two properties encroaching into the north-east and south-west parts of the Site and Brentmead Place is no longer shown having been replaced by the North Circular (Brentmead Place) by this time. The river is shown encroaching onto the south-western boundary of the Site.</p> <p>The map shows that much of the surrounding area had been developed into residential properties and estate roads. A railway line (Morden and Edgware line, part of which is shown on a viaduct) had developed approximately 230m south-west of the Site and Hendon Park approximately 260m to the north-west. The sewage works was disused by the time of the 1940 map.</p>
1951 & 1952-54	<p>The map shows the site and the houses adjacent to the Site had been demolished and replaced by detached properties / bungalows. The River is no longer shown within the Site and a weir and footbridge are shown approximately 25m north of the Site (rear of property No. 42).</p> <p>No significant changes are noted within the surrounding area.</p>
1953-55, 1966-68, 1987-91, 1991-93, 2002, 2010	<p>No significant changes are noted within the Site.</p> <p>The maps show the general expansion of residential areas within the Hendon and Golders Green areas. The Brent Cross flyover was developed by 1966 and the shopping centre by 1974.</p>
2014	<p>The property within the Site had been demolished.</p> <p>No significant changes are noted within the surrounding area.</p>

2.3 Unexploded Ordnance

With reference to the Zetica Regional Unexploded Bomb Risk of London - North (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 does not record high explosive bombs having been dropped within 100m of the Site.

3 PHYSICAL AND ENVIRONMENTAL SETTING

3.1 Published Geology, Hydrogeology and Hydrology

With reference to the sources of information detailed in section 1.2, the following information has been obtained.

Table 3.1 Information Regarding Geology, Hydrogeology and Hydrology

Geology / Aquifer Status	<p>Superficial Deposit: Alluvium associated with the Brent River described as clay, silt and gravel. The Alluvium is classified as a Secondary A Aquifer.</p> <p>Solid Geology: London Clay Formation which is classified as an Unproductive Strata.</p>
BGS Boreholes (within 100m of the site)	<p>Eight historic boreholes identified between 27m and 76m, the closest three are within 50m and are summarised below.</p> <p>TQ28NW94 (approximately 28m west, adjacent to the river) dated 1991 for the Golders Green junction improvement. The trial pit record revealed Made Ground from the surface comprising firm to stiff dark brown slightly sandy clay, coal, brick and glass up to a depth of 0.8m, underlain by Alluvium described as firm to stiff mottled grey and orange sandy silty clay to 1m below ground level (bgl). This was underlain by Alluvium / First River Terrace Deposits encountered as firm to stiff mottled grey orange friable sandy clay with flint to the termination depth of the pit at 1.4mbgl.</p> <p>TQ28NW83 (approximately 38m south-west) dated 1990. The borehole log reveals a surface cover of concrete and stone to 0.4mbgl. The driller's description of the underlying Made Ground reveals gravel with clay / sand matrix to depth of 1.50mbgl. This is underlain by firm brown sandy silty gravel with flint (possible River Terrace Deposits) and is in turn underlain by London Clay with fine gypsum crystals noted within the upper weathered layer (2.2-7.1m); terminating in the London Clay at 15mbgl. A claystone band was noted at 12.75m.</p> <p>TQ28NW67 (approximately 41m SE) dated 1990. The borehole indicates surface cover of Topsoil (0.1m thick) underlain by Made Ground comprising stiff brown mottled grey silty clay with brick, coal and ash to a depth of 1.70m. This is underlain by London Clay to the termination of the borehole at 10m (indicated as weathered between 1.7m and 6.10m). A 0.3m thick band of weak claystone was recorded at 3.2-3.5m.</p>
Within a Source Protection Zone	Not recorded within 500m of the Site boundary.
Licensed Groundwater Abstraction Points	There are no groundwater abstraction points noted within 500m of the Site.
Surface Water Feature	One is identified within 250m of the site; Brent River adjacent to the Site.
Likely Groundwater Flow Direction	Inferred to flow south-westerly towards the Brent River.

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 are recorded within 250m of the site	N/A
Current Industrial Data	<p>5 entries identified within 250m of the site associated to recycling services, a jeweller, construction services, an electrical substation and Brent Cross station</p> <p>1 petrol filling station is recorded 233m south-west but is no longer operational.</p>	172 east, 180 east, 234m north, 246 east and 249 south, respectively.

Off-site contaminative land uses are limited due to the largely residential area of the surrounding area.

The site has been subject to various phases of demolition and redevelopment including the narrowing of the river, therefore it is considered likely that Made Ground is present within the Site. Made Ground associated with redevelopments adjacent to the Site are also anticipated.

4 PRELIMINARY CONCEPTUAL MODEL

Geo-environmental assessments are required in accordance with current regulatory guidance (CIRIA C552 - Ref. 4 and CLR11 – Ref. 7) to consider the significance of potential contamination in terms of plausible contaminant source-pathway-receptor contaminants 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 any 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 historical and environmental research, the following potential sources of contamination have been identified (Table 4.1).

It should be noted that it is considered unlikely that all these substances would 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 the demolition and redevelopment into residential housing including narrowing of the river	Asbestos, metals, polycyclic aromatic hydrocarbon (PAH) compounds, hydrocarbons, ground gas
London Clay	Sulphates
Alluvium	Ground gas
Off Site	
Made Ground associated with demolition and redevelopment adjacent to the Site	Metals, PAHs, TPHs, asbestos, ground gas and vapours
Alluvium	Ground gas

4.2 Potential Receptors

The proposed land use is currently unknown. As a precautionary 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 site users.

4.2.2 Controlled Waters

- Groundwater beneath the site - Alluvium

- The Brent River flows adjacent to the south-western boundary

It is noted that the site is not within a Groundwater Source Protection Zone and there are no groundwater abstraction points within 500m.

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 Contaminative Pathways

Receptor	Description
Human health (residential, visitors' maintenance workers and contractors)	<p>Accidental ingestion of contaminants within soil, water and dust</p> <p>Inhalation of dust, vapours and ground gases</p> <p>Dermal contact with contaminants within soil, water and dust</p> <p>Ingestion of contaminated vegetables and soil attached to vegetables</p>
Controlled waters (Secondary A Aquifer and Brent River)	<p>Leaching of potential contaminants in soil or Made Ground into groundwater</p> <p>Vertical migration of soluble contaminants through the unsaturated zone into groundwater beneath the Site</p> <p>Surface run-off and lateral migration</p>
Buildings	<p>Direct contact of building services or foundations with contaminants in the soil and Made Ground</p> <p>Gas and / or vapour accumulation in confined and poorly ventilated spaces</p> <p>Sulphate attack on buried concrete</p>

4.4 Preliminary Qualitative Risk Assessment

Primary sources of on-site contamination are considered to be associated with Made Ground (demolition / redevelopment / narrowing of the river). Similarly, off-site sources are likely to be limited to Made Ground associated with demolition and redevelopments adjacent to the site given the largely residential area of the surrounding area.

Within the Site, the Made Ground is likely to be present which could be a source of contamination. Human exposure could occur in gardens or soft landscaped areas, especially if soils are disturbed by activities such as digging/gardening. Ground gas / vapours could be generated by the Made Ground which could accumulate in confined spaces and poses potential 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 present.

The London Clay is a source of naturally occurring sulphates which could impact buried concrete. The underlying Alluvium is also a potential source of ground gas.

5 Waste Management and Potential Development Constraints

5.1 Waste Management

Consideration should be given to a 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 disposal prior to acceptance, and 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 to the largely residential setting of the Site. Within the Site, the river has been narrowed and two properties were recorded within the Site until they and the adjacent properties were demolished and redeveloped into detached / bungalows. Sometime after 2010, the property was demolished and the Site is currently vacant. In addition, the underlying Alluvium is a potential source of ground gas.

A ground investigation is recommended to determine the potential contamination present on the site. 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:

- Removal of former foundations and concrete obstructions;
- Excavation and replacement of upper part of Made Ground;
- Asbestos protection measures during disturbance of Made Ground (depending on the findings of the ground investigation);
- Groundwater control measures and treatment of extracted groundwater (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);
- Provision of clean cover system in garden areas and public open space;
- Potentially further investigation and consultancy advice to support planning obligations.

It has been assumed that:

- There are no underground structures and the former building(s) have been demolished and removed from site; and
- A flood risk assessment will be required.

6 Geotechnical Considerations

Ground conditions anticipated at the site comprise Made Ground (recorded up to 1.7m bgl in nearby historical logs), underlain by Alluvium and in turn by London Clay. River Terrace Deposits have also been recorded underlying the Alluvium in the BGS logs (Ref. 1).

Potential founding solutions will be dependent on the thickness of Made Ground and Alluvium and the geotechnical properties of the natural deposits. The Made Ground and Alluvium are 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 with previous structures 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 may not be 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 be considered during the investigation / design.

7 Conclusion and Recommendations

The site is a vacant parcel of land, likely to be covered in scrub vegetation / rubble with trees in the front and rear gardens of the former property. The south-western boundary of the Site is bound by the Brent River and the south-eastern boundary fronts onto the North Circular Road (Brentmead Place). The Site is located within a largely residential area of Barnet, North London. The Site was most recently occupied by a residential property however, historically, two residential properties have been recorded and the river was also narrowed.

An intrusive site investigation has not been undertaken at this stage, however Made Ground is anticipated to be present from the various phases of redevelopment including the narrowing of the river.

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 ground gas / vapours and there are possible risks to human health from the off-site sources (Made Ground). 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 the recommendations in CIRIA C665 (Ref. 6) and CLR 11 (Ref. 7) and consideration of shrinkage and swelling, sulphate attack and the potential for relict shear slip surfaces.

7.2 Construction Considerations

During construction, 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 / demolition 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 risks to the underlying if foundations or piling which penetrate the base of Made Ground are proposed.

The site is in an area where 'low' risk of encountering unexploded ordnance is present and further assessment is not considered necessary.

8 References

1. British Geological Survey (BGS) online <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>
- Accessed June 2017
2. Environmental Agency (EA) What's in my backyard? <http://maps.environment-agency.gov.uk/wiyby>.
Accessed June 2017
3. Google maps accessed 31/05/17
<https://www.google.be/maps/place/Brentmead+PI,+London+NW11+9LJ,+UK/@51.5786536,-0.2175634,17z/data=!3m1!4m5!3m4!1s0x487610c1d2929787:0x57d895ae81e5411f!8m2!3d51.5785866!4d-0.2151341>
4. National Archives Bomb Sight <http://www.bombsight.org/#15/51.5782/-0.2159>
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.

APPENDIX A

Historical Maps

Site Details:

46, BRENTMEAD PLACE,
LONDON, NW11 9LJ

Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1863-1864

Scale: 1:2,500

Printed at: 1:2,500



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

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

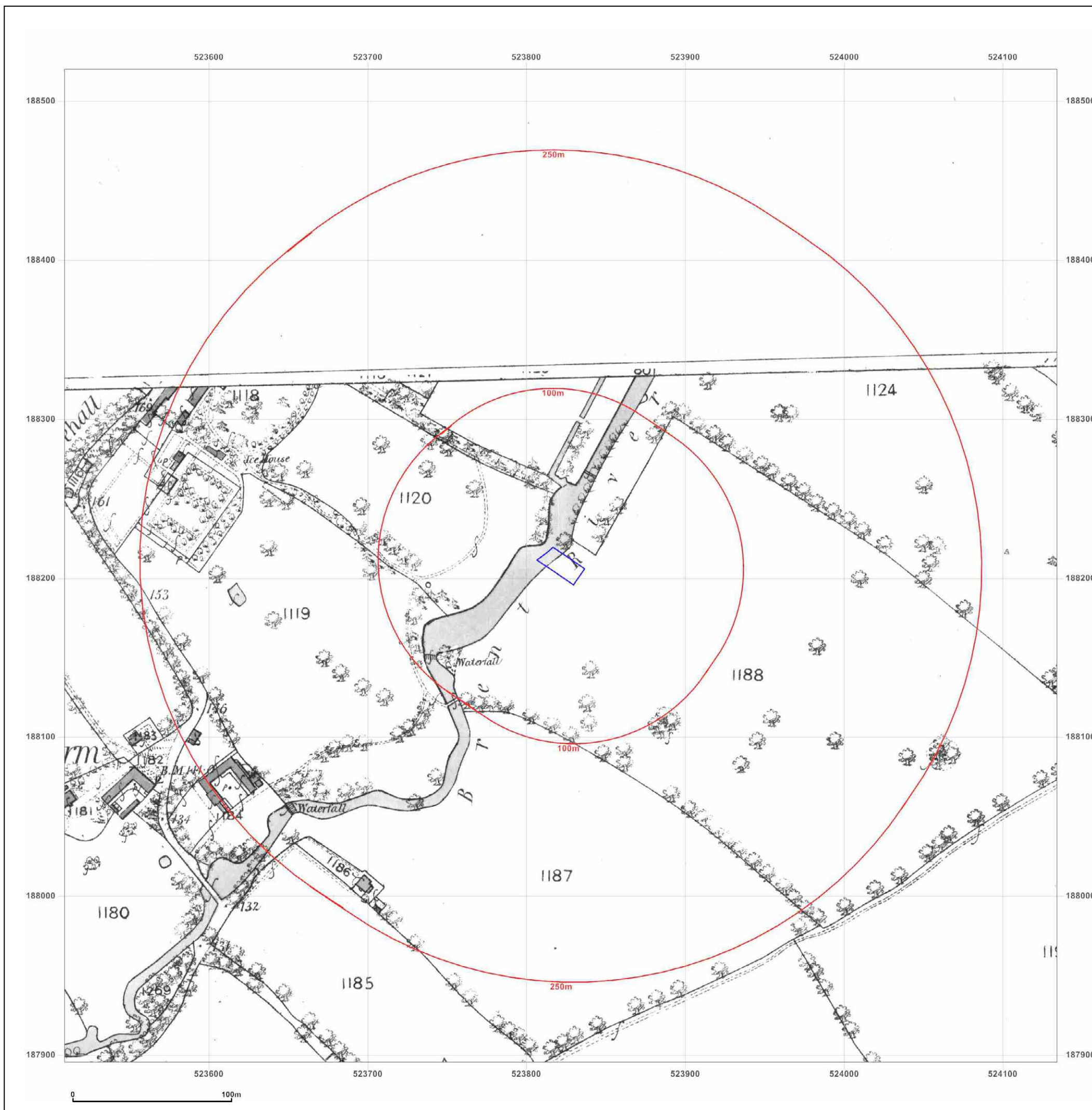


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Site Details:

46, BRENTMEAD PLACE,
LONDON, NW11 9LJ

Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1864

Scale: 1:2,500

Printed at: 1:2,500



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

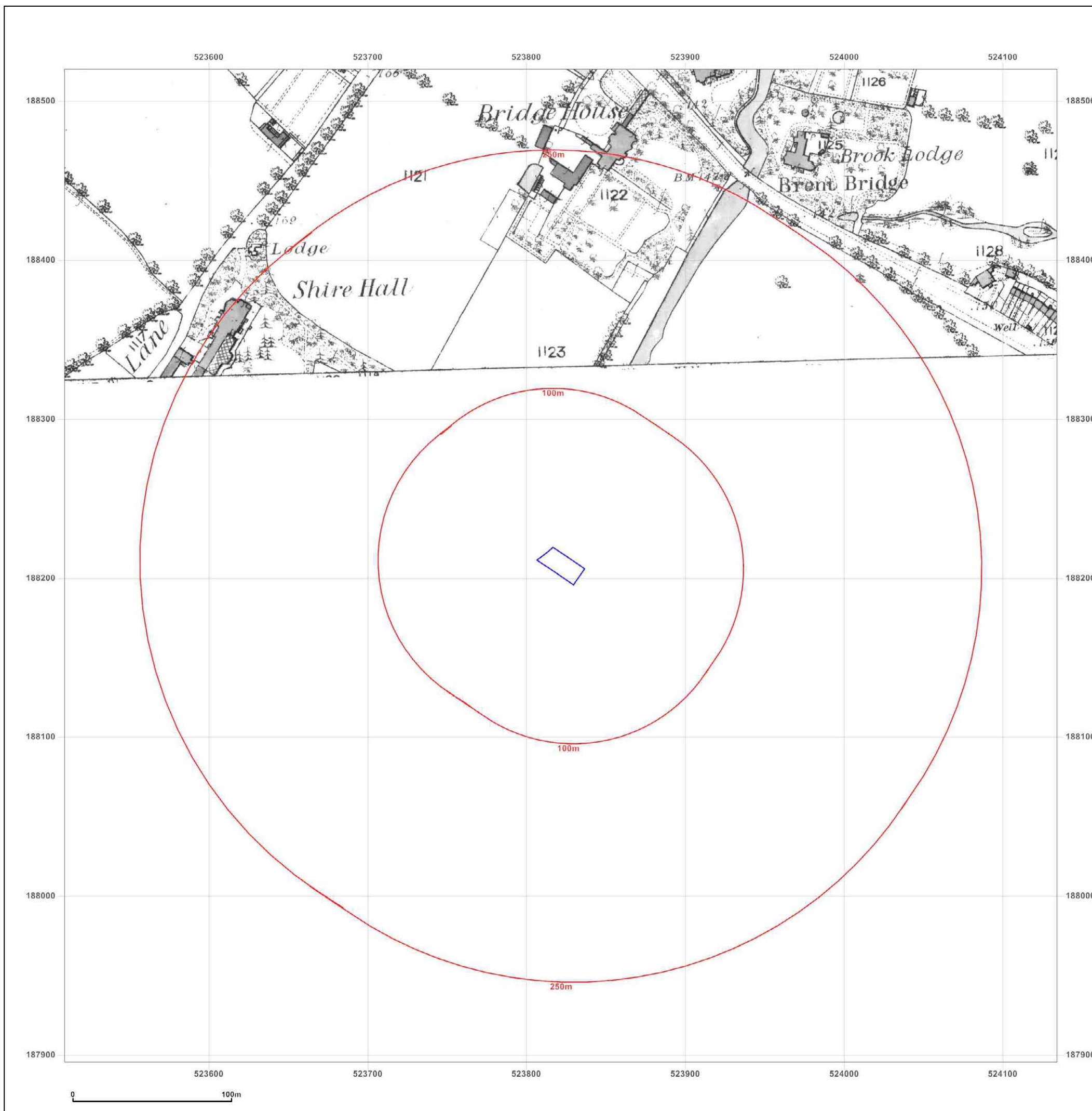


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Site Details:

46, BRENTMEAD PLACE,
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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

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

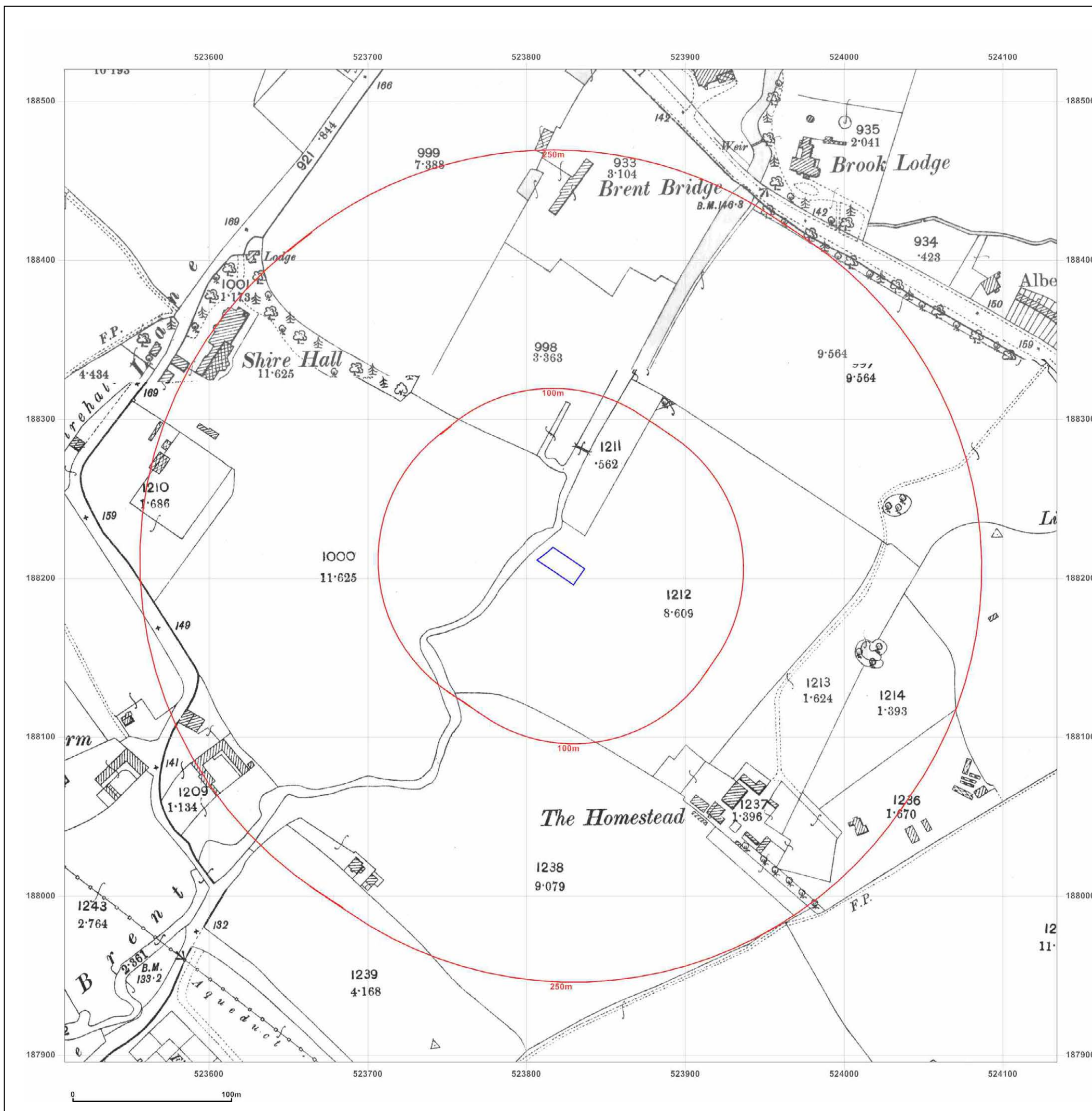


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Site Details:

46, BRENTMEAD PLACE,
LONDON, NW11 9LJ

Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1914-1915

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1914
Revised 1914
Edition N/A
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Surveyed 1915
Revised 1915
Edition N/A
Copyright N/A
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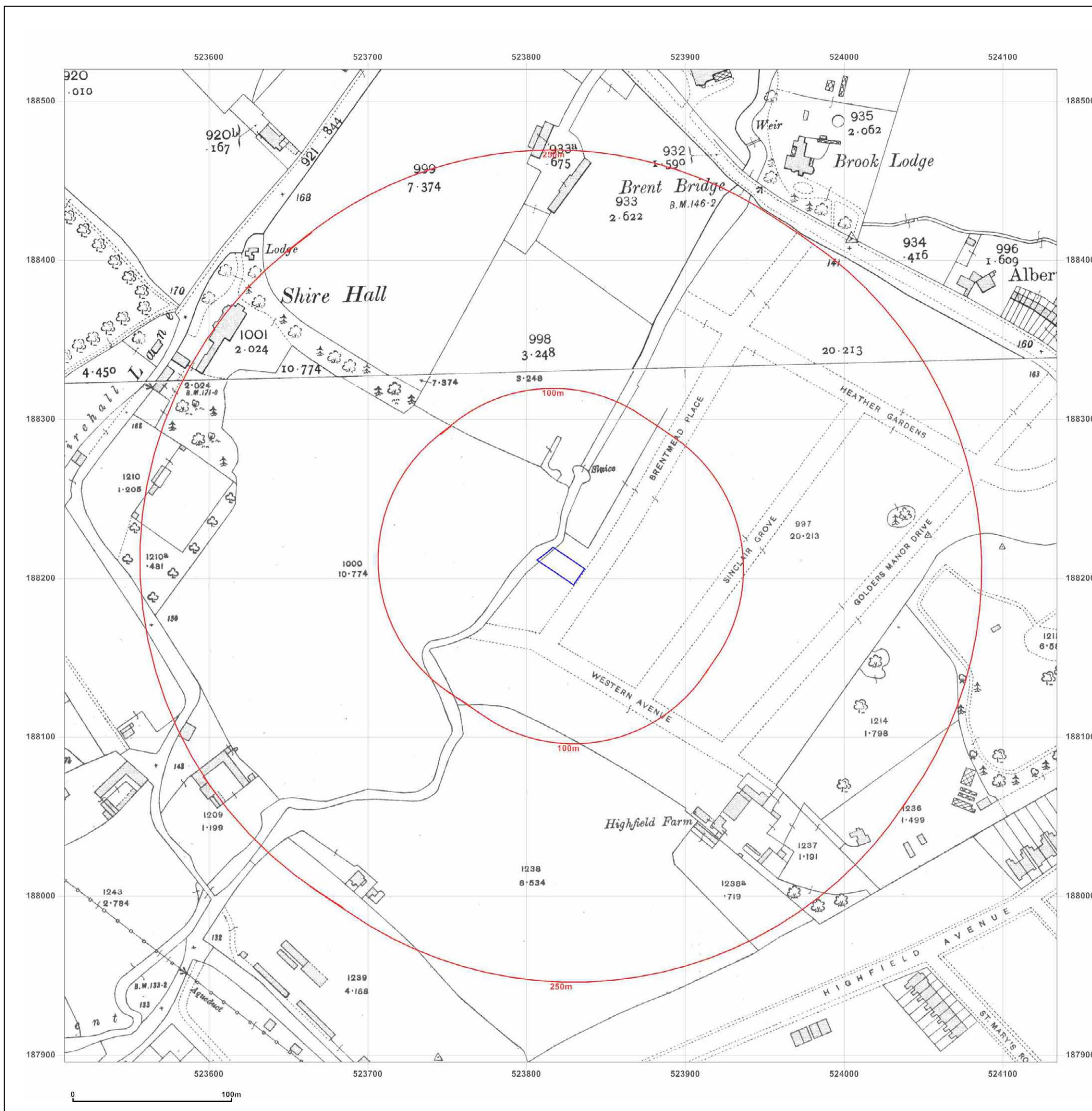


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Site Details:

46, BRENTMEAD PLACE,
LONDON, NW11 9LJ

Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1936

Scale: 1:2,500

Printed at: 1:2,500



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Site Details:

46, BRENTMEAD PLACE,
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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1952-1954

Scale: 1:1,250

Printed at: 1:2,000



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Revised 1954
Edition N/A
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Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled 1934

Surveyed 1952
Revised 1952
Edition N/A
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Site Details:

46, BRENTMEAD PLACE,
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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1953-1955

Scale: 1:1,250

Printed at: 1:2,000



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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1952-1955

Scale: 1:2,500

Printed at: 1:2,500



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Edition 1954
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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1955

Scale: 1:2,500

Printed at: 1:2,500



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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1966-1968

Scale: 1:1,250

Printed at: 1:2,000



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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1987-1991

Scale: 1:1,250

Printed at: 1:2,000



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Edition N/A
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Edition N/A
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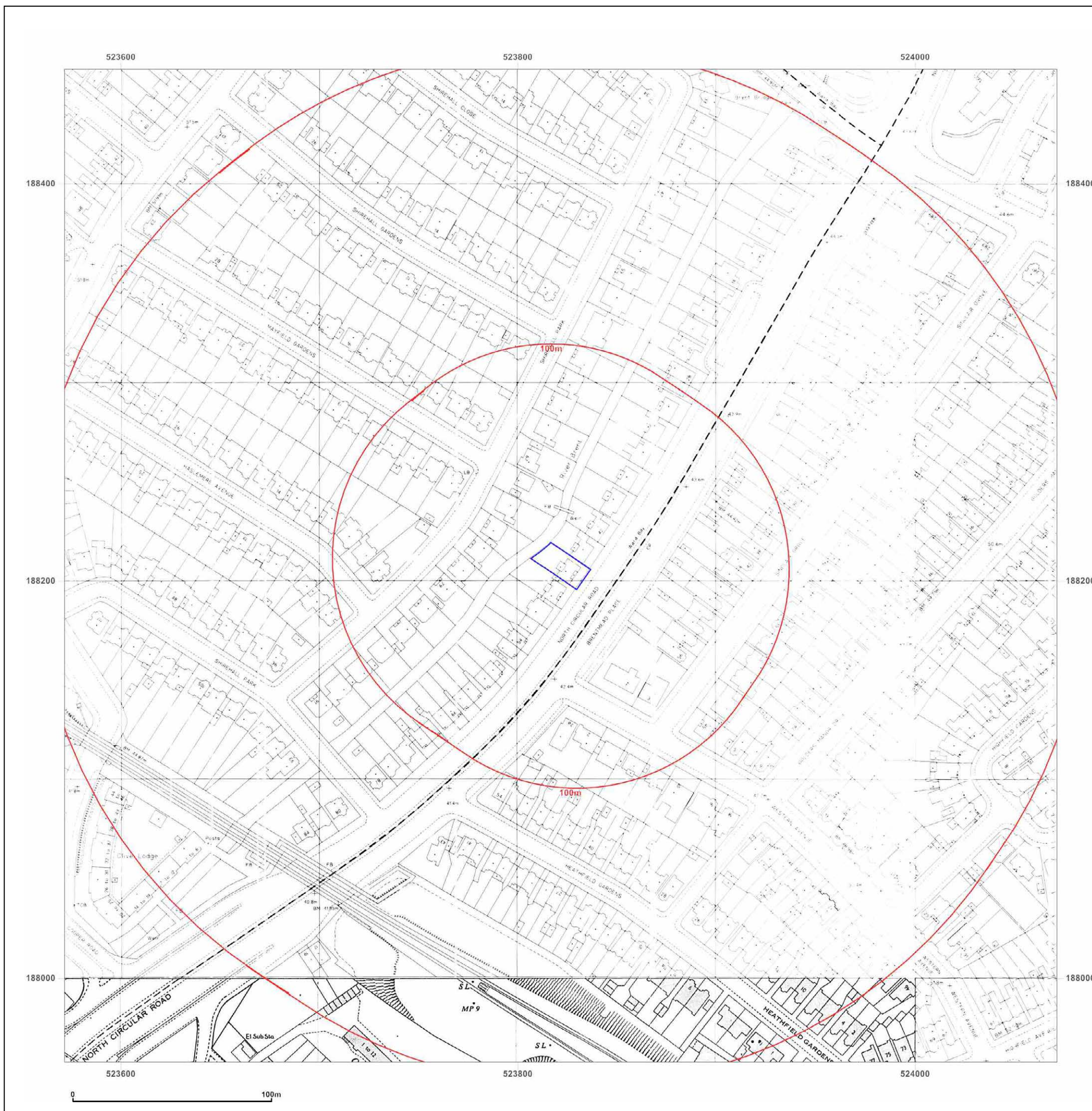


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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1991

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
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Revised N/A
Edition N/A
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Revised N/A
Edition N/A
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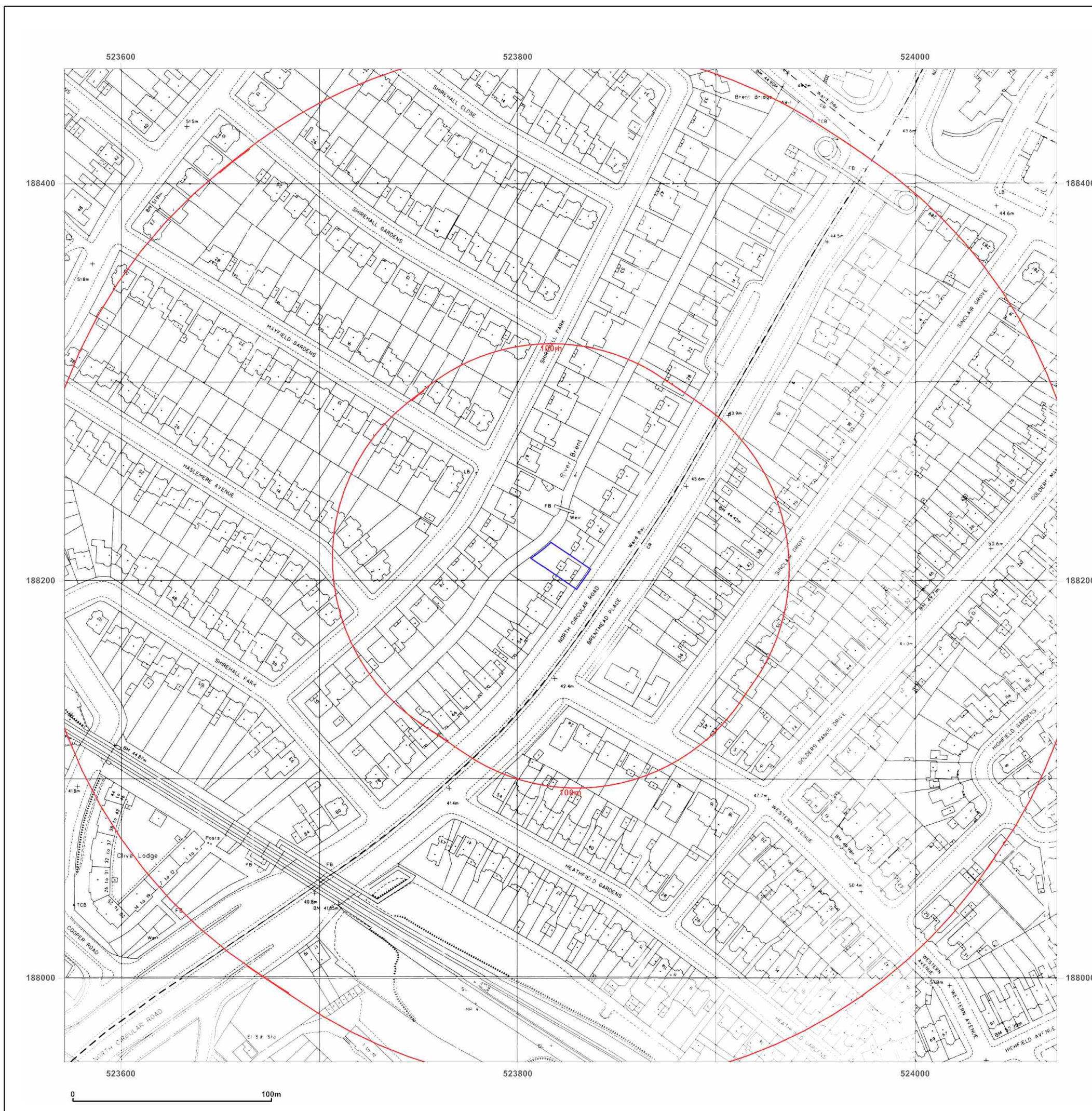


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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1991

Scale: 1:1,250

Printed at: 1:2,000



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Edition N/A
Copyright 1991
Levelled N/A

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Revised 1991
Edition N/A
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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1991-1993

Scale: 1:1,250

Printed at: 1:2,000



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Revised 1991
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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

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

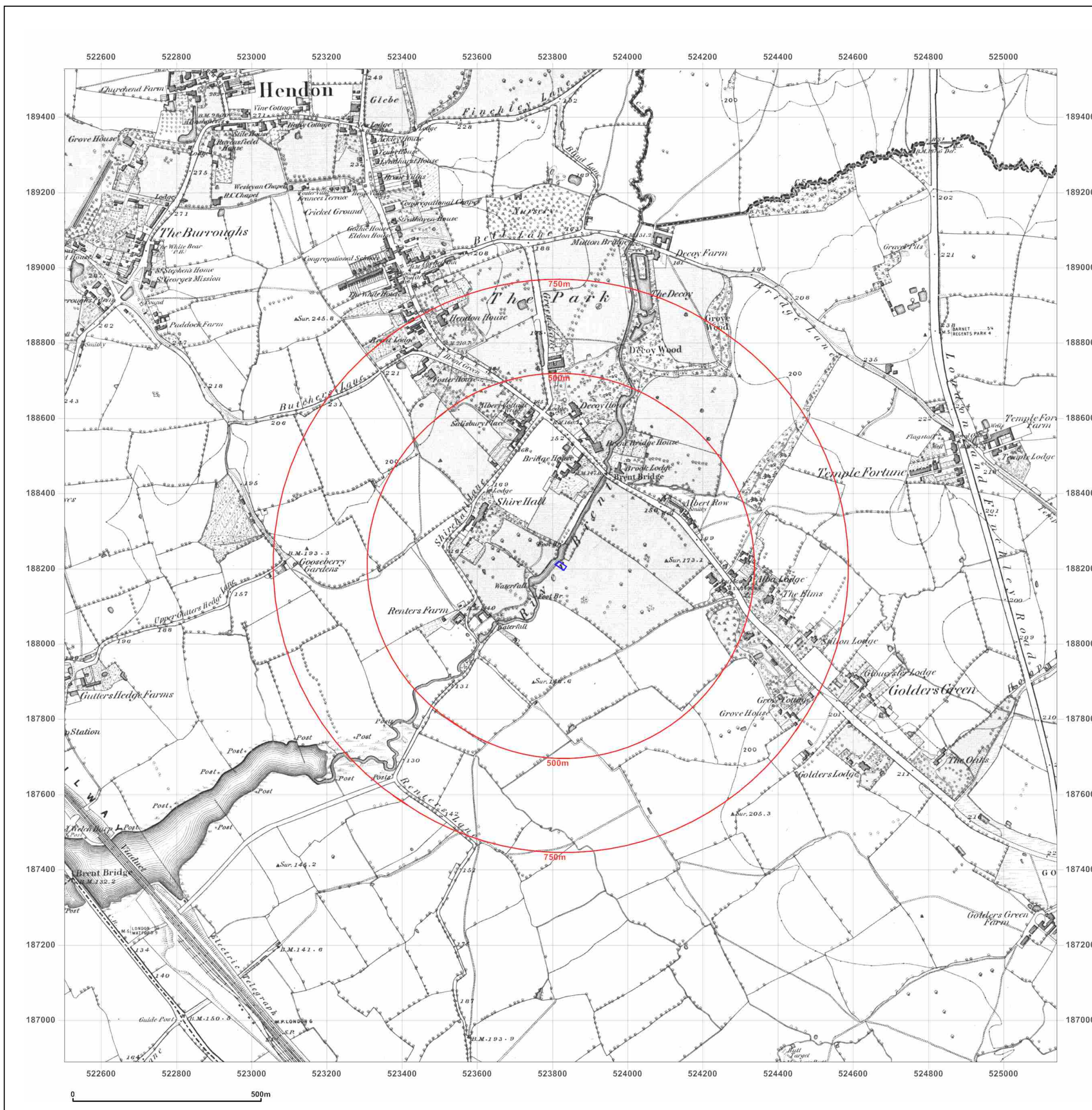


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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1896

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1895
Edition 1896
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1894
Edition 1896
Copyright N/A
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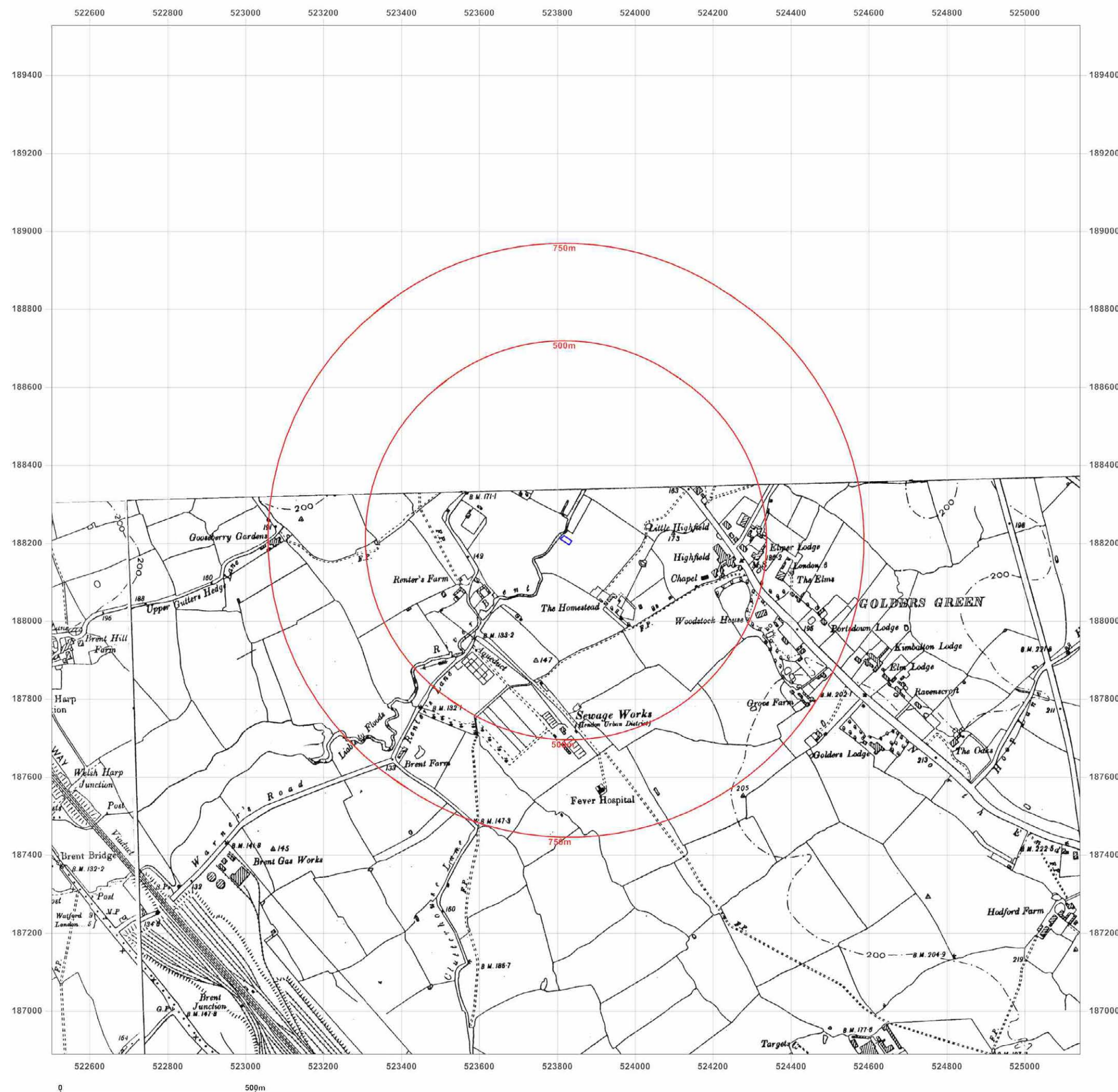


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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1894-1897

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1895
Edition 1897
Copyright N/A
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Surveyed 1895
Revised 1895
Edition 1896
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Surveyed 1865
Revised 1895
Edition N/A
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Surveyed 1894
Revised 1894
Edition N/A
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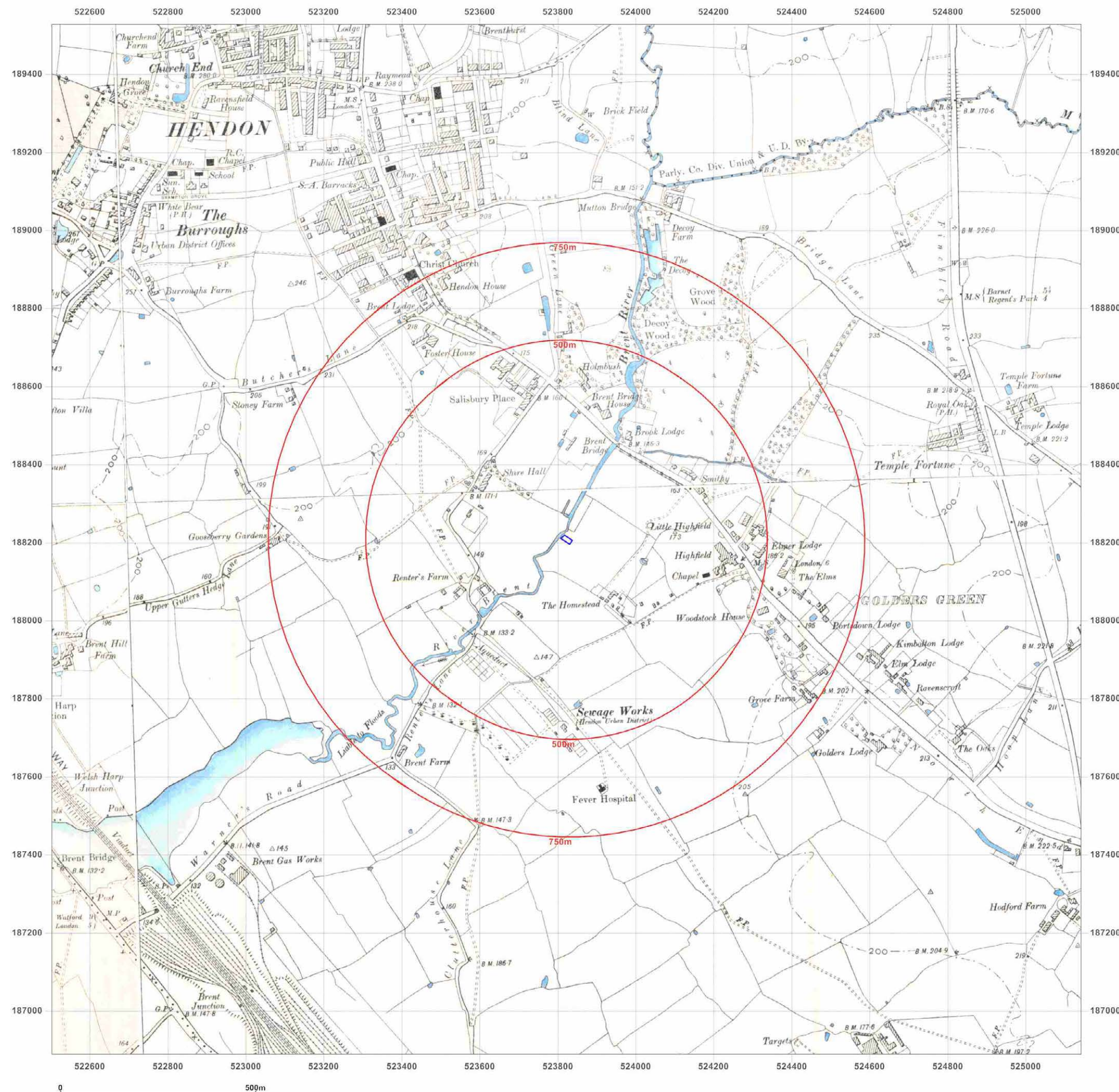


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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1920

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1865
Revised 1920
Edition N/A
Copyright N/A
Levelled N/A

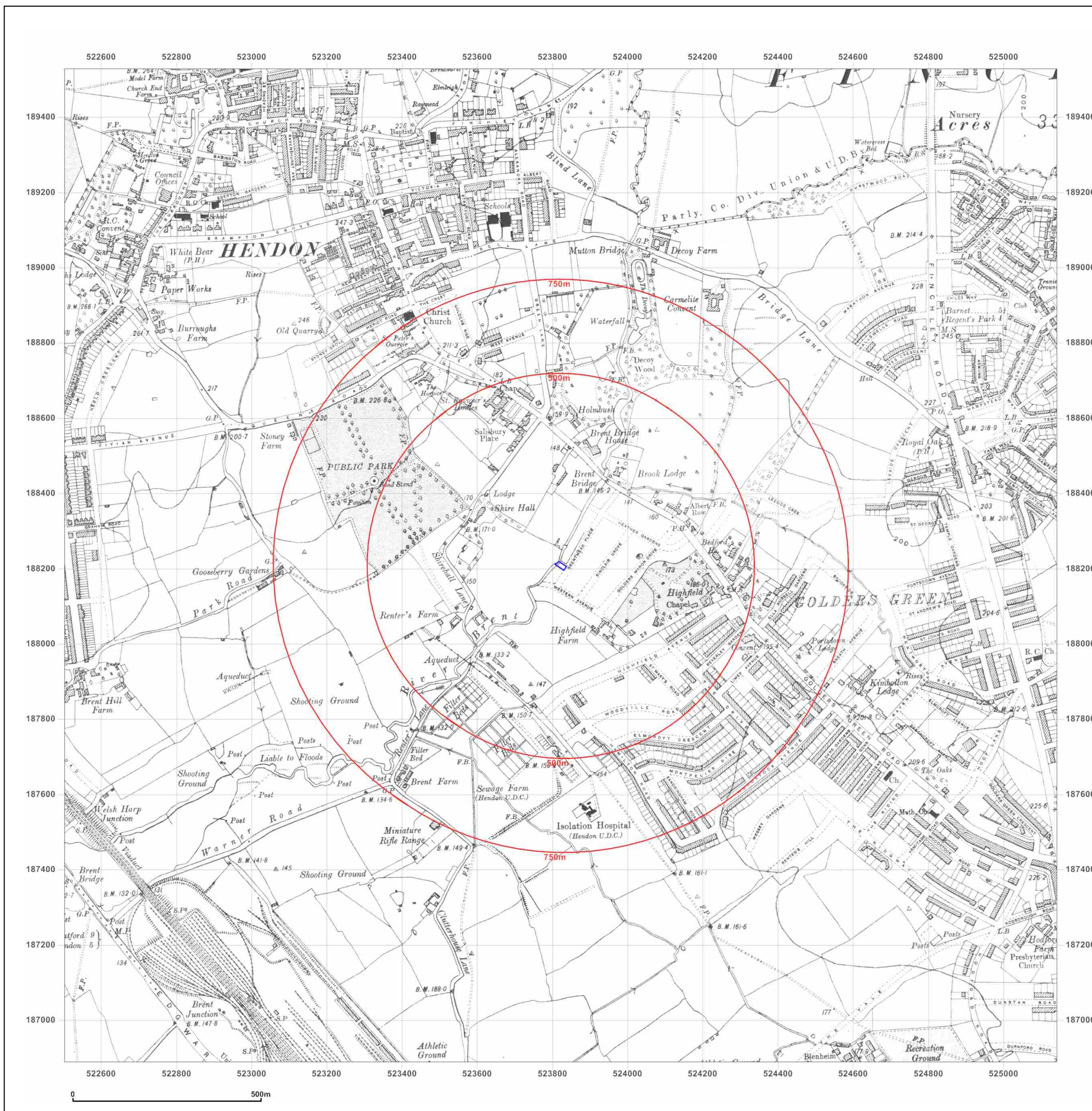


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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1936-1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1863
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Edition N/A
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Levelled 1935

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

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Surveyed 1865
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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1938-1939

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1863
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Edition N/A
Copyright N/A
Levelled 1935

Surveyed 1865
Revised 1938
Edition N/A
Copyright N/A
Levelled 1913

Surveyed 1864
Revised 1938
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Surveyed 1865
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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: County Series

Map date: 1938-1939

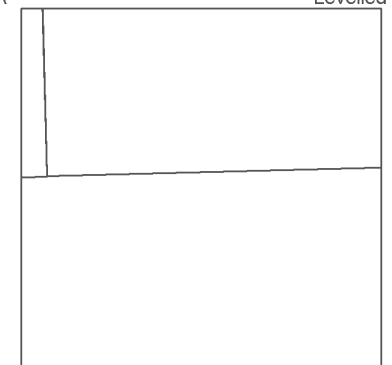
Scale: 1:10,560

Printed at: 1:10,560



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Edition N/A
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Surveyed 1865
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

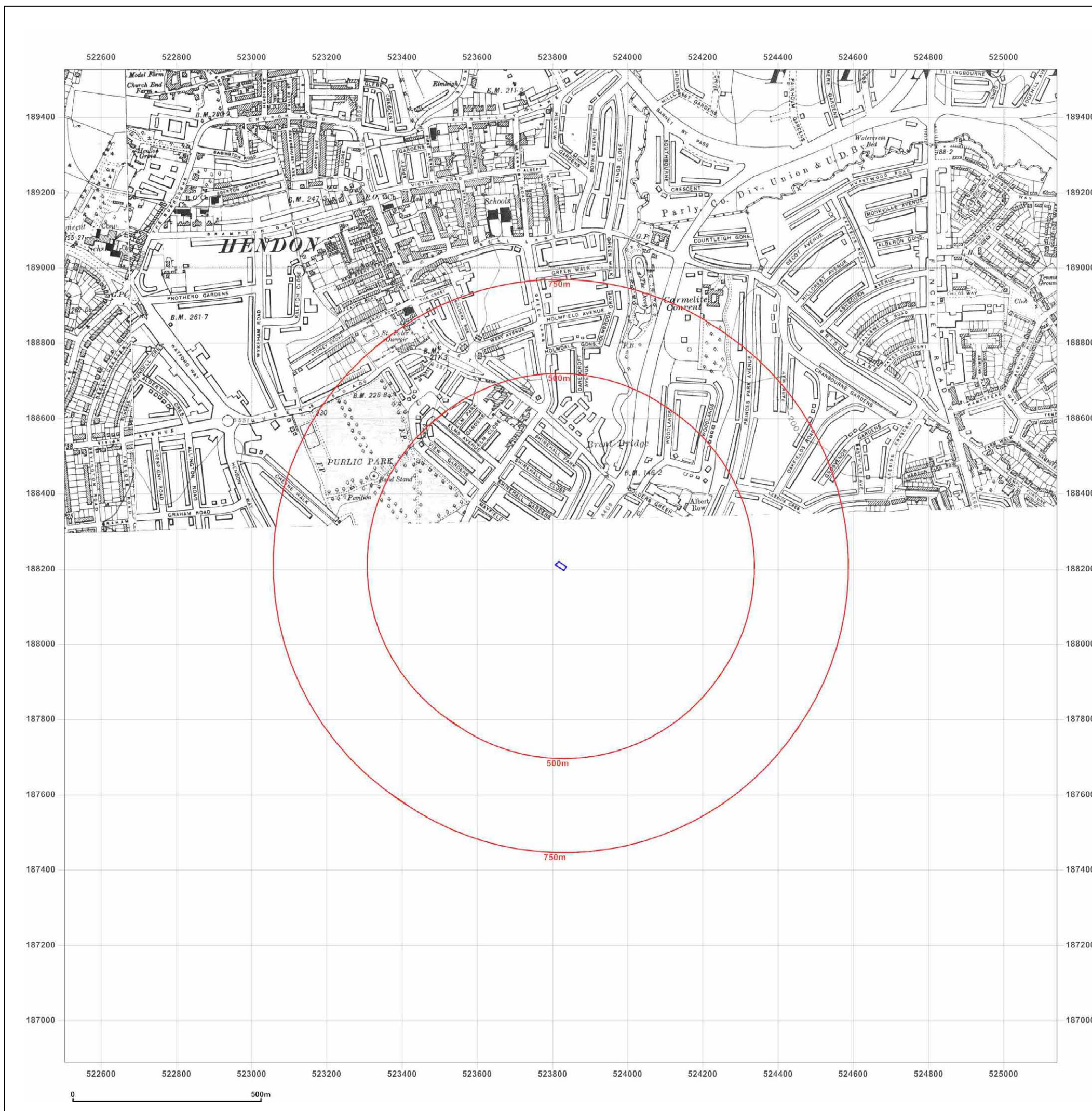


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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: Provisional

Map date: 1965-1966

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1966
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Edition N/A
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Levelled N/A

Surveyed 1965
Revised 1965
Edition N/A
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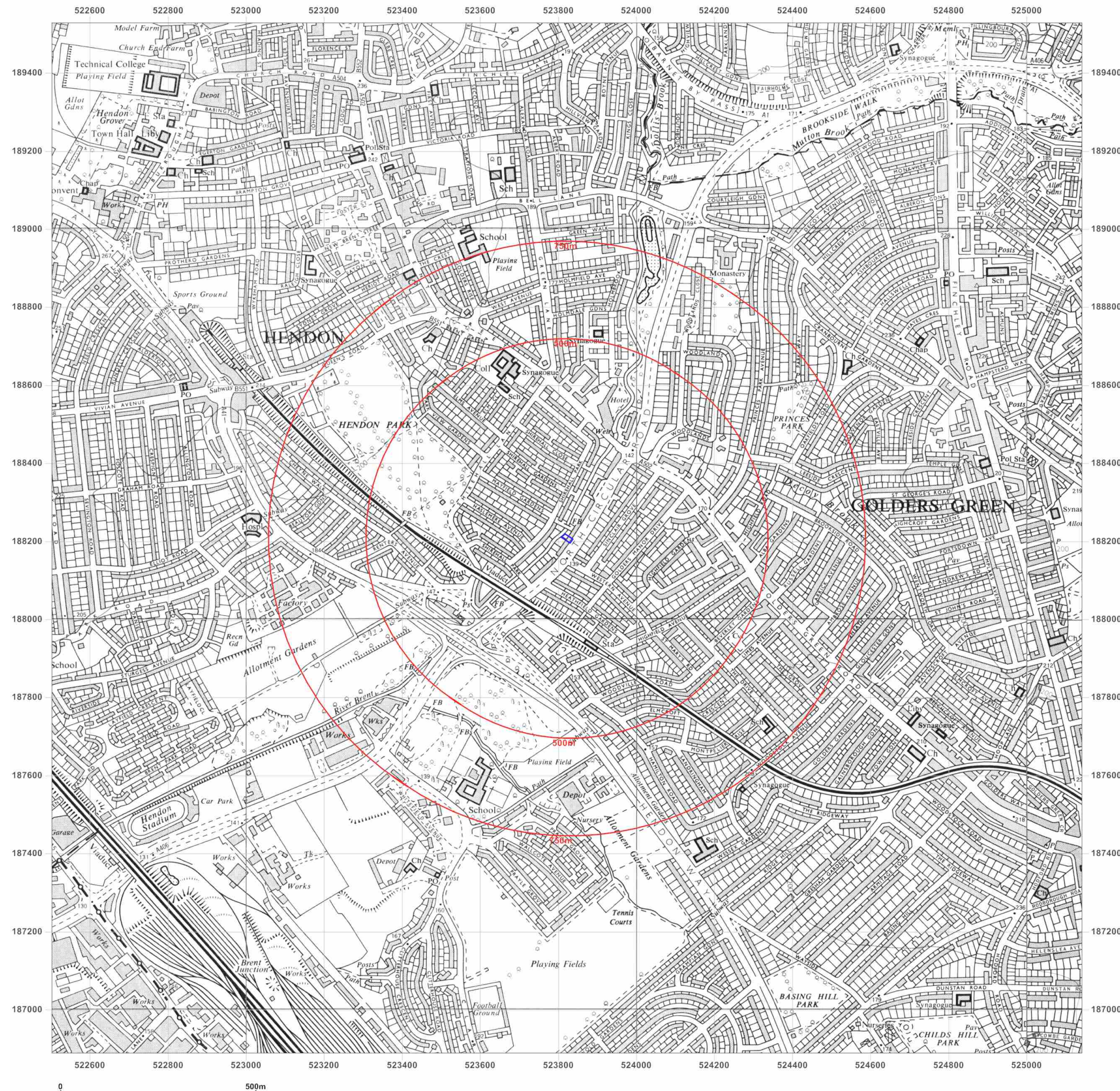


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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1974-1976

Scale: 1:10,000

Printed at: 1:10,000



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

Surveyed 1974
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

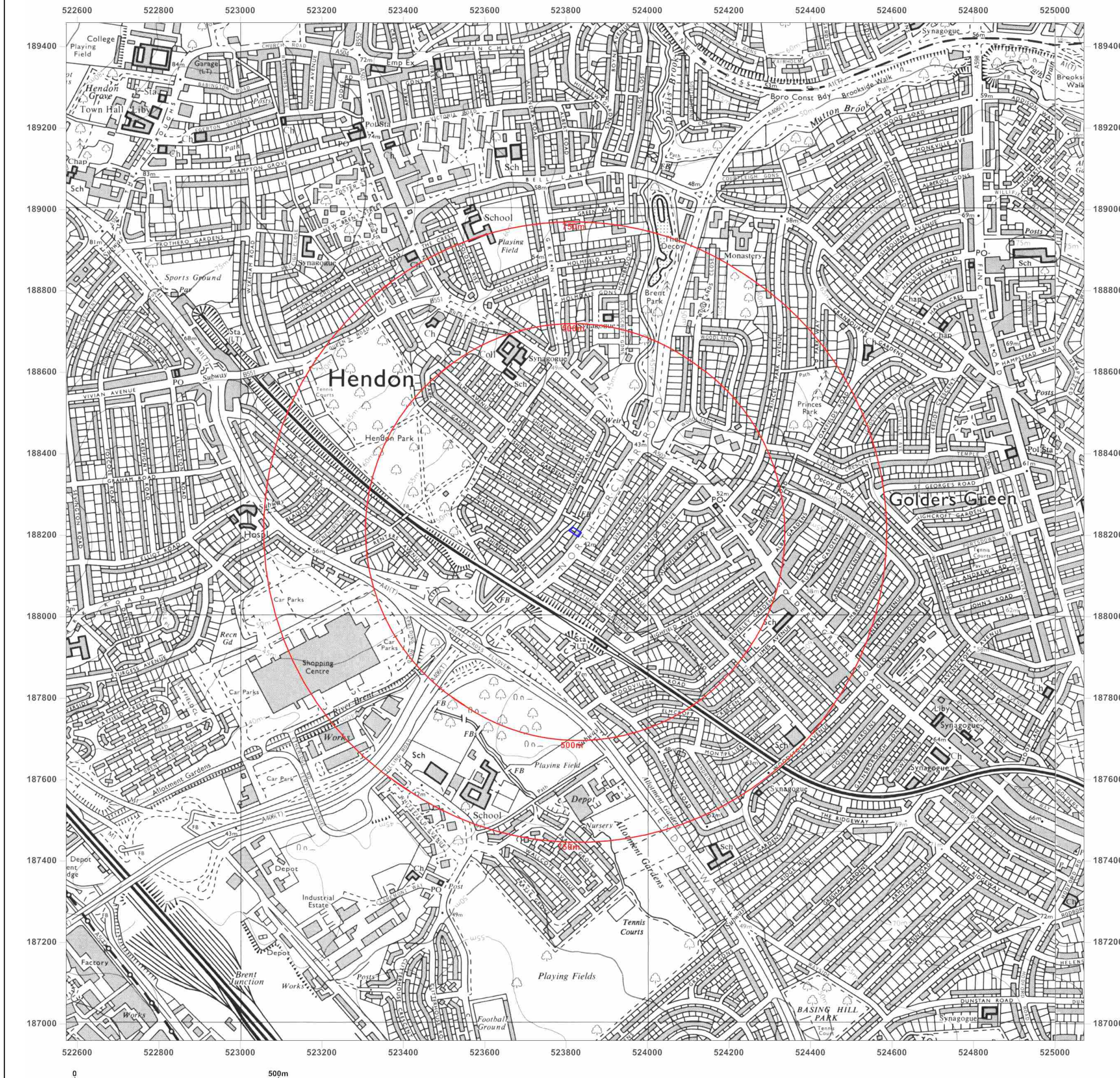


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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 1993

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1975
Revised 1993
Edition N/A
Copyright N/A
Levelled N/A

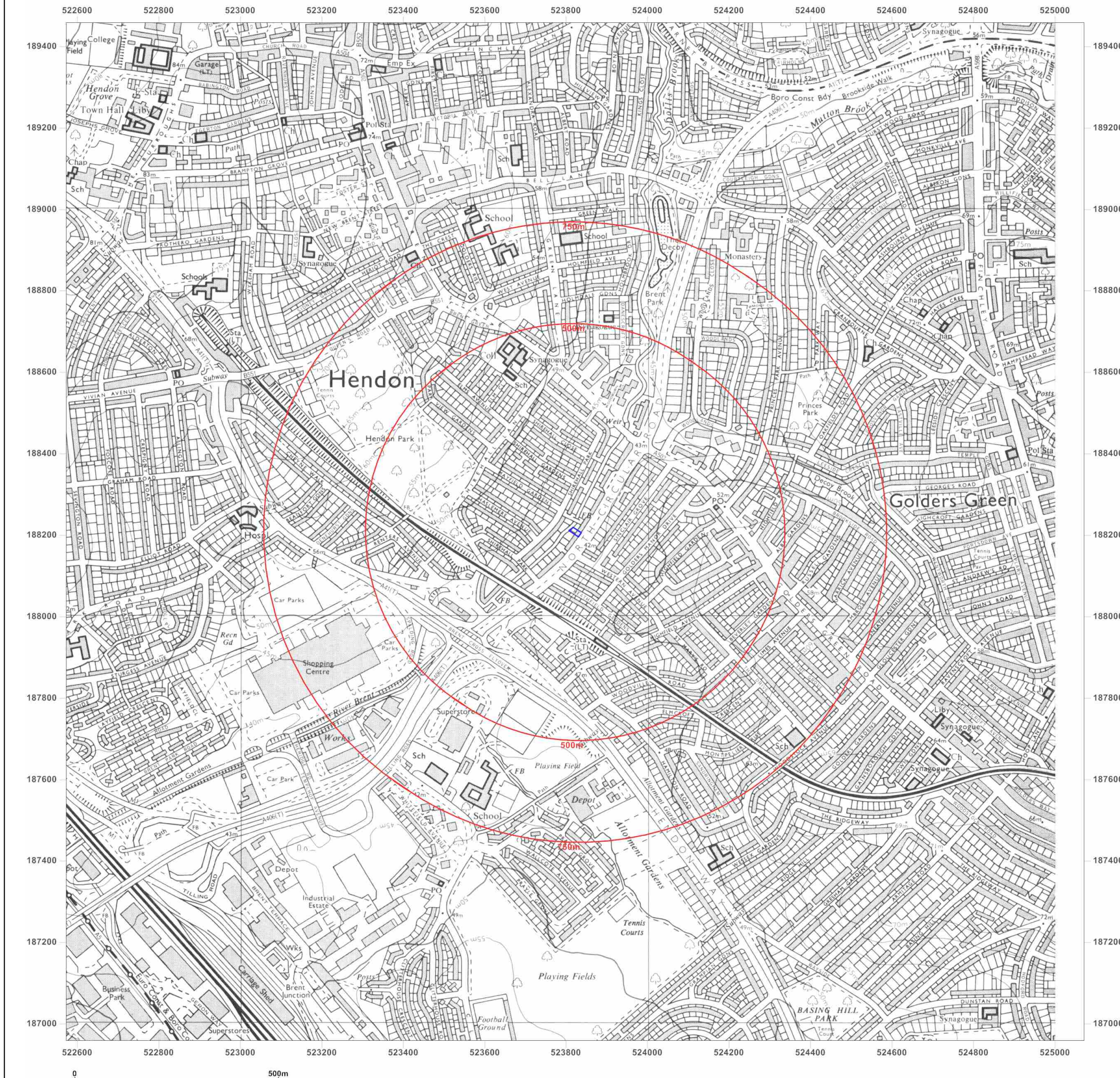


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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



2002

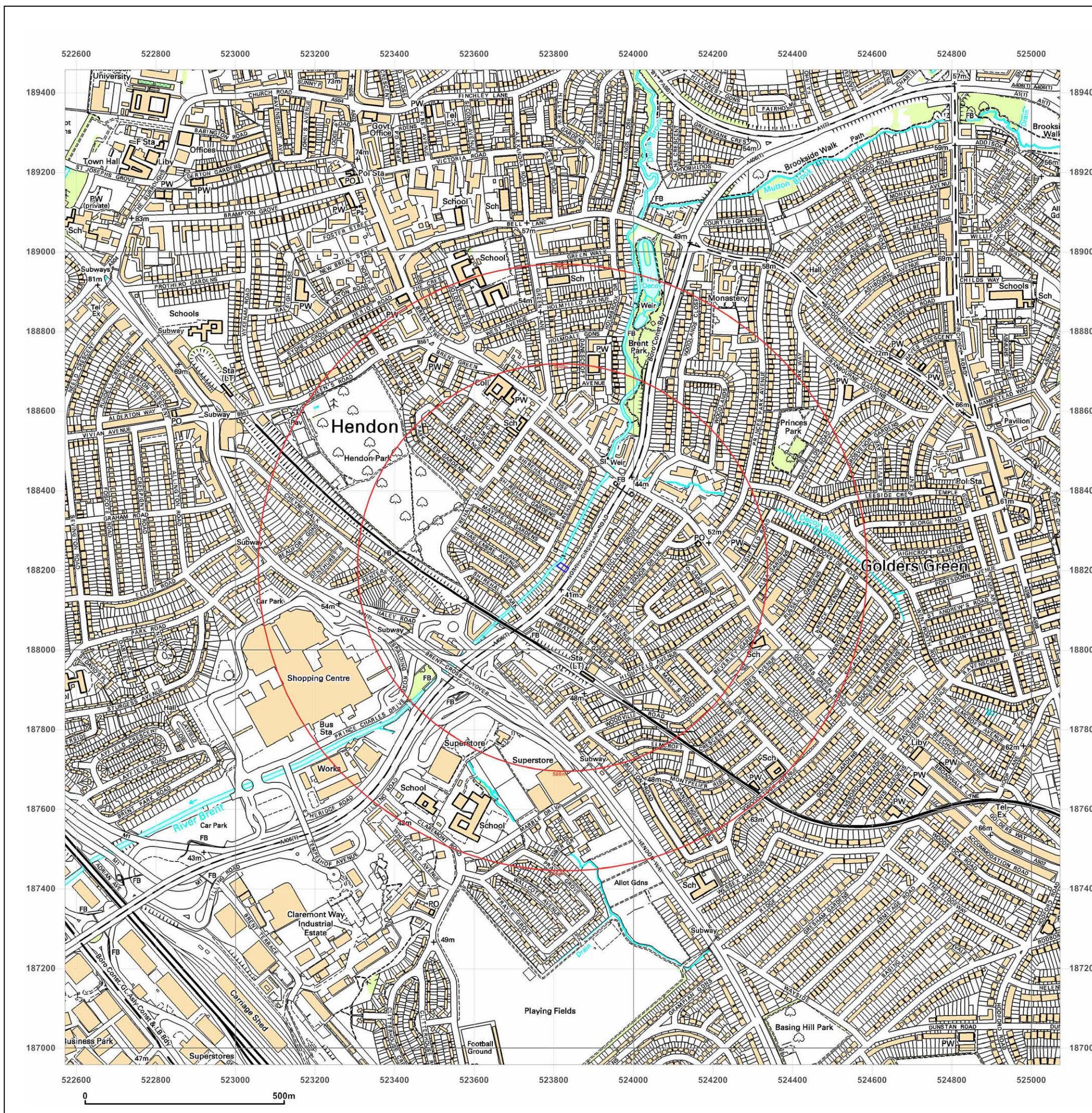


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Client Ref: PO0067007-1
Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



2010

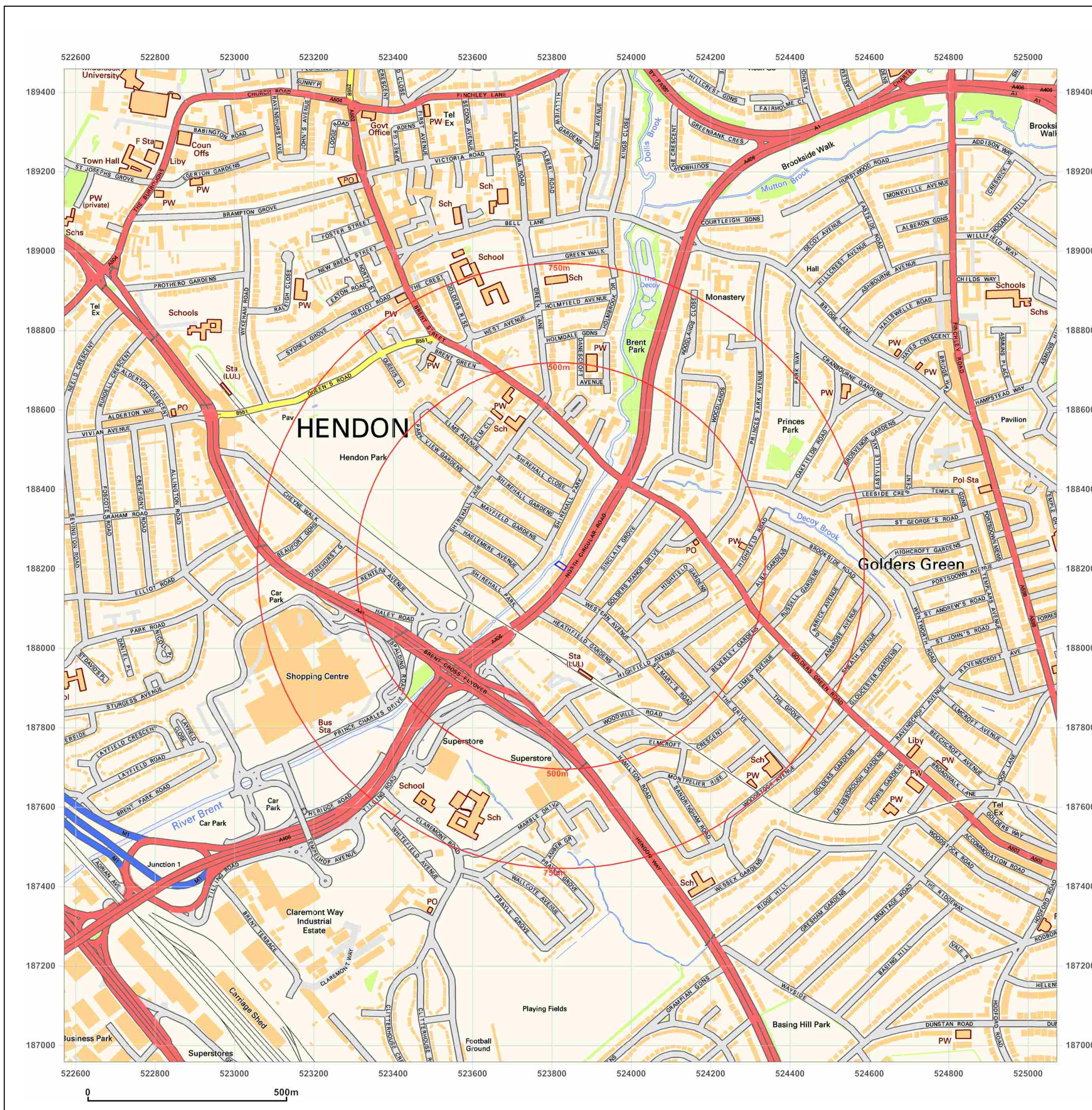


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Report Ref: GS-3885812
Grid Ref: 523821, 188208

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



2014

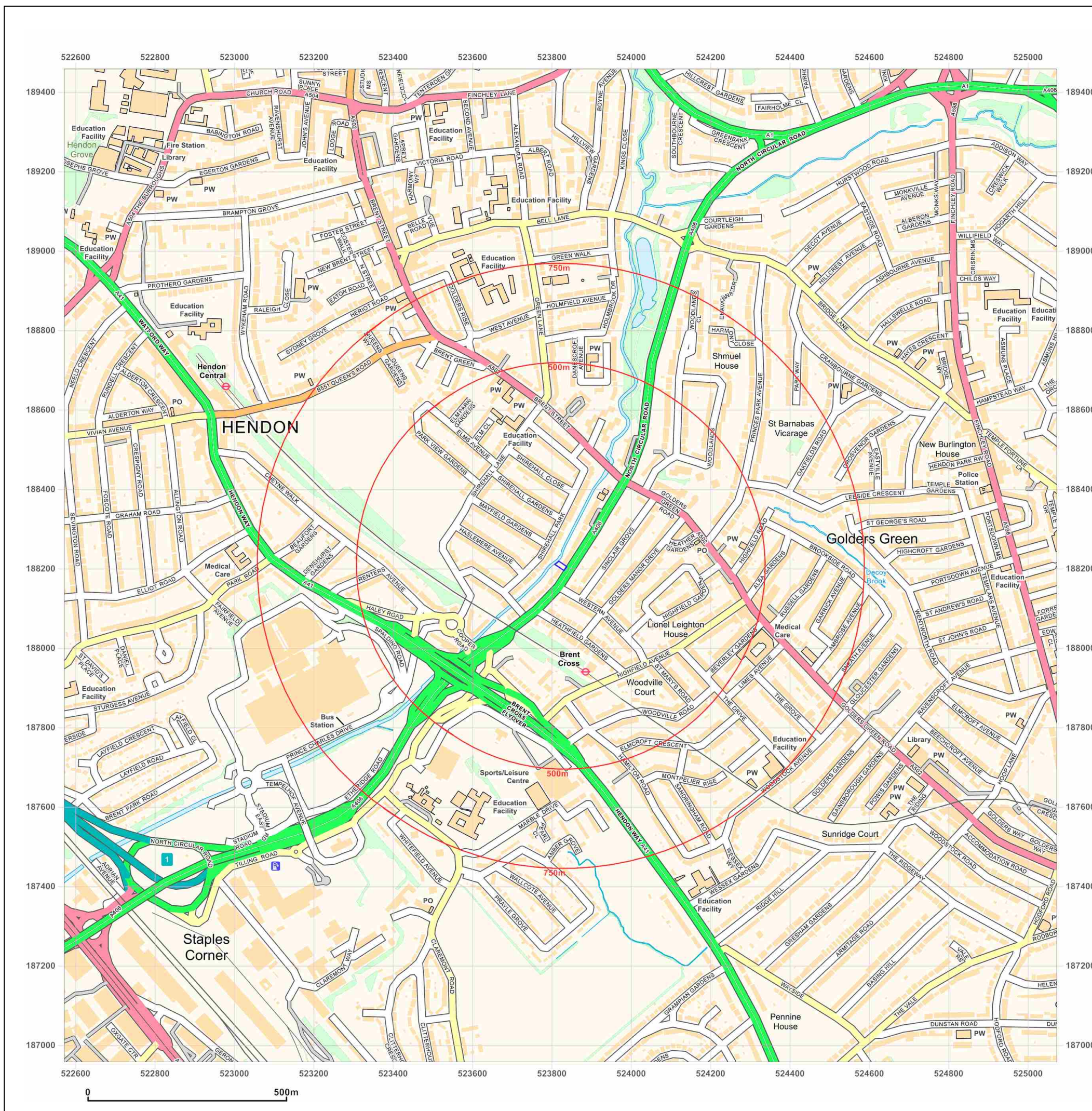


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APPENDIX B

Groundsure Data Sheets



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GUILDFORD, GU2 7AR

Groundsure
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GS-3885810

Your Reference: PO0067007-1

Report Date

16 May 2017

Report Delivery
Method:

Email - pdf

Groundsure Enviro Insight

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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
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Date: 16 May 2017

Reference: GS-3885810

Client: Arcadis

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 28-Apr-2013

Grid Reference: 523830,188206

Site Size: 0.03ha

Report Reference: GS-3885810

Client Reference: PO0067007-1

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8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:	50

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:	51
8.11 Records of National Parks (NP) within 2000m of the study site:	51
8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:.....	51
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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	5	27
1.2 Additional Information – Historical Tank Database	0	0	0	7
1.3 Additional Information – Historical Energy Features Database	0	0	1	44
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	0	19
1.6 Potentially Infilled Land	0	0	1	21
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	4
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	1
2.1.8 Records of Licensed Discharge Consents	0	0	1	2
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	5
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	1	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	0
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	19

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	5	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	1	1
4.3 National Grid Underground Electricity Cables	0	0	0	0
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	1	0	1	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	Yes	No
6.10 Detailed River Network entries within 500m of the site	0	1	0	4	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	No	Yes	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?	Yes					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Yes					
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	High					
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?	Potential at Surface					
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate					

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	4
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	1
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	3
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	0

Section 9: Natural Hazards	
9.1 What is the maximum risk of natural ground subsidence?	Moderate
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Moderate
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?	Moderate
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?	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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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: 32

ID	Distance [m]	Direction	Use	Date
1W	180	N	Gravel Pit	1873
2A	229	S	Railway Station	1949
3A	250	S	London Transport Station	1993
4A	250	S	London Transport Station	1976
5A	250	S	Railway Station	1966
6X	260	N	Gravel Pit	1873
7	275	SW	Sewage Farm	1920
8Y	283	NE	Gravel Pit	1873
9Z	287	N	Gravel Pit	1873
10	292	NE	Smithy	1873
11	318	NE	Smithy	1895
12B	321	SW	Sewage Farm	1938
13B	324	SW	Sewage Farm	1938
14B	328	SW	Disused Sewage Farm	1949
15H	331	NE	Unspecified Tank	1895
16L	336	SW	Railway Sidings	1920
17AA	343	SW	Disused Sewage Farm	1949
18C	363	S	Sewage Works	1894
19C	366	S	Sewage Works	1911
20D	368	SW	Filter Beds	1938
21D	370	SW	Filter Beds	1938
22D	378	SW	Filter Beds	1920
23E	403	SW	Filter Beds	1938
24E	405	SW	Filter Beds	1938
25E	415	SW	Filter Beds	1920
26I	425	N	Unspecified Tank	1873
27	426	SW	Unspecified Tanks	1949
28AB	433	S	Unspecified Ground Workings	1993
29F	444	W	Cuttings	1949
30F	444	W	Cuttings	1976
31F	444	W	Cuttings	1966
32F	444	W	Cuttings	1993

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:

7

ID	Distance (m)	Direction	Use	Date
33G	312	NE	Unspecified Tank	1896
34G	313	NE	Unspecified Tank	1864
35H	318	NE	Unspecified Tank	1914
36	333	N	Tank or Trough	1864
37	346	E	Tank or Trough	1864
38I	427	N	Unspecified Tank	1864
39	490	E	Unspecified Tank	1896

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:

45

ID	Distance (m)	Direction	Use	Date
40	232	E	Electricity Substation	1968
41J	278	SW	Electricity Substation	1995
42J	278	SW	Electricity Substation	1994
43J	278	SW	Electricity Substation	1993
44J	278	SW	Electricity Substation	1996
45J	281	SW	Electricity Substation	1991
46J	282	SW	Electricity Substation	1985
47J	282	SW	Electricity Substation	1991
48J	282	SW	Electricity Substation	1987
49K	329	E	Electricity Substation	1991
50K	329	E	Electricity Substation	1991
51K	329	E	Electricity Substation	1968
52K	329	E	Electricity Substation	1991
53K	329	E	Electricity Substation	1991
54L	345	SW	Electricity Substation	1952
55M	345	SW	Electricity Substation	1955
56M	346	SW	Electricity Substation	1955
57N	358	SW	Electricity Substation	1991
58N	358	SW	Electricity Substation	1994

59N	358	SW	Electricity Substation	1997
60N	358	SW	Electricity Substation	1991
61O	374	N	Electricity Substation	1954
62O	374	N	Electricity Substation	1955
63O	374	N	Electricity Substation	1955
64O	374	N	Electricity Substation	1991
65O	374	N	Electricity Substation	1991
66O	375	N	Electricity Substation	1991
67O	375	N	Electricity Substation	1992
68P	390	NE	Electricity Substation	1968
69P	391	NE	Electricity Substation	1991
70P	391	NE	Electricity Substation	1991
71P	391	NE	Electricity Substation	1991
72P	391	NE	Electricity Substation	1991
73Q	402	N	Electricity Substation	1955
74Q	402	N	Electricity Substation	1955
75Q	402	N	Electricity Substation	1954
76Q	403	N	Electricity Substation	1991
77Q	403	N	Electricity Substation	1991
78Q	403	N	Electricity Substation	1991
79Q	403	N	Electricity Substation	1992
80R	466	E	Electricity Substation	1991
81R	466	E	Electricity Substation	1991
82R	467	E	Electricity Substation	1968
83R	467	E	Electricity Substation	1991
84R	467	E	Electricity Substation	1991

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: 19

ID	Distance (m)	Direction	Use	Date
----	--------------	-----------	-----	------

85S	304	SW	Garage	1968
86S	304	SW	Garage	1967
87K	314	E	Garage	1952
88K	314	E	Garage	1968
89K	314	E	Garage	1952
90K	314	E	Garage	1991
91K	314	E	Garage	1991
92T	314	E	Garage	1991
93T	314	E	Garage	1991
94S	315	SW	Garage	1966
95U	322	SW	Garage	1967
96U	322	SW	Garage	1954
97U	322	SW	Garage	1955
98U	322	SW	Garage	1955
99S	324	SW	Garage	1967
100N	350	SW	Garage	1954
101N	350	SW	Garage	1952
102V	491	E	Garage	1952
103V	491	E	Garage	

1.6 Potentially Infilled Land

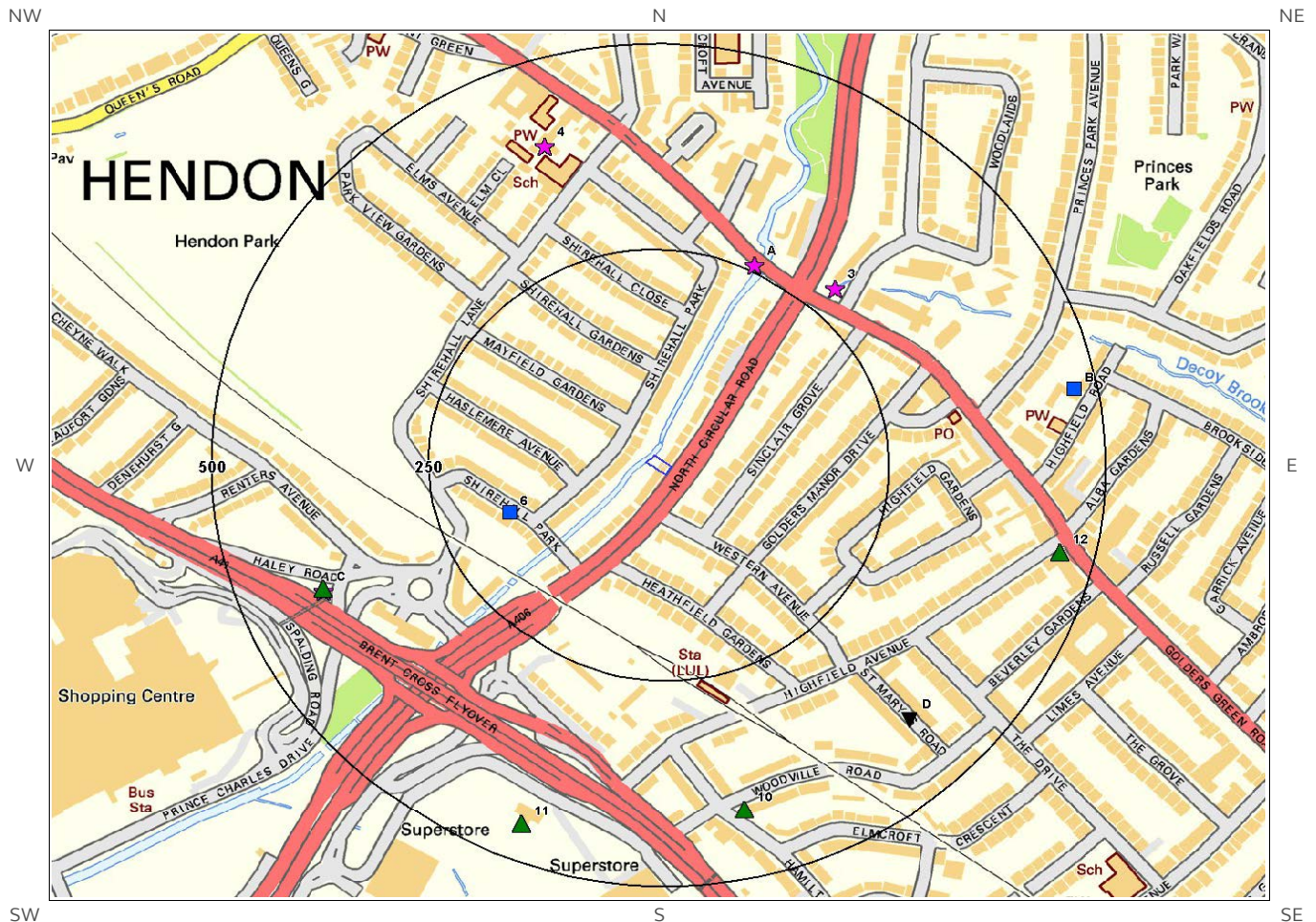
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 22

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















ID	Distance(m)	Direction	Use	Date
104W	180	N	Gravel Pit	1873
105X	260	N	Gravel Pit	1873
106E	275	SW	Sewage Farm	1920
107Y	283	NE	Gravel Pit	1873
108Z	287	N	Gravel Pit	1873
109B	321	SW	Sewage Farm	1938
110B	324	SW	Sewage Farm	1938
111B	328	SW	Disused Sewage Farm	1949
112AA	343	SW	Disused Sewage Farm	1949
113C	363	S	Sewage Works	1894
114C	366	S	Sewage Works	1911
115D	368	SW	Filter Beds	1938
116D	370	SW	Filter Beds	1938
117D	378	SW	Filter Beds	1920
118E	403	SW	Filter Beds	1938
119E	405	SW	Filter Beds	1938
120E	415	SW	Filter Beds	1920
121AB	433	S	Unspecified Ground Workings	1993

122F	444	W	Cuttings	1966
123F	444	W	Cuttings	1976
124F	444	W	Cuttings	1993
125F	444	W	Cuttings	1949

2. Environmental Permits, Incidents and Registers Map



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- | | | | | | |
|---|--------------------|---|-------------------------------|---|--|
|  | Site Outline |  | Recorded Pollution Incident |  | RAS 3 & 4 Authorisations |
|  | Search Buffers (m) |  | Dangerous Substances (List 1) |  | Part A(1) Authorised Processes and Historic IPC Authorisations |
| | |  | Dangerous Substances (List 2) |  | Part A(2) and Part B Authorised Processes |
| | |  | 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:

4

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
9C	403	SW	523434 188056	Address: Brent Cross Service Station, Hendon Way, London, NW4 Process: Petrol Vapour Recovery Process Status: Revoked Permit Type: Part B Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
10	419	S	523920 187787	Address: Woodstock Dry Cleaners, 100 Hamilton Road, Golders Green, London, NW11 9DY Process: Dry Cleaning Status: Historical Permit Permit Type: Part B Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
11	458	S	523663 187769	Address: Tesco Stores Ltd, Tesco Petrol Filling Station, Tilling Road, Brent Cross, NW2 1LZ Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
12	459	E	524283 188099	Address: Maurice Colp Dry Cleaners, 237 Golders Green Road, Golders Green, London, NW11 9EP Process: Dry Cleaning Status: Current Permit Permit Type: Part B Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

1

The following RAS Licence (3 or 4) records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permissio n Number	Dates	Status
14D	408	SE	524110 187900	Science Museum, 23 Blythe Road, London, W14 0QX	Science Museum	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	BV2751	Date of Approval:16/10/2003 Effective from:16/10/2003 Last date of update:2015-01-01	Effective

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

3

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
6	168	W	523650 188150	<p>Address: THE EXCHANGE, BRENT CROSS, HENDON W, THE EXCHANGE, BRENT CROSS, HENDO, N WAY, LONDON, -, -</p> <p>Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER</p> <p>Permit Number: CTWC.3337</p> <p>Permit Version: 1</p> <p>Receiving Water: RIVER BRENT</p> <p>Status: TRANSFERRED FROM COPA 1974</p> <p>Issue date: 08/06/1989</p> <p>Effective Date: 08-Jun-1989</p> <p>Revocation Date: -</p>
7B	473	E	524300 188300	<p>Address: BROOKSIDE ROAD,, GOLDERS GREEN, -, -, -</p> <p>Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY</p> <p>Permit Number: CANM.0917</p> <p>Permit Version: 1</p> <p>Receiving Water: THE DECOY BROOK</p> <p>Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995)</p> <p>Issue date: 26/07/2005</p> <p>Effective Date: 31-Mar-2005</p> <p>Revocation Date: 09/05/2007</p>
8B	473	E	524300 188300	<p>Address: OUTSIDE 135 LEESIDE CRESCENT, OUTSIDE 135 LEESIDE CRESCENT, GOLDERS GREEN, GOLDERS GREEN, LONDON, NW11 0JN</p> <p>Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY</p> <p>Permit Number: CANM.0917</p> <p>Permit Version: 2</p> <p>Receiving Water: THE DECOY BROOK</p> <p>Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995)</p> <p>Issue date: 10/05/2007</p> <p>Effective Date: 10-May-2007</p> <p>Revocation Date: -</p>

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:

5

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
1A	257	NE	523931 188450	Incident Date: 25-Jul-2001 Incident Identification: 19047 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2A	257	NE	523931 188450	Incident Date: 25-Jul-2001 Incident Identification: 19047 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3	285	NE	524023 188422	Incident Date: 08-Aug-2002 Incident Identification: 98663 Pollutant: Contaminated Water Pollutant Description: Urban Run-Off Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
4	397	N	523689 188595	Incident Date: 29-Aug-2003 Incident Identification: 185982 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
5C	403	SW	523435 188055	Incident Date: 26-Apr-2002 Incident Identification: 74980 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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

0

Database searched and no data found.

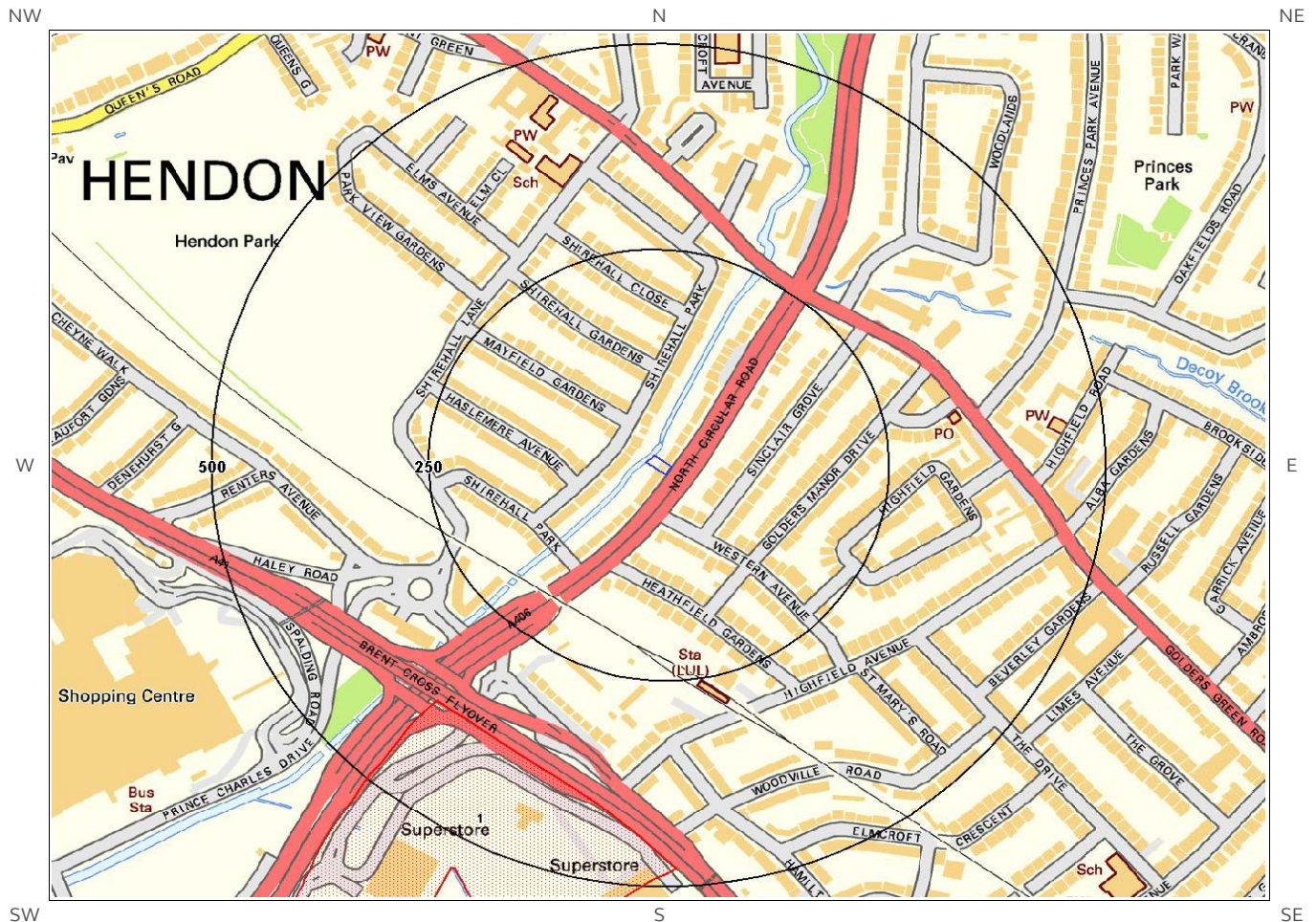
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

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?

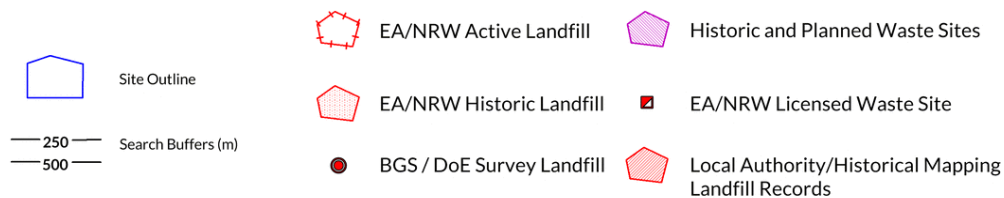
0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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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:

2

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	374	SW	523500 187700	Site Address: Hendon Way, Tilling Road, Brent Cross, Barnet Waste Licence: - Site Reference: 8BA004 Waste Type: Liquid, sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: 31-Dec-1975 Last Recorded: 31-Dec-1984
Not shown	802	SW	523200 187400	Site Address: Claremont Way, Templehof Avenue, Brent Cross, Barnet Waste Licence: - Site Reference: 8BA005, BAR005 Waste Type: Inert, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: 31-Dec-1960 Last Recorded: 31-Dec-1980

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:

0

Database searched and no data found.

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:

19

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

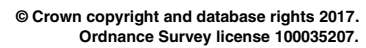
ID	Distance (m)	Direction	NGR	Details
Not shown	1059	SW	523260 187303	<p>Site Address: McGovern Brothers (Haulage) Ltd, 26-27, Brent Terrace, Claremont Ind.estate, Hendon, London, NW2 1BG</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MCG002</p> <p>EPR reference: EA/EPR/VP3091NS/V005</p> <p>Operator: McGovern Brothers (Haulage) Ltd</p> <p>Waste Management licence No: 80308</p> <p>Annual Tonnage: 89040.0</p> <p>Issue Date: 09/07/1991</p> <p>Effective Date: -</p> <p>Modified: 09/09/2002</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Mc Govern Brothers, Brent Terrace</p> <p>Correspondence Address: -</p>
Not shown	1061	SW	523224 187325	<p>Site Address: Claremont Way Ind Est, Brent Terrace, London, NW2 1BG</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: GOV005</p> <p>EPR reference: EA/EPR/JB3532AL/T001</p> <p>Operator: Mc Govern Haulage Ltd</p> <p>Waste Management licence No: 100814</p> <p>Annual Tonnage: 150000.0</p> <p>Issue Date: 02/10/2009</p> <p>Effective Date: 09/08/2012</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Transferred</p> <p>Site Name: Mc Governs Yard, Claremont Way</p> <p>Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details	
Not shown	1072	SW	523255 187291	<p>Site Address: McGovern Brothers (Haulage) Ltd, 26-27, Claremont Ind Est, Hendon, London, NW2 1BG</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: GOV004</p> <p>EPR reference: EA/EPR/JB3531RA/T001</p> <p>Operator: Mc Govern Haulage Ltd</p> <p>Waste Management licence No: 80308</p> <p>Annual Tonnage: 89040.0</p>	<p>Issue Date: 09/07/1991</p> <p>Effective Date: 09/08/2012</p> <p>Modified: 09/09/2002</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Transferred</p> <p>Site Name: 26/27 Claremont Way Ind Est</p> <p>Correspondence Address: -</p>
Not shown	1109	SW	523250 187250	<p>Site Address: Claremont Way, Claremont Way Ind Est, Brent Terrace, London, NW2 1BG</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MCG010</p> <p>EPR reference: EA/EPR/AP3197EH/A001</p> <p>Operator: Mc Govern Brothers (Haulage) Ltd</p> <p>Waste Management licence No: 100814</p> <p>Annual Tonnage: 150000.0</p>	<p>Issue Date: 02/10/2009</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Mc Governs Yard</p> <p>Correspondence Address: -</p>
Not shown	1171	SW	523096 187280	<p>Site Address: Nightingale Works, Brent Terrace, Claremont Way Ind Est, London, NW2 1LR</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CRI002</p> <p>EPR reference: EA/EPR/SP3593EM/A001</p> <p>Operator: Cripps Skips Limited</p> <p>Waste Management licence No: 80746</p> <p>Annual Tonnage: 10000.0</p>	<p>Issue Date: 24/07/2006</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Cripps Skips Brent Terrace</p> <p>Correspondence Address: -</p>
Not shown	1171	SW	523096 187280	<p>Site Address: Nightingale Works, Brent Terrace, Claremont Way Ind Est, London, NW2 1LR</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CRI002</p> <p>EPR reference: EA/EPR/SP3593EM/V002</p> <p>Operator: Ground Waste Recycling Ltd</p> <p>Waste Management licence No: 80746</p> <p>Annual Tonnage: 24999.0</p>	<p>Issue Date: 24/07/2006</p> <p>Effective Date: -</p> <p>Modified: 12/09/2012</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Cripps Skips</p> <p>Correspondence Address: -</p>
Not shown	1180	SW	523102 187265	<p>Site Address: Nightingale Works, Brent Terrace, Claremont Way Ind Est, London, NW2 1LR</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CRI002</p> <p>EPR reference: EA/EPR/SP3593EM/V</p> <p>Operator: Ground Waste Recycling Limited</p> <p>Waste Management licence No: 80746</p> <p>Annual Tonnage: 24999.0</p>	<p>Issue Date: 24/07/2006</p> <p>Effective Date: -</p> <p>Modified: 27/10/2015</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Cripps Skips</p> <p>Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details	
Not shown	1279	SW	523137 187120	<p>Site Address: SME Ltd, Hendon H W R C, Brent Terrace, London, NW2 1LN</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHA004</p> <p>EPR reference: EA/EPR/WP3491NF/V002</p> <p>Operator: F C C Waste Services (U K) Limited</p> <p>Waste Management licence No: 80323</p> <p>Annual Tonnage: 26000.0</p>	<p>Issue Date: 20/12/1994</p> <p>Effective Date: -</p> <p>Modified: 03/01/2013</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Hendon Household Waste Recycling Centre</p> <p>Correspondence Address: -</p>
Not shown	1279	SW	523137 187120	<p>Site Address: SME Ltd, Hendon CA Site, Brent Terrace, off Tilling Road, Hendon, London, NW2 1LN</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHA004</p> <p>EPR reference: -</p> <p>Operator: Shanks Waste Services Ltd</p> <p>Waste Management licence No: 80323</p> <p>Annual Tonnage: 0.0</p>	<p>Issue Date: 20/12/1994</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: "Hendon CA Site, Brent Terrace"</p> <p>Correspondence Address: Shanks & McEwan (Southern) Ltd, Dunedin House, Auckland Park, Mount Farm, Bletchley, Milton Keynes, Bucks, MK1 1BU</p>
Not shown	1279	SW	523137 187120	<p>Site Address: SME Ltd, Hendon C A Site, Brent Terrace, Off Tilling Road, Hendon, London, NW2 1LN</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHA004</p> <p>EPR reference: EA/EPR/WP3491NF/A001</p> <p>Operator: W R G Waste Services Ltd</p> <p>Waste Management licence No: 80323</p> <p>Annual Tonnage: 26000.0</p>	<p>Issue Date: 20/12/1994</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Hendon C A Site, Brent Terrace</p> <p>Correspondence Address: -</p>
Not shown	1280	SW	523137 187119	<p>Site Address: SME Ltd, Hendon Transfer Station, Brent Terrace, Hendon, London, NW2 1LN</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHA006</p> <p>EPR reference: EA/EPR/AP3291NT/V006</p> <p>Operator: F C C Waste Services (U K) Limited</p> <p>Waste Management licence No: 80334</p> <p>Annual Tonnage: 375600.0</p>	<p>Issue Date: 09/04/1979</p> <p>Effective Date: -</p> <p>Modified: 17/12/2012</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Hendon Transfer Station</p> <p>Correspondence Address: -</p>
Not shown	1280	SW	523137 187119	<p>Site Address: SME Ltd, Hendon Rail Transfer Station, Brent Terrace, Hendon, London, NW2 1LN</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHA006</p> <p>EPR reference: -</p> <p>Operator: Shanks Waste Services Ltd</p> <p>Waste Management licence No: 80334</p> <p>Annual Tonnage: 0.0</p>	<p>Issue Date: 09/04/1979</p> <p>Effective Date: -</p> <p>Modified: 18/01/1994</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: "Shanks, Hendon Ts"</p> <p>Correspondence Address: Shanks & McEwan (Southern) Ltd, Dunedin House, Auckland Park, Mount Farm, Bletchley, Milton Keynes, Bucks, MK1 1BU</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1280	SW	523137 187119	<p>Site Address: SME Ltd, Hendon Rail Transfer Station, Brent Terrace, Hendon, London, NW2 1LN</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHA006</p> <p>EPR reference: EA/EPR/AP3291NT/V005</p> <p>Operator: W R G Waste Services Ltd</p> <p>Waste Management licence No: 80334</p> <p>Annual Tonnage: 375600.0</p> <p>Issue Date: 09/04/1979</p> <p>Effective Date: -</p> <p>Modified: 18/01/1994</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: W R G, Hendon Ts</p> <p>Correspondence Address: -</p>
Not shown	1280	SW	523137 187119	<p>Site Address: SME Ltd, Hendon Transfer Station, Brent Terrace, Hendon, London, NW2 1LN</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHA006</p> <p>EPR reference: EA/EPR/AP3291NT/V006</p> <p>Operator: F C C Waste Services (U K) Limited</p> <p>Waste Management licence No: 80334</p> <p>Annual Tonnage: 375600.0</p> <p>Issue Date: 09/04/1979</p> <p>Effective Date: -</p> <p>Modified: 17/12/2012</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Hendon Transfer Station</p> <p>Correspondence Address: -</p>
Not shown	1281	SW	522924 187282	<p>Site Address: Upside Railway Yard, Brent Terrace, Cricklewood, London, NW2 1LN</p> <p>Type: Inert & Excavation WTS</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CON143</p> <p>EPR reference: EA/EPR/AB3200KE/V002</p> <p>Operator: G B Railfreight Limited</p> <p>Waste Management licence No: 400425</p> <p>Annual Tonnage: 249999.0</p> <p>Issue Date: 28/08/2013</p> <p>Effective Date: -</p> <p>Modified: 15/06/2015</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Upside Railway Yard</p> <p>Correspondence Address: -</p>
Not shown	1281	SW	522924 187282	<p>Site Address: Upside Railway Yard, Brent Terrace, Cricklewood, London, NW2 1LN</p> <p>Type: Material Recycling Treatment Facility</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CON143</p> <p>EPR reference: EA/EPR/AB3200KE/V003</p> <p>Operator: G B Railfreight Limited</p> <p>Waste Management licence No: 400425</p> <p>Annual Tonnage: 249999.0</p> <p>Issue Date: 28/08/2013</p> <p>Effective Date: -</p> <p>Modified: 13/12/2016</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Upside Railway Yard</p> <p>Correspondence Address: -</p>
Not shown	1313	SW	522916 187246	<p>Site Address: Upside Railway Yard, Brent Terrace, Cricklewood, London, NW2 1LF</p> <p>Type: Inert & Excavation WTS</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: APS005</p> <p>EPR reference: EA/EPR/ZP3498VC/A001</p> <p>Operator: A P S Materials Limited</p> <p>Waste Management licence No: 102913</p> <p>Annual Tonnage: 250000.0</p> <p>Issue Date: 16/09/2011</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Upside Railway Yard</p> <p>Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details	
Not shown	1419	SW	523274 186890	Site Address: SME Ltd, Hendon H W R C, Brent Terrace, London, NW2 1LN Type: Household, Commercial & Industrial Waste T Stn Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LON274 EPR reference: EA/EPR/CB3403GQ/T001 Operator: Londonwaste Limited Waste Management licence No: 80323 Annual Tonnage: 26000.0	Issue Date: 20/12/1994 Effective Date: 31/12/2014 Modified: 03/01/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Hendon Terrace Household Waste Recycling Site Correspondence Address: -
Not shown	1419	SW	523274 186890	Site Address: SME Ltd, Hendon Transfer Station, Brent Terrace, Tilling Road, Hendon, London, NW2 1LN Type: Household, Commercial & Industrial Waste T Stn Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LON275 EPR reference: EA/EPR/CB3403FJ/V003 Operator: Londonwaste Limited Waste Management licence No: 80334 Annual Tonnage: 375600.0	Issue Date: 09/04/1979 Effective Date: 31/12/2014 Modified: 02/11/2015 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Hendon Waste Transfer Station Correspondence Address: -



4. Current Land Uses

4.1 Current Industrial Data

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

5

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1A	172	E	Ray's House Clearance	523998 188263	Ray's House Clearance, 11, Sinclair Grove, London, NW11 9JH	Clearance and Salvage Dealers	Recycling Services
2A	180	E	M G & S Adler	524005 188268	M G & S Adler, 9, Sinclair Grove, London, NW11 9JH	Jewellery, Gems, Clocks and Watches	Consumer Products
3	234	N	Frame Your T V Ltd	523740 188440	Frame Your T V Ltd, 21, Shirehall Close, London, NW4 2QR	Construction Completion Services	Construction Services
4	246	E	Electricity Sub Station	524081 188231	Electricity Sub Station, NW11	Electrical Features	Infrastructure and Facilities
5	249	S	Brent Cross	523896 187955	Brent Cross, Brent Cross Station Station Approach, Highfield Avenue, London, NW11 9UA	Underground Network Stations	Public Transport, Stations and Infrastructure

4.2 Petrol and Fuel Sites

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

2

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
6	233	SW	523723 187989	Obsolete	Brent Cross Service Station, 301-303, Hendon Way, Brent Cross, London, Outer London, NW4 3NB	Not Applicable	Obsolete
7	418	S	523680 187805	Tesco	Tesco Brent Cross Hendon Way, Tilling Road, Tilling Road, Brent Cross, London, Outer London, NW2 1LZ	No	Open

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:

0

Database searched and no data found.

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
ALV-XCZSV	ALLUVIUM	CLAY, SILT, 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

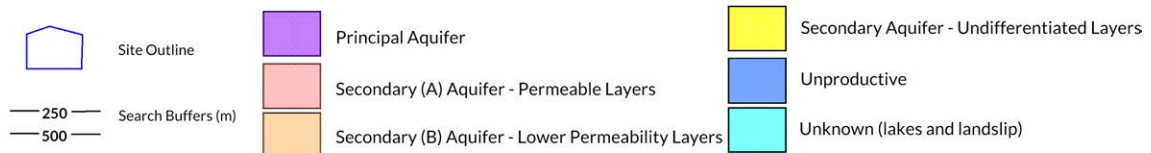
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

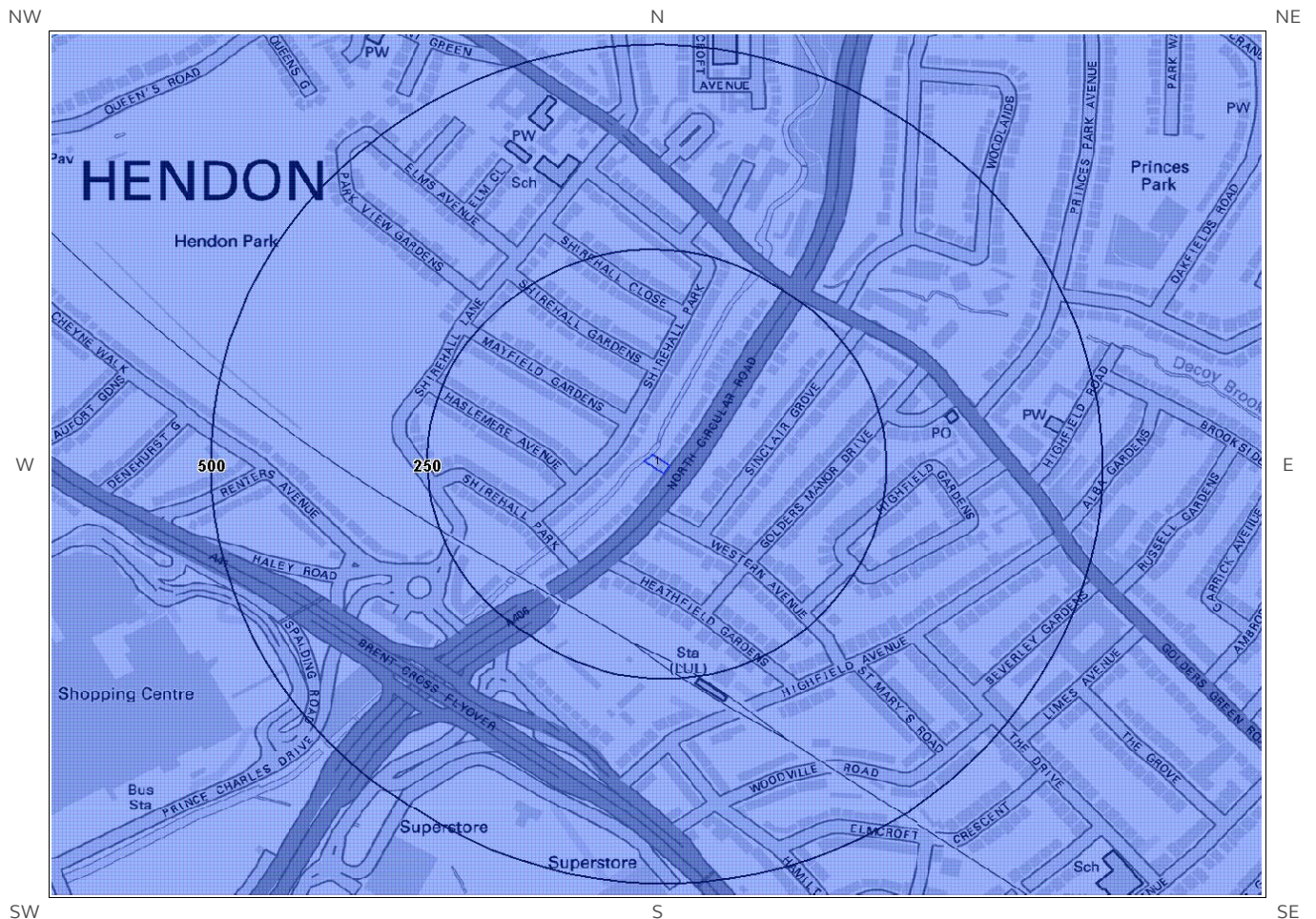
6a. Aquifer Within Superficial Geology



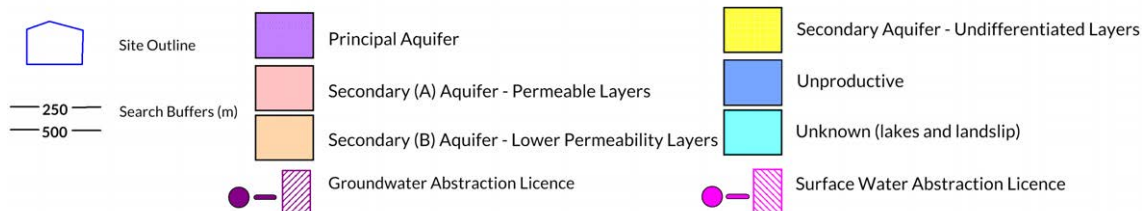
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6b. Aquifer Within Bedrock Geology and Abstraction Licenses



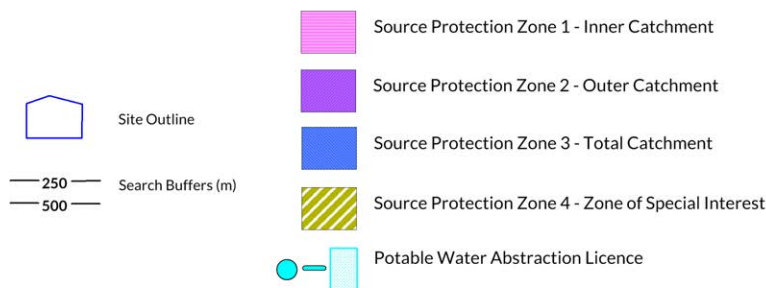
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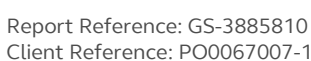
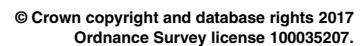


6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



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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
1	4	NW	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

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

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
39	NW	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.
488	W	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? Yes

6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
Not shown	926	N	524030 189120	River Name: Brent Reach: Conf Dollis/mutton Bk - Neasden Lane Swo End/Start of Stretch: Start of Stretch NGR	D	D	D	D	D

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? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	3	NW	River Name: River Brent Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
2	256	NE	River Name: Decoy Brook Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
3	256	NE	River Name: River Brent Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
4	282	NE	River Name: Decoy Brook Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
5	431	NE	River Name: Decoy Brook Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined

6.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

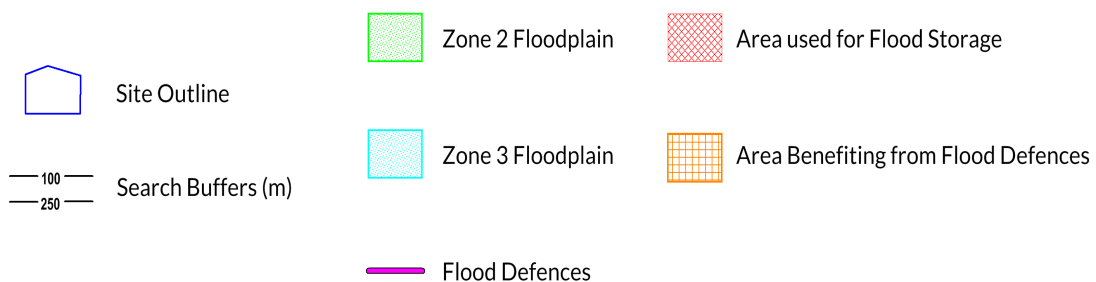
The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
150	SW
218	SW

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



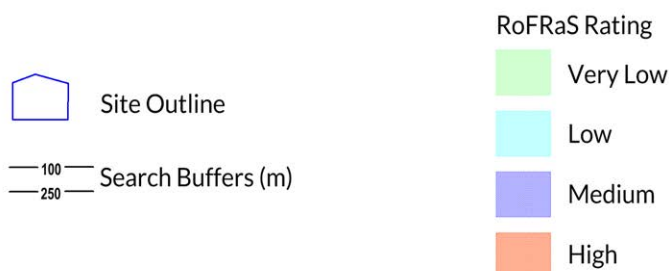
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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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? Yes

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:

ID	Distance (m)	Direction	Update	Type
1	0	On Site	01-Feb-2017	Zone 2 - (Fluvial /Tidal Models)
2	200	SW	01-Feb-2017	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? Yes

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.

ID	Distance (m)	Direction	Update	Type
1	0	On Site	01-Feb-2017	Zone 3 - (Fluvial Models)
2	200	SW	01-Feb-2017	Zone 3 - (Fluvial Models)

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

What is the highest risk of flooding onsite?

High

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 High (1 in 30 or greater) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS flood Risk
1	0.0	On Site	High
2	35.0	NW	Low
3	46.0	NE	Low
4A	46.0	SW	Low
5A	50.0	SW	Low

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?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

7.8 Groundwater Flooding Confidence Areas

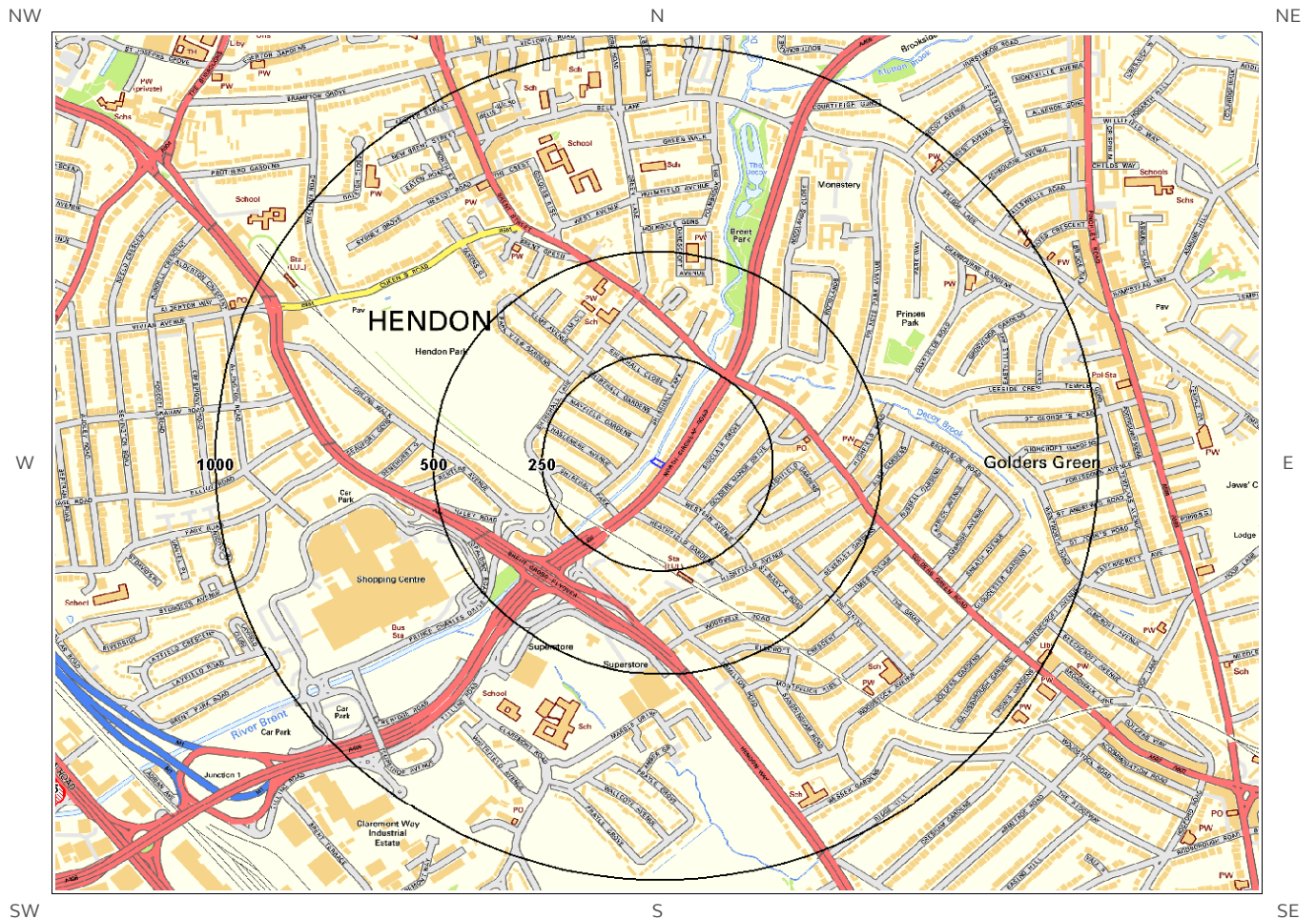
What is the British Geological Survey confidence rating in this result?

Moderate

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:

4

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1	1564	SW	Brent Reservoir	Natural England
Not shown	1573	SW	Brent Reservoir	Natural England
Not shown	1607	SW	Brent Reservoir	Natural England
Not shown	1909	W	Brent Reservoir	Natural England

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:

1

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
Not shown	1645	E	UNKNOWN	Ancient and Semi-Natural Woodland

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

3

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
5	1564	SW	Brent Reservoir / Welsh Harp	Natural England
Not shown	1645	E	Big Wood & Little Wood	Natural England
Not shown	1651	NE	Big Wood & Little Wood	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:

0

Database searched and no data found.

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? Moderate

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

Hazard
Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. 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 probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk 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?

Moderate

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

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

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?

Low

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

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.

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

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info@groundsure.com

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Web: www.bgs.ac.uk

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

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Rotherham, S60 1BY
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Public Health England

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www.gov.uk/phe

Email: enquiries@phe.gov.uk
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Phone: 020 8359 2000

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

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

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Groundsure
Reference:

GS-3885811

Your Reference: PO0067007-1

Report Date 16 May 2017

Report Delivery Method: Email - pdf

Groundsure Geo Insight

Address: 46, BRENTMEAD PLACE, LONDON, NW11 9LJ

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
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Address: 46, BRENTMEAD PLACE, LONDON, NW11 9LJ

Date: 16 May 2017

Reference: GS-3885811

Client: Arcadis



Aerial Photograph Capture date: 28-Apr-2013

Grid Reference: 523830,188206

Site Size: 0.03ha

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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	1	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

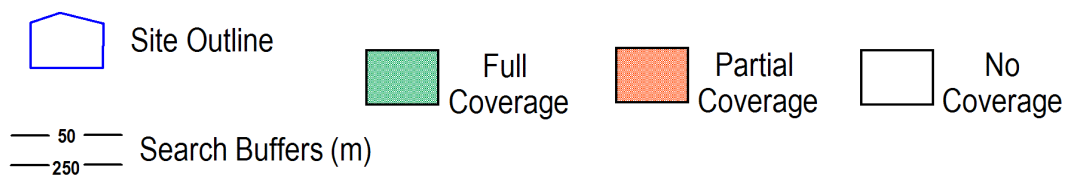
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Moderate				
6.2 Landslides	Very Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Moderate				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	4	18		
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	1	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	1164.0	Some deposits are mapped	Full	Full	No coverage
N3	1781.0	Some deposits are mapped	Full	Full	No coverage

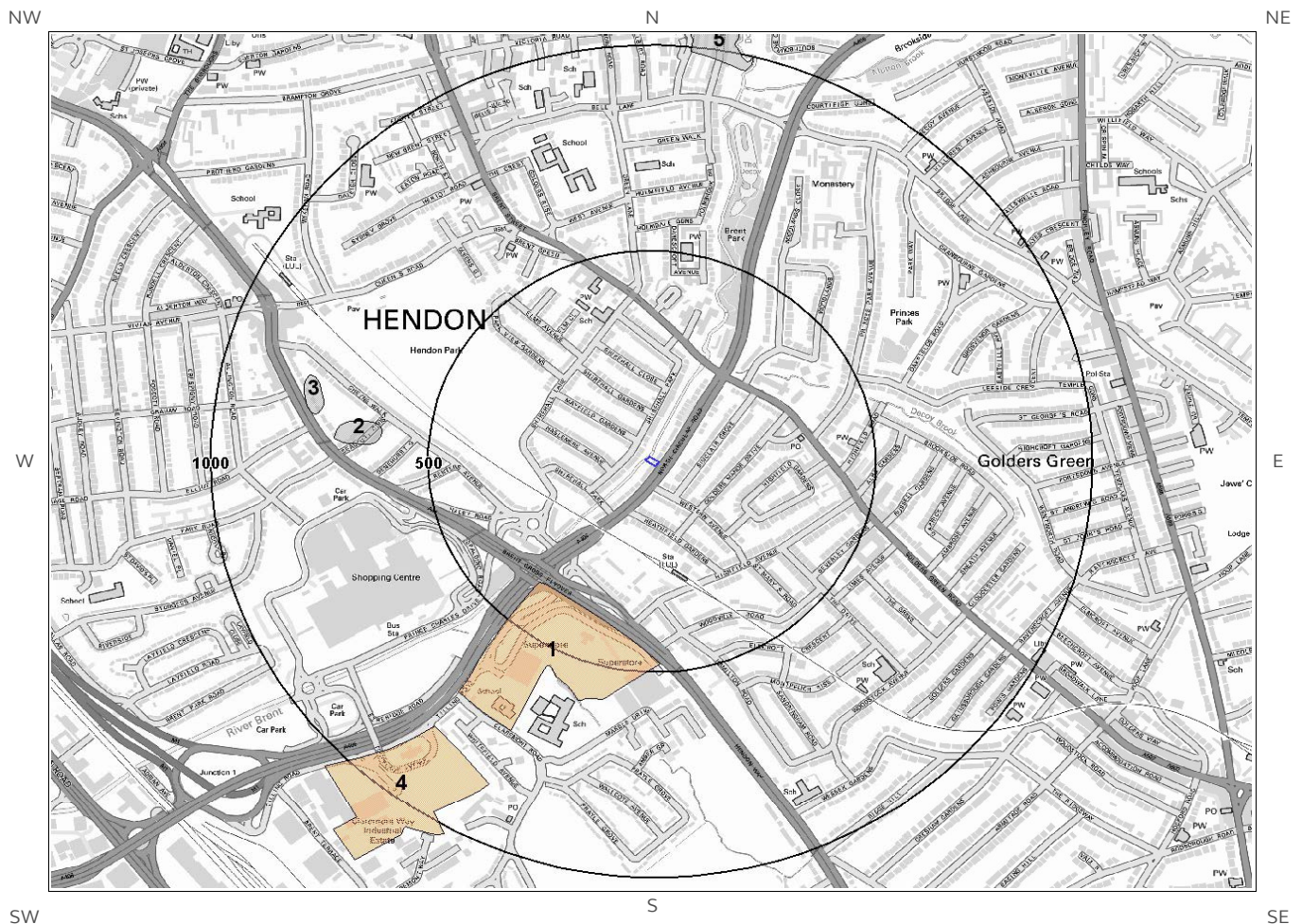
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not 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

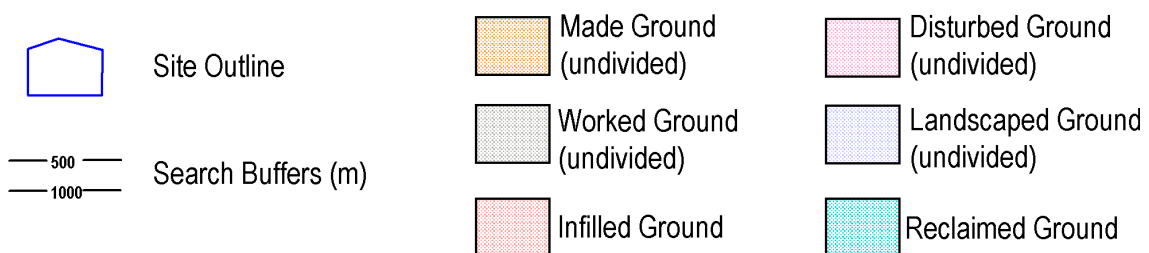
1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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1. Geology 1:10,000 scale

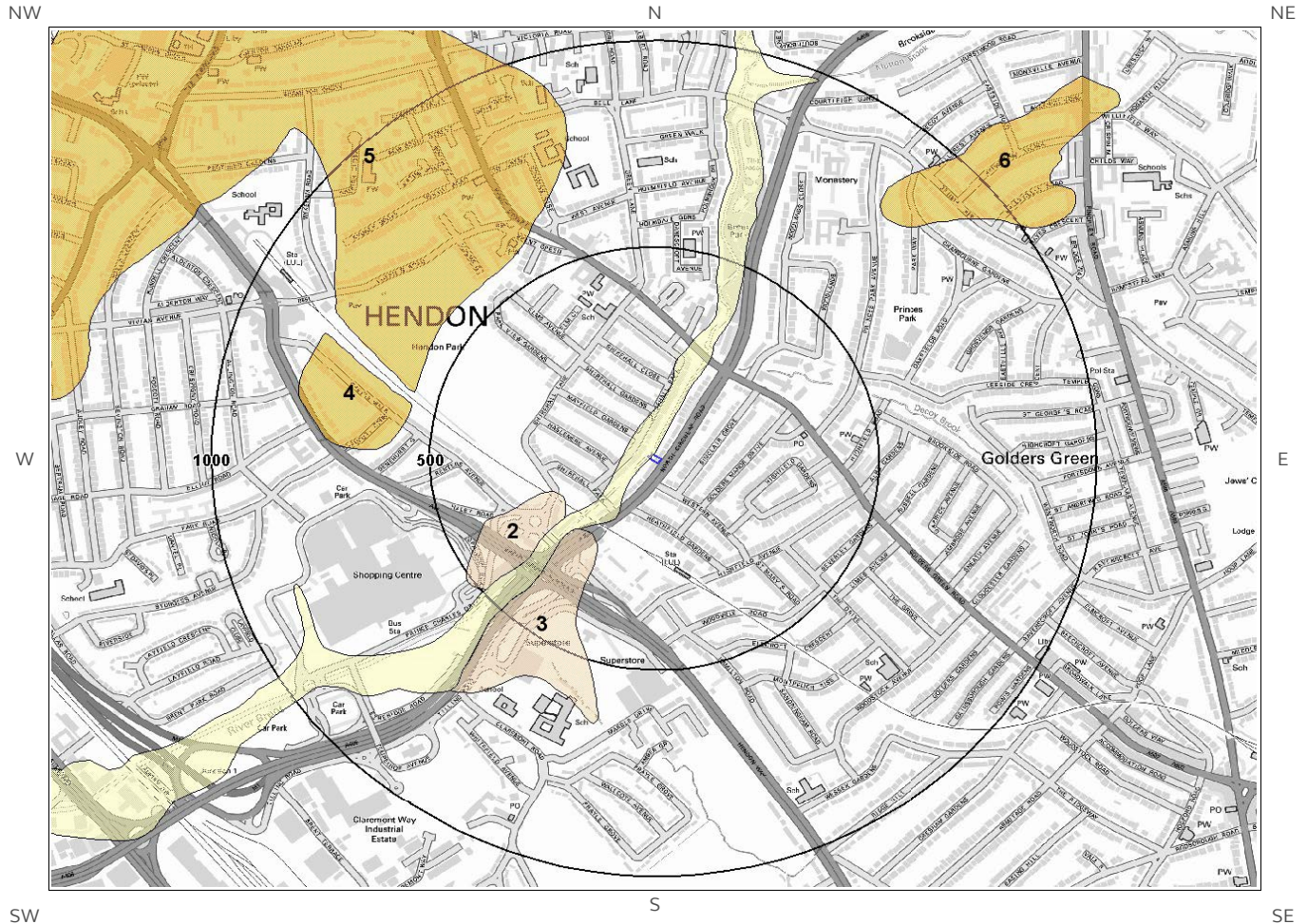
1.1 Artificial Ground

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

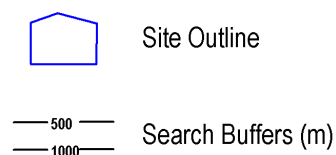
ID	Distance	Direction	LEX Code	Description	Rock Description
1	377.0	SW	MGR- UNKNOWN	Made Ground (Undivided)	Unknown/unclassified Entry

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	ALV-C	Alluvium - Clay (unlithified Deposits Coding Scheme)	Clay
2	217.0	SW	TPGR-XSV	Taplow Gravel Formation - Sand And Gravel	Sand And Gravel
3	226.0	SW	TPGR-XSV	Taplow Gravel Formation - Sand And Gravel	Sand And Gravel

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

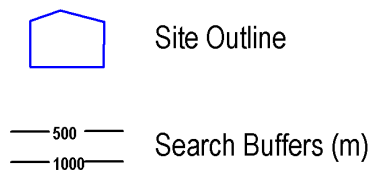
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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



Bedrock and Faults Legend

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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

1.3.2 Faults

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

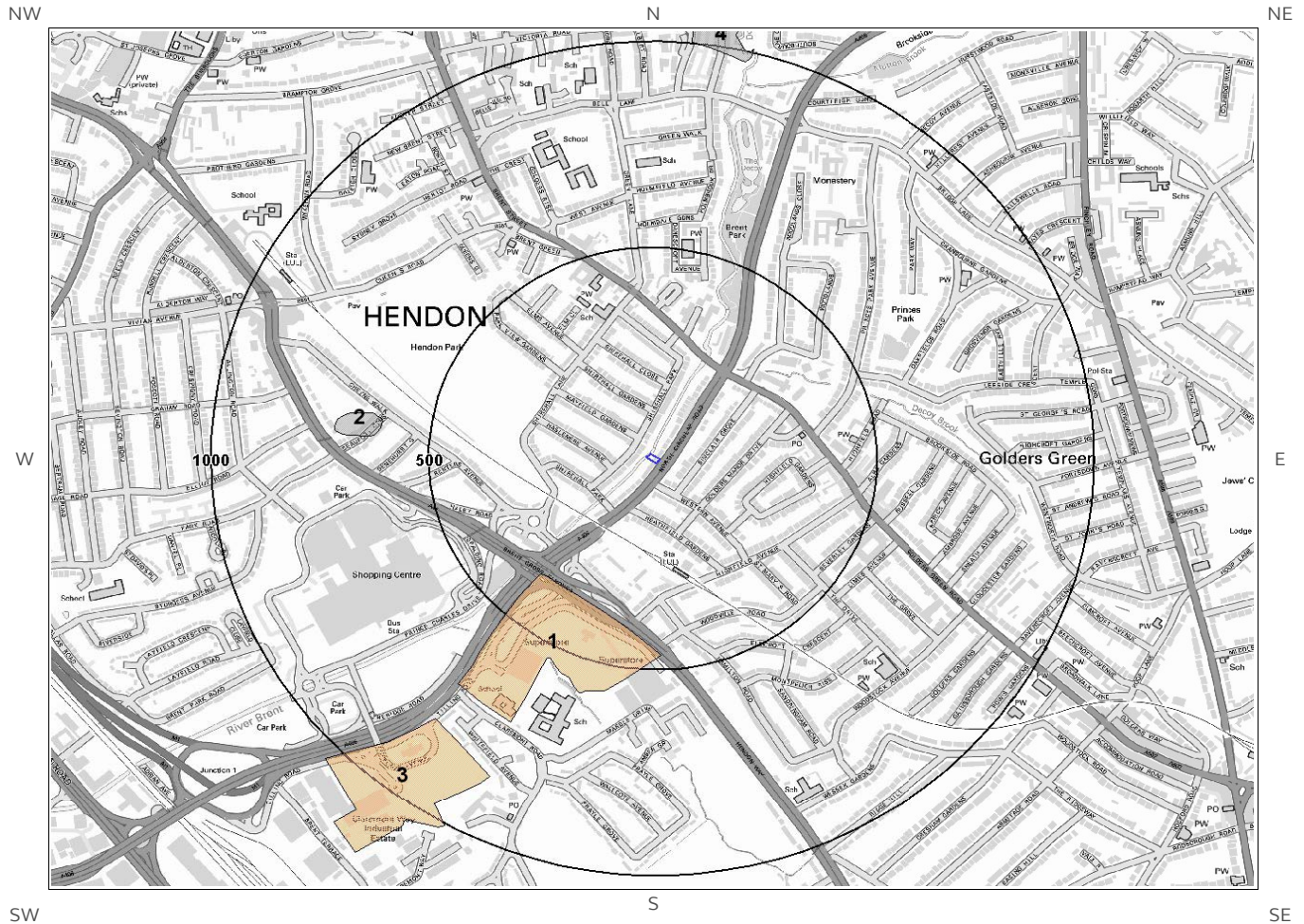
Database searched and no data found at this scale.

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.

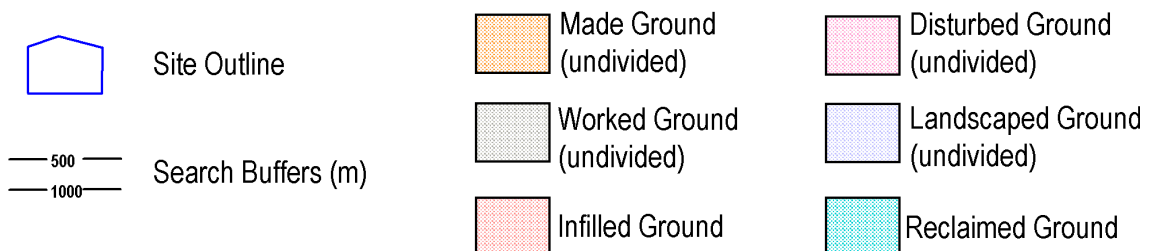
2 Geology 1:50,000 Scale

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

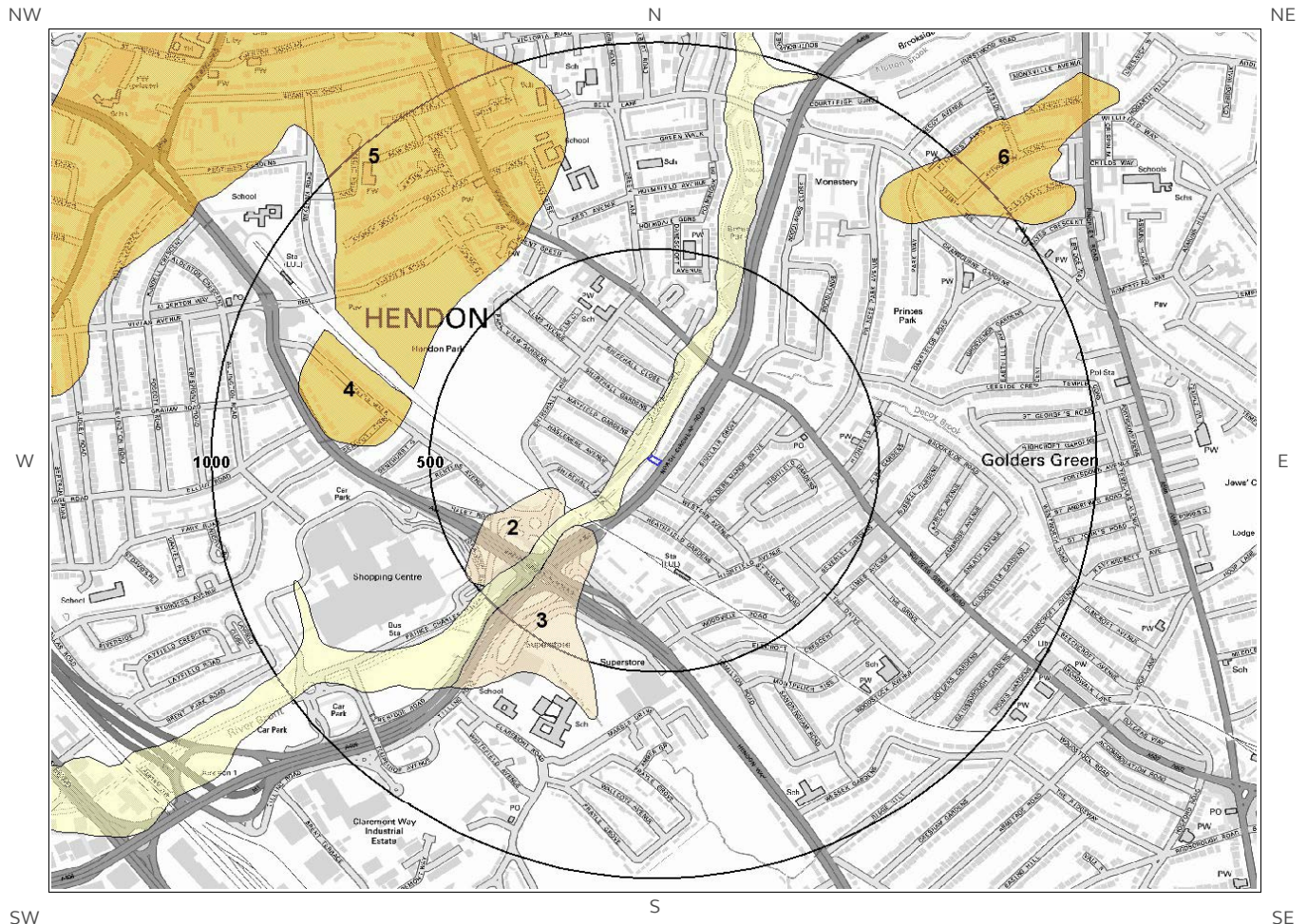
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	366.0	SW	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

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

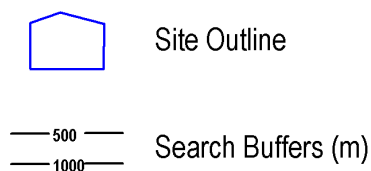
Database searched and no data found.

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



Ground Workings Legend

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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	4.0	NW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
2	212.0	SW	TPGR-XSV	TAPLOW GRAVEL MEMBER	SAND AND GRAVEL
3	215.0	SW	TPGR-XSV	TAPLOW 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
4.0	NW	Intergranular	High	Very Low

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

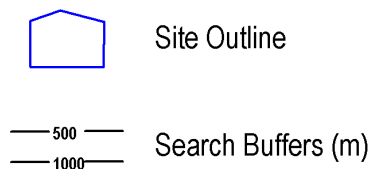
Database searched and no data found.

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



Ground Workings Legend

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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

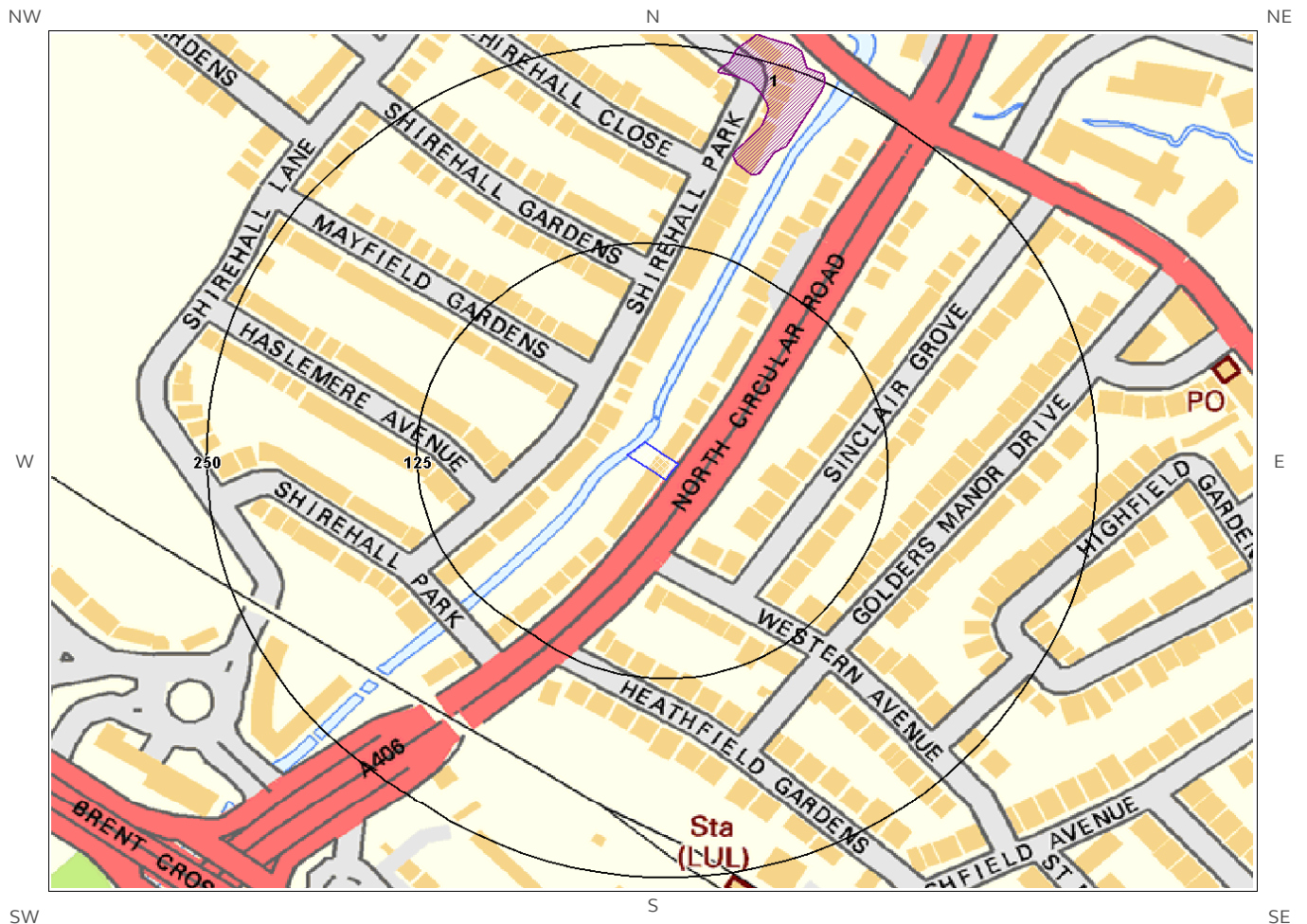
3.1 Radon Affected Areas

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



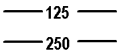


Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

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	180.0	N	523892 188432	Gravel Pit	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.

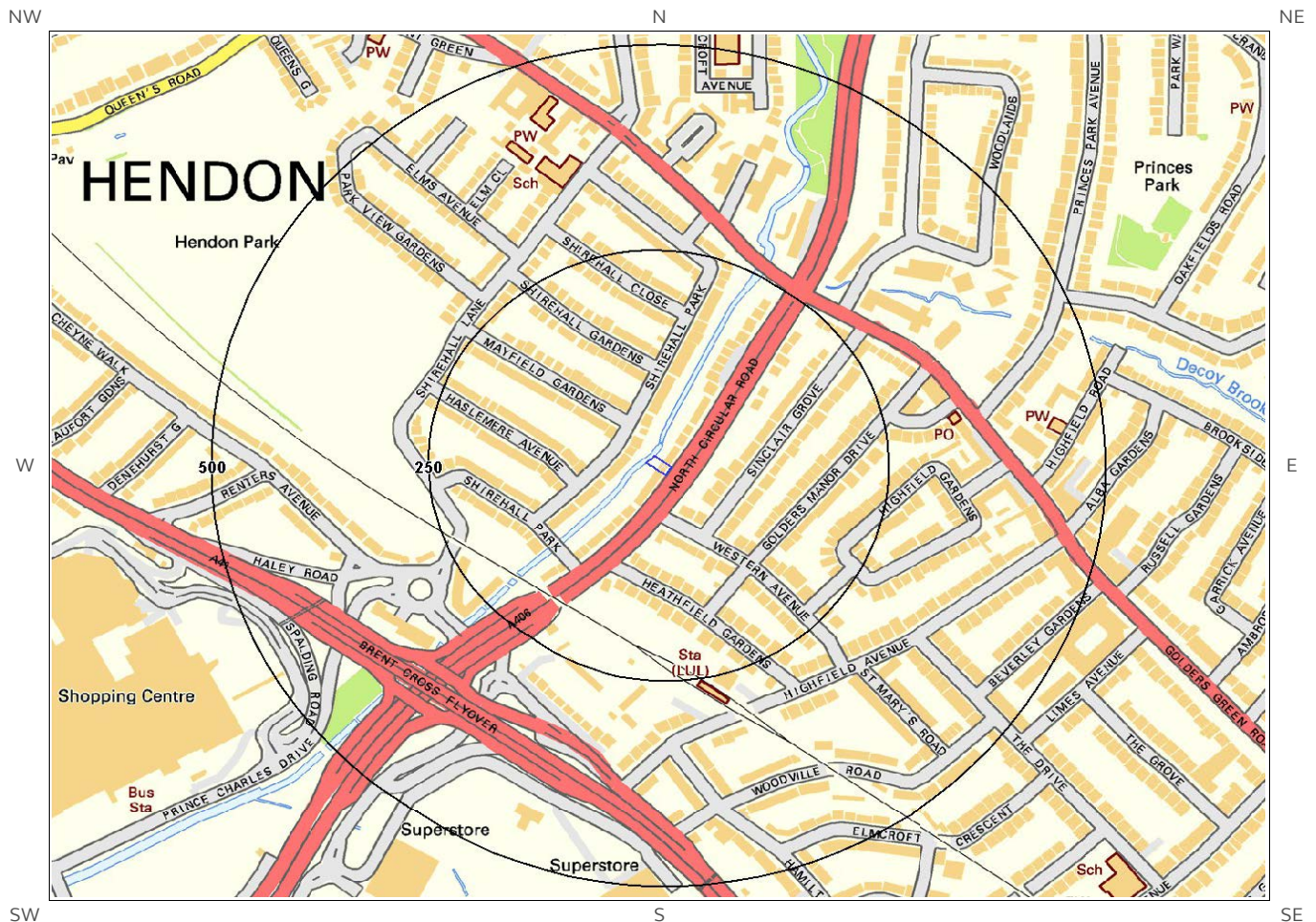
4.3 Current Ground Workings

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.

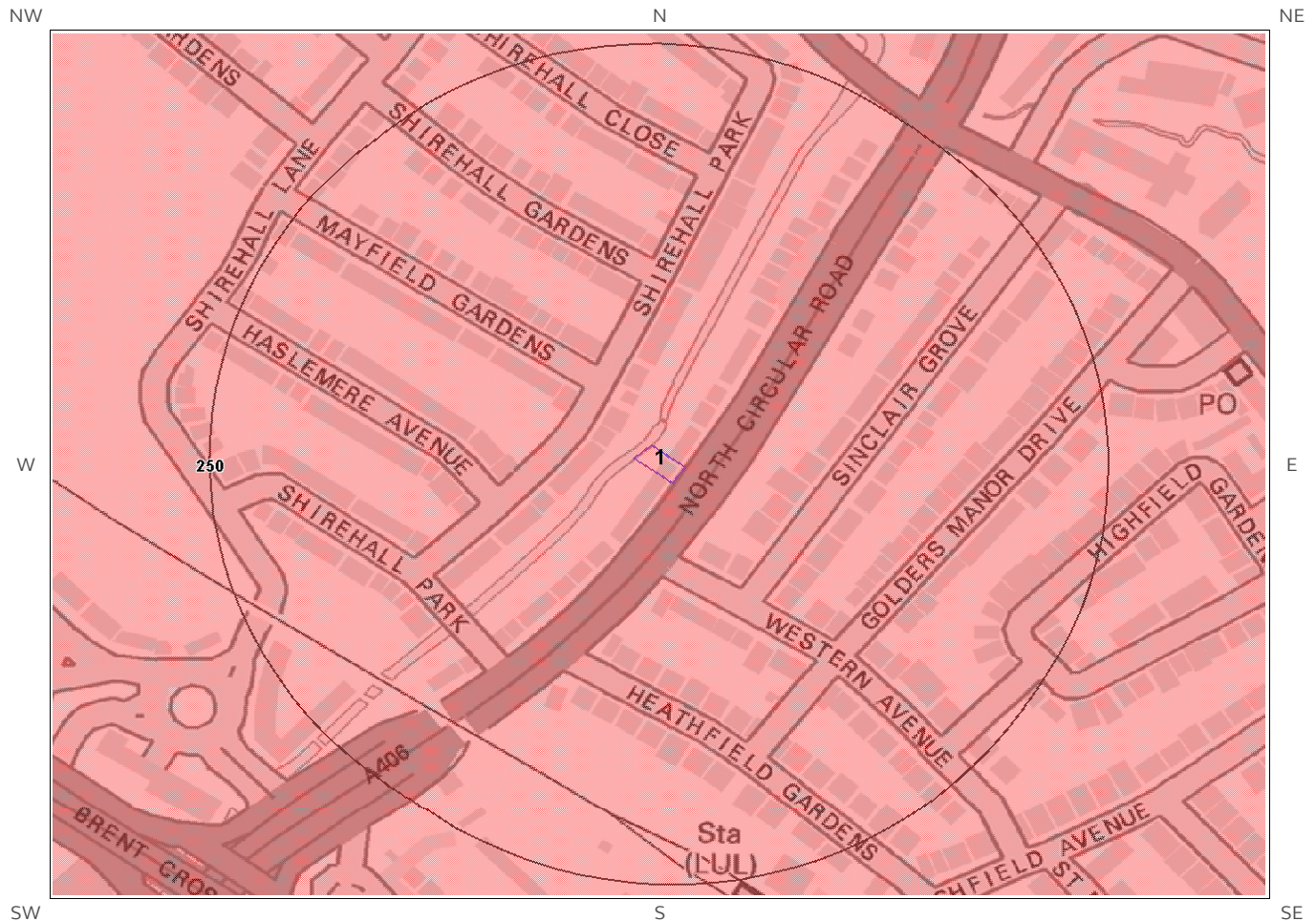
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

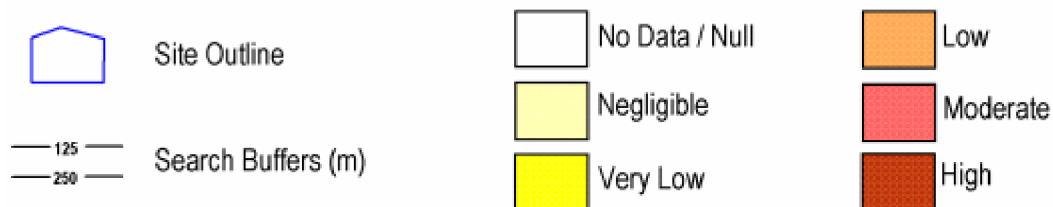
6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map



Shrink Swell Clay Legend

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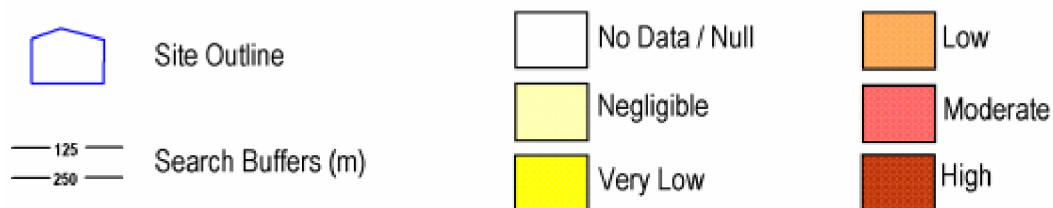


6.2 Landslides Map

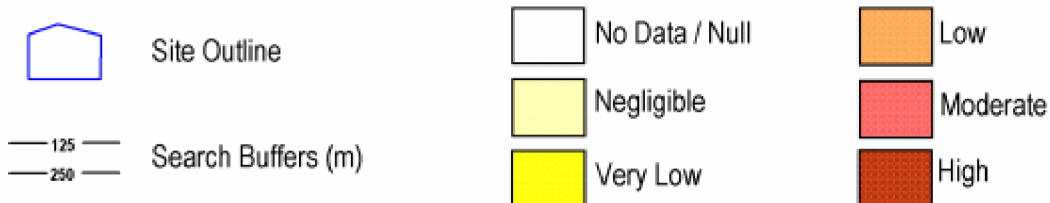


Landslides Legend

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6.3 Ground Dissolution of Soluble Rocks Map

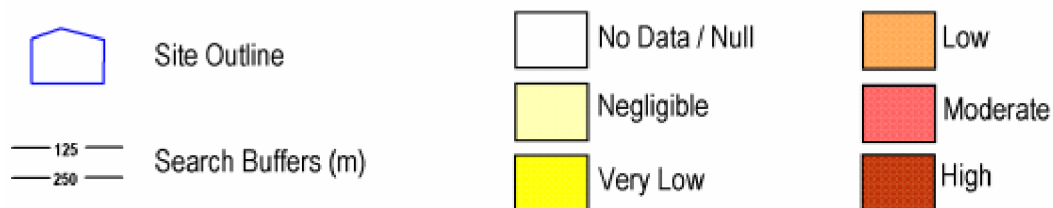


6.4 Compressible Deposits Map

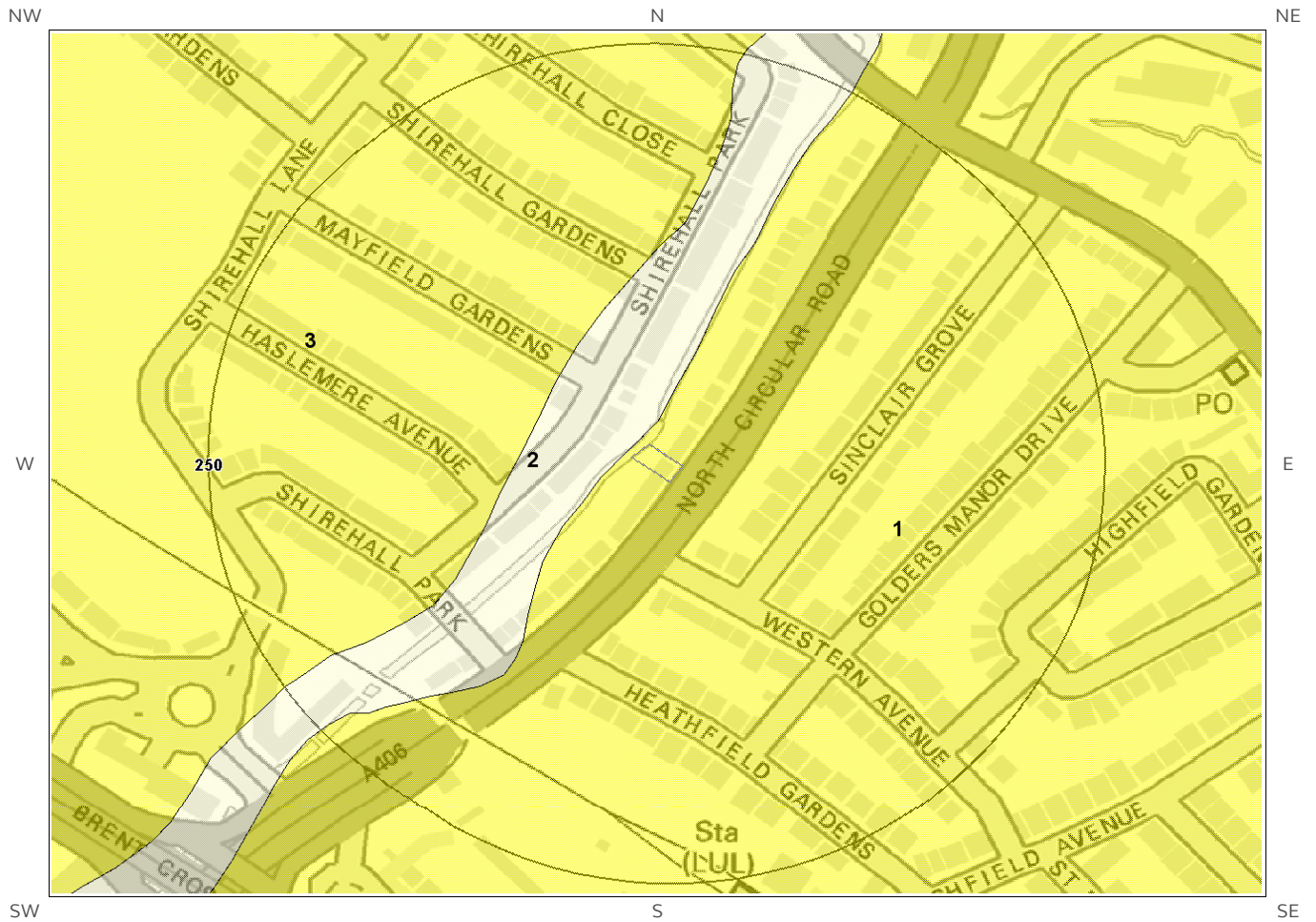


Compressible Deposits Legend

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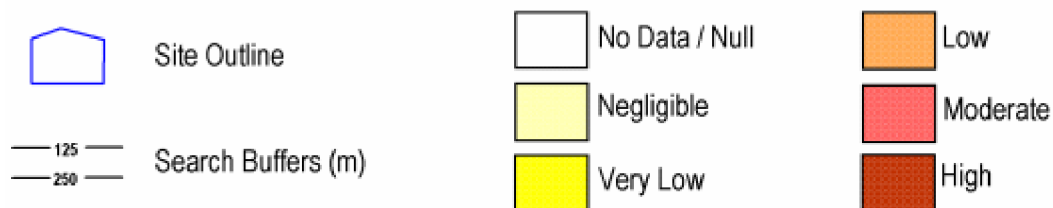


6.5 Collapsible Deposits Map

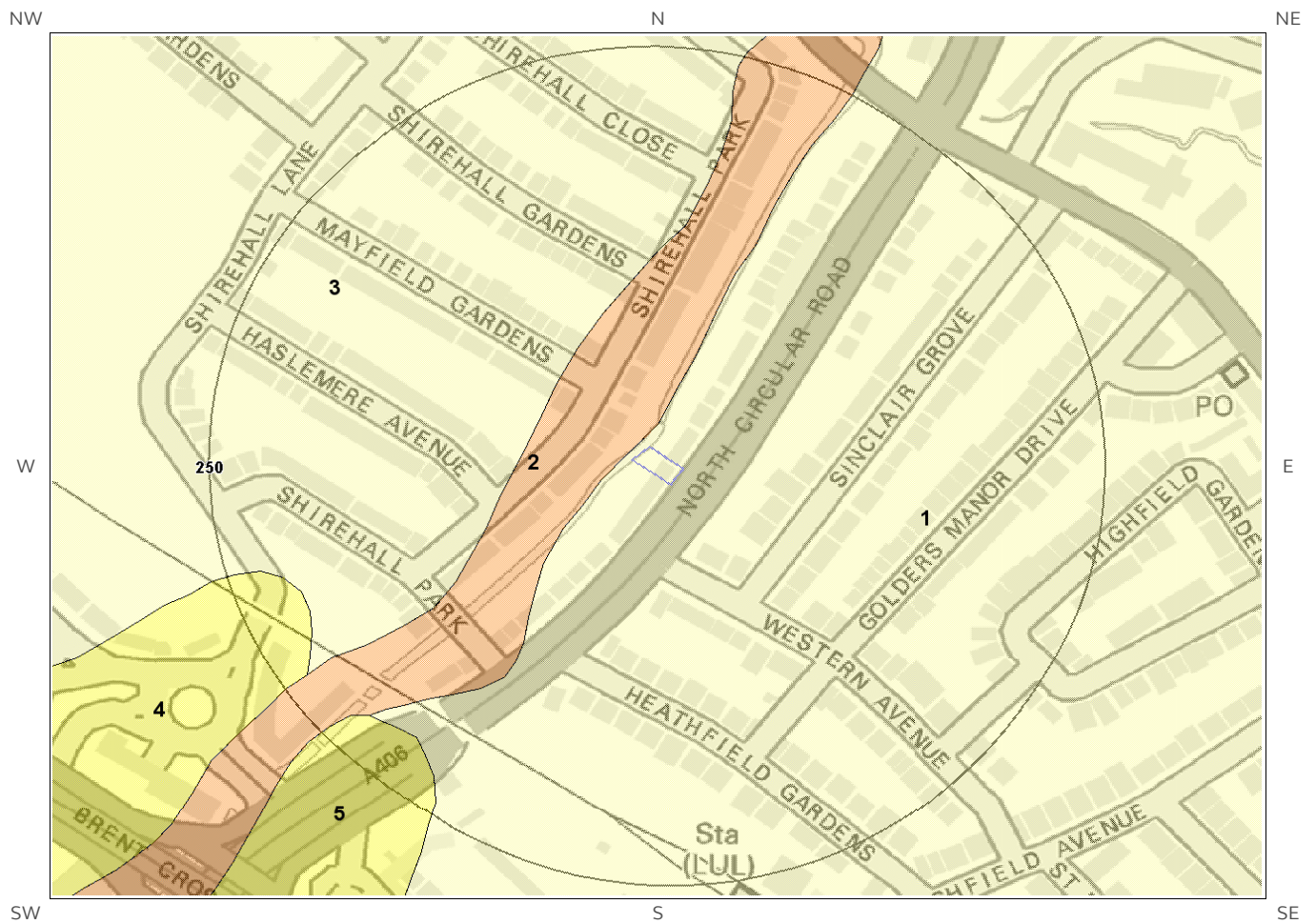


Collapsible Deposits Legend

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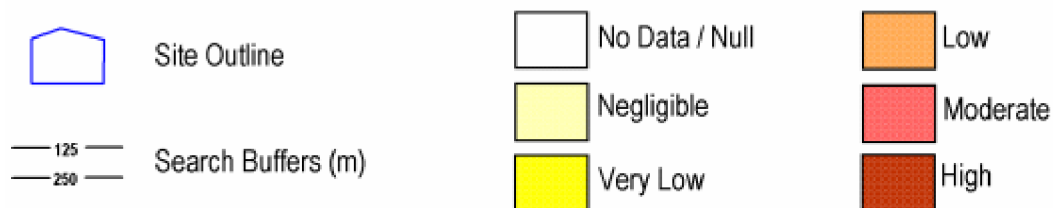


6.6 Running Sand Map



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? Moderate

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	Moderate	Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. 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 probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.

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 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.
2	4.0	NW	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

6.5 Collapsible Deposits

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

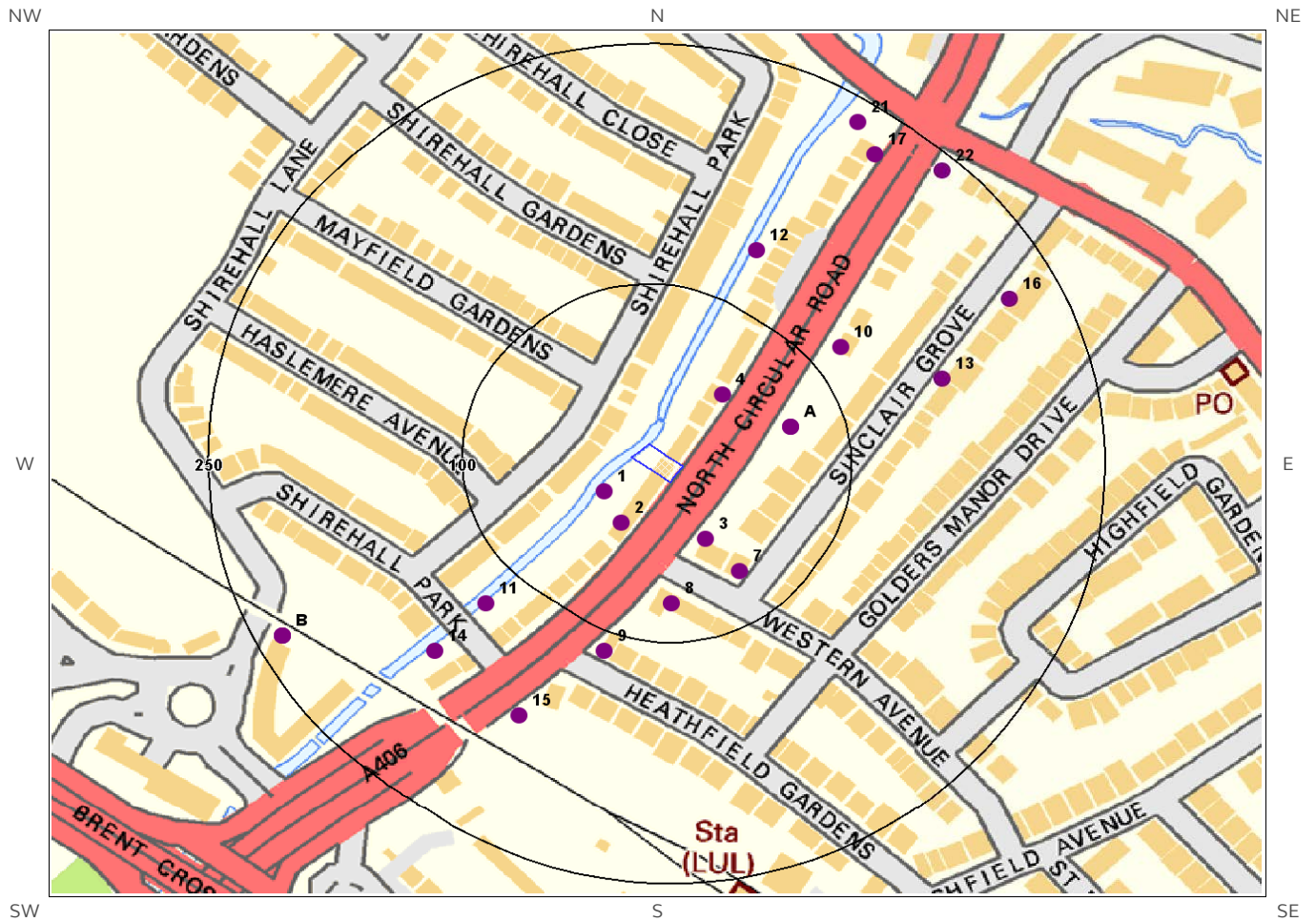
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
2	4.0	NW	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. 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:

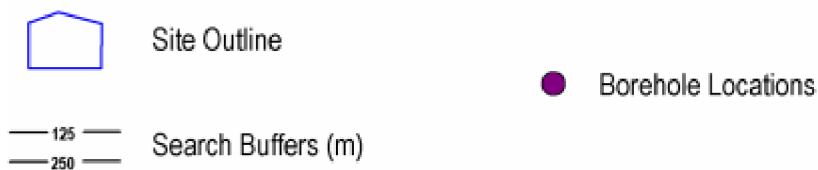
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	4.0	NW	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

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:

22

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	27.0	SW	523790 188190	TQ28NW94	1.0	A406 LONDON NTH CIRC'RD TP6/6A
2	38.0	SW	523800 188170	TQ28NW83	15.0	A406 LONDON NTH CIRC'RD BHA104
3	41.0	SE	523850 188160	TQ28NW67	10.0	A406 LONDON NTH CIRC'RD BHA1
4	50.0	NE	523860 188250	TQ28NW68	15.0	A406 LONDON NTH CIRC'RD BHA2
5A	68.0	E	523900 188230	TQ28NW74	3.0	A406 LONDON NTH CIRC'RD TP 7
6A	68.0	E	523900 188230	TQ28NW95	1.0	A406 LONDON NTH CIRC'RD TP7
7	69.0	SE	523870 188140	TQ28NW82	15.0	A406 LONDON NTH CIRC'RD BHA103
8	76.0	S	523830 188120	TQ28NW93	3.0	A406 LONDON NTH CIRC'RD TP5
9	113.0	S	523790 188090	TQ28NW91	3.0	A406 LONDON NTH CIRC'RD TP3
10	119.0	NE	523930 188280	TQ28NW69	20.0	A406 LONDON NTH CIRC'RD BHA3
11	126.0	SW	523720 188120	TQ28NW92	1.0	A406 LONDON NTH CIRC'RD TP4
12	136.0	NE	523880 188340	TQ28NW70	30.0	A406 LONDON NTH CIRC'RD BHA4
13	163.0	E	523990 188260	TQ28NW81	15.0	A406 LONDON NTH CIRC'RD BHA102
14	168.0	SW	523690 188090	TQ28NW90	1.0	A406 LONDON NTH CIRC'RD TP2
15	171.0	SW	523740 188050	TQ28NW89	2.0	A406 LONDON NTH CIRC'RD TP1
16	220.0	NE	524030 188310	TQ28NW80	15.0	A406 LONDON NTH CIRC'RD BHA101
17	224.0	NE	523950 188400	TQ28NW73	30.0	A406 LONDON NTH CIRC'RD BHA6
18B	234.0	SW	523600 188100	TQ28NW139	15.3	PROPOS IND DEVP NEASDEN 2
19B	234.0	SW	523600 188100	TQ28NW140	15.0	PROPOS IND DEVP NEASDEN 3
20B	234.0	SW	523600 188100	TQ28NW138	20.0	PROPOS IND DEVP NEASDEN 1
21	236.0	NE	523940 188420	TQ28NW72	4.0	A406 LONDON NTH CIRC'RD BHA5A
22	240.0	NE	523990 188390	TQ28NW75	40.0	A406 LONDON NTH CIRC'RD BHA8

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/590408
#2: scans.bgs.ac.uk/sobi_scans/boreholes/590397
#3: scans.bgs.ac.uk/sobi_scans/boreholes/590381
#4: scans.bgs.ac.uk/sobi_scans/boreholes/590382
#5A: scans.bgs.ac.uk/sobi_scans/boreholes/590388
#6A: scans.bgs.ac.uk/sobi_scans/boreholes/590409
#7: scans.bgs.ac.uk/sobi_scans/boreholes/590396
#8: scans.bgs.ac.uk/sobi_scans/boreholes/590407
#9: scans.bgs.ac.uk/sobi_scans/boreholes/590405
#10: scans.bgs.ac.uk/sobi_scans/boreholes/590383
#11: scans.bgs.ac.uk/sobi_scans/boreholes/590406
#12: scans.bgs.ac.uk/sobi_scans/boreholes/590384
#13: scans.bgs.ac.uk/sobi_scans/boreholes/590395
#14: scans.bgs.ac.uk/sobi_scans/boreholes/590404
#15: scans.bgs.ac.uk/sobi_scans/boreholes/590403
#16: scans.bgs.ac.uk/sobi_scans/boreholes/590394
#17: scans.bgs.ac.uk/sobi_scans/boreholes/590387
#18B: scans.bgs.ac.uk/sobi_scans/boreholes/590453
#19B: scans.bgs.ac.uk/sobi_scans/boreholes/590454
#20B: scans.bgs.ac.uk/sobi_scans/boreholes/590452
#21: scans.bgs.ac.uk/sobi_scans/boreholes/590386
#22: scans.bgs.ac.uk/sobi_scans/boreholes/590389

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
4.0	NW	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

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
192	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? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1	164	SW	n/a	Railway	1936

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? Yes

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

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BGS Geological Hazards Reports and general geological enquiries



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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

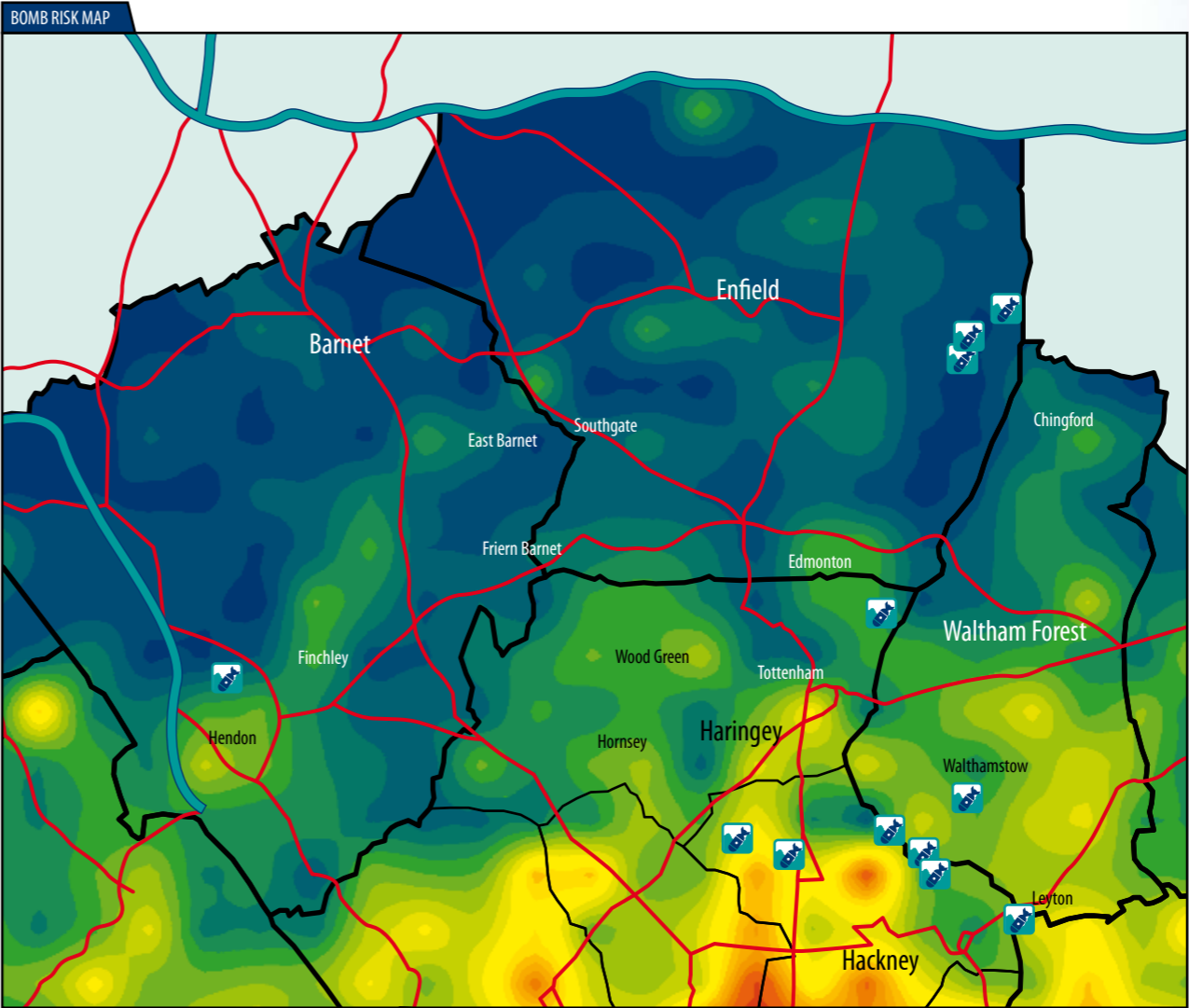
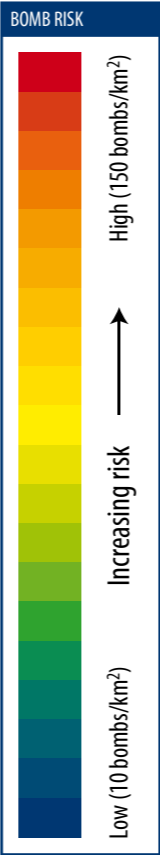
LONDON – North

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.

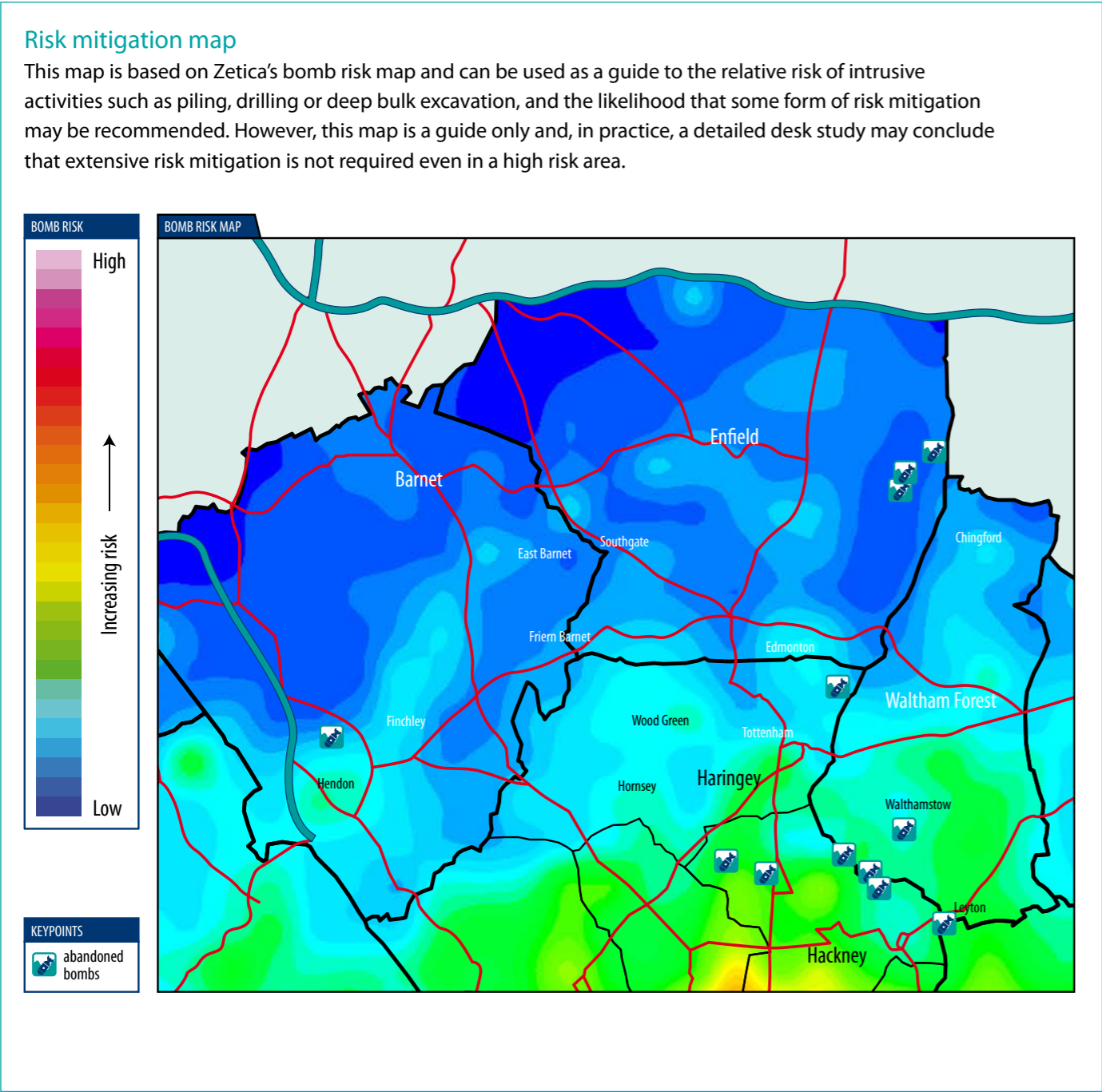


Detected UXBs can be dealt with by our EOC engineers and a Clearance Certificate issued for the site.



RISK MITIGATION AND INVESTIGATION

LONDON – North



Investigation options

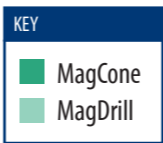
The unexploded bomb (UXB) risk for intrusive site works, such as drilling or piling that usually extend to depths greater than can be mapped from surface, can be effectively managed by clearing borehole or pile locations using MagCone or MagDrill techniques.

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

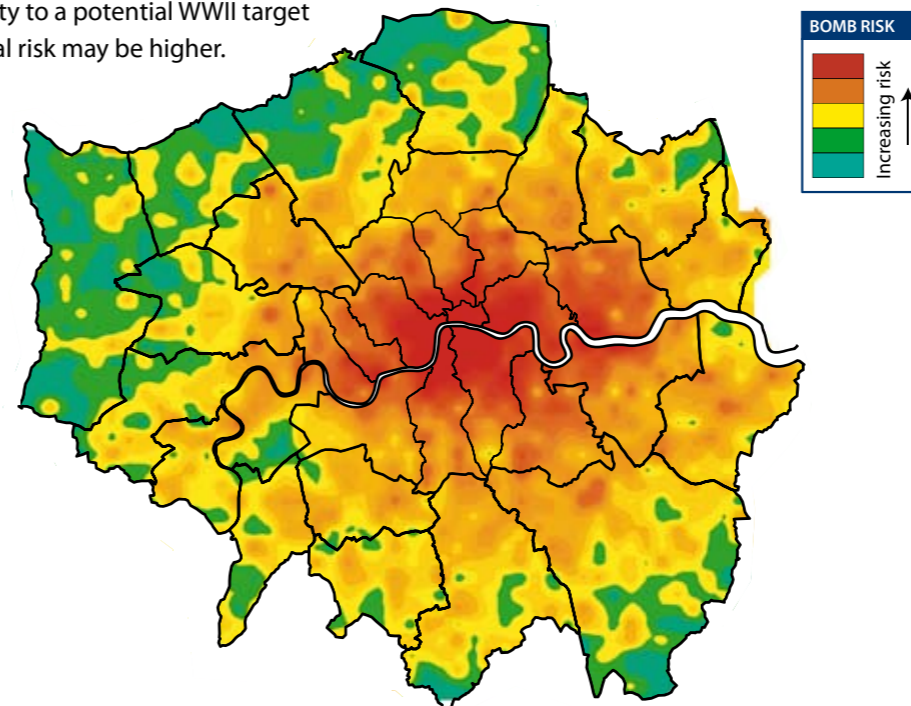
The relative risk for the London area is established by plotting the recorded bombing densities. These are represented as counts of high explosive bombs in km² area.

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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