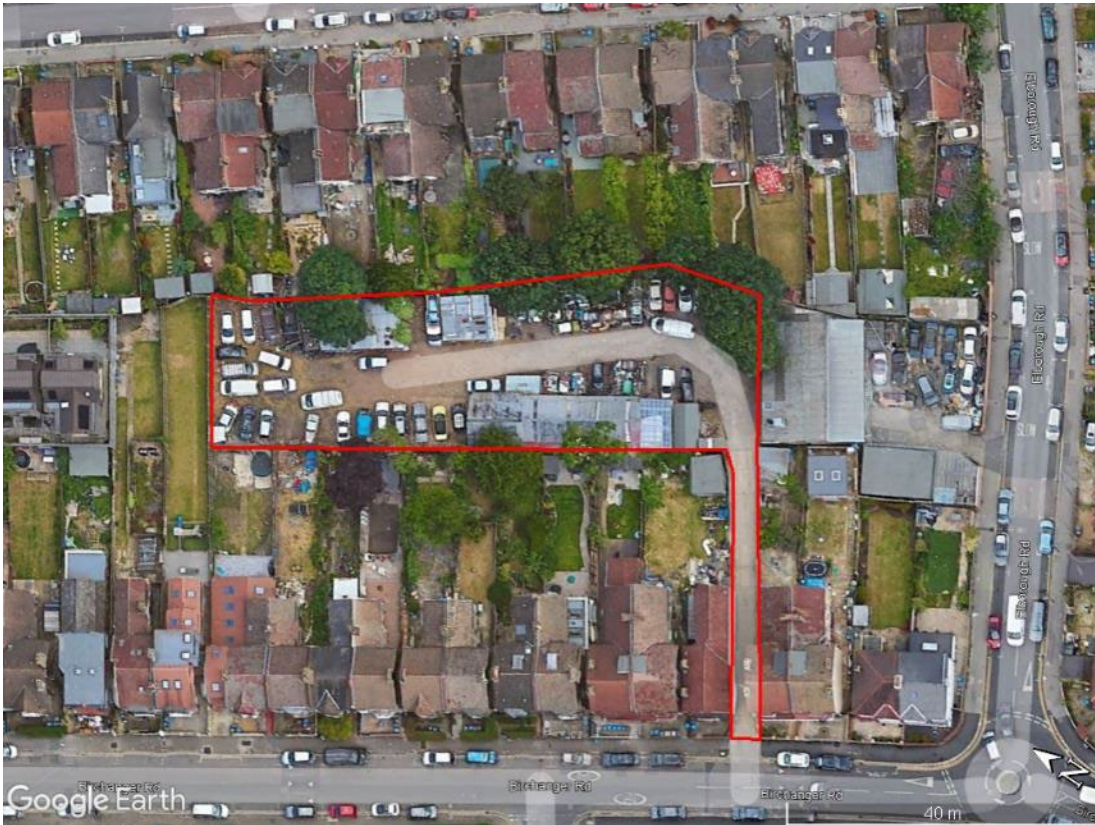


**PROPOSED RESIDENTIAL DEVELOPMENT
AT
BIRCHANGER ROAD, SOUTH NORWOOD
LONDON SE25 5BA
FOR
FEATHERSTONE HOMES**




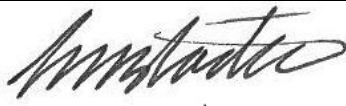
**COMBINED PHASE 1 AND PHASE 2
GEOTECHNICAL AND GEOENVIRONMENTAL INTERPRETATIVE REPORT
REPORT NUMBER 16429GI2**

FEBRUARY 2024

DOCUMENT CONTROL PAGE

Report details	
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Report prepared by	Report checked by
	
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Use and reliance
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Authorisation
Authorisation for the investigation was given by Simon Holmes of Featherstone Homes in a purchase order reference PO 00267 dated 30 October 2023. Further instruction to carry out more detailed desk study aspect was received from Simon Holmes dated 1 February 2024.

Limitations
<p>This report considers the proposals for the subject site at the time of issue of the report. Should the scheme change significantly then the implications regarding the geotechnical and geoenvironmental aspects will need consideration relative to the new proposals. This report is based on the results of the fieldwork and laboratory testing carried out and on an examination of the recovered samples. The possibility that different conditions may exist other than at the exploratory hole positions, or at greater depth, should not be ruled out. In particular, groundwater records apply only to the time and place of investigation, since wide variations may occur through seasonal or other causes. Advice and recommendations have been based on the findings of the investigation. It must be appreciated that not finding indicators does not mean that hazardous substances do not exist on the site. The site investigation only permits a small proportion of the site to be inspected.</p> <p>The desk study sections of this report are based on data contained within an earlier desk study prepared by a third-party; this information was provided to RSA Geotechnics by Featherstone Homes for use in the preparation of this report. The factual information from the earlier report has been appended on the understanding that Featherstone Homes are permitted to utilise this information for their purposes. RSA Geotechnics Limited have based this report on the results of the desk study information and recent intrusive investigation and testing carried out, as well as the other sources detailed within the report, which are believed to be reliable. However, RSA Geotechnics Limited cannot and does not warrant or guarantee the authenticity or reliability of the third-party information that it has relied upon.</p>

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FACTUAL DATA

Window sample hole logs
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Chemical contamination analyses results

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APPENDICES

Appendix 1:	Fieldwork methodology
Appendix 2:	Risk assessment methodology and legislative background; Risk classification system; Published guidelines
Appendix 3:	Screening values for residential development
Appendix 4:	Groundsure report

EXECUTIVE SUMMARY

Site Setting	
Proposed development	The proposed scheme comprises the construction of nine mews houses with private garden areas.
Site location and description	The site was located in South Norwood, London SE25 5BA, and can be approximately located by National Grid Reference TQ 342 679.
Current and historic site use	The site has been used as a scrap metal facility since the 1970s.
Geology and hydrogeology	The British Geological Survey (BGS) 1:50000 Series Sheet 270 'South London' and the BGS GeoIndex indicate the site to be directly underlain by London Clay Formation – Clay and Silt (Unproductive Strata).
Potential sources of contamination/ key geotechnical issues	Use of the site as a scrapyards, vehicle dismantling. Made ground associated with previous phases of construction and demolition. Vehicular use on site. Sulphate and acidic pH contents in the made ground and natural deposits. Possible asbestos containing materials in the existing construction. Potential for volume change in clay soils underlying the site, from tree root action.
Site Investigation	
Fieldwork	Nine small diameter window sample boreholes, and the installation of three gas monitoring wells.
Ground conditions	Made ground over Head Deposits over London Clay.
Geotechnical recommendations	Spread foundations and floors should be designed by an Engineer and need to consider volume change in the zone of influence of trees. Piled foundations could be considered for the scheme.
Identified contaminants	Elevated lead, zinc, arsenic, and asbestos within shallow made ground. Potential for asbestos containing materials to be present within the existing construction.
Geoenvironmental recommendations	Clean cover soil system in all areas of soft landscaping to provide a break in pathway between impacted soils and end users. Surveys of existing structures for asbestos containing materials.

1. INTRODUCTION

Consideration is being given by Feathersone Homes Limited to the development at a site at Birchanger Road, South Norwood SE25 5BA. The proposed scheme comprises the construction of nine mews houses with private garden areas. The general layout of the proposed development is illustrated on drawing number 16429GI/3.

This interpretative report describes a review of the Groundsure information package (as appended to this report and contained within a Phase 1 desk study carried out for the site by others), and a limited Phase 2 intrusive investigation undertaken by RSA Geotechnics.

The original scope of the works was as outlined in RSA Geotechnics Limited's quotation AMP/QUO/450 dated 24 October 2023, and comprised the following:

- Undertake a reconnaissance survey and review the existing desk study data.
- Form nominally 8 to 10 small diameter percussive window sample boreholes to target depths of 2 to 5 m bgl.
- Carry out in-situ and geotechnical laboratory testing to obtain shallow soil parameters to inform the design of structural foundations, floors and external pavements.
- Undertake preliminary headspace testing using a photo-ionisation detector to measure the presence of volatile organic compounds.
- Carry out environmental chemical testing to determine the concentration of a range of common potential contaminants.
- Prepare an interpretative report providing advice on the geotechnical and the environmental aspects of the project, including conceptual model, risk assessment and recommendations for a remedial strategy, where required.

Following regulatory review, it was understood that the Phase 1 desk study report by others was inadequate to clear the respective planning conditions and consequently RSA Geotechnics were requested by Featherstone Homes to revise this report to comprise a combined Phase 1 and Phase 2 report, including review of the original Groundsure information package and other sources as detailed in the relevant sections.

The purposes of the investigation were to undertake a site reconnaissance visit, assess previous uses of the site and identify the potential sources, pathways and receptors that may be affected by contamination, and to determine ground conditions beneath the site and to provide initial geotechnical and geoenvironmental recommendations for use in the design of the project.

For full information it is recommended that this report is read in conjunction with the above referenced Phase 1 desk study report.

2. SITE SETTING

2.1 Site location

The site was located in South Norwood, London SE25 5BA, to the rear of numbers 15 to 35 Birchanger Road.

The site can be approximately located using National Grid Reference TQ 342 679.

2.2 Site description

A reconnaissance visit was undertaken on 6 November 2023 by an engineer from RSA Geotechnics Ltd when the site was found to be in the following condition:

The site was accessed via a narrow alleyway off Birchanger Road (Figure 1).



Figure 1 – site entrance off Birchanger Road



Figure 2 – main shed on LHS, steel frame & metal sheet roof. Black Poplar tree behind.



Figure 3 – interior of main shed with cars/car parts/batteries/tools etc.

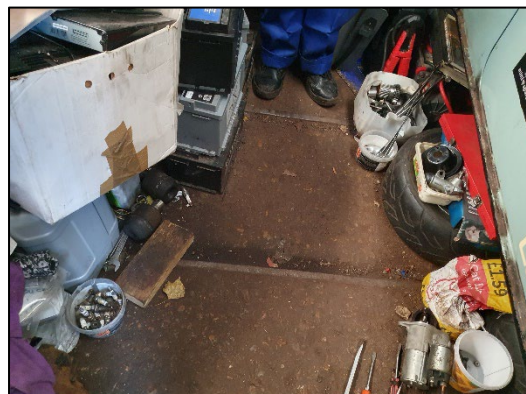


Figure 4 – narrow gauge tracks inside main shed

The main building on the site was a steel framed shed with a corrugated metal sheet roof (Figure 2). The building contained cars and numerous car parts. Narrow gauge tracks were visible within the concrete floor and were observed to continue outside the shed to the north-west (Figures 4 & 5). Anecdotal evidence from personnel on the site suggested that the shed may formerly have been used for repairing small gauge railway plant, however no

evidence of this was identified from the historic maps, and the tracks could potentially have been associated with a gantry crane or similar.



Figure 5 – tracks extended outside of shed to north west



Figure 6 – smaller sheds on north-eastern boundary

Two smaller timber sheds were present along the north-western half of the north-eastern boundary. The south-easternmost shed contained a car and two motorcycles (Figure 7), and the north-westernmost shed was a workshop containing various tools and car parts (Figure 8).



Figure 7 – Inside timber shed, NE boundary



Figure 8 – Inside timber shed, NE boundary



Figure 9 – domestic garage in north-west of site

A domestic garage (Figure 9) was present at the north-western end of the north-eastern boundary. This was partially overgrown and contained a Jaguar car.

Small sheds were also present to the north-east and south-east of the main shed and in the eastern corner of the site. A toilet block was present in the southern corner of the site. Oil drums and containers were stored adjacent to the toilet block. The occupants of the site indicated that

historically there used to be a waste oil tank close to the site entrance but that in recent years any waste oil has been removed from site via drums for disposal with no storage on site.



Figure 10 – toilet block



Figure 11 – drums and oil containers to north-west of toilet

Numerous cars and car parts were present across the site, some intact and some partially dismantled. Shallow soil mounds were present in the western corner of the site.



Figure 12 – looking south-west across site towards site entrance, from east corner



Figure 13 – looking south-east from south west end of main shed



Figure 14 – western corner of site with shallow soil mounds



Figure 15 – northern corner of site



Figure 16 – looking south-east across central area of site



Figure 17 – looking south-east from northern corner – neighbouring gardens on LHS and sycamore tree



Figure 18 – houses to north-west

The site was generally surrounded by rear gardens of adjacent domestic properties. A number of trees were present on or adjacent to the site. From drawings provided for review these comprised Sycamore, Black Poplar, Cherry, Ash, Bay Laurel and Lawson Cypress. Google Earth aerial imagery suggested that locally, other trees have formerly been present in the surrounding area.

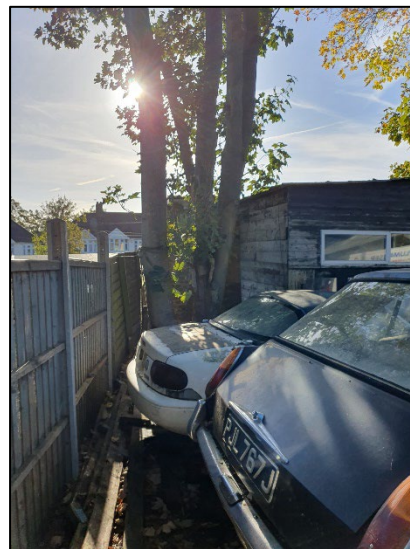


Figure 19 – Acer and shed, east corner of site



Figure 20 – building at lower level to south-east of site (Croydon Accident Repair Centre)

A brick building was present at lower level to the south-east of the site (Figure 20), with a chimney/vent stack protruding from the roof. A shallow retaining wall was present between the building and the subject site. This building housed Croydon Accident Repair Centre.



Figure 21 – retaining wall



Figure 22 – suspected ACM at surface

The site surface had a cover of made ground over much of the site, with areas of concrete and flexible surfacing close to the entrance and to the north of the main building. A suspected asbestos cement fragment was observed locally at surface in the north-western area of the site (Figure 22). Limited areas of dark staining were observed locally at surface, indicating possible impact from hydrocarbons, however no gross contamination was observed.

A survey for invasive, noxious, or otherwise problematic plant species, such as Japanese Knotweed, was not included in the remit, however no obvious indicators were observed.

Review of publicly available aerial imagery from Google Earth indicated a broadly similar site layout from 2003 to 2022.

3. DESK STUDY

3.1 Sources of information

A previous Phase 1 desk study for the site was prepared for Northhill Properties Limited by Ground Condition Consultants (GCC) and detailed in report reference J22-073-R01 dated 16 November 2022. This document was understood to be insufficient based on comments from the Local Authority and consequently the source data provided within the Groundsure package (that was attached to the referred report) has been reviewed independently by RSA Geotechnics and is discussed and assessed in the relevant sections of this revised report.

Historical Ordnance Survey maps and data from a search of Public Registers were provided with the Groundsure product (reference number GS-9194240, dated 12 November 2022). This included information from organisations such as the Environment Agency, Local Authority, British Geological Survey, Natural England, and others. The maps included a range of historic and modern Ordnance Survey maps sourced at a range of scales.

It should be noted that the following text does not generally consider features beyond a search radius of 250 m, since based on their distance from the site, a risk from these features was not generally identified. However, for further details outside this 250 m radius a full list is given in Appendix 4.

3.2 Historical land use

The historical land use of the site and immediate surrounding area has been assessed by reference to the Ordnance Survey maps in the Groundsure report, as detailed in Table 3.2.

Table 3.2 – Historical land use		
Date	On site	Surrounding area
1868	Site is part of agricultural field.	Werendar Hall located 120 m NE, with orchards and ponds. Pond approximately 20 m SE of the site. Railway 170 m NW, with Engine House and siding identified 180 m W. Norwood Junction (significant station) identified 250 m NW.
1891	No significant differences.	The track/footpath that passed near the SW corner of the site had been converted to a road to serve new residential properties that had been constructed 200 m N and 150 m SE.
1896-1897	Site shown as open land surrounded by residential development.	The area immediately adjacent to the site (on three sides) was semi-detached housing with gardens. The area to the SE was shown to be open land. Public Baths were identified 60m NW of the site. A School was present approximately 90 m north of the site. The Engine House appeared to have been replaced by a number of sidings and Coal Depots were identified 250 m NW and W.

Table 3.2 – Historical land use		
Date	On site	Surrounding area
1898-1913	No significant differences.	No significant differences. Further residential development was present to the NE by 1912/1913.
1933	No significant differences.	Elborough Road had been constructed 30 m south of the site and residential properties had been constructed on either side. Further residential properties were under construction 100 m S of the site.
1940-1941	No significant differences.	No significant differences.
1952-1953	A building had been erected adjacent to the SW boundary of the site, with a smaller structure on the S side of the building (possible shed or tank?).	Baths N of site were identified as 'disused'. Corporation Yard identified 15m NW. Electricity Substation 140 m W, adjacent to Canister, Sweet and Perfume Factories. Tank identified adjacent to the railway sidings, 170 m NW. Corporation Yard and St George's Works 165 m SW.
1953-1955	No significant differences.	No significant differences.
1971-1972	A further smaller structure was present on the S side of the other buildings (possible shed or tank?). The site was labelled as a Scrap Metal Yard.	Large building present immediately SE of the site. The disused baths had been demolished and replaced by buildings possibly associated with the adjacent Primary School. Instrument Works identified 90 m NE of the site, adjacent to Werndee Hall. Crosfield Nursery School was present approximately 90 m to the south-east of the site.
1987-1988	Mapping is unclear, however no significant differences observed.	The Instrument Works identified 90 m NE of the site, and Werndee Hall appear to have been recently replaced with Shinnars Close and associated residential properties.
1991-1992	No significant differences.	No significant differences.
1994	No significant differences.	Small building (possible garages) located 90 m SE of the site had been demolished.
2003	No significant differences.	The small buildings 90m S of the site had been developed into six properties on Greenmead Close.

Historical maps indicated that the site area comprised open fields until the 1890s, when residential properties were constructed around the site. The site remained undeveloped until the main workshop structures currently present on site were shown on maps from 1953. The site was first annotated as a scrap metal facility from the 1970s. The smaller sheds now present were constructed subsequent to the main building.

3.3 Unexploded ordnance (UXO)

Consideration of UXO is beyond the scope of this report. It is recommended that this aspect be considered prior to any groundworks.

3.4 Public Register data

Public Register data and other information was received as part of the Groundsure report. This included information from the Environment Agency, Local Authority, British Geological Survey, Natural England and several other sources. A full list of the data obtained can be found in Appendix 4 of this report. It should be noted that the positions of symbols on the environment map supplied are not always very accurate and that judgement should be used in locating each item. It should also be noted that the following summary is generally restricted to a search radius of 250 m on the basis that beyond this distance a low to negligible risk is identified. The environmental information is summarised in Table 3.4.

Table 3.4 – Summary of environmental data from Groundsure report			
Agency, authorisations & controls			
Subject	On site	Within 250m	Details/Remarks
Licensed Discharges to controlled waters	None recorded	None recorded	
Pollution Incidents to Controlled Waters	None recorded	7	The closest incident recorded was located 190m NW, and was described as a Category 3 (Minor) impact to air, dated 29/10/2003. The remaining records appear to be related to the same location and range from 240 to 245m NW between 06 May to 25 June 2003, relating to Construction and Demolition Materials and Wastes. These were typically significant water and land impacts, with minor air impact.
No further entries under this section			
Waste and Landfill			
Subject	On site	Within 250 m	Details/Remarks
Historical Landfill Sites	None recorded	1	188 m south of the site, for 'Inert' waste types, active 31 December 1924 to 25 February 1984.
Historical waste sites	4	None recorded	All four described as 'Scrap Yard' or 'Scrap Metal Yard', dated 1988, 1988, 1971 and 1994.

Table 3.4 – Summary of environmental data from Groundsure report			
Waste and Landfill			
Subject	On site	Within 250 m	Details/Remarks
Waste exemptions	None recorded	1	240 m NE, described as 'burning waste in the open'.
No further entries under this section.			
Geological			
Subject	Details/Remarks		
BGS 1:50,000 Bedrock and Superficial Geology and BGS Online Geology Viewer	The British Geological Survey (BGS) 1:50,000 Series Sheet 270 'South London' and the BGS GeoIndex indicate the site to be directly underlain by London Clay Formation – Clay and Silt.		
BGS 1:50,000 Artificial Ground	Infilled Ground identified 145m S.		
BGS Boreholes	The closest BGS archive borehole records were approximately 275 m southwest of the site. Three shallow boreholes recorded made ground to extend to between 1.22 and 1.83 m bgl. Soft to firm organic clayey silt/silty clay was recorded in two bores to maximum 1.98 m bgl, over firm mottled clay to between 3.35 and 4.27 m bgl. Stiff mottled clay, with gypsum crystals extended to between 7.62 and 8.02 m bgl, underlain by stiff dark grey clay. Mudstone layers up to 75 mm thick were recorded at 3.1 and 6.81 m bgl. Groundwater was recorded in one borehole at 3.61 m bgl, rising to 2.29 m bgl.		
BGS Recorded Mineral Sites*	Woodside Brickworks (Brick Clay) identified 242m S, but with a refused status. No others were identified within 250 m.		
Coal Mining Affected Areas	None recorded.		
Non Coal Mining Areas of Great Britain*	No risk identified.		
Surface ground workings	7 identified 50-250 m from site. Pond 54m NW identified on 1895 mapping. Unspecified Ground Workings (172m SW) on 1974 mapping. Unspecified Ground Workings (177m SW) and Disused Workings (188m S) identified from 1981 mapping. Unspecified Heap identified 205 and 209m W based on 1971-1972 maps. Old canal identified 242m W on 1871 mapping.		
No further entries under this section.			

Table 3.4 – Summary of environmental data from Groundsure report			
Ground stability hazard potential*			
Subject	On site/within 50 m		
Collapsible Ground	Very low		
Compressible Ground	Negligible		
Ground Dissolution	Negligible		
Landslide	Very low		
Running Sand	Negligible		
Shrinking or Swelling Clay	Moderate		
BGS Urban Soil Chemistry Averages			
Subject	Details/Remarks		
Arsenic	16 to 17 mg/kg		
Cadmium	0.5 to 0.6 mg/kg		
Chromium	84 to 91 mg/kg		
Lead	130 to 147 mg/kg		
Nickel	29 to 36 mg/kg		
Tin	16 to 17 mg/kg		
Radon Potential - Radon Affected Areas*	Less than 1% of homes estimated to be at or above Action Level		
Radon Potential - Radon Protection Measures*	No radon protection measures considered necessary (BGS)		
Hydrogeological, hydrological, flooding			
Subject	On site	Within 250 m	Details/Remarks
Water Abstractions	None recorded	None recorded	
Source Protection Zones	None recorded	None recorded	
Extreme Flooding from Rivers or Sea without Defences	None (within 50m).		
Subject	Details/Remarks		
Groundwater vulnerability	Identified (within 50m)		
Groundwater vulnerability-soluble rock risk	None (within 0m)		

Table 3.4 – Summary of environmental data from Groundsure report			
Hydrogeological, hydrological, flooding			
Bedrock aquifer	Identified (within 500m)		
Superficial aquifer	None (within 500m)		
Nearest Surface Water Feature	230 m south of the site: pond.		
Groundwater flooding	Low (within 50m)		
Surface water flooding	1 in 30 year, 0.1m - 0.3m (within 50m)		
Industrial land use			
Subject	On site	Within 250 m	Details/Remarks
Recent industrial land uses	None recorded	8	Two identified 2 m south of site (but likely to represent operations on site) for 'Secondhand Vehicles' and 'Vehicle Repair, Testing and Servicing'. Electrical Equipment Repair and Servicing identified 79 m N, however as the address is identified as a Flat, it is unlikely to be a significant contaminative source. The remaining five features are identified as Electricity Substations, located 159 m to 226 m from site.
Fuel Station Entries	None recorded	None recorded	Nearest 330 m NE of the site.
Sensitive land use			
Subject	On site	Within 250 m	Details/Remarks
SSSI Impact Risk Zones	1	0	1 identified on site. Types of development requiring consultation: Infrastructure - Airports, helipads and other aviation proposals. Air pollution - Livestock & poultry units with floorspace > 500m ² , slurry lagoons & digestate stores > 750m ² , manure stores > 3500t
Conservation Areas	0	1	Located 234m N (South Norwood)
Open Mosaic Habitat	0	1	Located 187m S (Woodside brickworks)
No further entries under this section. *National Geoscience Information Service			

3.5 Environmental site reconnaissance visit

The site reconnaissance visit encountered the following potential contaminative sources:

- cars and car parts – fuels, oils, fluids
- oil drums
- made ground
- potential asbestos containing materials
- adjacent vehicle repair garage

3.6 Summary of desk study

A summary of the salient points from the desk study review is provided in Table 3.6

Table 3.6 – Summary of key points identified by desk study research and site inspection	
Subject	Relevant detail
Site History	Open land, then scrapyards since 1970s (and possibly from the 1950s)
Geological Units and Aquifer Designations	Made ground over London Clay – Unproductive strata
Identified potential sources of on-site contaminants	Made ground associated with previous phases of construction and demolition. Vehicular use/repair on site, with the potential for hydrocarbon storage. Sulphate and acidic pH contents in the made ground and natural deposits. Possible asbestos containing materials in the existing construction.
Identified potential sources of off-site contaminants	Vehicle repair garage to south-east.
Other key information	Potential for volume change within shallow clay soils underlying the site, in the vicinity of trees, both on and off site. Potential for high sulphate concentrations in the London Clay.

3.7 Outline conceptual model

3.7.1 Introduction

A conceptual model represents the characteristics of the site that show the possible relationship between sources (contaminants), pathways and receptors (or targets).

The following outline conceptual model has been based on the results of the desk study and environmental reconnaissance of the site.

The outline conceptual model is developed later in the report, in the light of the results of the intrusive investigation, to produce the refined conceptual model given in subsection 7.4.

The proposed development comprises the construction of nine mews houses with private garden areas. A 'residential with homegrown produce' end use category has therefore been adopted for the risk assessment of the site.

In order to classify the anticipated risk associated with the proposed development the classification system defined in Table A shown in Appendix 2 has been adopted (from CIRIA C552). The level of risk was determined by the product of the potential consequence (minor, mild, medium, severe) of the contaminant hazard and probability of it occurring (unlikely, low likelihood, likely, high likelihood). A risk level has been assigned to each possible pollutant linkage.

3.7.2 Potential sources, pathways and receptors

The potential sources, pathways and receptors identified by the desk study data are summarised in Table 3.7.2.

Table 3.7.2 – Potential sources, pathways and receptors	
Potential sources	
On site:	Off site:
Use of the site as a scrapyards, vehicle dismantling, possible oil/fuel storage. Made ground associated with previous phases of construction and demolition. Vehicular use on site. Sulphate and acidic pH contents in the made ground and natural deposits. Possible asbestos containing materials in the existing or former construction.	Vehicle repair garage to east. Made ground.
Potential pathways	
Direct contact Inhalation Ingestion Leaching and migration via groundwater Migration via permeable soils Uptake by plants.	
Potential receptors	
End users Groundworkers Controlled Waters (groundwater and surface water) Off-Site human and property receptors Building materials Vegetation.	

3.7.3 Potential pollutant linkages

The considered potential source-pathway-receptor linkages for the site and their perceived level of associated risk are summarised in Table 3.7.3A.

Table 3.7.3A – Potential relevant pollutant linkages							
Source	Contaminants	Pathway	Receptor	Probability	Consequence	Risk classification	Comments
Made ground	Heavy metals, PAH, TPH	Direct contact	End users	Likely	Medium	Moderate	Less of a risk considered to Groundworkers and off-site receptors due to limited exposure
		Ingestion	Groundworkers	Likely	Minor	Low	
		Inhalation	Off-site receptors	Likely	Minor	Low	
		Leaching and migration via groundwater	Controlled Waters	Unlikely	Medium	Low	Site is underlain by low permeability clay soils
	Plant uptake	Vegetation	Likely	Mild	Low		
	Direct contact	Building materials	Likely	Mild	Low/Moderate		
	Ground gas, vapour	Inhalation	End users	Unlikely	Medium	Low	No indication of significant sources of ground gas
		Groundworkers	Unlikely	Medium	Low		
	Sulphate and pH	Direct contact	Building materials	Likely	Mild	Low/Moderate	London Clay can contain high concentrations of sulphate
Use of site as scrapyards since the 1970s (& possibly 1950s). Vehicle repair garage to east.	Hydrocarbons (TPH, PAH, BTEX, VOC, SVOC, MTBE)	Direct contact	End users	Likely	Medium	Moderate	
		Ingestion	Groundworkers	Likely	Medium	Moderate	
		Inhalation	Off-site receptors	Likely	Mild	Low	
		Leaching and migration via groundwater	Controlled Waters	Unlikely	Medium	Low	Site is underlain by low permeability clay soils
			Off-site receptors	Unlikely	Low	Low	
		Direct contact	Building materials	Likely	Medium	Moderate	Hydrocarbons can affect normal plastic potable water infrastructure

Asbestos and invasive/problematic plants have been given separate consideration in Table 3.7.3B.

Table 3.7.3B – Risk associated with asbestos and invasive plants	
Source/Contaminant	Associated impacts/Issues
Asbestos	Asbestos was commonly used in older brake and clutch parts, and can be present within made ground, as the provenance of such materials is commonly unknown. A suspected asbestos cement fragment was noted at surface during the site reconnaissance. Asbestos containing materials could also be present within the existing buildings on the site. A Moderate potential risk was therefore identified for asbestos.
Invasive Plant Species	The remit for the works did not include a survey for invasive, noxious or otherwise problematic plant species such as Japanese Knotweed, however none were recorded during the reconnaissance visit. This aspect has not been considered further in this report.

4. GROUND INVESTIGATION

4.1 Fieldwork

The investigation comprised the drilling of nine small diameter window sample boreholes using a percussive track mounted rig. The fieldwork was carried out on 9 and 10 November 2023.

The locations of the exploratory holes are illustrated on drawing number 16429GI/1.

Buried service information was provided via Featherstone Homes, and exploratory holes were positioned to avoid known services. Each location was scanned by a trained operator using a calibrated cable avoidance tool prior to breaking ground.

The locations of the exploratory holes were chosen to provide reasonable coverage of the site within the restrictions of access due to the extensive presence of cars and car parts, and the operational use of the site.

Ground gas monitoring pipes were installed in three exploratory holes to facilitate the monitoring of ground gases or vapours, should this be necessary. Details of the installations are shown in Table 4.1.

Table 4.1 – Response zones of installations			
Location	Installation date	Response zone (mbgl)	Strata
WS2	10-11-23	1.0-2.0	Made Ground/Head Deposits
WS3	10-11-23	1.0-3.0	Made Ground/Head Deposits
WS6	09-11-23	1.0-3.0	London Clay

The methodology of undertaking the fieldwork is given in Appendix 1. Full details of the fieldwork and the ground conditions are shown on the logs and test reports.

4.2 Laboratory testing

Laboratory testing was undertaken to determine the following parameters:

- i) natural water contents
- ii) plasticity indices (Liquid and Plastic Limits) of cohesive materials
- iii) pH and water-soluble sulphate levels
- iv) concentrations of a suite of commonly occurring determinands in soil, including heavy metals, polycyclic aromatic hydrocarbons (PAH), phenol, cyanide, sulphate and pH
- v) concentrations of speciated petroleum hydrocarbons (CWG aliphatic/aromatic suite), BTEX compounds and MTBE
- vi) volatile organic compounds (VOC)

- vii) semi-volatile organic compounds (SVOC)
- viii) screening for asbestos fibres and Asbestos Containing Materials (ACM) in soils
- ix) quantification of asbestos within soils
- x) photo-ionisation detector (PID) headspace screening on all samples retrieved to measure concentrations of Volatile Organic Compounds (VOC)
- xi) Waste Acceptance Criteria (WAC) leachate analysis on selected samples

Sample headspace screening was undertaken using a photo-ionisation detector (PID) to measure concentrations of volatile organic compounds (VOCs), to screen for potentially significant concentrations of volatiles which can be indicative of hydrocarbon contamination, to inform the scheduling of environmental laboratory analysis.

The geotechnical soil laboratory testing and PID screening was carried out at the laboratory of RSA Geotechnics. The geotechnical testing was conducted generally in accordance with BS 1377: 1990, British Standard 'Methods of tests for soils for civil engineering purposes'. The chemical contamination analyses were carried out between 15 and 29 November 2023 by DETS Ltd, which has UKAS, ISO 17025 and MCERTS accreditation.

The results of the laboratory testing are given in the test reports later in this report.

5. GROUND CONDITIONS

5.1 Geology

The British Geological Survey (BGS) 1:50000 Series Sheet 270 'South London' and the BGS GeoIndex indicate the site to be directly underlain by London Clay Formation – Clay and Silt.

The closest BGS archive borehole records were approximately 300 m south-west of the site and recorded fissured clay with gypsum crystals to extend to at least 8 m bgl.

5.2 Summary of ground investigation data

A summary of the ground conditions encountered during the exploratory investigation has been provided in Table 5.2.

Table 5.2 – Summary of ground conditions			
Stratum	Min/Max depth of top of stratum (m)	Min/Max depth of base of stratum (m)	Min/Max thickness of stratum (m)
Surfacing over Made Ground	0.0-0.0	0.65-1.8 ¹	0.65-1.8 ¹
Head Deposits	0.65-1.8	1.0-2.6 ¹	0.2-0.95 ¹
London Clay	1.0-2.6	>2->4.0 ²	>0.3->3.0 ²
Groundwater	Recorded during drilling at between 0.4 m bgl (WS7) and 3.0 m bgl (WS3)		
¹ where fully penetrated			
² not fully penetrated			

5.2.1 Made Ground

Made ground was recorded at all locations, ranging in thickness (where fully penetrated) between 0.65 and 1.8 m. The shallow made ground was typically described as silty clayey gravelly sand with brick and concrete and occasional ash, glass, coal, plastic, rubber, ceramic, and metal fragments.

Deeper made ground included sandy silty clay with occasional gravel, brick, and ash. Roots and rootlets were recorded locally.

Suspected asbestos cement fragments were recorded in made ground at locations WS5 and WS6.

5.2.2 Head Deposits

Shallow clay soils comprised mottled grey and brown slightly sandy silty clay with occasional gravel and were considered to comprise Head Deposits. These extended to between 1.0 and 2.6 m bgl.

5.2.3 London Clay

Firm to stiff brown with blue grey mottling London Clay with pockets of silt and fine sand and occasional sand sized selenite crystals was recorded to underlie the Head Deposits, and were not fully penetrated by the maximum depth of investigation of 4.0 m bgl. Roots and rootlets were recorded locally.

5.2.4 Visual or olfactory evidence of contamination

Occasional anthropogenic constituents of brick, concrete, ash, glass, coal, plastic, rubber, ceramic, metal (including sparking plugs, bolts) and suspected asbestos were noted in the made ground during the fieldwork.

A hydrocarbon odour was noted in WS7 between 1.45 and 1.8 m, with a slight organic odour in WS10 between 0.75 and 1.1 m.

6. GEOTECHNICAL CONSIDERATIONS

6.1 Introduction

The proposed scheme comprises the construction of nine mews houses with private garden areas.

A cover of made ground ranging in thickness between 0.65 and 1.8 m was recorded during the investigative works, underlain by high to very high plasticity clay soils composed of a thin cover of Head Deposits underlain by London Clay.

A number of mature/semi-mature trees including species of generally Moderate but locally High water demand are present in the vicinity of the site. The majority are located just off-site in neighbouring gardens of residential properties. Two sycamores at the south-eastern end of the site and within the site boundary are scheduled to be removed to facilitate the proposed development.

Roots and rootlets were noted to be present locally within the clay soils, to at least 4 m depth. Obvious desiccation was only noted within WS2 at the south-eastern end of the site, within clay made ground to 1.65 m depth. However, the investigation was undertaken in November after a period of particularly wet weather and consequently is not considered likely to reflect the full extent of desiccation that could be present seasonally or in the future associated with continued tree growth. It should also be noted that due to restrictions of access it was not possible to position the exploratory holes in the areas that may be most affected by tree root action.

6.2 Structural foundations

The combination of trees and shrinkable clay soils require detailed consideration in the design of a foundation solution. Moisture removed from shrinkable clay soils by tree root action can result in significant volume change and associated ground movement. Where trees are removed, heave can occur associated with recovery of soils from any moisture deficit. Foundations should fully penetrate made ground and will generally need to extend below the zone of potential volume change to bear within moisture stable natural undisturbed soils, which may require excavation to a considerable depth. The cumulative effect of multiple trees should also be considered.

Guidance with respect to foundations in shrinkable soils within the zone of influence of trees is contained within the NHBC Standards, which represent good practice for foundation construction. Laboratory testing indicated the Head Deposits to have an intermediate plasticity with a medium volume change potential while the London Clay Formation was found to have a high to very high plasticity, and a medium to high volume change potential. Guidance recommends that the worst case plasticity and volume change potential should be used in the assessment, therefore calculations for assessing tree-clay interaction for foundations should generally be based upon Chart 1 of NHBC Standards Chapter 4.2.

Initial assessment of the influence of the existing trees on the required foundation depths indicates that foundations will need to extend to between approximately 2 and 3 m depth over the majority of the site to penetrate the zones that could potentially be affected by future volume change, and anti-heave precautions will need to be incorporated as per the guidance. Foundations greater than 2.5 m depth will need to be designed by an Engineer.

Consideration will need to be given to costs associated with an extended depth of dig for foundations, disposal of arisings, and potential construction difficulties with deep excavations close to adjacent properties, including stability and health and safety.

We have included a table of likely bearing pressures for conventional spread foundations, for completeness. Foundations could potentially take the form of individual pad bases and ground beams to support wall loads, or trenchfill foundations.

However, it is recommended that alternative foundation solutions are also explored, which could include CFA, bored or screw piles.

The minimum foundation depths outside of the zone of influence of trees would be 1.0 m for a high plasticity clay. The majority of the site would require foundations considerably deeper than this due to the potential influence of trees. Foundations should be designed to bear on moisture stable clay and must be deepened to fully penetrate the following materials:

- i) Made ground and ground disturbed during the removal of existing trees, buried services and any below-ground obstructions.
- ii) Soft clays that may be present at some levels in the upper Head Deposits/London Clay. Hand shear vane testing recorded values as low as 39 kN/m² at relatively shallow depth, however the presence of trees will mean that foundations will generally found below such layers. The base of foundation excavations should be inspected and tested by an experienced engineer using a hand shear vane. Considerations of nett allowable bearing pressure in this section have assumed a minimum shear strength of 50 kN/m² which is considered generally conservative. If higher bearing pressures are required a more detailed assessment of shear strength at the derived foundation levels can be made.
- iii) Clays within the range of influence of existing, felled and proposed trees. Laboratory testing determined Modified Plasticity Indices of 21% for the Head Deposits and between 32% and 49% for the shallow London Clay. These equate to medium and high volume change potential. It is recommended that the worst case is adopted on a precautionary basis and therefore preliminary foundation depths have been determined from reference to Chart 1 of Chapter 4.2 NHBC Standards 'Building near trees'.
- iv) If significant roots are present at foundation level further excavation may be necessary.

Preliminary estimations of foundation depths have been made based upon the heights, locations and species of the main trees to be retained and felled, based on the tree survey report provided. The estimated foundation depths, based upon reference to Charts 1 and 2 of NHBC Standards Chapter 4.2, are presented in Table 6.2A.

Table 6.2A – Estimated Foundation Depths based upon Charts 1 and 2					
Tree ID and species	Existing/ mature height - H (m)	Approximate distance from nearest foundation – D (m)	Water Demand	Foundation Depth (m)	
				Chart 1 – high volume change potential	Chart 2 – medium volume change potential
T1, Sycamore (to be removed)	12/22	1	Moderate	2.3	1.95
T2, Sycamore (to be removed)	12/22	2	Moderate	2.25	1.85
T3, Sycamore	10/22	5	Moderate	1.95	1.65
T4, Ash	11/23	7	Moderate	1.8	1.55
T5, Lawson Cypress	7.5/18	7	High	2.7	2.35
T6, Sycamore	12/22	4	Moderate	2.05	1.7
T7, Bay Laurel	8/10	6	Moderate	1.3	1.15
T8, Sycamore	13/22	4	Moderate	2.05	1.7
T9, Purple Plum	9/10	10	Moderate	1.0	0.9
T12, Cherry	9/17	8	Moderate	1.55	1.3
T13, Poplar	10/28	10	High	2.8? ¹	2.4
¹ extrapolated from Chart 1 – Engineer to assess. Calculated depths are based on single tree and do not consider cumulative effect of multiple trees					

It should be borne in mind that the NHBC design charts are based upon the influence of a single tree growing in isolation. Where trees grow close to each other and potentially are competing for the same soil moisture, the aggregate depth of influence of the trees may be greater than predicted. It is therefore recommended that the base of foundation excavations be carefully inspected by a suitably experienced engineer for the presence of roots and evidence of residual desiccation to ensure that the foundations fully penetrate any unsuitable materials.

Table 6.2B presents nett allowable bearing pressures (NABP) that may be adopted in the design of spread foundations resting upon moisture stable natural clay, adopting a lower bound design shear strength of 50 kN/m².

At the recommended bearing pressures, settlements would not exceed 25 mm and will occur over a period of months after the structure is completed due to long-term consolidation of the clay.

NABP is the maximum permissible increase in vertical stress at foundation level in excess of overburden pressure. A soil density of 20 kN/m³ may be assumed in the calculation of overburden pressure.

Table 6.2B – NABP for spread foundations on firm to stiff clay			
Depth (m)	Width (m)	Nett allowable bearing pressure (kN/m²)	
		Trenchfill	Equidimensional Pad
1.0	1.0	110	125
	1.5	-	100
	2.0	-	75
2.0	1.0	115	140
	1.5	-	100
	2.0	-	75
2.5	1.0	120	145
	1.5	-	100
	2.0	-	75

Full anti-heave precautions should be incorporated into the foundation design as outlined in NHBC Standards, Volume 1, Chapter 4.2. due to the potential for long-term heave in the underlying clay following the removal of vegetation.

The design engineer will need to consider the following:

- Potential instability of deep excavations and their effect on neighbouring properties
- How to construct foundations without adverse impact on trees to be retained
- the potential for soil desiccation and associated arboricultural advice
- the lateral and shear forces acting on large vertical areas of foundation
- heave precautions
- lateral forces on construction joints.

6.3 Ground floors

NHBC guidance requires anti-heave precautions to be adopted in dwellings where the depth of foundations derived in accordance with Chapter 4.2 is greater than 1.5 m; and where the foundation is within the zone of influence of trees.

Due to the presence of the cohesive Head Deposits and London Clay Formation and made ground locally in excess of 0.6 m depth, it is recommended that suspended floors are adopted in all the proposed dwellings regardless of the depth of foundations. Consideration could be given to adopting ground bearing floor slabs in detached garages provided that some differential movement can be tolerated.

The anti-heave precautions should be designed based upon guidance in NHBC Standards, Chapter 4.2.

6.4 Access roads and areas of hardstanding

It is recommended that a California Bearing Ratio (CBR) value of 2% be adopted for the preliminary design of any external hardstanding areas constructed on made ground or disturbed soil, or for prepared sub-formations within the cohesive Head Deposits where encountered at sub-formation level, based upon empirical guidance and experience of similar materials.

An assessment of prepared formation levels can be made using in-situ testing to inform the design as well as considering equilibrium CBR values, adopting the lower of the two values in the design.

Clay subgrades will be liable to deteriorate if exposed to poor weather conditions or excessive site traffic. It is recommended that all prepared subgrades are proof rolled with a heavy dead-weight roller and any 'soft spots' identified by the passing of the roller should be removed and replaced with locally thickened subbase materials. Prepared sub-formations should be adequately protected by the prompt placing of the subbase layers.

Surface finishes could be affected by movement associated with volume change of cohesive soils, and flexible construction should be considered in the design.

6.5 Groundworks

All excavations requiring entry by site personnel will require temporary support or battering back to a stable angle in accordance with the requirements of Health and Safety legislation, to enable work to be carried out safely within them. Shallow excavations within made ground and the Head Deposits should be considered unstable irrespective of depth. Collapse of unsupported excavations could be sudden and without warning.

Groundwater was recorded locally during the investigation within the made ground. This is likely to represent ephemeral perched water and it is considered that this could be dealt with by simple sump pumping.

Standpipes were installed in three of the exploratory holes and these could be dipped to establish shallow groundwater levels prior to commencement of groundworks.

Anecdotal information from site personnel indicated that below-ground obstructions may be present beneath the site.

6.6 Soakaway drainage

Soakaways are considered unsuitable due to the presence of low permeability clays beneath the site, and a positive drainage solution should be explored.

7. GEOENVIRONMENTAL CONSIDERATIONS

7.1 Introduction

This section describes the chemical analyses carried out and assesses the implications of any proven contamination. The results of the chemical analyses have been reviewed against the appropriate guidelines in use at the time of the preparation of this report.

The proposed development comprises the construction of nine mews houses with private garden areas. Consequently, generic screening thresholds for a 'residential with homegrown produce' end use have been adopted for initial assessment.

A qualitative risk assessment has been carried out in terms of a source – pathway – receptor analysis. The risk assessment analyses the significance of any contamination that has been identified on the proposed development and the local environment. The methodology for the risk assessments and legislative background is discussed in Appendix 2.

7.2 Published guidelines

The results of the chemical analyses have been interpreted by comparing them with the various published guidelines that are currently used for land quality risk assessments. The references used in the following assessment of the site have been summarised in Appendix 2.

7.3 Generic qualitative risk assessment by receptor

The following subsections review the results of the chemical laboratory analyses carried out on samples retrieved from the site, with respect to the potential receptors outlined in subsection 3.5.

In order to quantify risk and assign a qualitative risk category the classification system adopted in Appendix 2 has been adopted.

7.3.1 **End users**

The risk to end users of the development has been considered by comparing the results of the chemical analyses with the Tier 1 Human Health Screening Values as summarised in Appendix 3. As part of the general suite of contamination testing carried out, organic matter was measured. A conservative SOM value of 6% was adopted for the site, based on measured values, where screening values are sensitive to organic matter contents.

7.3.1.1 Inorganic contaminants

Inorganic contaminants found to exceed the adopted Tier 1 screening values for the site have been summarised in Table 7.3.1.1

Table 7.3.1.1 – Summary of elevated inorganic determinands in made ground							
Determinand	No. of tests	Max concentration (mg/kg)	Mean concentration (mg/kg)	Tier 1 screening value (mg/kg)	Number of results exceeding Tier 1 value	Upper confidence limit (95%ile)	Upper confidence limit exceeds Tier 1 value?
Made Ground							
Arsenic	9	54	23.6	37	2	47.4	Yes
Cadmium	9	11.4	3.9	11	1	10.0	No
Lead	9	3700	1950	200	9	2671	Yes
Nickel	9	134	40.7	130	1	100.7	No
Zinc	9	10100	2454	3700	2	7050	Yes

Concentrations of arsenic, cadmium, lead, nickel, and zinc were recorded above the adopted screening values for the proposed 'residential with homegrown produce' end use.

Statistical analysis indicates that the derived upper confidence limits (95th %ile) for cadmium and nickel were below the adopted screening values for the site. The exceedances for these determinands were minor and a negligible risk to end users was determined. Upper confidence limits for arsenic, lead, and zinc were above the screening values. A moderate risk was determined to end users from arsenic, and a potential high risk from lead and zinc.

7.3.1.2 Organic contaminants

i) **Phenol and Polycyclic Aromatic Hydrocarbons (PAH)**

Concentrations of phenol were below the adopted Tier 1 screening values for the site. PAH determinands were locally elevated, as recorded in Table 7.3.1.2.

Table 7.3.1.2 – Summary of elevated PAH in made ground							
Determinand	No. of tests	Max concentration (mg/kg)	Mean concentration (mg/kg)	Tier 1 screening value (mg/kg)	Number of results exceeding Tier 1 value	Upper confidence limit (95%ile)	Upper confidence limit exceeds Tier 1 value?
Made Ground							
Benzo(b)fluoranthene	9	3.8	2.05	3.7	1	2.7	No
Benzo(a)pyrene	9	3.31	1.74	3.0	1	2.32	No
Dibenz(a,h)anthracene	9	0.41	0.23	0.3	2	0.3	No

The measured concentrations were only slightly above their relevant Tier 1 Screening Values, and the mean and upper confidence values did not exceed the thresholds. A negligible risk was determined to end users from these determinands.

ii) Total Petroleum Hydrocarbons (TPH)

Samples recovered from the exploratory holes were screened for the presence of volatile organic compounds (VOC) using a photo-ionisation detector (PID), as VOC can be an indicator of hydrocarbon contamination. A copy of the PID results is presented with the factual data later in this report. The results were generally very low, with concentrations ranging from <0.1 ppm to a maximum of 5.3 ppm, and a significant risk from hydrocarbons was not generally evidenced by odours or staining during the fieldwork (although a hydrocarbon odour was noted within WS7 between 1.45 and 1.8 m depth), however on a precautionary basis, four samples of shallow soils were submitted for laboratory analysis for speciated total petroleum hydrocarbons (TPH), as well as concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX) and methyl tert-butyl ether (MTBE).

Concentrations of speciated TPH bands were generally very low, with no exceedances of individual screening thresholds. Hazard Index calculations were made based on the methodology of the EA 'UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils', Science Report P5-080/TR3 to assess the cumulative influence of the TPH on human health. Hazard Indices greater than one typically require remedial action. The calculated values were well below this threshold and consequently remediation for the recorded concentration was not considered necessary for the protection of end users from TPH.

The suite of testing for TPH also included BTEX determinands. Concentrations measured were below the detection limit of the test method and well below the adopted screening values for the site and consequently the risk to end users from these concentrations was considered to be negligible.

iii) Volatile Organic Compounds (VOC) and Semi-Volatile Organic Compounds (SVOC)

Two samples were scheduled for VOC and SVOC laboratory analysis.

All VOC and SVOC laboratory results were below the detection limit of the testing method, and a negligible risk was determined to end users from VOC and SVOC.

7.3.1.3 Asbestos

Asbestos screening was undertaken on nine samples of made ground. Asbestos detections and quantifications are summarised in Table 7.3.1.3.

Table 7.3.1.3 – Asbestos screening and quantification results		
Location and depth (m)	Type of asbestos identified	Quantification result (%)
WS3, 0.5 m	Chrysotile insulation	0.002
WS4, 0.2 m	Chrysotile insulation	0.001
WS5, 0.2 m	Chrysotile cement insulation	1.660
WS6, 0.2 m	Chrysotile cement insulation	4.370

Suspected asbestos cement fragments were noted in made ground in WS5 and WS6, and at one location at surface during the fieldwork, and a high potential risk to end users was determined from asbestos.

Quantifications indicated concentrations above the Hazardous Waste threshold of 0.1% w/w for the samples from WS5 and WS6, within which fragments of cement sheeting were recorded.

The source of the asbestos was not identified but could be associated with the use of the site as a scrapyards.

It was also considered plausible that asbestos containing materials could be present within the existing site buildings, based on the time of their construction when the use of asbestos containing materials was prevalent.

7.3.1.4 Ground gas

On a precautionary basis, three wells were installed to facilitate monitoring of shallow groundwater levels and ground gas concentrations, should this be required.

However, a significant source of ground gas was not identified by the desk study or intrusive investigation, and a significant risk to end users was not determined.

7.3.1.5 Conclusion of end user risk assessment

Table 7.3.1.5 – Summary of identified risks to end users		
Contaminants of concern	Level of associated risk	Identified active pathways
Lead, Zinc Arsenic	High Moderate	Ingestion, inhalation, and direct contact in soft landscaping areas.
Asbestos	High	Inhalation of fibres from disturbance of soils in soft landscaping areas.

7.3.2 Groundworkers

Groundworkers could come into direct contact with the soil and were generally considered to be at moderate risk from lead and zinc, and low risk from arsenic and barium. A high potential risk was determined for asbestos, as there is no 'safe' limit for asbestos, and exposure should be minimised.

Risks are generally mitigated by the wearing of 'normal' protective equipment to prevent direct contact, inhalation and ingestion, and by good housekeeping during the works such as dust suppression and welfare facilities, however asbestos requires more robust consideration.

7.3.3 Controlled Waters

Table 7.3.3 – Site sensitivity in relation to Controlled Waters		
Hydrological and hydrogeological information	Direction and distance from site	Sensitivity rating
Nearest Surface Water Feature	Pond located 250m south of site.	Negligible
Aquifer Classifications	No Superficial Aquifer Bedrock Unproductive Aquifer	Negligible
Source Protection Zones (SPZ)	Not on site	Negligible
Water Abstractions	None within 500 m	Low

There are no surface water features in the vicinity of the site, and no Superficial Aquifer beneath the site. The presence of a significant thickness of low permeability London Clay beneath the site will mitigate risks to deeper aquifers and will prevent lateral migration through these soils. No significant risk to Controlled Waters was determined by the testing carried out and associated assessment.

Suitable controls will need to be put in place during development of the site, including for concrete wash-out areas.

7.3.4 Off-site human and property receptors

The risk from leachable determinands was considered to be negligible, for the reasons given in subsection 7.3.3. Suitable control of surface water will need to be considered, as above.

Off-site receptors could be subjected to impact from windblown dust, and from soil attached to the wheels of vehicles leaving the site, and a potential moderate risk was determined to off-site receptors from asbestos within made ground, and possibly within existing buildings during removal. The site is situated within a sensitive residential area and is largely surrounded by back gardens of residential properties. South Norwood Primary School is present from approximately 60 m north of the site, and Crosfield Nursery School is approximately 90 m south-east of the site. Given the sensitive nature of the site environs, strict precautions will need to be taken in order to prevent any contaminants impacting on off-site receptors, particularly during the demolition/removal of buildings. Any buildings on site should have full asbestos demolition surveys undertaken, or asbestos registers checked, prior to demolition, to prevent the release of asbestos fibres.

7.3.5 Building materials

7.3.5.1 Below ground concrete

Nine samples of shallow made ground were tested for water-soluble sulphate content and pH value. One sample of Head Deposits clay and five samples of London Clay were also tested, and three samples of London Clay were also tested for total sulphur and acid soluble sulphate. The results were compared with the guidelines outlined in BRE Special Digest 1 (SD-1), 2005, 'Concrete in Aggressive Ground'. This publication attributes a Design Sulphate Class and an Aggressive Chemical Environment for Concrete (ACEC) class for the site under consideration, based upon the nature of the site, sulphate concentrations, pH values and mobility of groundwater.

The results are summarised in Table 7.3.5.1.

Table 7.3.5.1 – Water-soluble sulphate and pH assessment for buried concrete						
Stratum	pH		Water soluble sulphate (mg/l)		DS class	ACEC class ²
	Range	Characteristic Value	Range	Characteristic Value ¹		
Made Ground	6.9-8.9	7.0	17-204	200	DS-1	AC-1
Head Deposits	7.1	7.1	2530	2500	DS-3	AC-3
London Clay	7.1-7.6	7.1	149-2110	2100	DS-3	AC-3
¹ Value is rounded to 100mg/l ² assumes mobile groundwater						

A moderate risk was determined to below-ground concrete based on the testing.

7.3.5.2 Potable water pipes

Organic contaminants can impact on plastic pipework. The recorded concentrations of PAH and TPH were not severe, however due to the former use of the site as a scrapyards it is possible that higher concentrations may be present locally. It is recommended that liaison with the potable water providers is undertaken to establish their requirements with regard to pipework and backfill materials for potable water supply, as they are the final arbiter in this respect. It is possible that further testing along the route and level of the proposed main will be required. Barrier pipe may be required to mitigate potential risks.

7.3.6 Vegetation

Nickel, copper and zinc are phytotoxic and could therefore inhibit plant growth or establishment. In order to assess the risk posed to vegetation on site from these potentially phytotoxic contaminants the concentrations of copper, zinc and nickel were compared against values given in the British Standard BS 3882: 2015, 'Specification for topsoil'.

Adopting a pH value of >7, screening values for nickel, copper and zinc are 110 mg/kg, 200 mg/kg and 300 mg/kg, respectively. Samples with elevated concentrations are summarised in Table 7.3.6 below.

Table 7.3.6 – Summary of phytotoxic exceedances				
Location	Depth (m)	Nickel (mg/kg)	Copper (mg/kg)	Zinc (mg/kg)
WS2	0.2	33	174	4320
WS3	0.5	17	243	789
WS4	0.2	26	308	1130
WS5	0.2	134	437	10100
WS6	0.2	85	730	2980
WS7	0.2	18	66	1240
WS8	0.5	13	51	363
WS9	0.2	24	866	1060

The concentrations indicate a potential significant risk to vegetation from copper and zinc. The made ground was noted to include anthropogenic materials such as glass, metal, ash, clinker, brick, coal, concrete, rubber, ceramic, plastic and suspected asbestos, which would generally render the made ground as unsuitable for use in the scheme. The recorded concentrations of contaminants confirm that the made ground would not be suitable for re-use as subsoil or topsoil with respect to both phytotoxic and human health.

No invasive or otherwise problematic plant species such as Japanese Knotweed or Giant Hogweed were noted during the fieldwork, however the remit did not include a formal survey for such plants and we are not specialists in this field. It would be prudent to confirm the absence of such species prior to commencement of siteworks.

7.4 Refined conceptual model

7.4.1 Introduction

The refined conceptual model represents the characteristics of the site that show the relevant pollutant linkages as defined by the results of the intrusive investigation. Negligible and discounted risks have not been included.

7.4.2 Plausible relevant pollutant linkages

Table 7.4.2 - Plausible relevant pollutant linkages				
Source	Contaminants	Pathway	Receptor	Risk
Made ground	Lead, Zinc, Arsenic,	Direct contact Ingestion Inhalation	End users Groundworkers Off-site human and property receptors	Moderate to High Moderate Low
	PAH, TPH	Direct contact	Building materials	Low
	Asbestos	Inhalation	End users Groundworkers Off-site human and property receptors	High High Moderate
	Sulphate and pH	Direct contact	Building materials	Low
Existing buildings	Asbestos (potential)	Inhalation	End users Demolition workers and site workers Off-site human and property receptors	High High Moderate
Natural soils	Sulphate and pH	Direct contact	Building materials	Moderate

7.5 Recommended remediation strategy

The investigation and testing carried out have recorded some impact to site soils from former uses of the site, and remedial recommendations are contained below. It should be appreciated that site investigation permits the inspection of only a very small proportion of site soils, and that the investigation to date may not have recorded the highest concentrations of contaminants that may be present beneath the site. Consequently, vigilance will need to be maintained throughout the development for indicators of the potential presence of contamination; where identified further assessment will be required.

7.5.1 Asbestos within existing buildings

The buildings on site are restricted to single storey sheds. On a precautionary basis it is recommended that 'refurbishment and demolition' asbestos surveys are undertaken for these buildings, in case asbestos containing materials are present. Where identified, all asbestos and asbestos containing materials must be fully removed by an appropriately qualified and experienced contractor in accordance with best practice and current legislation prior to demolition, and with all necessary mitigation measures in place to avoid any adverse impact to on-site and off-site receptors (including residential properties and schools) via migration of asbestos containing materials and fibres. Detailed records of the removal, handling, waste classification and disposal of asbestos containing materials will need to be kept by the Contractor and copies provided to the Client.

Cross-contamination of materials with asbestos is a common issue on demolition sites, and great care will need to be taken to avoid such impact throughout the works. Measures must be taken to prevent the generation of any dust, and personal and boundary monitoring for asbestos should be considered to confirm that mitigating measures are effective in preventing the release of asbestos fibres, for both on-site and off-site receptors. All works should be supervised by suitably trained and experienced personnel. All other site users will need to be informed of the asbestos works being undertaken and the protocols adopted to mitigate risks.

Existing hardstanding should be carefully inspected as it could potentially have asbestos fragments embedded if they were used as hardcore beneath, which is not uncommon. Asbestos fragments identified during the works should be carefully hand-picked by suitably trained and experienced personnel.

7.5.2 Contaminated land

The investigation and assessment have identified elevated concentrations of lead, zinc and arsenic within shallow made ground, and a moderate to high risk was identified to end users without mitigating measures.

Asbestos was positively identified within four samples of shallow made ground, and fragments of suspected asbestos cement materials were observed within two recovered samples and at one location at surface, with a high potential risk identified to end users. The positive detections recorded are considered indicative of the potential presence of asbestos in made ground/disturbed ground across the site.

Quantification of the identified asbestos recorded concentrations of 1.66 and 4.37% w/w within two of the samples, within which fragments of cemented materials were observed; this is above the Hazardous Waste threshold of 0.1% w/w.

To protect end users of the site from the identified contaminants, it is recommended that a clean cover soil system is adopted in all areas of soft landscaping, including private garden areas and communal landscaped areas, to form a break in pathway between the site soils and end users of the scheme. No suitable soils were identified on site, and it is considered that suitable topsoil and subsoil will need to be imported for this purpose.

It is recommended that the clean cover soils should be placed over a conspicuous basal geotextile marker layer of appropriate permeability and longevity to provide separation between the imported and original soils and to act as a deterrent to digging beyond this level.

A suitable thickness of clean cover materials is considered to be 600 mm in private garden areas (to allow for 'double-digging') and 450 mm in areas of communal soft landscaping. However, this takes no account of potential changes in level across the site, which could reduce or remove affected soils, or provide a cap above the affected soils.

The site is underlain by low permeability clay soils, and underdrainage of soft landscaped areas (and other areas) should be considered by the Designers/Engineers at the design stage

to avoid 'waterlogging' of soils where suitable drainage paths are not present, e.g. localised areas at reduced level that could retain water.

Any imported materials proposed for use on site should be sourced from reputable suppliers and be accompanied by compliance certification, indicating the materials have originated from a 'clean source', and are potentially chemically suitable for use on site. Once delivered to site, it is recommended that independent inspection and validation sampling be undertaken by the geoenvironmental engineer to confirm that the soils provided are consistent with the results of the compliance certificates and are chemically suitable for use on site, and that the required minimum thickness has been attained.

Groundworkers should be made aware that the investigation of the site has recorded the presence of asbestos and elevated concentrations of metals within shallow soils. To prevent direct contact with contaminants, groundworkers (and demolition workers) should wear appropriate protective clothing, in accordance with Health and Safety Regulations, during any works. Workers should be properly equipped with dust masks, safety boots, gloves, hard hats and overalls, and where appropriate respiratory equipment. Adequate washing and welfare facilities should be provided, and their use should be enforced. All site workers should wash their hands before eating, drinking or smoking. Site visitors should be supervised and protected, as necessary.

On a precautionary basis, confined spaces such as excavations where personnel are to work should be monitored to ensure there is a safe working atmosphere, and safe systems of work should be in place.

Mitigation measures to prevent any dust generation will need to be carried out during the groundworks, to prevent potential impact upon site workers and off-site human receptors during the groundworks. Regular dampening down of the topsoil/made ground soils (working areas and stockpiles) should be undertaken during periods of dry weather to reduce this risk. Controls should also be put in place to reduce the risk of soils being tracked off site via site vehicles. Due to the presence of asbestos within shallow site soils, groundworks should be supervised by personnel trained in working with asbestos containing materials such that appropriate controls are maintained, and consideration should be given to personal and boundary monitoring to evidence that the works are not releasing significant asbestos fibres that could affect site and off-site receptors.

Vigilance should be maintained throughout the groundworks to identify any previously undiscovered contamination including potential asbestos containing materials. Detailed records should be kept of any contamination found. Should any suspected contaminated soils be identified, works should cease in the affected area, and the geoenvironmental engineer should be contacted to allow for appropriate assessment of the contamination.

The shallow soil mounds in the west of the site should be removed prior to siteworks.

Buried concrete should be designed in accordance with BRE Special Digest 1. A Design Sulphate Class of DS-3 and an ACEC Class of AC-3 were determined for the samples tested. The London Clay can contain localised high sulphate concentrations, and further sulphate can

be generated within the London Clay should oxidation occur (where soils are significantly disturbed). This should be taken into account at the design stage.

Liaison with the potable water supplier should be undertaken to confirm their requirements for pipework and backfill materials.

This report does not cover assessment of unexploded ordnance risk and it is recommended that this aspect is considered prior to groundworks.

7.6 Waste disposal

The development of the site could create soils that require disposal. Excess soils could be disposed of to a waste treatment or recycling facility or an appropriately licenced landfill. Under the Waste Regulations there are three main categories of waste: Inert, Non-Hazardous and Hazardous. The Inert category is a subgroup of Non-Hazardous.

Waste soils are first categorised as Hazardous or Non-Hazardous using the calculations in the EA document 'Guidance on the classification and assessment of waste' Technical Guidance WM3, Ver 1.2 GB, October 2021. Waste acceptance criteria (WAC) testing is then required on Hazardous waste soils to determine if they need any additional treatment before they can be received at a Hazardous waste landfill, or if they can be taken to a Non-Hazardous landfill which has cells to receive 'Stable Non-Reactive Hazardous' waste. WAC testing of Non-Hazardous soils is required to determine if it can be received at an Inert landfill. Non-Hazardous waste does not require WAC testing as there are no limits set for the various determinands. However, in reality, most landfills request WAC test results to ensure that the waste complies with their licence requirements.

An initial high-level assessment of the test results indicates that the majority of the made ground samples tested would be considered Hazardous for waste disposal, based on concentrations of lead and zinc.

WAC leachate analysis on two composite samples of made ground recorded lead to slightly exceed the Inert Waste Acceptance Criteria limit in one of the samples.

It should be noted that one sample from WS7, 0.2 m depth recorded relatively high total organic carbon (TOC) which exceeded the Hazardous Waste Landfill acceptance criteria limit, however typical concentrations were below this threshold and the composite WAC samples recorded no exceedances.

Soils identified to contain asbestos containing materials are generally classified as Hazardous Waste and therefore will be subject to the consignment note procedures given in the Hazardous Waste Regulations. Asbestos containing materials will generally be considered to be 'Stable Non-Reactive Hazardous' (SNRH) waste and will therefore need to be disposed of at a Hazardous landfill or a Non-Hazardous landfill which has separate cells to take SNRH waste. However, if the amount of asbestos present as fibres within the soils constitutes less than 0.1% by weight, and there are no visible fragments present, the soils can potentially be classed as not Hazardous for waste disposal, subject to agreement of the receiving facility.

Additional testing should be carried out once soils destined for removal off site as waste have been clearly identified and liaison with the proposed receiving facility is recommended to be undertaken at an early stage in the scheme to confirm the requirements.

Uncontaminated natural soils are typically classified as Inert for waste disposal purposes, unless they contain a high proportion of organic materials.

During the redevelopment programme a 'watching brief' should be maintained to identify any untoward or overtly contaminated soils intended for disposal off-site, which should be segregated and tested to confirm requirements for waste disposal.

Existing asphalt surfacing is likely to have special requirements for disposal and should be segregated accordingly for disposal.

Copies of all waste transfer notes for waste soils removed off site should be kept on file by the appointed contractor for inspection at the end of the project, to confirm that all soils removed off-site have been done so using a licensed waste haulage company and have been disposed of to a suitably licensed waste disposal facility or recycling depot.

Further advice can also be sought from the local waste regulatory authority, who should also be able to offer advice on which landfills are available to accept the waste.

8. CONCLUSIONS

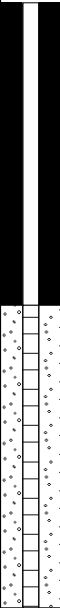
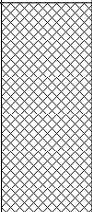
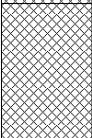
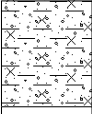
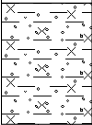
This report should not be regarded as the conclusion of the geotechnical or geoenvironmental involvement of the proposed scheme. It is recommended that a continuing overview of this aspect is maintained throughout the scheme.

Samples from the investigation will be retained for a period of three weeks from the date of this report, unless instructions to the contrary are received.

All recommendations made in this report should be agreed with the Planning Department and Environmental Health Department at the Local Authority, before being undertaken.

Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS2	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D				Made Ground (Flexible surfacing over dark grey slightly silty slightly clayey medium-coarse sand with some angular-subangular fine-medium flint gravel, some fine-coarse gravel size brick fragments, occasional fine-coarse gravel size ash fragments, rare plastic/glass fragments and occasional rootlets)		
		0.60	D		0.70		- contains several coarse gravel-cobble size brick fragments between 0.55-0.70m		
		0.90	D				Made Ground (Light brown slightly silty very sandy fine-coarse gravel size brick with rare fine gravel size ash fragments and occasional rootlets/roots up to 2mm diameter)	1	
		1.40	D		1.15		Made Ground (Stiff brown sandy silty clay with occasional angular-subrounded fine-medium flint gravel, occasional fine-medium gravel size brick and ash fragments and occasional rootlets (desiccated)		
		1.50	D	HVP=140.0	1.65				
		1.90	D		2.00		Firm mottled grey and brown slightly sandy silty CLAY with occasional fine gravel size pockets of dark grey silt and occasional angular-subangular fine-medium flint and chalk gravel and rare roots to 1mm diameter (Head Deposits?)	2	
		2.00	D	HVP=46.0			[Infill material from collapse of borehole as drilled]		
		2.60	D		2.60		Firm-stiff brown with blue-grey mottling silty CLAY with rare fine sand size selenite crystals, rare siltstone nodules and rare rootlets (London Clay Formation)		
		2.80	D	HVP=93.0	3.00			3	
		2.80	D					End of Borehole at 3.00m	4

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
 No groundwater encountered. Collapsed material recovered between 2.00-2.60m depth. Window sample hole collapsed to 2.00m upon completion. 25mm diameter pipe installed to 2.00m. Pipework capped and protected with flush lockable cover.



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS3	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.40		Made Ground (Flexible surfacing over dark brown grey slightly silty fine-coarse sand with much fine-coarse gravel size brick fragments, some angular-subrounded fine-coarse flint gravel, occasional fine-medium gravel size concrete fragments and rare plastic/metal fragments)		
		0.50	D		0.65		Made Ground (Dark brown grey slightly silty clayey medium-coarse sand with some angular-subrounded fine-coarse flint gravel, some fine-coarse gravel size brick and concrete fragments and occasional gravel size coal, glass and rare rootlets)		
		0.75	D		0.85		Made Ground (Weak un-reinforced mortar or sand concrete)		
		0.90	D		1.15		Made Ground (Firm-stiff mottled grey and brown sandy silty clay with pockets of brown medium-coarse sand and some fine-coarse gravel size brick and ash fragments and some angular-subangular fine-coarse flint gravel - occasional roots to 1mm diameter)		
		1.40	D	HVP=65.0	1.70		Firm brown slightly sandy silty CLAY with rare angular-subangular fine-coarse flint and chalk gravel and occasional rootlets (Head Deposits?)		
		1.50	D		1.90		Firm-stiff brown slightly silty sandy CLAY with occasional rootlets and small pockets of silt and fine sand (London Clay Formation)		
		1.90	D	HVP=79.0	2.30		- rare decayed root traces		
		2.00	D		2.40		Stiff brown slightly silty sandy CLAY with some angular-subangular fine-coarse flint gravel and gravel size tabular fragments of siltstone (London Clay Formation)		
		2.40	D	HVP=96.0	2.70		Stiff-very stiff mottled brown with occasional grey mottling silty CLAY with occasional pockets of brown silt and fine sand (London Clay Formation)		
		2.50	D		2.90		- rare rootlets and decayed root traces		
		2.90	D	HVP=96.0	3.40		- occasional fine sand size selenite crystals		
		3.00	D		3.50		- numerous pockets of orange brown fine-medium sand from 3.60m		
		3.40	D	HVP=121.0	3.90				
		3.50	D		4.00		End of Borehole at 4.00m		

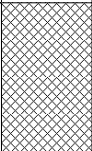
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
 On completion groundwater standing at 3.00m. No collapse. 25mm diameter pipe installed to 3.00m. Pipework capped and protected with flush lockable cover.



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS4	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.50		Made Ground (Dark brown grey slightly silty clayey medium-coarse sand with some angular-subangular fine-coarse flint and chalk gravel and some fine-coarse gravel size brick and concrete fragments and occasional metal/glass/plastic/clinker fragments and occasional rootlets)		
							End of Borehole at 0.50m		

1
2
3
4
5

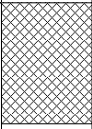
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered. Window sample refused at 0.50m.



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS4A	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40		 Made Ground (Dark brown grey slightly silty clayey medium-coarse sand with some angular-subangular fine-coarse flint and chalk gravel and some fine-coarse gravel size brick and concrete fragments and occasional metal/glass/plastic fragments and occasional rootlets) End of Borehole at 0.40m		
								1	
								2	
								3	
								4	
								5	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
 No groundwater encountered. Window sample refused at 0.40m.



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS4B	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.45		Made Ground (Dark brown grey slightly silty clayey medium-coarse sand with some angular-subangular fine-coarse flint and chalk gravel and some fine-coarse gravel size brick and concrete fragments and occasional metal/glass/plastic fragments and occasional rootlets) End of Borehole at 0.45m		



Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

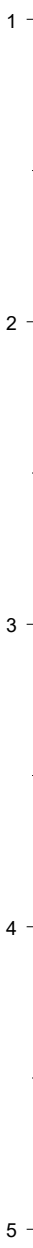
Remarks
 No groundwater encountered. Window sample hole refused at 0.45m



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS4C	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.55		Made Ground (Dark brown grey slightly silty clayey medium-coarse sand with some angular-subangular fine-coarse flint and chalk gravel and some fine-coarse gravel size brick and concrete fragments and occasional metal/glass/plastic fragments and occasional rootlets)		
							End of Borehole at 0.55m		



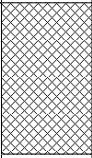
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered. Window sample refused at 0.55m



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Hand dug	
Borehole Number WS4D	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.50		Made Ground (Dark brown grey slightly silty slightly clayey medium-coarse sand with some fine-coarse gravel size brick fragments and some angular-subangular fine-medium flint and chalk gravel and occasional metal and glass fragments and occasional rootlets) <i>- concrete gravel found at base of pit</i> End of Borehole at 0.50m	1 2 3 4 5	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
 No groundwater encountered. Hand dug pit to 0.50m attempted by boundary fence, close to tree just outside site boundary



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 09/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS5	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D				Made Ground (Dark brown grey slightly silty slightly clayey medium-coarse sand with some angular-subangular fine-coarse flint gravel, some fine-coarse gravel size brick fragments, occasional glass, plastic, rubber, metal and ceramic fragments and occasional roots up to 4mm diameter)		
		0.50	D		0.70			- <u>one possible asbestos cement fragment</u>	
		0.90 0.90	D	HVP=87.0	1.00		Firm mottled brown with orange brown mottling slightly sandy CLAY with occasional angular-subangular fine-coarse flint gravel (Head Deposits?)	1	
		1.40 1.50	D	HVP=61.0				Firm mottled brown with occasional grey mottling slightly sandy silty CLAY with occasional fine-coarse sand size selenite crystals (London Clay Formation)	
		1.90 1.90	D	HVP=75.0	2.00		- <u>occasional pockets and partings of brown silt and fine-medium sand</u> - <u>becomes more sandy below 1.70m</u>		
								End of Borehole at 2.00m	2
								3	
								4	
								5	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered. No collapse



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 09/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS6	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D				Made Ground (Dark brown grey slightly silty clayey medium-coarse sand with some angular-subangular fine-coarse flint gravel, fine-coarse gravel size brick fragments and occasional rootlets)		
		0.60	D		0.55		- rare glass, metal and suspected asbestos cement fragments		
		0.90	D		0.80		Made Ground (Dark brown grey slightly clayey silty medium-coarse sand with much angular-subangular fine-coarse flint gravel and occasional fine-medium gravel size brick fragments)		
		1.40	D		1.00		Firm mottled brown and grey silty CLAY with occasional angular-subangular fine-coarse flint gravel (Head Deposits)	1	
		1.40	D	HVP=50.0			Firm brown slightly sandy silty CLAY with occasional fine-medium sand size selenite crystals and rare pockets of fine-medium sand (London Clay Formation)		
		1.90	D				- with many pockets and partings of fine-medium sand below 1.65m		
		1.90	D	HVP=78.0				2	
		2.40	D				- becoming stiff with depth		
		2.40	D	HVP=123.0		2.70			
		2.90	D				Very stiff brown silty CLAY with occasional fine-coarse sand size selenite crystals and occasional pockets and partings of silt and fine sand (London Clay Formation)	3	
	2.90	D	HVP=140.0						
	3.40	D				- contains silt pockets between 3.30-3.60m			
	3.40	D	HVP=140.0		3.70				
	3.90	D				Very stiff brown with occasional grey mottling CLAY with occasional fine-medium sand size selenite crystals and occasional pockets of silt and fine sand (London Clay Formation)	4		
	3.90	D	HVP=140.0		4.00		End of Borehole at 4.00m		

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
 No groundwater encountered. No collapse. 25mm diameter pipe installed to 3.00m. Pipework capped and protected with flush lockable cover. Bentonite backfill between 3.00-4.00m



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 09/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS7	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.35		Made Ground (Dark brown grey silty medium-coarse sand with some angular-subangular fine-coarse flint gravel and occasional fine-coarse gravel size brick, concrete, glass and ceramic fragments) No sample recovery		
		1.20	D		1.00		Made Ground (Dark brown grey slightly clayey silty medium-coarse sand with occasional angular-subangular fine-coarse flint gravel and much fine-coarse gravel size brick and ceramic and occasional clinker fragments)	1	
		1.60 1.60	D	HVP=41.0	1.45		Possible Made Ground (Soft-firm mottled brown with occasional grey mottled silty clay. Grey coloured pockets of clay contain a strong hydrocarbon odour)		
		1.90 1.90	D	HVP=74.0	1.80		Firm brown slightly sandy silty CLAY with occasional fine-medium sand size selenite crystals (London Clay Formation)	2	
		2.80 2.80	D	HVP=132.0	2.00		Collapsed material (mixture of material from 1.00-1.80m)		
					2.50		Stiff brown silty CLAY with occasional fine-medium sand size crystals and pockets and partings of brown and orange brown silt and fine sand (London Clay Formation)		
					3.00		End of Borehole at 3.00m	3	
								4	
								5	

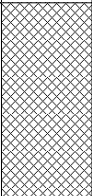
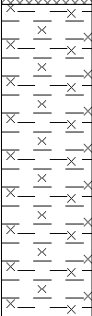

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
On completion groundwater standing at 0.40m. Window sample hole collapsed to 0.80m upon completion.



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 09/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS8	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.65		Made Ground (Dark brown grey slightly silty slightly clayey medium-coarse sand with some angular-subangular fine-coarse flint gravel and occasional fine-coarse gravel size brick and concrete fragments and rare plastic fragments)		
		0.50	D						
		0.90 0.90	D	HVP=44.0	1.70		Firm brown with occasional grey mottling silty CLAY with rare fine-medium sand size selenite crystals and occasional fine-medium gravel size siltstone nodules (London Clay Formation) <i>- becomes darker in colour below 1.10m</i>	1	
		1.40 1.40	D	HVP=58.0					
		1.90 1.90	D	HVP=71.0	2.00		Firm-stiff brown silty sandy CLAY with occasional fine-medium sand size crystals and many pockets and partings of silt and fine-medium sand (London Clay Formation)	2	
							End of Borehole at 2.00m		
								3	
								4	
								5	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered. No collapse. Some perched water found at base of hole after drilling (less than 10cm)



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 09/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS9	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D				Made Ground (Dark brown grey slightly silty slightly clayey medium-coarse sand with occasional angular-subrounded fine-medium flint and chalk gravel and occasional fine-medium gravel size brick fragments and occasional plastic and metal fragments)		
		0.55					- <i>occasional spark plugs, bolts</i>		
		0.70	D				Made Ground (Brown sandy fine-coarse gravel size angular sandstone fragments with occasional pockets of soft clay and rare gravel size fragments of brick and concrete)		
		0.80		HVP=39.0			Firm brown silty CLAY with occasional roots to 1mm diameter (London Clay Formation)	1	
		0.90							
		1.00	D						
		1.40					- <i>occasional grey mottling and pockets and partings of silt and fine sand from 1.20m approximately</i>		
		1.40	D	HVP=64.0					
		1.60					Firm brown silty sandy CLAY with occasional fine-medium sand size selenite crystals and many pockets and partings of brown and grey brown silt and fine-medium sand (London Clay Formation)		
		1.90							
		1.90	D	HVP=88.0	2.00		End of Borehole at 2.00m	2	
								3	
								4	
								5	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered. No collapse



Percussion Drilling Log

Project Name: 15-35 Birchanger Road		Client: Featherstone Homes Ltd		Date: 10/11/2023	
Location: South Norwood, Croydon, SE25 5BA		Contractor: RSA Geotechnics			
Project No. : 16429GI		Crew Name: MR/LG		Drilling Equipment: Percussive window sampler	
Borehole Number WS10	Hole Type WS	Level	Logged By MR	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D				Made Ground (Brown slightly silty medium-coarse sand with occasional fine-medium brick and mortar fragments and occasional flint)		
		0.60	D		0.50		Made Ground (Dark grey silty medium-coarse sand with much angular-subangular fine-coarse flint gravel and occasional fine-medium gravel size brick fragments and rare glass/plastic fragments)		
		0.90	D		0.75		Made Ground (Firm dark grey slightly sandy silty clay with occasional angular-subangular fine-medium flint gravel and rare fine-coarse gravel size brick fragments. Slight organic odour)	1	
		1.40 1.40	D	HVP=51.0	1.10		Firm mottled brown with grey mottling sandy silty CLAY with rare angular-subrounded fine-coarse flint gravel and rare rootlets and sand size selenite crystals (Head Deposits?)		
		1.90 1.90	D	HVP=87.0	1.70		Stiff brown with occasional grey mottling silty CLAY with occasional rootlets, rare sand size selenite crystals and fine gravel size black carbonaceous pockets (London Clay Formation)	2	
					2.00		End of Borehole at 2.00m		
								3	
								4	
								5	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered. No collapse.



SUMMARY OF CLASSIFICATION TESTING

BS1377: Part 1 1990: Clause 7.3 and 7.4 and Part 2 1990: Clause 3.2, 4.4, 5 and 6.5

Project	Birchanger Road, South Norwood, SE25 5BA	Report number	16429GI
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Location	Sample type	Sample number	Depth - top (m)	Depth - base (m)	Material passing 425µm (%)	Moisture content (w %)	Plastic limit (wp %)	Liquid limit (wL %)	Plasticity index (IP %)	Linear shrinkage (LS %)	Particle density (Mg/m³)	Prep method	Drying temp (°C)	Description
WS2	D	4	-	1.40	97	15.6	18	40	22			Wet sieve	105	Made Ground (Stiff brown sandy silty clay with occasional angular-subrounded fine-medium flint gravel, occasional fine-medium gravel size brick and ash fragments and occasional rootlets)
WS2	D	5	-	1.90	94	21.0	15	37	22			Wet sieve	105	Firm mottled grey and brown slightly sandy silty CLAY with occasional fine gravel size pockets of dark grey silt and occasional angular-subangular fine-medium flint and chalk gravel and rare roots to 1mm diameter (Head Deposits?)
WS2	D	6	-	2.80		26.0							105	Firm-stiff brown with blue-grey mottling silty CLAY with rare fine sand size selenite crystals, rare siltstone nodules and rare rootlets (London Clay Formation)
WS3	D	5	-	1.40		21.5							105	Firm brown slightly sandy silty CLAY with rare angular-subangular fine-coarse flint and chalk gravel and occasional rootlets (Head Deposits?)
WS3	D	6	-	1.90		24.1							105	Firm-stiff brown slightly silty sandy CLAY with occasional rootlets and small pockets of silt and fine sand (London Clay Formation)
WS3	D	7	-	2.40		25.4							105	Stiff brown slightly silty sandy CLAY with some angular-subangular fine-coarse flint gravel and gravel size tabular fragments of siltstone (London Clay Formation)
WS3	D	8	-	2.90		27.7							105	Stiff-very stiff mottled brown with occasional grey mottling silty CLAY with occasional pockets of brown silt and fine sand (London Clay Formation)
WS3	D	9	-	3.40		28.5							105	Stiff-very stiff mottled brown with occasional grey mottling silty CLAY with occasional pockets of brown silt and fine sand (London Clay Formation)
WS3	D	10	-	3.90		28.6							105	Stiff-very stiff mottled brown with occasional grey mottling silty CLAY with occasional pockets of brown silt and fine sand (London Clay Formation)
WS5	D	3	-	0.90		21.7							105	Firm mottled brown with orange brown mottling slightly sandy CLAY with occasional angular-subangular fine-coarse flint gravel (Head Deposits?)

SUMMARY OF CLASSIFICATION TESTING

BS1377: Part 1 1990: Clause 7.3 and 7.4 and Part 2 1990: Clause 3.2, 4.4, 5 and 6.5

Project	Birchanger Road, South Norwood, SE25 5BA	Report number	16429GI
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Location	Sample type	Sample number	Depth - top (m)	Depth - base (m)	Material passing 425µm (%)	Moisture content (w %)	Plastic limit (wp %)	Liquid limit (wL %)	Plasticity index (IP %)	Linear shrinkage (LS %)	Particle density (Mg/m³)	Prep method	Drying temp (°C)	Description
WS5	D	4	-	1.40		27.0							105	Firm mottled brown with occasional grey mottling slightly sandy silty CLAY with occasional fine-coarse sand size selenite crystals (London Clay Formation)
WS5	D	5	-	1.90		25.9							105	Firm mottled brown with occasional grey mottling slightly sandy silty CLAY with occasional fine-coarse sand size selenite crystals (London Clay Formation)
WS6	D	4	-	1.40	99	33.2	24	73	49			Wet sieve	105	Firm brown slightly sandy silty CLAY with occasional fine-medium sand size selenite crystals and rare pockets of fine-medium sand (London Clay Formation)
WS6	D	5	-	1.90		28.3							105	Firm brown slightly sandy silty CLAY with occasional fine-medium sand size selenite crystals and rare pockets of fine-medium sand
WS6	D	6	-	2.40	100	25.8	19	51	32			Wet sieve	105	Firm brown slightly sandy silty CLAY with occasional fine-medium sand size selenite crystals and rare pockets of fine-medium sand (London Clay Formation)
WS6	D	7	-	2.90		26.3							105	Very stiff brown silty CLAY with occasional fine-coarse sand size selenite crystals and occasional pockets and partings of silt and fine sand (London Clay Formation)
WS6	D	8	-	3.40		23.1							105	Very stiff brown silty CLAY with occasional fine-coarse sand size selenite crystals and occasional pockets and partings of silt and fine sand (London Clay Formation)
WS6	D	9	-	3.90		27.0							105	Very stiff brown silty CLAY with occasional fine-coarse sand size selenite crystals and occasional pockets and partings of silt and fine sand (London Clay Formation)
WS7	D	4	-	1.90		27.8							105	Firm brown slightly sandy silty CLAY with occasional fine-medium sand size selenite crystals (London Clay Formation)
WS7	D	5	-	2.80		24.0							105	Stiff brown silty CLAY with occasional fine-medium sand size crystals and pockets and partings of brown and orange brown silt and fine sand (London Clay Formation)

SUMMARY OF CLASSIFICATION TESTING

BS1377: Part 1 1990: Clause 7.3 and 7.4 and Part 2 1990: Clause 3.2, 4.4, 5 and 6.5

Project	Birchanger Road, South Norwood, SE25 5BA	Report number	16429GI
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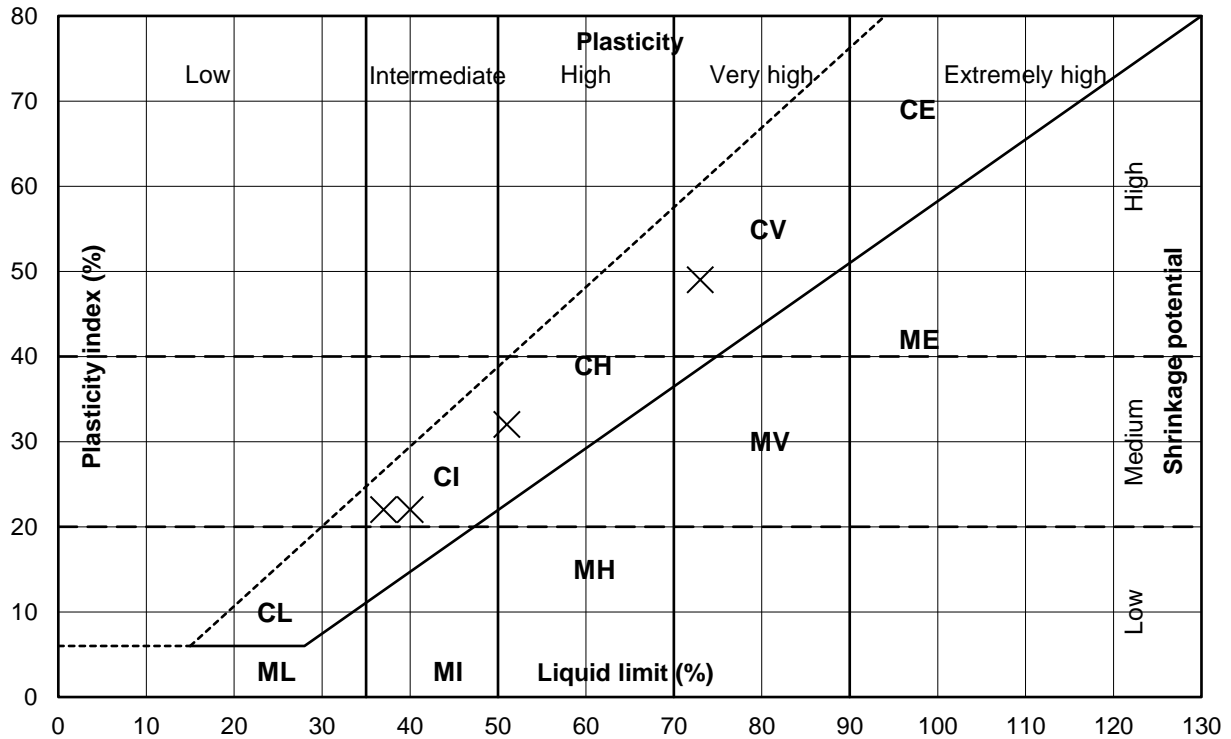
Location	Sample type	Sample number	Depth - top (m)	Depth - base (m)	Material passing 425µm (%)	Moisture content (w %)	Plastic limit (wp %)	Liquid limit (wL %)	Plasticity index (IP %)	Linear shrinkage (LS %)	Particle density (Mg/m³)	Prep method	Drying temp (°C)	Description
WS9	D	3	-	1.00		39.6							105	Firm brown silty CLAY with occasional roots to 1mm diameter (London Clay Formation)
WS9	D	4	-	1.40		26.9							105	Firm brown silty CLAY with occasional roots to 1mm diameter (London Clay Formation)
WS9	D	5	-	1.90		26.0							105	Firm brown silty sandy CLAY with occasional fine-medium sand size selenite crystals and many pockets and partings of brown and grey brown silt and fine-medium sand (London Clay Formation)

LABORATORY TEST RESULTS

PLASTICITY CHART

BS1377: Part 2: 1990: Clause 4.4 and 5

Project	Birchanger Road, South Norwood, SE25 5BA	Report number	16429GI
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COMMENTS

Shrinkage potential taken from NHBC Standards - Chapter 4.2, Clause 4.2 - D5, Table 1.
 Plasticity chart taken from BS5930: Clause 41, Figure 31.

HEADSPACE MONITORING RECORD SHEET

Type of Test: Photoionisation Detector (PID)

Date	Location	Sample Ref	Depth (m)	Volatile (ppm)
10/11/23	Stockpile A	D1	0.10	
		D2	0.15	
11/11/23	WS2	D1	0.20	<0.1
		D2	0.60	<0.1
		D3	0.90	<0.1
		D4	1.40	<0.1
		D5	1.90	<0.1
		D6	2.80	<0.1
	WS3	D1	0.20	<0.1
		D2	0.50	<0.1
		D3	0.75	<0.1
		D4	0.90	<0.1
		D5	1.40	<0.1
		D6	1.90	<0.1
		D7	2.40	<0.1
		D8	2.90	<0.1
		D9	3.40	<0.1
		D10	3.90	<0.1
	WS4	D1	0.20	<0.1
	WS4D	D1	0.30	<0.1
	WS5	D1	0.20	<0.1
		D2	0.50	0.3
		D3	0.90	<0.1
		D4	1.40	<0.1
		D5	1.90	<0.1
	WS6	D1	0.20	<0.1
		D2	0.60	<0.1
		D3	0.90	<0.1
D4		1.40	<0.1	
D5		1.90	<0.1	
D6		2.40	<0.1	
D7		2.90	<0.1	
D8		3.40	<0.1	
D9		3.90	<0.1	

Project

15-35 BIRCHANGER ROAD, SOUTH NORWOOD, SE25 5BA

Job No. 16429GI

Date NOVEMBER 2023

HEADSPACE MONITORING RECORD SHEET

Type of Test: Photoionisation Detector (PID)

Date	Location	Sample Ref	Depth (m)	Volatile (ppm)
11/11/23	WS7	D1	0.20	<0.1
		D2	1.20	<0.1
		D3	1.60	5.3
		D4	1.90	0.8
		D5	2.80	<0.1
	WS8	D1	0.20	<0.1
		D2	0.50	<0.1
		D3	0.90	<0.1
		D4	1.40	<0.1
		D5	1.90	<0.1
	WS9	D1	0.20	<0.1
		D2	0.70	<0.1
		D3	1.00	<0.1
		D4	1.40	<0.1
		D5	1.90	<0.1
	WS10	D1	0.20	<0.1
		D2	0.60	<0.1
		D3	0.90	<0.1
		D4	1.40	<0.1
		D5	1.90	<0.1

Project

15-35 BIRCHANGER ROAD, SOUTH NORWOOD, SE25 5BA

Job No. 16429GI

Date NOVEMBER 2023



Adrian Phillips
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Derwentside Environmental Testing Services Ltd
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Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-14098

Site Reference: Birchanquer Road, South Norwood SE25 5BA

Project / Job Ref: 16429GI

Order No: None Supplied

Sample Receipt Date: 15/11/2023

Sample Scheduled Date: 15/11/2023

Report Issue Number: 4

Reporting Date: 01/12/2023

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.
This report supersedes 23-14098, issue no.3.
Reason for reissue:

Data Summary sheet removed

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DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate						
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23	14/11/23	14/11/23	14/11/23
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Birchanger Road, South Norwood SE25 5BA	TP / BH No	WS2	WS3	WS4	WS5	WS6
Project / Job Ref: 16429GI	Additional Refs	D1	D2	D1	D1	D1
Order No: None Supplied	Depth (m)	0.20	0.50	0.20	0.20	0.20
Reporting Date: 01/12/2023	DETS Sample No	685670	685671	685672	685673	685674

Determinand	Unit	RL	Accreditation	14/11/23	14/11/23	14/11/23	14/11/23	14/11/23
Asbestos Screen ⁽⁵⁾	N/a	N/a	ISO17025	Not Detected	Detected	Detected	Detected	Detected
Sample Matrix ⁽⁵⁾	Material Type	N/a	NONE		insulation	insulation	Cement Insulation	Cement Insulation
Asbestos Type ⁽⁵⁾	PLM Result	N/a	ISO17025		Chrysotile	Chrysotile	Chrysotile	Chrysotile
pH	pH Units	N/a	MCERTS	7.4	7.3	7.5	7.1	7.4
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	2
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	74	105	37	204	123
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.07	0.10	0.04	0.20	0.12
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Organic Matter (SOM)	%	< 0.1	MCERTS	8.2	5.4	4.7	9.6	8.3
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	4.7	3.2	2.7	5.6	4.8
Arsenic (As)	mg/kg	< 2	MCERTS	24	16	17	54	48
Barium (Ba)	mg/kg	< 2.5	MCERTS	534	818	556	1040	1010
Beryllium (Be)	mg/kg	< 0.5	MCERTS	1.3	0.8	0.5	0.8	0.7
W/S Boron	mg/kg	< 1	NONE	1.2	< 1	< 1	< 1	4.6
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	9.4	1	2.7	11.4	6.7
Chromium (Cr)	mg/kg	< 2	MCERTS	25	20	22	71	64
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	174	243	308	437	730
Lead (Pb)	mg/kg	< 3	MCERTS	2960	2380	1310	3700	2050
Mercury (Hg)	mg/kg	< 1	MCERTS	1.6	< 1	< 1	1.1	1.8
Nickel (Ni)	mg/kg	< 3	MCERTS	33	17	26	134	85
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	52	26	24	47	43
Zinc (Zn)	mg/kg	< 3	MCERTS	4320	789	1130	10100	2980
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
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Tel : 01622 850410



Soil Analysis Certificate						
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23	14/11/23	14/11/23	14/11/23
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Birchanger Road, South Norwood SE25 5BA	TP / BH No	WS7	WS7	WS8	WS9	WS10
Project / Job Ref: 16429GI	Additional Refs	D1	D3	D2	D2	D2
Order No: None Supplied	Depth (m)	0.20	1.60	0.50	0.20	0.60
Reporting Date: 01/12/2023	DETS Sample No	685675	685676	685677	685678	685679

Determinand	Unit	RL	Accreditation	14/11/23	14/11/23	14/11/23	14/11/23
Asbestos Screen ⁽⁵⁾	N/a	N/a	ISO17025	Not Detected		Not Detected	Not Detected
Sample Matrix ⁽⁵⁾	Material Type	N/a	NONE				
Asbestos Type ⁽⁵⁾	PLM Result	N/a	ISO17025				
pH	pH Units	N/a	MCERTS	6.9		8.9	7.5
Total Cyanide	mg/kg	< 1	NONE	5		3	< 1
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	64		39	45
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.06		0.04	0.04
Elemental Sulphur	mg/kg	< 10	NONE	< 10		< 10	< 10
Organic Matter (SOM)	%	< 0.1	MCERTS	14.1		6.8	5.2
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	8.2		4	3
Arsenic (As)	mg/kg	< 2	MCERTS	16		6	20
Barium (Ba)	mg/kg	< 2.5	MCERTS	237		259	511
Beryllium (Be)	mg/kg	< 0.5	MCERTS	0.6		0.6	0.7
W/S Boron	mg/kg	< 1	NONE	< 1		< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	2.2		0.3	1.1
Chromium (Cr)	mg/kg	< 2	MCERTS	20		7	22
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	66		51	866
Lead (Pb)	mg/kg	< 3	MCERTS	747		681	3100
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	18		13	24
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	25		24	23
Zinc (Zn)	mg/kg	< 3	MCERTS	1240		363	1060
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 23-14098	Date Sampled	14/11/23				
RSA Geotechnics Ltd	Time Sampled	None Supplied				
Site Reference: Birchanger Road, South Norwood SE25 5BA	TP / BH No	WS10				
Project / Job Ref: 16429GI	Additional Refs	D3				
Order No: None Supplied	Depth (m)	0.90				
Reporting Date: 01/12/2023	DETS Sample No	685680				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ⁽⁵⁾	N/a	N/a	ISO17025				
Sample Matrix ⁽⁵⁾	Material Type	N/a	NONE				
Asbestos Type ⁽⁵⁾	PLM Result	N/a	ISO17025				
pH	pH Units	N/a	MCERTS				
Total Cyanide	mg/kg	< 1	NONE				
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS				
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS				
Elemental Sulphur	mg/kg	< 10	NONE				
Organic Matter (SOM)	%	< 0.1	MCERTS				
TOC (Total Organic Carbon)	%	< 0.1	MCERTS				
Arsenic (As)	mg/kg	< 2	MCERTS				
Barium (Ba)	mg/kg	< 2.5	MCERTS				
Beryllium (Be)	mg/kg	< 0.5	MCERTS				
W/S Boron	mg/kg	< 1	NONE				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS				
Chromium (Cr)	mg/kg	< 2	MCERTS				
Chromium (hexavalent)	mg/kg	< 2	NONE				
Copper (Cu)	mg/kg	< 4	MCERTS				
Lead (Pb)	mg/kg	< 3	MCERTS				
Mercury (Hg)	mg/kg	< 1	MCERTS				
Nickel (Ni)	mg/kg	< 3	MCERTS				
Selenium (Se)	mg/kg	< 2	MCERTS				
Vanadium (V)	mg/kg	< 1	MCERTS				
Zinc (Zn)	mg/kg	< 3	MCERTS				
Total Phenols (monohydric)	mg/kg	< 2	NONE				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23	14/11/23	14/11/23	14/11/23
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Birchanger Road, South	TP / BH No	WS2	WS3	WS4	WS5	WS6
Norwood SE25 5BA	Additional Refs	D1	D2	D1	D1	D1
Project / Job Ref: 16429GI	Depth (m)	0.20	0.50	0.20	0.20	0.20
Order No: None Supplied	DETS Sample No	685670	685671	685672	685673	685674
Reporting Date: 01/12/2023						

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	0.15	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	0.13	0.15	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	2.44	2.93	0.79	0.86	1.04
Anthracene	mg/kg	< 0.1	MCERTS	0.55	0.72	< 0.1	0.22	0.21
Fluoranthene	mg/kg	< 0.1	MCERTS	4.39	7.70	1.36	2.07	2.51
Pyrene	mg/kg	< 0.1	MCERTS	3.63	6.78	1.10	1.83	2.27
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	2.13	3.08	0.45	0.91	1.23
Chrysene	mg/kg	< 0.1	MCERTS	2.10	3.11	0.49	1.09	1.30
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	2.41	3.80	0.65	1.69	1.57
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.86	1.29	0.19	0.41	0.60
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.95	3.31	0.50	1.30	1.35
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.15	1.81	0.45	1	0.80
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.29	0.41	< 0.1	0.20	0.18
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.88	1.46	0.64	0.85	0.67
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	23.1	36.6	6.6	12.4	13.7



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23	14/11/23	14/11/23	
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Birchanger Road, South	TP / BH No	WS7	WS8	WS9	WS10	
Norwood SE25 5BA	Additional Refs	D1	D2	D2	D2	
Project / Job Ref: 16429GI	Depth (m)	0.20	0.50	0.20	0.60	
Order No: None Supplied	DETS Sample No	685675	685677	685678	685679	
Reporting Date: 01/12/2023						

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	0.13	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.19	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	0.31	0.12	0.17	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	7.08	2.69	1.77	0.91
Anthracene	mg/kg	< 0.1	MCERTS	1.12	0.51	0.43	0.22
Fluoranthene	mg/kg	< 0.1	MCERTS	11.80	5.48	2.13	2.90
Pyrene	mg/kg	< 0.1	MCERTS	9.47	4.45	1.83	2.69
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	3.74	1.87	0.79	1.46
Chrysene	mg/kg	< 0.1	MCERTS	3.61	2.10	0.88	1.45
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	3.45	2.12	0.93	1.87
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.34	0.86	0.41	0.80
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	2.96	1.90	0.80	1.63
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.51	0.99	0.54	1.02
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.34	0.24	0.13	0.25
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	1.18	0.83	0.46	0.81
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	48.2	24.2	11.6	16



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23	14/11/23	14/11/23	
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Birchanger Road, South Norwood SE25 5BA	TP / BH No	WS4	WS7	WS9	WS10	
Project / Job Ref: 16429GI	Additional Refs	D1	D3	D2	D3	
Order No: None Supplied	Depth (m)	0.20	1.60	0.20	0.90	
Reporting Date: 01/12/2023	DETS Sample No	685672	685676	685678	685680	

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	4	< 3	4	< 3
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	39	< 3	65	< 3
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	432	< 10	54	< 10
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	476	< 21	123	< 21
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	14	< 3	< 3	< 3
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	123	< 10	< 10	< 10
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	137	< 21	< 21	< 21
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	613	< 42	123	< 42



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23	14/11/23	14/11/23	
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Birchanger Road, South	TP / BH No	WS4	WS7	WS9	WS10	
Norwood SE25 5BA	Additional Refs	D1	D3	D2	D3	
Project / Job Ref: 16429GI	Depth (m)	0.20	1.60	0.20	0.90	
Order No: None Supplied	DETS Sample No	685672	685676	685678	685680	
Reporting Date: 01/12/2023						

Determinand	Unit	RL	Accreditation				
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - Volatile Organic Compounds (VOC)					
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Birchanger Road, South	TP / BH No	WS7	WS10		
Norwood SE25 5BA	Additional Refs	D3	D3		
Project / Job Ref: 16429GI	Depth (m)	1.60	0.90		
Order No: None Supplied	DETS Sample No	685676	685680		
Reporting Date: 01/12/2023					

Determinand	Unit	RL	Accreditation			
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	
TAME	ug/kg	< 5	MCERTS	< 5	< 5	
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2	
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	
1,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	



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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)					
DETS Report No: 23-14098	Date Sampled	14/11/23	14/11/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Birchanger Road, South	TP / BH No	WS7	WS10		
Norwood SE25 5BA	Additional Refs	D3	D3		
Project / Job Ref: 16429GI	Depth (m)	1.60	0.90		
Order No: None Supplied	DETS Sample No	685676	685680		
Reporting Date: 01/12/2023					

Determinand	Unit	RL	Accreditation				
Phenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
0-Cresol	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15		
Isophorone	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15		
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15		
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
4-Chloroaniline	mg/kg	< 0.15	NONE	< 0.15	< 0.15		
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Azobenzene	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
Carbazole	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1		
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15		
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-14098	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood SE25 5BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 01/12/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
685670	WS2	D1	0.20	13	Brown sandy clay with stones
685671	WS3	D2	0.50	15.6	Brown sandy clay with stones
685672	WS4	D1	0.20	13.9	Brown clayey sand with stones
685673	WS5	D1	0.20	13.1	Brown clayey sand with stones
685674	WS6	D1	0.20	14.8	Brown clayey sand with stones
685675	WS7	D1	0.20	27	Brown sandy clay with stones and brick
685676	WS7	D3	1.60	21.8	Brown clay
685677	WS8	D2	0.50	18.2	Brown clayey sand with stones and brick
685678	WS9	D2	0.20	13.6	Brown clayey sand with stones
685679	WS10	D2	0.60	6.6	Brown clayey sand with stones
685680	WS10	D3	0.90	17.4	Brown sandy clay with stones and brick

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{u/s}



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Tel : 01622 850410



Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 23-14098	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood SE25 5BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 01/12/2023	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCS	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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List of HWOL Acronyms and Operators
DETS Report No: 23-14098
RSA Geotechnics Ltd
Site Reference: Birchanger Road, South Norwood SE25 5BA
Project / Job Ref: 16429GI
Order No: None Supplied
Reporting Date: 01/12/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS



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DETS Report No: 23-14144

Site Reference: Birchanger Road, South Norwood, SE255BA

Project / Job Ref: 16429GI

Order No: None Supplied

Sample Receipt Date: 16/11/2023

Sample Scheduled Date: 16/11/2023

Report Issue Number: 1

Reporting Date: 22/11/2023

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 23-14144	Date Sampled	10/11/23	10/11/23	10/11/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Birchanger Road, South Norwood, SE255BA	TP / BH No	WS3	WS3	WS9		
Project / Job Ref: 16429GI	Additional Refs	5	8	5		
Order No: None Supplied	Depth (m)	1.40	2.90	1.90		
Reporting Date: 22/11/2023	DETS Sample No	685876	685877	685878		

Determinand	Unit	RL	Accreditation			
pH	pH Units	N/a	MCERTS	7.1	7.4	7.6
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	2530	162	149
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	2.53	0.16	0.15

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-14144	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood, SE255BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 22/11/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
685876	WS3	5	1.40	19.6	Brown clay
685877	WS3	8	2.90	16.8	Brown clay
685878	WS9	5	1.90	17.7	Brown clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{U/5}

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-14144

RSA Geotechnics Ltd

Site Reference: Birchanger Road, South Norwood, SE255BA

Project / Job Ref: 16429GI

Order No: None Supplied

Reporting Date: 22/11/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCS	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

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AR As Received



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List of HWOL Acronyms and Operators

DETS Report No: 23-14144
RSA Geotechnics Ltd
Site Reference: Birchanger Road, South Norwood, SE255BA
Project / Job Ref: 16429GI
Order No: None Supplied
Reporting Date: 22/11/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
~	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym



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DETS Report No: 23-14214

Site Reference: Birchanquer Road, South Norwood, SE25 5BA

Project / Job Ref: 16429GI

Order No: None Supplied

Sample Receipt Date: 17/11/2023

Sample Scheduled Date: 17/11/2023

Report Issue Number: 1

Reporting Date: 23/11/2023

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 23-14214	Date Sampled	10/11/23	09/11/23	09/11/23		
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Birchanger Road, South Norwood, SE25 5BA	TP / BH No	WS2	WS5	WS6		
Project / Job Ref: 16429GI	Additional Refs	D6	D4	D5		
Order No: None Supplied	Depth (m)	2.80	1.40	1.90		
Reporting Date: 23/11/2023	DETS Sample No	686211	686212	686213		

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	MCERTS	7.5	7.4	7.1	
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	6902	1183	762	
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.69	0.12	0.08	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	2110	444	470	
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	2.11	0.44	0.47	
Total Sulphur	%	< 0.02	NONE	0.27	0.03	0.03	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-14214	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood, SE25 5BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 23/11/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
686211	WS2	D6	2.80	17.6	Brown clay
686212	WS5	D4	1.40	19.1	Brown clay
686213	WS6	D5	1.90	20.1	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{U/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 23-14214	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood, SE25 5BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 23/11/2023	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCS	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

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List of HWOL Acronyms and Operators
DETS Report No: 23-14214
RSA Geotechnics Ltd
Site Reference: Birchanger Road, South Norwood, SE25 5BA
Project / Job Ref: 16429GI
Order No: None Supplied
Reporting Date: 23/11/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total
	Det - Acronym



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DETS Report No: 23-14350

Site Reference: Birchanqer Road, South Norwood SE25 5BA

Project / Job Ref: 16429GI

Order No: None Supplied

Sample Receipt Date: 22/11/2023

Sample Scheduled Date: 22/11/2023

Report Issue Number: 1

Reporting Date: 29/11/2023

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3									
DETS Report No: 23-14350	Date Sampled	None Supplied		Landfill Waste Acceptance Criteria Limits					
RSA Geotechnics Ltd	Time Sampled	None Supplied							
Site Reference: Birchanger Road, South Norwood SE25 5BA	TP / BH No	WS3+WS4+WS10							
Project / Job Ref: 16429GI	Additional Refs	2+1+2							
Order No: None Supplied	Depth (m)	0.50 - 0.20 - 0.60							
Reporting Date: 29/11/2023	DETS Sample No	686719							
Determinand	Unit	MDL							
TOC ^{MU}	%	< 0.1	1.1			3%	5%	6%	
Loss on Ignition ^{MU}	%	< 0.01	1.48			--	--	10%	
BTEX ^{MU}	mg/kg	< 0.05	< 0.05			6	--	--	
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--	
Mineral Oil ^{MU}	mg/kg	< 10	211			500	--	--	
Total PAH ^{MU}	mg/kg	< 1.7	22.9			100	--	--	
pH ^{MU}	pH Units	N/a	8.1			--	>6	--	
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.2			--	To be evaluated	To be evaluated	
Eluate Analysis			2:1 mg/l	8:1 mg/l	Cumulative 10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
Arsenic ^U		0.0023	0.0035		0.062	0.5	2	25	
Barium ^U		0.0561	0.0539		0.978	20	100	300	
Cadmium ^U		< 0.0002	< 0.0002		< 0.002	0.04	1	5	
Chromium ^U		0.0126	0.0118		0.214	0.5	10	70	
Copper ^U		0.0056	0.0070		0.126	2	50	100	
Mercury ^U		0.00004	0.00004		0.0008	0.01	0.2	2	
Molybdenum ^U		0.0119	0.0040		0.079	0.5	10	30	
Nickel ^U		0.0011	0.0008		0.0142	0.4	10	40	
Lead ^U		0.0073	0.0368		0.639	0.5	10	50	
Antimony ^U		< 0.0002	< 0.0002		< 0.002	0.06	0.7	5	
Selenium ^U		0.0011	0.0005		0.0093	0.1	0.5	7	
Zinc ^U		0.051	0.020		0.40	4	50	200	
Chloride ^U		6	1		25	800	15000	25000	
Fluoride ^U		0.8	< 0.5		< 1	10	150	500	
Sulphate ^U		27	6		125	1000	20000	50000	
TDS		135	61		1174	4000	60000	100000	
Phenol Index ^U		< 0.01	< 0.01		< 0.5	1	-	-	
DOC ^U		12.4	9.9		181	500	800	1000	
Leach Test Information									
Sample Mass (kg)		0.09							
Dry Matter (%)		95							
Moisture (%)		5.4							
Stage 1									
Volume Eluate L2 (litres)		0.17							
Filtered Eluate VE1 (litres)		0.08							
Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion									
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation									
M Denotes MCERTS accredited test									
U Denotes ISO17025 accredited test									

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3								
DETS Report No: 23-14350		Date Sampled	None Supplied		Landfill Waste Acceptance Criteria Limits			
RSA Geotechnics Ltd		Time Sampled	None Supplied					
Site Reference: Birchanger Road, South Norwood SE25 5BA		TP / BH No	WS6+WS7+WS8					
Project / Job Ref: 16429GI		Additional Refs	1+1+2					
Order No: None Supplied		Depth (m)	0.20 - 0.20 - 0.50					
Reporting Date: 29/11/2023		DETS Sample No	686720					
Determinand	Unit	MDL		Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill		
TOC ^{MU}	%	< 0.1	2.6	3%	5%	6%		
Loss on Ignition ^{MU}	%	< 0.01	6.66	--	--	10%		
BTEX ^{MU}	mg/kg	< 0.05	< 0.05	6	--	--		
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--		
Mineral Oil ^{MU}	mg/kg	< 10	< 10	500	--	--		
Total PAH ^{MU}	mg/kg	< 1.7	9.4	100	--	--		
pH ^{MU}	pH Units	N/a	7.8	--	>6	--		
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1	--	To be evaluated	To be evaluated		
Eluate Analysis			2:1 mg/l	8:1 mg/l	Cumulative 10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic ^U		0.0005	< 0.0002		0.003	0.5	2	25
Barium ^U		0.0561	0.0431		0.787	20	100	300
Cadmium ^U		< 0.0002	< 0.0002		< 0.002	0.04	1	5
Chromium ^U		0.0009	0.0004		0.007	0.5	10	70
Copper ^U		0.0055	0.0050		0.091	2	50	100
Mercury ^U		< 0.00004	< 0.00004		< 0.0004	0.01	0.2	2
Molybdenum ^U		0.0052	0.0030		0.056	0.5	10	30
Nickel ^U		0.0009	0.0004		0.0067	0.4	10	40
Lead ^U		0.0135	0.0060		0.113	0.5	10	50
Antimony ^U		< 0.0002	< 0.0002		< 0.002	0.06	0.7	5
Selenium ^U		0.0003	< 0.0002		0.0015	0.1	0.5	7
Zinc ^U		0.020	0.020		0.37	4	50	200
Chloride ^U		7	5		91	800	15000	25000
Fluoride ^U		< 0.5	< 0.5		< 1	10	150	500
Sulphate ^U		19	8		143	1000	20000	50000
TDS		101	64		1179	4000	60000	100000
Phenol Index ^U		< 0.01	< 0.01		< 0.5	1	-	-
DOC ^U		9.3	11.5		207	500	800	1000
Leach Test Information								
Sample Mass (kg)			0.11					
Dry Matter (%)			82.1					
Moisture (%)			21.8					
Stage 1								
Volume Eluate L2 (litres)			0.16					
Filtered Eluate VE1 (litres)			0.05					
Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion								
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation								
M Denotes MCERTS accredited test								
U Denotes ISO17025 accredited test								



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-14350	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood SE25 5BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 29/11/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 686719	WS3+WS4+WS10	2+1+2	50 - 0.20 - 0.60	4.5	Brown gravelly sand with stones and concrete
^ 686720	WS6+WS7+WS8	1+1+2	20 - 0.20 - 0.50	17.5	Brown sandy gravel with stones and brick

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{U/S}

^ no sampling date provided; unable to confirm if samples are within acceptable holding times



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 23-14350	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood SE25 5BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 29/11/2023	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCS	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

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4480

Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-14350
RSA Geotechnics Ltd
Site Reference: Birchanger Road, South Norwood SE25 5BA
Project / Job Ref: 16429GI
Order No: None Supplied
Reporting Date: 29/11/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered



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List of HWOL Acronyms and Operators
DETS Report No: 23-14350
RSA Geotechnics Ltd
Site Reference: Birchanger Road, South Norwood SE25 5BA
Project / Job Ref: 16429GI
Order No: None Supplied
Reporting Date: 29/11/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Mineral Oil (C10 - C40) (BS EN 12457-3) - EH_CU_1D_AL
Total BTEX (BS EN 12457-3) - HS_1D_MS_Total

Parameter	Matrix Type	Suite Reference	Expanded Uncertainty Measurement	Unit
TOC	Soil	BS EN 12457	10.4	%
Loss on Ignition	Soil	BS EN 12457	16.9	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	21.1	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	17.9	%
pH	Soil	BS EN 12457	0.282	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	19.5	%
Barium	Leachate	BS EN 12457	12.2	%
Cadmium	Leachate	BS EN 12457	17.2	%
Chromium	Leachate	BS EN 12457	20.7	%
Copper	Leachate	BS EN 12457	14.1	%
Mercury	Leachate	BS EN 12457	16.7	%
Molybdenum	Leachate	BS EN 12457	13.3	%
Nickel	Leachate	BS EN 12457	14.0	%
Lead	Leachate	BS EN 12457	12.1	%
Antimony	Leachate	BS EN 12457	16.1	%
Selenium	Leachate	BS EN 12457	15.5	%
Zinc	Leachate	BS EN 12457	14.0	%
Chloride	Leachate	BS EN 12457	15.7	%
Fluoride	Leachate	BS EN 12457	19.1	%
Sulphate	Leachate	BS EN 12457	27.6	%
TDS	Leachate	BS EN 12457	10.0	%
Phenol Index	Leachate	BS EN 12457	12.9	%
DOC	Leachate	BS EN 12457	20.4	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	16.9	%
pH	Soil	BS 3882: 2015	0.282	Units
Carbonate	Soil	BS 3882: 2015	12.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	19.8	%
Copper	Soil	BS 3882: 2015	23.2	%
Nickel	Soil	BS 3882: 2015	32.6	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%



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DETS Report No: 23-14369

Site Reference: Birchanquer Road, South Norwood SE25 5BA

Project / Job Ref: 16429GI

Order No: None Supplied

Sample Receipt Date: 15/11/2023

Sample Scheduled Date: 23/11/2023

Report Issue Number: 1

Reporting Date: 29/11/2023

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



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4480

Soil Analysis Certificate					
DETS Report No: 23-14369	Date Sampled	14/11/23	14/11/23	14/11/23	14/11/23
RSA Geotechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Birchanger Road, South Norwood SE25 5BA	TP / BH No	WS3	WS4	WS5	WS6
Project / Job Ref: 16429G1	Additional Refs	D2	D1	D1	D1
Order No: None Supplied	Depth (m)	0.50	0.20	0.20	0.20
Reporting Date: 29/11/2023	DETS Sample No	686840	686841	686842	686843

Determinand	Unit	RL	Accreditation				
Asbestos Quantification ^(S)	%	< 0.001	ISO17025	0.002	0.001	1.660	4.370

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 23-14369	
RSA Geotechnics Ltd	
Site Reference: Birchanger Road, South Norwood SE25 5BA	
Project / Job Ref: 16429GI	
Order No: None Supplied	
Reporting Date: 29/11/2023	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCS	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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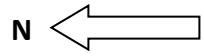


4480

List of HWOL Acronyms and Operators
DETS Report No: 23-14369
RSA Geotechnics Ltd
Site Reference: Birchanger Road, South Norwood SE25 5BA
Project / Job Ref: 16429GI
Order No: None Supplied
Reporting Date: 29/11/2023

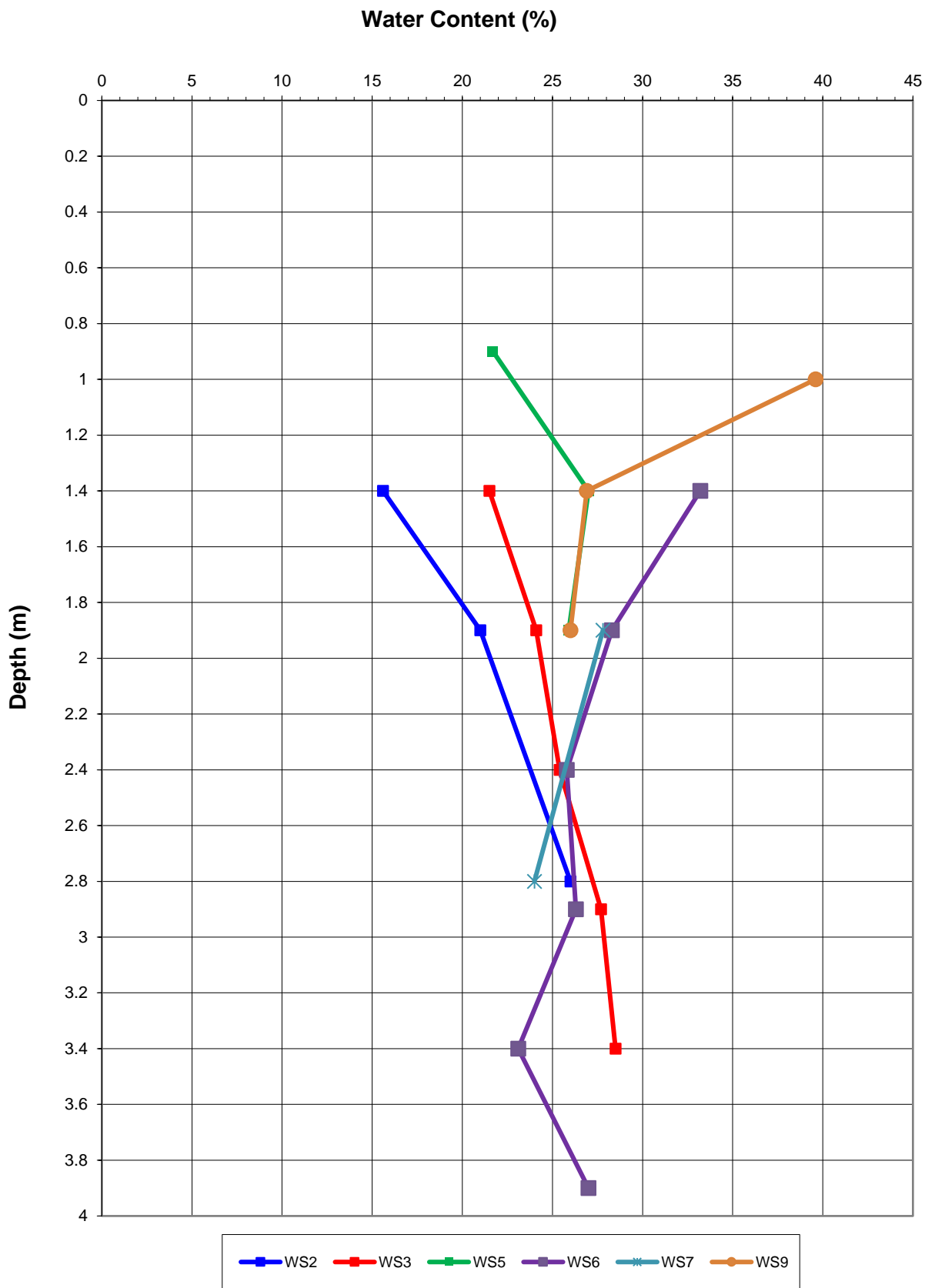
Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

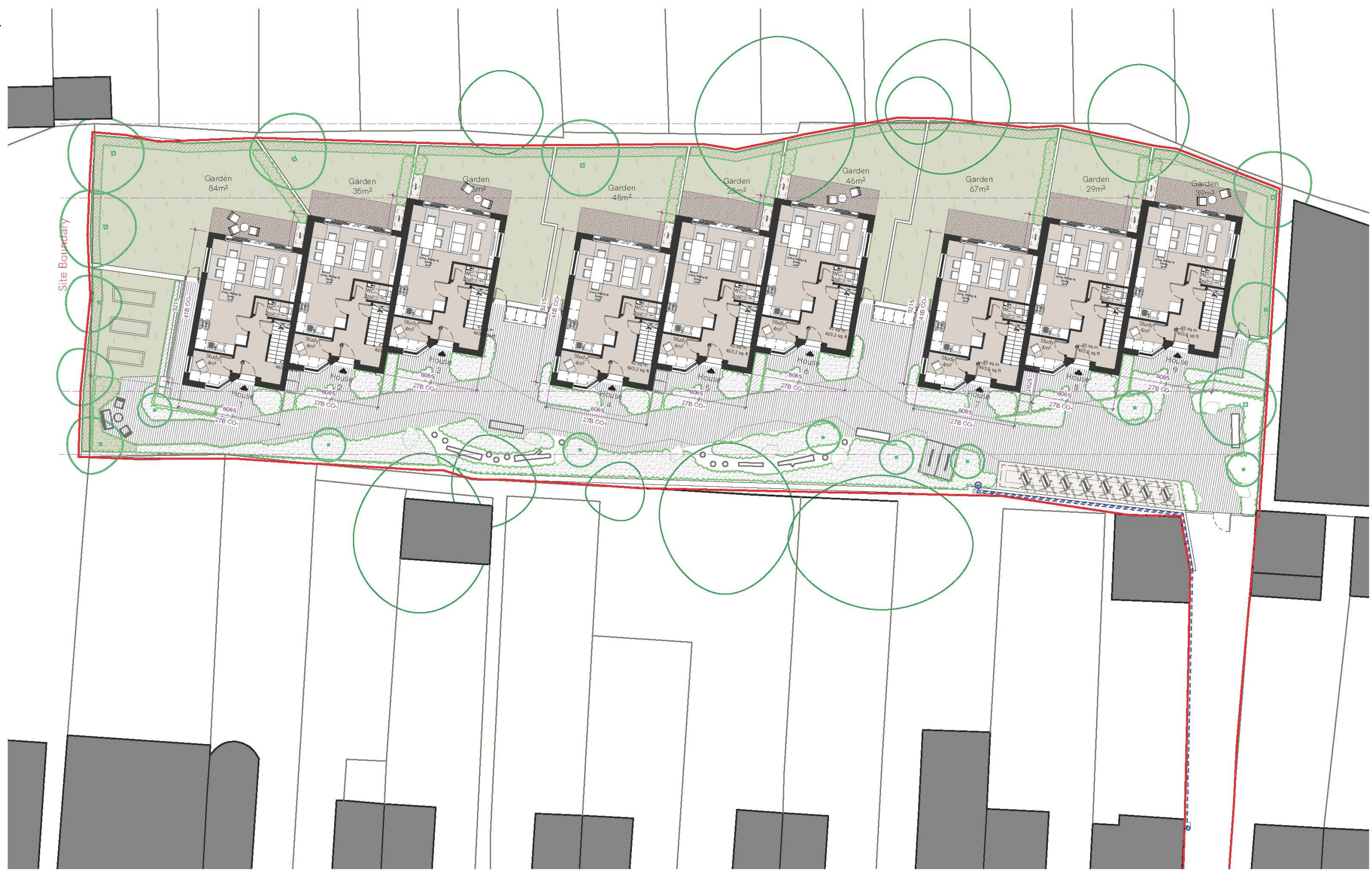
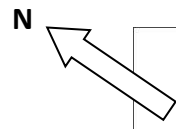
Det - Acronym



EXPLORATORY HOLE LOCATION PLAN (Based upon drawing supplied by others) 15-35 BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA	NOTE: All locations are approximate Date 29 NOVEMBER 2023
	Scale NOT TO SCALE
RSA GEOTECHNICS LIMITED	Drawing No 16429GI/1 Version A

Water Content vs Depth Plot





PROPOSED DEVELOPMENT LAYOUT (Based upon GPAD drawing number 797-PL-100-P1) 15-35 BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA	NOTE: All locations are approximate Date 29 NOVEMBER 2023
	Scale NOT TO SCALE
	Drawing No 16429GI/3 Version A

RSA GEOTECHNICS LIMITED

APPENDIX 1

Fieldwork methodology

FIELDWORK METHODOLOGY

The fieldwork for the investigation was carried out generally in accordance with BS 5930: 2015+A1:2020 'Code of Practice for Ground Investigations' and the contamination sampling was carried out generally in accordance with BS 10175: 2011+A2: 2017, 'Investigation of Potentially Contaminated Sites – Code of Practice'.

Window Sampling

The window sampling was carried out using a small, track mounted, soil sampling rig which utilised a sliding hammer to drive steel tubes into the ground and hydraulic rams to extract them. Each of the window sample tubes recovered a core of soil from the ground. Representative samples were taken from the core at approximately 0.5 m intervals, for material identification and testing purposes, and sealed into suitable containers to prevent deterioration or moisture content loss. The soils encountered were logged on site by an experienced geotechnician. Hand shear vane tests were undertaken in cohesive soils.

APPENDIX 2

Risk assessment methodology and legislative background,
Risk classification system; Published guidelines

RISK ASSESSMENT METHODOLOGY AND LEGISLATIVE BACKGROUND

The legislative document regarding land contamination is the 1995 Environment Act. Forming Part 2A of the Environmental Protection Act of 1990, this act created the framework for the identification and remediation of contaminated land. It established the Environment Agency as the overall National Enforcement Agency, with regional control provided by the Local Authorities.

This Act defines “contaminated land” as any land which appears by the Local Authority to be “in such a condition, by reason of substances, in, on or under the land that:

- significant harm is being caused or there is significant possibility of such harm being caused; or*
- significant pollution of Controlled Waters is being caused, or there is significant possibility of such harm being caused.”*

The Act is supported by other key guidance including BS10175, 2011+A2:2017 and the National Planning Policy Framework, 2019. In relation to regulatory intervention (Part 2A) and ‘voluntary’ investigation (including redevelopment of sites which may be affected by contamination), the Model Procedures (CLR-11, Environment Agency 2004) provided a generic framework indicating key technical activities applicable in each of those contexts; these have been replaced by the online guidance Land Contamination Risk Management (LCRM) from GOV.UK. The management of land contamination broadly comprises three components, which are identified as ‘Risk Assessment’, ‘Options Appraisal’ and ‘Implementation’. These in turn determine if any unacceptable risks exist, ascertain the most appropriate remediation strategy for the site and demonstrate that the strategy will be effective.

In accordance with this and other current guidance, where a ‘land quality’ risk assessment is required each ‘Relevant Pollutant Linkage’ (formerly referred to as ‘source-pathway-receptor’ framework), is separately identified and a level of risk attached. The risk assessment takes account of the local environment, end user behaviour patterns and the nature of the development in relation to proven ‘unacceptable’ risk. This is the approach supported by current guidance and therefore has been adopted in the assessment of this site.

The guidance requires a Phase 1 investigation or desk study to be undertaken as the first stage of the risk assessment. This derives potential sources, pathways and receptors for the site taking into account the proposed end use. It results in the generation of potential pollutant linkages which are documented in the form of an ‘Outline Conceptual Model’. This is then used to direct and target a Phase 2 or intrusive investigation, if deemed necessary.

In order to classify the anticipated risk associated with the proposed development the classification system defined in Table A has been adopted (from CIRIA C552). The level of risk was determined by the product of the potential consequence (minor, mild, medium, severe) of the contaminant hazard and probability of it occurring (unlikely, low likelihood, likely, high likelihood). A risk level has been assigned to each possible pollutant linkage in accordance with Table B.

Table A – Definitions of consequence, probability and risk ratings	
Potential consequence	
<i>Term</i>	<i>Description</i>
Severe	Short term (acute) risk to human health likely to result in ‘significant harm’ as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short-term risk to an ecosystem or organism forming part of that ecosystem.
Medium	Chronic damage to human health, or pollution of sensitive water resources, significant changes in an ecosystem or organism forming part of that ecosystem.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, building structures and services. Damage to sensitive buildings, structures, or the environment.
Minor	Harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.
Probability	
Highly likely	The event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	It is probable that an event will occur, or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	Circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term.
Unlikely	Circumstances are such that it is improbable the event would occur even in the long term.
Risk rating	
<i>Term</i>	<i>Description</i>
Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
High risk	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
Moderate risk	It is possible that without appropriate remedial action harm could arise to a designated receptor but it is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild.
Low risk	It is possible that harm could arise to a designated receptor from an identified hazard but is likely that at worst, this harm if realised would normally be mild.
Very Low/ Negligible risk	The presence of an identified hazard does not give rise to the potential to cause significant harm to a designated receptor.

Table B – Risk Matrix		Consequence			
		<i>Severe</i>	<i>Medium</i>	<i>Mild</i>	<i>Minor</i>
<i>Probability</i>	<i>Highly Likely</i>	Very High	High	Moderate	Moderate/Low
	<i>Likely</i>	High	Moderate	Moderate/Low	Low
	<i>Low Likelihood</i>	Moderate	Moderate/Low	Low	Very Low/Negligible
	<i>Unlikely</i>	Moderate/Low	Low	Very Low/Negligible	Very Low/Negligible

The outcome of the intrusive investigation and subsequent 'land quality' risk assessment is the establishment of plausible relevant pollutant linkages shown in the form of a 'Refined Conceptual Model'. This is then used to determine the need for further investigation, or remediation to appropriately mitigate any determined unacceptable risks.

In accordance with the Model Procedures and Regulatory preference, detailed remedial measures should be provided in a separate report to the investigation and risk assessment generally referred to as a Remediation Method Statement (RMS).

The National Planning Policy Framework (NPPF) places responsibility with the Applicant and Developer to ensure that the land and development is suitable for the proposed purpose, and that unacceptable risks have been suitably mitigated.

Human Health Generic Risk Assessment

Generic risk assessment includes the comparison of concentrations of determinands measured in site soils with 'Tier 1' screening values derived from reference to current guidance, principally comprising Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) 'Suitable for Use Levels (S4ULs) 2015, Defra Category 4 Screening Levels (C4SL) 2014 and CL:AIRE Generic Assessment Criteria (GAC) values 2010. Reference may be made to other sources where considered appropriate, including non-UK sources where no screening values are readily available, such as the USEPA Regional Screening Levels (RSLs).

Screening values must be appropriate to the site setting and/or proposals for development. 'Default' generic categories include 'Residential with home-grown produce'; 'Residential without home-grown produce'; 'Allotment'; 'Commercial'; 'Public Open Space_{residential}'; and 'Public Open Space_{park}'.

Generic screening values considered appropriate to the development proposals for the subject site have been tabulated and included within this section, together with their source.

For some projects it may be appropriate to derive site specific screening values using the Environment Agency Contaminated Land Exposure Assessment (CLEA) model or other tools, to more appropriately reflect site conditions, receptors and the context of exposure.

Screening values for organic determinands can be sensitive to the soil organic matter content and this is taken into account in their derivation.

The assessment of cumulative risk to human health from total petroleum hydrocarbons is undertaken through Hazard Index calculation based on the methodology of the EA 'UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils', Science Report P5-080/TR3. Hazard Indices greater than one typically require remedial action or further consideration.

Groundwater Risk Assessment

Generic assessment criteria for groundwater are principally derived from reference to Environmental Quality Standards or Drinking Water Standards, as appropriate for the site environs, or in the absence of such values from other sources as considered appropriate. Modelling of the fate and transport of

contaminants in soil or groundwater and their potential effects on Controlled Waters may be appropriate depending on the sensitivity of the site setting.

Asbestos

There are currently no generic assessment criteria concentrations for asbestos in soils however industry guidance is contained within CIRIA C733 and CAR-SOIL 2012 (2016). It is recognised that the risk is proportional to the potential for fibre release, with a lower risk from asbestos in bonded form, in damp conditions and at low (trace) concentrations. The type of asbestos is also important, with blue asbestos (crocidolite) generally considered two orders of magnitude more hazardous than white asbestos (chrysotile), and brown asbestos (amosite) being in between. The current approach is to reduce exposure to asbestos as far as practically possible, both during siteworks and post-development. This is typically achieved through removal or the provision of a suitable break in pathway between source and receptor.

Ground Gas

Guidance with respect to risk assessment and protective measures for ground gases is contained within CIRIA C665, 2007 'Assessing risks posed by hazardous ground gases to buildings'; the Ground Gas Handbook, 2009; BS8485: 2015+A1:2019, 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CL:AIRE Research Bulletin 'A Pragmatic Approach to Ground Gas Risk Assessment' (RB 17, 2012). Gas Screening Values are calculated using the recorded concentrations of methane and carbon dioxide from borehole well monitoring together with the flow rate from the borehole installations, to categorise the site with respect to the typical ground gas precautions anticipated to mitigate unacceptable risks.

Buried Concrete

The potential risk to buried concrete is assessed with reference to the guidance of BRE Special Digest 1 (SD-1), 2005, 'Concrete in Aggressive Ground'. This publication attributes a Design Sulphate Class and an Aggressive Chemical Environment for Concrete (ACEC) Class for the site under consideration, based upon the nature of the site, sulphate concentrations, pH values and mobility of groundwater.

Potable Water Pipes

Guidance on the selection of potable water supply pipework is contained within the UK Water Industry Research (UKWIR) report reference 10/WM/0321, 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites', and this has been adopted by a number of water authorities. The report recommends specific investigation of the proposed pipeline route and level, with laboratory analysis and associated risk assessment to determine the specification for the pipework, once the proposed route and level is confirmed.

Vegetation

Nickel, copper and zinc are phytotoxic and could therefore inhibit plant growth or establishment. In order to assess the risk posed to vegetation on site from these potentially phytotoxic contaminants the concentrations of copper, zinc and nickel are compared against values given in the British Standard BS 3882: 2015, 'Specification for topsoil', taking into account the typical pH of the site soils.

PUBLISHED GUIDELINES

- i) *Land Contamination Risk Management (LCRM), GOV.UK*
- ii) *Contaminated Land Statutory Guidance, DEFRA, 2012*
- iii) *CIRIA C552 – Contaminated Land Risk Assessment: A Guide to Good Practice, 2001*
- iv) *BS10175:2011+A2:2017 Investigation of potentially contaminated sites, code of practice*
- v) *LQM-CIEH Suitable for Use Levels (S4ULs) for Human Health Risk Assessment, 2015 (Publication Number S4UL3364)*
- vi) *EIC/AGS/CL:AIRE - Soil Generic Assessment Criteria for Human Health Risk Assessment, 2010*
- vii) *Category 4 Screening Levels (C4SL) – DEFRA 2014*
- viii) *The Water Supply (Water Quality) Regulations 2018 – Drinking Water Standards*
- ix) *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017*
- x) *Environmental Quality Standards (EQS) for freshwaters; estuaries and coastal waters; specific pollutants; operational EQS; priority hazardous substances; priority substances and other pollutants*
- xi) *CL:AIRE – ‘Guidance on Comparing Soil Contamination Data with a Critical Concentration’, 2008*
- xii) *Environment Agency Technical Advice to Third Parties on Pollution of Controlled Waters for Part 2A, Version 2, 2002*
- xiii) *BRE Special Digest 1, ‘Concrete in Aggressive Ground’, 2005*
- xiv) *UK Water Industry Research ‘Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites’ Report Ref. No. 10/WM/03/21, 2011*
- xv) *BS 3882: 2015, ‘Specification for topsoil’ & BS8601:2013, ‘Specification for subsoil and requirements for use’*
- xvi) *CIRIA C665 ‘Assessing risks posed by hazardous ground gases to buildings’, 2007*
- xvii) *Environment Agency ‘Guidance on the classification and assessment of waste’ Technical Guidance WM3, 2021, (Version 1.2 GB), October 2021*
- xviii) *Environment Agency ‘Soil Guideline Values for dioxins furans and dioxin-like PCBs in soil’ Science Report SC050021, 2009*
- xix) *United States Environmental Protection Agency (USEPA) – Regional Screening Values, 2022*
- xx) *Health Protection Agency ‘Indicative Atlas of Radon’, 2007*
- xxi) *BRE 211 ‘Radon: Protective Measures for New Buildings’, 2015*
- xxii) *Water UK ‘Contaminated Land Assessment Guidance’ 2014*
- xxiii) *BS 8485:2015+A1:2019, ‘Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings’*

- xxiv) *CL:AIRE Research Bulletin 17 'A Pragmatic Approach to Ground Gas Risk Assessment', 2012*
- xxv) *CIRIA C733: 'Asbestos in soil and made ground: a guide to understanding and managing risks', 2014*
- xxvi) *CIRIA 765: 'Asbestos in soil and made ground: good practice site guide; 2017*
- xxvii) *AGS 'Assessment and control of asbestos risk in soil', 2021.*

APPENDIX 3

Screening values for residential development

GENERIC SCREENING VALUES ADOPTED IN THE ASSESSMENT

HUMAN HEALTH SCREENING VALUES

Table 1 – Soil Screening Values, Residential with Homegrown Produce End Use

Determinand	Screening Value (mg/kg)			Source
	<i>Soil Organic Matter Content</i>			
	1%	2.5%	6%	
Arsenic	37	37	37	LQM/CIEH 2015
Barium	1300*	1300*	1300*	CL:AIRE GAC 2010
Beryllium	1.7	1.7	1.7	LQM/CIEH 2015
Boron	290	290	290	LQM/CIEH 2015
Cadmium	11	11	11	LQM/CIEH 2015
Chromium (III)	910	910	910	LQM/CIEH 2015
Chromium (VI)	6	6	6	LQM/CIEH 2015
Copper	2400	2400	2400	LQM/CIEH 2015
Lead	200	200	200	DEFRA 2014
Mercury	40	40	40	LQM/CIEH 2015
Nickel	130	130	130	LQM/CIEH 2015
Selenium	250	250	250	LQM/CIEH 2015
Vanadium	410	410	410	LQM/CIEH 2015
Zinc	3700	3700	3700	LQM/CIEH 2015
Cyanide	34	34	34	ATRISK SOIL
Phenol	120	200	380	LQM/CIEH 2015**
Benzene	0.087	0.17	0.37	LQM/CIEH 2015**
Toluene	130	290	660	LQM/CIEH 2015**
Ethylbenzene	47	110	260	LQM/CIEH 2015**
Xylenes	56	130	310	LQM/CIEH 2015**
MTBE	49	84	160	CL:AIRE GAC 2010
TPH CWG - Aliphatic >C5-C6	42	78	160	LQM/CIEH 2015**
TPH CWG - Aliphatic >C6-C8	100	230	530	LQM/CIEH 2015**
TPH CWG - Aliphatic >C8-C10	27	65	150	LQM/CIEH 2015**
TPH CWG - Aliphatic >C10-C12	130	330	760	LQM/CIEH 2015**
TPH CWG - Aliphatic >C12-C16	1100	2400	4300	LQM/CIEH 2015**
TPH CWG - Aliphatic >C16-C35	65000	92000	110000	LQM/CIEH 2015**
TPH CWG - Aliphatic >C35-C44	65000	92000	110000	LQM/CIEH 2015**
TPH CWG - Aromatic >C5-C7	70	140	300	LQM/CIEH 2015**
TPH CWG - Aromatic >C7-C8	130	290	660	LQM/CIEH 2015**
TPH CWG - Aromatic >C8-C10	34	83	190	LQM/CIEH 2015**
TPH CWG - Aromatic >C10-C12	74	180	380	LQM/CIEH 2015**
TPH CWG - Aromatic >C12-C16	140	330	660	LQM/CIEH 2015**
TPH CWG - Aromatic >C16-C21	260	540	930	LQM/CIEH 2015**
TPH CWG - Aromatic >C21-C35	1100	1500	1700	LQM/CIEH 2015**
TPH CWG - Aromatic >C35-C44	1100	1500	1700	LQM/CIEH 2015**

Table 1 – Soil Screening Values, Residential with Homegrown Produce End Use continued

Determinand	Screening Value (mg/kg)			Source
	<i>Soil Organic Matter Content</i>			
	1%	2.5%	6%	
Naphthalene	2.3	5.6	13	LQM/CIEH 2015**
Acenaphthylene	170	420	920	LQM/CIEH 2015**
Acenaphthene	210	510	1100	LQM/CIEH 2015**
Fluorene	170	400	860	LQM/CIEH 2015**
Phenanthrene	95	220	440	LQM/CIEH 2015**
Anthracene	2400	5400	11000	LQM/CIEH 2015**
Fluoranthene	280	560	890	LQM/CIEH 2015**
Pyrene	620	1200	2000	LQM/CIEH 2015**
Benzo(a)anthracene	7.2	11	13	LQM/CIEH 2015**
Chrysene	15	22	27	LQM/CIEH 2015**
Benzo(b)fluoranthene	2.6	3.3	3.7	LQM/CIEH 2015**
Benzo(k)fluoranthene	77	93	100	LQM/CIEH 2015**
Benzo(a)pyrene	2.2	2.7	3.0	LQM/CIEH 2015**
Indeno(1,2,3-cd)pyrene	27	36	41	LQM/CIEH 2015**
Di-benzo(a,h)anthracene	0.24	0.28	0.3	LQM/CIEH 2015**
Benzo(g,h,i)perylene	320	340	350	LQM/CIEH 2015**
Chloromethane	0.0083	0.0098	0.013	CL:AIRE GAC 2010
Chloroethane	8.3	11	18	CL:AIRE GAC 2010
Vinyl Chloride	0.00064	0.00087	0.0014	LQM/CIEH 2015**
1,1-dichloroethene	0.23	0.4	0.82	CL:AIRE GAC 2010
Cis-1,2-dichloroethene	0.11	0.19	0.37	CL:AIRE GAC 2010
1,1-dichloroethane	2.4	3.9	7.4	CL:AIRE GAC 2010
Trichloromethane	0.91	1.7	3.4	LQM/CIEH 2015**
1,1,1-Trichloroethane	8.8	18	39	LQM/CIEH 2015**
Trans-1,2-dichloroethene	0.19	0.34	0.7	CL:AIRE GAC 2010
Tetrachloromethane	0.026	0.056	0.13	LQM/CIEH 2015**
1,2-dichloropropane	0.024	0.042	0.084	CL:AIRE GAC 2010
Trichloroethene	0.016	0.034	0.075	LQM/CIEH 2015**
Bromodichloromethane	0.016	0.03	0.061	CL:AIRE GAC 2010
1,1,2-Trichloroethane	0.6	1.2	2.7	CL:AIRE GAC 2010
Tetrachloroethene	0.18	0.39	0.9	LQM/CIEH 2015**
Chlorobenzene	0.46	1	2.4	LQM/CIEH 2015**
1,1,1,2-Tetrachloroethane	1.2	2.8	6.4	LQM/CIEH 2015**
Styrene	8.1	19	43	CL:AIRE GAC 2010
1,1,2,2-Tetrachloroethane	1.6	3.4	7.5	LQM/CIEH 2015**
Isopropylbenzene	11	27	64	CL:AIRE GAC 2010
Bromobenzene	0.87	2	4.7	CL:AIRE GAC 2010
N-Propylbenzene	34	82	190	CL:AIRE GAC 2010
1,2,4-Trimethylbenzene	0.35	0.85	2	CL:AIRE GAC 2010
1,2,3-Trichlorobenzene	1.5	3.6	8.6	LQM/CIEH 2015**
1,3-Dichlorobenzene	0.4	1	2.3	LQM/CIEH 2015**
1,2-Dichlorobenzene	23	55	130	LQM/CIEH 2015**
1,4-Dichlorobenzene	61	150	350	LQM/CIEH 2015**

Table 1 – Soil Screening Values, Residential with Homegrown Produce End Use continued

Determinand	Screening Value (mg/kg)			Source
	<i>Soil Organic Matter Content</i>			
	1%	2.5%	6%	
Hexachloroethane	0.2	0.48	1.1	CL:AIRE GAC 2010
2,4-Dimethylphenol	19	43	97	CL:AIRE GAC 2010
1,2,4-Trichlorobenzene	2.6	6.4	15	LQM/CIEH 2015**
Hexachlorobutadiene	0.29	0.7	1.6	LQM/CIEH 2015**
2-Chloronaphthalene	3.7	9.2	22	CL:AIRE GAC 2010
2,6-Dinitrotoluene	0.78	1.7	3.9	CL:AIRE GAC 2010
2,4-Dinitrotoluene	1.5	3.2	7.2	CL:AIRE GAC 2010
Diethyl phthalate	120	260	570	CL:AIRE GAC 2010
Hexachlorobenzene	1.8	3.3	4.9	LQM/CIEH 2015**
Butyl benzyl phthalate	1400	3300	7200	CL:AIRE GAC 2010
Di-n-octylphthalate	2300	2800	3100	CL:AIRE GAC 2010
Bis(2-ethylhexyl)phthalate	280	610	1100	CL:AIRE GAC 2010
Pentachlorophenol	0.22	0.52	1.2	LQM/CIEH 2015**

* Based on residential without home grown produce

** Assumes no free product

Table 2 – Soil Screening Values, Residential without Homegrown Produce End Use

Determinand	Screening Value (mg/kg)			Source
	<i>Soil Organic Matter Content</i>			
	1%	2.5%	6%	
Arsenic	40	40	40	LQM/CIEH 2015
Barium	1300	1300	1300	CL:AIRE GAC 2010
Beryllium	1.7	1.7	1.7	LQM/CIEH 2015
Boron	11000	11000	11000	LQM/CIEH 2015
Cadmium	85	85	85	LQM/CIEH 2015
Chromium (III)	910	910	910	LQM/CIEH 2015
Chromium (VI)	6	6	6	LQM/CIEH 2015
Copper	7100	7100	7100	LQM/CIEH 2015
Lead	310	310	310	DEFRA 2014
Mercury	56	56	56	LQM/CIEH 2015
Nickel	180	180	180	LQM/CIEH 2015
Selenium	430	430	430	LQM/CIEH 2015
Vanadium	1200	1200	1200	LQM/CIEH 2015
Zinc	40000	40000	40000	LQM/CIEH 2015
Cyanide	34	34	34	ATRISK SOIL
Phenol	440	690	1200	LQM/CIEH 2015**
Benzene	0.38	0.7	1.4	LQM/CIEH 2015**
Toluene	880	1900	3900	LQM/CIEH 2015**
Ethylbenzene	83	190	440	LQM/CIEH 2015**
Xylenes	79	180	430	LQM/CIEH 2015**
MTBE	73	120	220	CL:AIRE GAC 2010
TPH CWG - Aliphatic >C5-C6	42	78	160	LQM/CIEH 2015**
TPH CWG - Aliphatic >C6-C8	100	230	530	LQM/CIEH 2015**
TPH CWG - Aliphatic >C8-C10	27	65	150	LQM/CIEH 2015**
TPH CWG - Aliphatic >C10-C12	130	330	770	LQM/CIEH 2015**
TPH CWG - Aliphatic >C12-C16	1100	2400	4400	LQM/CIEH 2015**
TPH CWG - Aliphatic >C16-C35	65000	92000	110000	LQM/CIEH 2015**
TPH CWG - Aliphatic >C35-C44	65000	92000	110000	LQM/CIEH 2015**
TPH CWG - Aromatic >C5-C7	370	690	1400	LQM/CIEH 2015**
TPH CWG - Aromatic >C7-C8	860	1800	3900	LQM/CIEH 2015**
TPH CWG - Aromatic >C8-C10	47	110	270	LQM/CIEH 2015**
TPH CWG - Aromatic >C10-C12	250	590	1200	LQM/CIEH 2015**
TPH CWG - Aromatic >C12-C16	1800	2300	2500	LQM/CIEH 2015**
TPH CWG - Aromatic >C16-C21	1900	1900	1900	LQM/CIEH 2015**
TPH CWG - Aromatic >C21-C35	1900	1900	1900	LQM/CIEH 2015**
TPH CWG - Aromatic >C35-C44	1900	1900	1900	LQM/CIEH 2015**

Table 2 – Soil Screening Values, Residential without Homegrown Produce End Use continued

Determinand	Screening Value (mg/kg)			Source
	<i>Soil Organic Matter Content</i>			
	1%	2.5%	6%	
Naphthalene	2.3	5.6	13	LQM/CIEH 2015**
Acenaphthylene	2900	4600	6000	LQM/CIEH 2015**
Acenaphthene	3000	4700	6000	LQM/CIEH 2015**
Fluorene	2800	3800	4500	LQM/CIEH 2015**
Phenanthrene	1300	1500	1500	LQM/CIEH 2015**
Anthracene	31000	35000	37000	LQM/CIEH 2015**
Fluoranthene	1500	1600	1600	LQM/CIEH 2015**
Pyrene	3700	3800	3800	LQM/CIEH 2015**
Benzo(a)anthracene	11	14	15	LQM/CIEH 2015**
Chrysene	30	31	32	LQM/CIEH 2015**
Benzo(b)fluoranthene	3.9	4	4	LQM/CIEH 2015**
Benzo(k)fluoranthene	110	110	110	LQM/CIEH 2015**
Benzo(a)pyrene	3.2	3.2	3.2	LQM/CIEH 2015**
Indeno(1,2,3-cd)pyrene	45	46	46	LQM/CIEH 2015**
Di-benzo(a,h)anthracene	0.31	0.32	0.32	LQM/CIEH 2015**
Benzo(g,h,i)perylene	360	360	360	LQM/CIEH 2015**
Chloromethane	0.0085	0.0099	0.013	CL:AIRE GAC 2010
Chloroethane	8.4	11	18	CL:AIRE GAC 2010
Vinyl Chloride	0.00077	0.00010	0.0015	LQM/CIEH 2015**
1,1-dichloroethene	0.23	0.41	0.82	CL:AIRE GAC 2010
Cis-1,2-dichloroethene	0.12	0.2	0.39	CL:AIRE GAC 2010
1,1-dichloroethane	2.5	4.1	7.7	CL:AIRE GAC 2010
Trichloromethane	1.2	2.1	4.2	LQM/CIEH 2015**
1,1,1-Trichloroethane	9	18	40	LQM/CIEH 2015**
Trans-1,2-dichloroethene	0.19	0.35	0.71	CL:AIRE GAC 2010
Tetrachloromethane	0.026	0.056	0.13	LQM/CIEH 2015**
1,2-dichloropropane	0.024	0.042	0.085	CL:AIRE GAC 2010
Trichloroethene	0.017	0.036	0.080	LQM/CIEH 2015**
Bromodichloromethane	0.019	0.034	0.070	CL:AIRE GAC 2010
1,1,2-Trichloroethane	0.88	1.8	3.9	CL:AIRE GAC 2010
Tetrachloroethene	0.18	0.4	0.92	LQM/CIEH 2015**
Chlorobenzene	0.46	1.0	2.4	LQM/CIEH 2015**
1,1,1,2-Tetrachloroethane	1.5	3.5	8.2	LQM/CIEH 2015**
Styrene	35	78	170	CL:AIRE GAC 2010
1,1,2,2-Tetrachloroethane	3.9	8.0	17	LQM/CIEH 2015**
Isopropylbenzene	12	28	67	CL:AIRE GAC 2010
Bromobenzene	0.91	2.1	4.9	CL:AIRE GAC 2010
N-Propylbenzene	40	97	230	CL:AIRE GAC 2010
1,2,4-Trimethylbenzene	0.41	0.99	2.3	CL:AIRE GAC 2010
1,2,3-Trichlorobenzene	1.5	3.7	8.8	LQM/CIEH 2015**
1,3-Dichlorobenzene	0.44	1.1	2.5	LQM/CIEH 2015**
1,2-Dichlorobenzene	24	57	130	LQM/CIEH 2015**
1,4-Dichlorobenzene	61	150	350	LQM/CIEH 2015**

Table 2 – Soil Screening Values, Residential without Homegrown Produce End Use continued

Determinand	Screening Value (mg/kg)			Source
	<i>Soil Organic Matter Content</i>			
	1%	2.5%	6%	
Hexachloroethane	0.22	0.54	1.3	CL:AIRE GAC 2010
2,4-Dimethylphenol	210	410	730	CL:AIRE GAC 2010
1,2,4-Trichlorobenzene	2.6	6.4	15	LQM/CIEH 2015**
Hexachlorobutadiene	0.32	0.78	1.8	LQM/CIEH 2015**
2-Chloronaphthalene	3.8	9.3	22	CL:AIRE GAC 2010
2,6-Dinitrotoluene	78	84	87	CL:AIRE GAC 2010
2,4-Dinitrotoluene	170	170	170	CL:AIRE GAC 2010
Diethyl phthalate	1800	3500	6300	CL:AIRE GAC 2010
Hexachlorobenzene	4.1	5.7	6.7	LQM/CIEH 2015**
Butyl benzyl phthalate	42000	44000	44000	CL:AIRE GAC 2010
Di-n-octylphthalate	3400	3400	3400	CL:AIRE GAC 2010
Bis(2-ethylhexyl)phthalate	2700	2800	2800	CL:AIRE GAC 2010
Pentachlorophenol	27	29	31	LQM/CIEH 2015**

** Assumes no free product

APPENDIX 4

Groundsure report

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Order Details

Date: 12/11/2022
Your ref: J22-073
Our Ref: GS-9194240

Site Details

Location: 534177 167905
Area: 0.16 ha
Authority: [London Borough of Croydon](#)



Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.13

groundsure.com/insightuserguide

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	<u>Historical industrial land uses</u>	0	1	67	91	-
20	1.2	<u>Historical tanks</u>	0	0	2	0	-
21	1.3	<u>Historical energy features</u>	0	0	12	17	-
22	1.4	Historical petrol stations	0	0	0	0	-
22	1.5	<u>Historical garages</u>	0	0	0	5	-
23	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
24	2.1	<u>Historical industrial land uses</u>	0	1	85	126	-
32	2.2	<u>Historical tanks</u>	0	0	4	0	-
33	2.3	<u>Historical energy features</u>	0	0	35	42	-
36	2.4	Historical petrol stations	0	0	0	0	-
36	2.5	<u>Historical garages</u>	0	0	0	12	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
37	3.1	Active or recent landfill	0	0	0	0	-
37	3.2	Historical landfill (BGS records)	0	0	0	0	-
38	3.3	<u>Historical landfill (LA/mapping records)</u>	0	0	0	2	-
38	3.4	<u>Historical landfill (EA/NRW records)</u>	0	0	1	0	-
38	3.5	<u>Historical waste sites</u>	4	0	0	0	-
39	3.6	Licensed waste sites	0	0	0	0	-
39	3.7	<u>Waste exemptions</u>	0	0	1	34	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
43	4.1	<u>Recent industrial land uses</u>	0	2	6	-	-
44	4.2	<u>Current or recent petrol stations</u>	0	0	0	1	-
44	4.3	Electricity cables	0	0	0	0	-
45	4.4	Gas pipelines	0	0	0	0	-
45	4.5	Sites determined as Contaminated Land	0	0	0	0	-



45	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
45	4.7	Regulated explosive sites	0	0	0	0	-
45	4.8	Hazardous substance storage/usage	0	0	0	0	-
46	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
46	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
46	4.11	<u>Licensed pollutant release (Part A(2)/B)</u>	0	0	1	7	-
47	4.12	Radioactive Substance Authorisations	0	0	0	0	-
47	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
47	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
48	4.15	Pollutant release to public sewer	0	0	0	0	-
48	4.16	List 1 Dangerous Substances	0	0	0	0	-
48	4.17	List 2 Dangerous Substances	0	0	0	0	-
48	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	7	5	-
50	4.19	Pollution inventory substances	0	0	0	0	-
50	4.20	Pollution inventory waste transfers	0	0	0	0	-
50	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
51	5.1	Superficial aquifer	None (within 500m)				
52	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
53	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
54	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
54	5.5	Groundwater vulnerability- local information	None (within 0m)				
55	5.6	<u>Groundwater abstractions</u>	0	0	0	0	3
56	5.7	Surface water abstractions	0	0	0	0	0
57	5.8	<u>Potable abstractions</u>	0	0	0	0	2
57	5.9	Source Protection Zones	0	0	0	0	-
57	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
58	6.1	Water Network (OS MasterMap)	0	0	0	-	-



58	6.2	<u>Surface water features</u>	0	0	1	-	-
59	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
59	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
60	6.5	WFD Groundwater bodies	0	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
61	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
61	7.2	Historical Flood Events	0	0	0	-	-
61	7.3	Flood Defences	0	0	0	-	-
62	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
62	7.5	Flood Storage Areas	0	0	0	-	-
63	7.6	Flood Zone 2	None (within 50m)				
63	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding					
64	8.1	<u>Surface water flooding</u>	1 in 30 year, 0.1m - 0.3m (within 50m)				

Page	Section	Groundwater flooding					
66	9.1	<u>Groundwater flooding</u>	Low (within 50m)				

Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
67	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
68	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
68	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
68	10.4	Special Protection Areas (SPA)	0	0	0	0	0
68	10.5	National Nature Reserves (NNR)	0	0	0	0	0
69	10.6	<u>Local Nature Reserves (LNR)</u>	0	0	0	0	1
69	10.7	<u>Designated Ancient Woodland</u>	0	0	0	0	2
69	10.8	Biosphere Reserves	0	0	0	0	0
70	10.9	Forest Parks	0	0	0	0	0
70	10.10	Marine Conservation Zones	0	0	0	0	0
70	10.11	Green Belt	0	0	0	0	0
70	10.12	Proposed Ramsar sites	0	0	0	0	0



70	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
71	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
71	10.15	Nitrate Sensitive Areas	0	0	0	0	0
71	10.16	<u>Nitrate Vulnerable Zones</u>	0	0	0	0	1
72	10.17	<u>SSSI Impact Risk Zones</u>	1	-	-	-	-
73	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
74	11.1	World Heritage Sites	0	0	0	-	-
75	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
75	11.3	National Parks	0	0	0	-	-
75	11.4	Listed Buildings	0	0	0	-	-
75	11.5	<u>Conservation Areas</u>	0	0	1	-	-
76	11.6	Scheduled Ancient Monuments	0	0	0	-	-
76	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
77	12.1	<u>Agricultural Land Classification</u>	Urban (within 250m)				
78	12.2	Open Access Land	0	0	0	-	-
78	12.3	Tree Felling Licences	0	0	0	-	-
78	12.4	Environmental Stewardship Schemes	0	0	0	-	-
78	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
79	13.1	Priority Habitat Inventory	0	0	0	-	-
79	13.2	Habitat Networks	0	0	0	-	-
80	13.3	<u>Open Mosaic Habitat</u>	0	0	1	-	-
80	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
81	14.1	<u>10k Availability</u>	Identified (within 500m)				
82	14.2	<u>Artificial and made ground (10k)</u>	0	0	1	2	-
83	14.3	Superficial geology (10k)	0	0	0	0	-



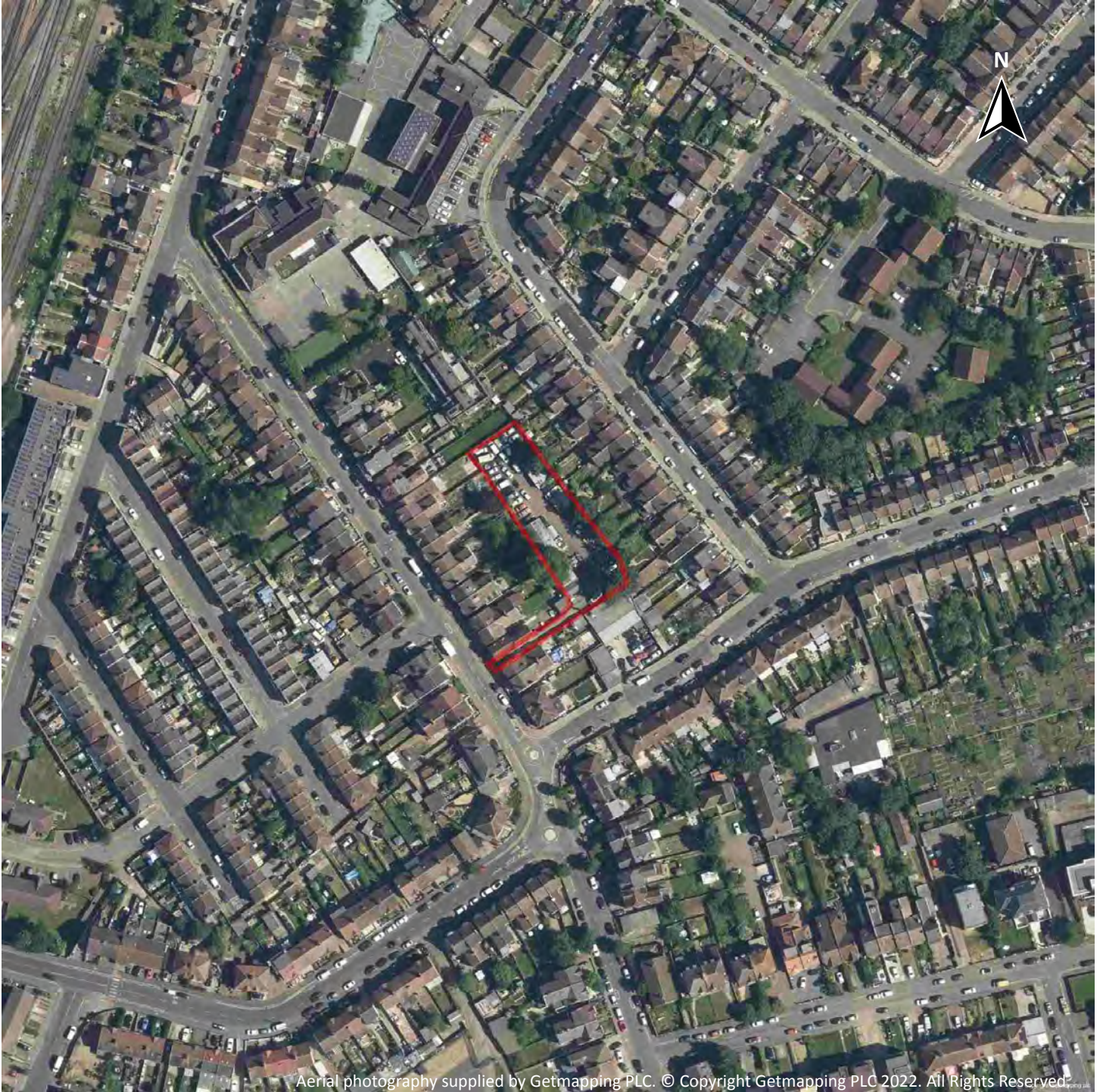
83	14.4	Landslip (10k)	0	0	0	0	-
84	14.5	<u>Bedrock geology (10k)</u>	1	0	0	0	-
85	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
86	15.1	<u>50k Availability</u>	Identified (within 500m)				
87	15.2	<u>Artificial and made ground (50k)</u>	0	0	1	2	-
88	15.3	Artificial ground permeability (50k)	0	0	-	-	-
89	15.4	Superficial geology (50k)	0	0	0	0	-
89	15.5	Superficial permeability (50k)	None (within 50m)				
89	15.6	Landslip (50k)	0	0	0	0	-
89	15.7	Landslip permeability (50k)	None (within 50m)				
90	15.8	<u>Bedrock geology (50k)</u>	1	0	0	0	-
91	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
91	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
92	16.1	<u>BGS Boreholes</u>	0	0	1	-	-
Page	Section	Natural ground subsidence					
93	17.1	<u>Shrink swell clays</u>	Moderate (within 50m)				
94	17.2	<u>Running sands</u>	Negligible (within 50m)				
95	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
96	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
97	17.5	<u>Landslides</u>	Very low (within 50m)				
98	17.6	<u>Ground dissolution of soluble rocks</u>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
99	18.1	Natural cavities	0	0	0	0	-
100	18.2	<u>BritPits</u>	0	0	0	3	-
100	18.3	<u>Surface ground workings</u>	0	0	7	-	-
101	18.4	Underground workings	0	0	0	0	0
101	18.5	<u>Historical Mineral Planning Areas</u>	0	0	1	0	-



101	18.6	<u>Non-coal mining</u>	0	0	0	2	1
102	18.7	Mining cavities	0	0	0	0	0
102	18.8	JPB mining areas	None (within 0m)				
102	18.9	Coal mining	None (within 0m)				
103	18.10	Brine areas	None (within 0m)				
103	18.11	Gypsum areas	None (within 0m)				
103	18.12	Tin mining	None (within 0m)				
103	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
104	19.1	<u>Radon</u>	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
105	20.1	<u>BGS Estimated Background Soil Chemistry</u>	1	0	-	-	-
105	20.2	<u>BGS Estimated Urban Soil Chemistry</u>	3	2	-	-	-
106	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
107	21.1	Underground railways (London)	0	0	0	-	-
107	21.2	Underground railways (Non-London)	0	0	0	-	-
108	21.3	Railway tunnels	0	0	0	-	-
108	21.4	<u>Historical railway and tunnel features</u>	0	0	75	-	-
111	21.5	Royal Mail tunnels	0	0	0	-	-
111	21.6	Historical railways	0	0	0	-	-
111	21.7	<u>Railways</u>	0	0	27	-	-
112	21.8	Crossrail 1	0	0	0	0	-
113	21.9	Crossrail 2	0	0	0	0	-
113	21.10	HS2	0	0	0	0	-



Recent aerial photograph



Capture Date: 14/06/2021

Site Area: 0.16ha



Recent site history - 2019 aerial photograph



Capture Date: 29/06/2019

Site Area: 0.16ha



Recent site history - 2013 aerial photograph



Capture Date: 20/04/2013

Site Area: 0.16ha



Recent site history - 2009 aerial photograph



Capture Date: 23/08/2009

Site Area: 0.16ha



Recent site history - 1999 aerial photograph



Capture Date: 04/09/1999

Site Area: 0.16ha



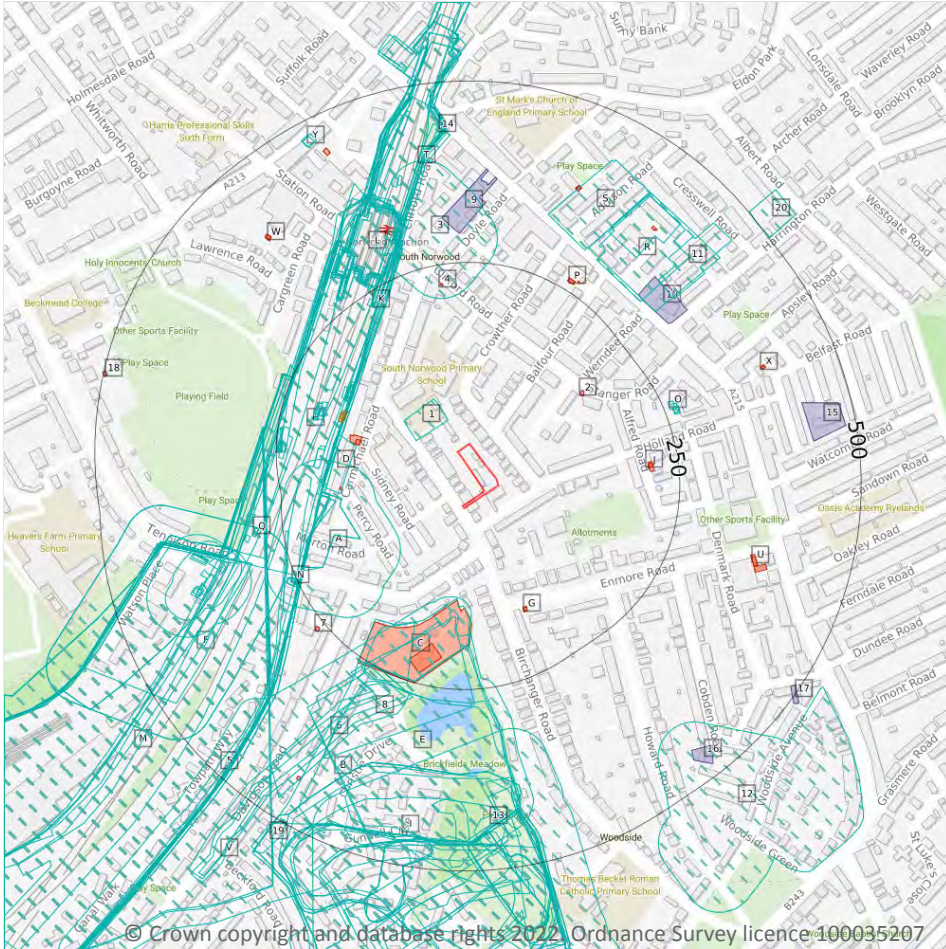
OS MasterMap site plan



Site Area: 0.16ha



1 Past land use



Site Outline

Search buffers in metres (m)

- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

1.1 Historical industrial land uses

Records within 500m **159**

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	44m NW	Unspecified Commercial/Industrial	1895	2130694

ID	Location	Land use	Dates present	Group ID
A	99m SW	Corporation Yard	1958 - 1965	2215282
B	123m S	Fireworks Manufactory	1895	2185409
C	125m S	Electric Substation	1974 - 1981	2210280
D	139m W	Unspecified Commercial/Industrial	1895	2130693
E	141m S	Fireworks Manufactory	1895	2232796
F	148m SW	Railway Sidings	1958	2254745
F	148m SW	Railway Sidings	1948	2265233
E	151m S	Manufactory Works	1895	2142771
F	159m W	Railway Sidings	1895 - 1898	2277598
F	162m NW	Railway Sidings	1895	2270822
F	163m NW	Railway Sidings	1981	2175538
F	163m NW	Railway Sidings	1965	2180565
F	163m NW	Railway Sidings	1974	2234244
D	163m NW	Railway Sidings	1911 - 1919	2284880
D	163m NW	Railway Sidings	1933 - 1938	2222071
F	164m NW	Railway Sidings	1938	2187384
F	164m NW	Railway Sidings	1910	2194020
F	164m NW	Railway Sidings	1930	2261636
D	164m NW	Railway Building	1919	2289582
D	165m NW	Railway Building	1933	2170589
D	165m NW	Railway Building	1895	2200974
D	165m NW	Railway Building	1911	2247066
D	165m NW	Railway Sidings	1938	2184804
H	165m W	Railway Sidings	1936	2235774
D	165m NW	Railway Building	1910	2251800
D	165m NW	Railway Building	1930 - 1938	2272275
D	166m NW	Railway Building	1938	2228886
F	170m NW	Railway Sidings	1895	2295094



ID	Location	Land use	Dates present	Group ID
C	172m SW	Unspecified Ground Workings	1974 - 1981	2284718
D	172m NW	Railway Building	1895	2278806
D	173m NW	Railway Sidings	1871	2241822
D	182m W	Engine House	1871 - 1936	2240379
I	188m S	Disused Workings	1981	2144620
D	191m NW	Railway Building	1938 - 1948	2189109
D	193m NW	Railway Building	1974 - 1981	2205385
D	193m W	Railway Building	1895	2230662
D	193m W	Railway Building	1911	2290460
D	197m W	Railway Building	1933	2210909
D	200m W	Railway Building	1895	2174435
3	203m N	Unspecified Works	1974	2159508
A	205m W	Unspecified Heap	1871 - 1936	2265352
D	218m W	Railway Sidings	1938	2245235
K	227m NW	Railway Building	1895	2252818
H	228m W	Railway Sidings	1871	2198299
L	231m NW	Railway Building	1911	2228765
L	232m NW	Railway Station	1919	2200275
K	233m NW	Railway Building	1895	2150505
L	233m NW	Railway Building	1930 - 1938	2171794
L	233m NW	Railway Building	1910	2290518
H	234m W	Railway Buildings	1938 - 1948	2229100
H	237m W	Railway Building	1958 - 1981	2237234
H	242m W	Railway Building	1910	2259670
H	242m W	Railway Building	1930	2264897
H	242m W	Railway Building	1938	2273257
H	242m W	Railway Building	1933	2150502
H	242m W	Railway Building	1933	2228431



ID	Location	Land use	Dates present	Group ID
H	242m W	Railway Building	1911	2286770
H	242m W	Railway Building	1919	2199017
5	242m W	Old Canal	1871 - 1936	2217670
M	244m SW	Railway Sidings	1919	2207469
L	245m NW	Railway Station	1898	2278414
B	247m SW	Tramway Sidings	1895 - 1898	2209956
6	248m SW	Tramway Sidings	1895	2265362
N	249m SW	Railway Building	1930	2183931
N	249m SW	Railway Building	1938	2265621
N	249m SW	Railway Building	1910	2268148
L	250m NW	Railway Building	1895	2248657
N	251m SW	Railway Building	1933	2196286
F	252m SW	Coal Depot	1910	2186078
F	252m SW	Coal Depot	1938	2225072
N	252m SW	Railway Building	1938	2226374
B	253m SW	Tramway Sidings	1895	2260784
L	253m NW	Railway Buildings	1895 - 1948	2183096
L	253m NW	Railway Building	1895	2253302
O	257m E	Smithy	1895	2198231
L	258m NW	Unspecified Commercial/Industrial	1871	2130696
L	259m NW	Railway Station	1958 - 1981	2279525
L	259m NW	Railway Building	1933 - 1936	2239292
O	261m E	Smithy	1895	2282815
O	261m E	Smithy	1898	2171954
8	262m SW	Unspecified Pit	1965	2125276
L	263m NW	Railway Station	1938	2282027
L	263m NW	Railway Station	1938	2201726
I	264m S	Unspecified Ground Workings	1958	2283652



ID	Location	Land use	Dates present	Group ID
M	267m W	Railway Land	1932	2169211
M	268m W	Railway Sidings	1932	2169268
M	268m W	Railway Sidings	1938	2169269
M	268m W	Railway Sidings	1932	2169270
M	268m W	Railway Sidings	1911	2246984
M	269m W	Railway Land	1898	2169044
L	281m NW	Railway Building	1895	2282507
L	283m NW	Railway Building	1958 - 1981	2262965
Q	283m W	Railway Building	1938	2207307
Q	283m W	Railway Building	1930	2263661
Q	283m W	Railway Building	1910	2268455
Q	286m W	Railway Building	1965 - 1981	2180856
L	288m NW	Railway Building	1911	2270156
Q	296m W	Railway Building	1936	2150501
M	301m W	Railway Sidings	1898	2180504
F	302m W	Coal Depot	1930	2187038
R	304m NE	Brick Field	1871	2257414
F	307m SW	Coal Depot	1919	2176663
R	308m NE	Brick Field	1936	2183123
I	310m S	Brick Works	1965 - 1974	2265088
S	311m NE	Brick Field	1871 - 1936	2274799
F	316m W	Coal Depot	1911	2276775
F	332m W	Coal Depot	1932	2244526
T	337m N	Railway Sidings	1898	2279080
F	337m W	Railway Buildings	1974 - 1981	2205298
11	345m NE	Nursery	1958	2161776
R	345m NE	Unspecified Works	1958	2159503
F	351m W	Railway Building	1948 - 1958	2197952



ID	Location	Land use	Dates present	Group ID
F	355m W	Coal Depot	1958 - 1981	2189089
F	358m W	Railway Building	1932	2241122
F	359m W	Railway Building	1938	2223240
T	360m N	Railway Sidings	1898	2290873
I	364m S	Unspecified Works	1958	2159499
I	364m S	Brick Works	1948	2253631
I	364m S	Unspecified Pit	1948	2274221
I	367m S	Unspecified Ground Workings	1958	2197810
T	368m N	Railway Building	1933 - 1938	2192459
T	368m N	Railway Building	1948	2209198
T	370m N	Railway Sidings	1938	2293831
F	371m SW	Coal Depot	1948	2220321
T	371m N	Railway Sidings	1871	2276489
I	373m S	Railway Sidings	1948	2188994
V	373m SW	Fireworks Manufactory	1895	2277115
F	375m SW	Coal Depot	1932	2245915
V	375m SW	Firework Manufactory	1898	2164531
I	377m S	Railway Sidings	1965	2261777
F	377m SW	Railway Building	1938	2150500
I	389m S	Tram Sidings	1958	2143188
I	401m S	Unspecified Quarry	1974	2144967
12	413m SE	Brick Field	1871 - 1936	2244084
I	420m S	Brick Works	1895 - 1911	2250976
I	420m S	Brick Works	1930	2287033
I	423m S	Brick Works	1919	2202764
13	424m S	Refuse Heap	1974	2158583
I	427m S	Brick Works	1895	2232330
14	430m N	Railway Building	1895	2150504



ID	Location	Land use	Dates present	Group ID
I	447m S	Unspecified Pits	1910	2220805
I	447m S	Unspecified Pits	1930	2283155
I	447m S	Unspecified Ground Workings	1911	2284654
I	449m S	Unspecified Pits	1919	2194236
I	455m S	Bricks Works	1938	2191426
V	456m SW	Railway Sidings	1895 - 1898	2271134
I	457m S	Brick Works	1933 - 1938	2181569
I	458m S	Unspecified Ground Workings	1938	2286124
I	458m S	Railway Sidings	1933	2229436
I	458m S	Unspecified Pit	1933	2243639
I	460m S	Unspecified Heap	1919 - 1930	2174698
I	460m S	Unspecified Heap	1910	2239331
I	461m S	Tramway Sidings	1938	2248060
I	463m S	Unspecified Heap	1911	2286568
Y	464m NW	Police Station	1981	2262146
Y	467m NW	Police Station	1965 - 1974	2236474
19	496m SW	Unspecified Heap	1965 - 1974	2229975
20	499m NE	Unspecified Works	1958	2159504

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

2

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**



ID	Location	Land use	Dates present	Group ID
D	162m NW	Unspecified Tank	1953	390775
D	164m NW	Unspecified Tank	1940	386101

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	29
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Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
C	127m S	Electricity Substation	1994	264504
D	133m W	Electricity Substation	1953 - 1972	279473
D	135m W	Electricity Substation	1953 - 1994	291673
G	159m S	Electricity Substation	1988 - 1994	287292
G	160m S	Electricity Transformer	1972	250754
2	162m NE	Electricity Substation	1987 - 1992	284456
D	166m W	Electricity Substation	1988 - 1997	273621
C	192m S	Electricity Substation	1972 - 1994	290163
J	208m E	Electricity Substation	1991 - 1994	278740
J	208m E	Electricity Transformer	1972	250753
J	209m E	Electricity Substation	1994	267963
4	221m N	Electricity Substation	1952	248326
7	259m SW	Electricity Substation	1988 - 1997	274994
P	262m NE	Electricity Substation	1971	288604
P	262m NE	Electricity Substation	1952 - 1992	260308
P	267m NE	Electricity Substation	1952	248325

ID	Location	Land use	Dates present	Group ID
U	361m E	Electricity Substation	1953 - 1976	282947
U	364m E	Electricity Substation	1953	266464
U	370m E	Electricity Substation	1991	285011
S	379m N	Electricity Substation	1987	289777
S	380m N	Electricity Substation	1991 - 1992	268122
R	389m NE	Electricity Substation	1952	262903
W	390m NW	Electricity Substation	1991 - 1997	287035
W	392m NW	Electricity Substation	1988	278316
X	395m E	Electricity Transformer	1971	250762
X	395m E	Electricity Substation	1991 - 1992	278580
B	434m SW	Electricity Substation	1995	264216
Y	443m NW	Electricity Substation	1988 - 1997	279368
18	494m W	Electricity Substation	1988 - 1997	284953

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m

5

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.



Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
9	290m N	Garages	1952	81117
10	310m NE	Garage	1966 - 1971	82330
15	433m E	Garage	1963 - 1976	84337
16	452m SE	Garages	1953	84798
17	489m SE	Garage	1963 - 1996	83163

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

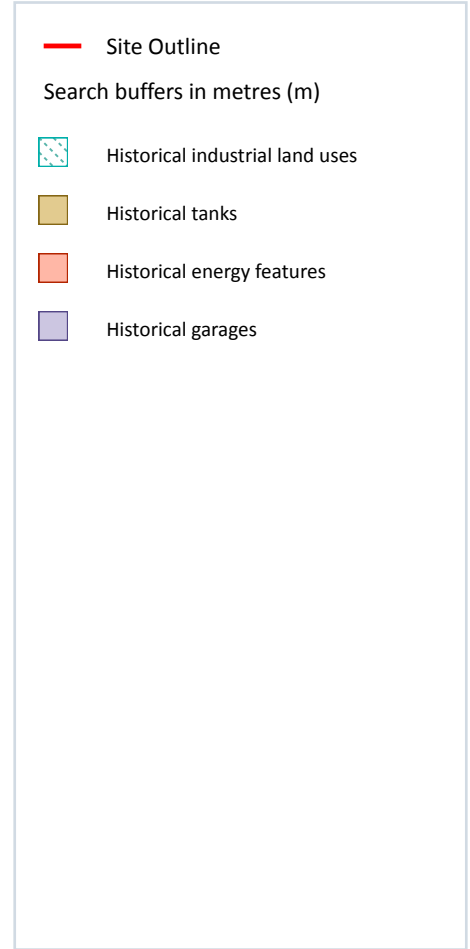
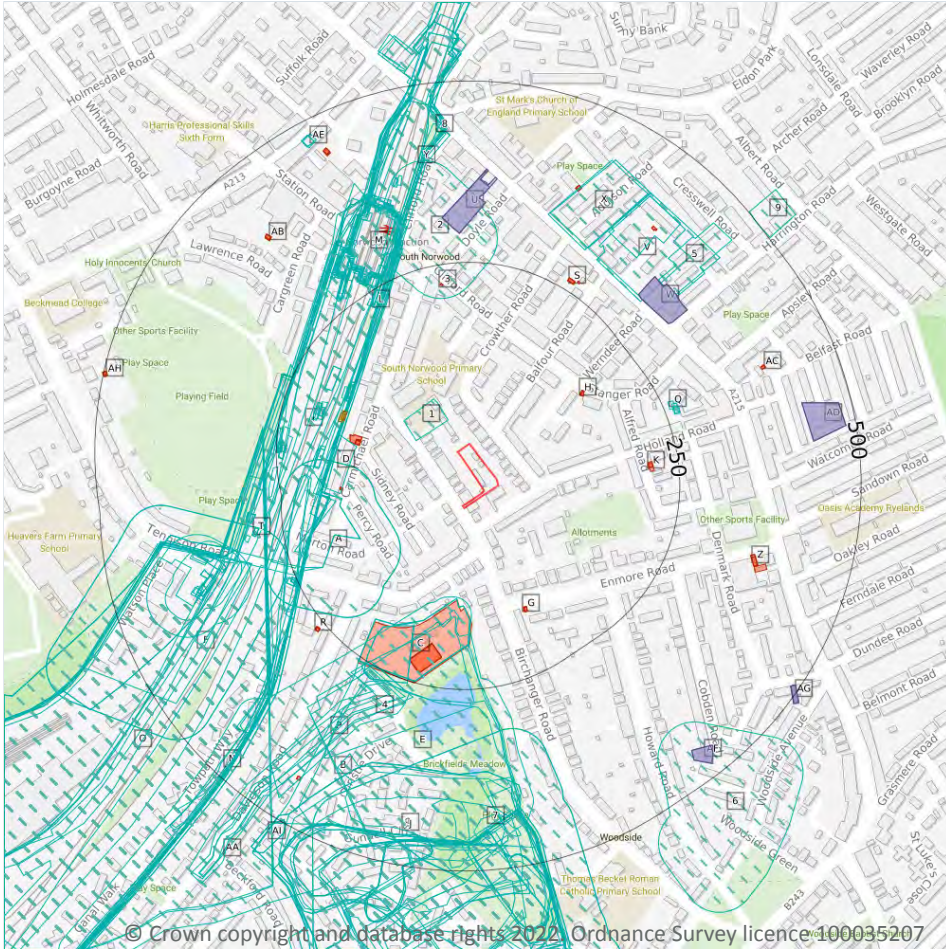
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Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.



2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m

212

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 24**

ID	Location	Land Use	Date	Group ID
1	44m NW	Unspecified Commercial/Industrial	1895	2130694
A	99m SW	Corporation Yard	1958	2215282
A	99m SW	Corporation Yard	1965	2215282

ID	Location	Land Use	Date	Group ID
B	123m S	Fireworks Manufactory	1895	2185409
C	125m S	Electric Substation	1981	2210280
C	125m S	Electric Substation	1974	2210280
D	139m W	Unspecified Commercial/Industrial	1895	2130693
E	141m S	Fireworks Manufactory	1895	2232796
F	148m SW	Railway Sidings	1958	2254745
F	148m SW	Railway Sidings	1948	2265233
E	151m S	Manufactory Works	1895	2142771
D	159m W	Railway Sidings	1898	2277598
D	162m NW	Railway Sidings	1895	2277598
F	162m NW	Railway Sidings	1895	2270822
F	163m NW	Railway Sidings	1981	2175538
F	163m NW	Railway Sidings	1974	2234244
F	163m NW	Railway Sidings	1965	2180565
D	163m NW	Railway Sidings	1919	2284880
D	163m NW	Railway Sidings	1933	2222071
D	163m NW	Railway Sidings	1911	2284880
D	164m NW	Railway Sidings	1938	2222071
F	164m NW	Railway Sidings	1938	2187384
F	164m NW	Railway Sidings	1930	2261636
F	164m NW	Railway Sidings	1910	2194020
D	164m NW	Railway Building	1919	2289582
D	165m NW	Railway Building	1933	2170589
D	165m NW	Railway Building	1911	2247066
D	165m NW	Railway Building	1895	2200974
D	165m NW	Railway Sidings	1938	2184804
I	165m W	Railway Sidings	1936	2235774
D	165m NW	Railway Building	1938	2272275



ID	Location	Land Use	Date	Group ID
D	165m NW	Railway Building	1930	2272275
D	165m NW	Railway Building	1910	2251800
D	166m NW	Railway Building	1938	2228886
F	170m NW	Railway Sidings	1895	2295094
C	172m SW	Unspecified Ground Workings	1974	2284718
D	172m NW	Railway Building	1895	2278806
D	173m NW	Railway Sidings	1871	2241822
C	177m SW	Unspecified Ground Workings	1981	2284718
D	182m W	Engine House	1936	2240379
D	183m W	Engine House	1871	2240379
J	188m S	Disused Workings	1981	2144620
D	191m NW	Railway Building	1948	2189109
D	193m NW	Railway Building	1981	2205385
D	193m NW	Railway Building	1974	2205385
D	193m W	Railway Building	1911	2290460
D	193m W	Railway Building	1895	2230662
D	197m W	Railway Building	1933	2210909
D	199m W	Railway Building	1938	2189109
D	200m W	Railway Building	1895	2174435
2	203m N	Unspecified Works	1974	2159508
A	205m W	Unspecified Heap	1936	2265352
D	208m W	Railway Sidings	1898	2277598
A	209m W	Unspecified Heap	1871	2265352
D	218m W	Railway Sidings	1938	2245235
L	227m NW	Railway Building	1895	2252818
I	228m W	Railway Sidings	1871	2198299
M	231m NW	Railway Building	1911	2228765
M	232m NW	Railway Station	1919	2200275



ID	Location	Land Use	Date	Group ID
L	233m NW	Railway Building	1895	2150505
M	233m NW	Railway Building	1938	2171794
M	233m NW	Railway Building	1930	2171794
M	233m NW	Railway Building	1910	2290518
I	234m W	Railway Buildings	1948	2229100
I	237m W	Railway Building	1981	2237234
I	237m W	Railway Building	1974	2237234
I	237m W	Railway Building	1958	2237234
I	237m W	Railway Building	1965	2237234
I	242m W	Railway Building	1938	2273257
I	242m W	Railway Building	1930	2264897
I	242m W	Railway Building	1910	2259670
I	242m W	Railway Building	1933	2150502
I	242m W	Railway Building	1933	2228431
I	242m W	Railway Building	1911	2286770
I	242m W	Railway Building	1919	2199017
N	242m W	Old Canal	1871	2217670
I	243m W	Railway Buildings	1938	2229100
O	244m SW	Railway Sidings	1919	2207469
M	245m NW	Railway Station	1898	2278414
B	247m SW	Tramway Sidings	1895	2209956
P	248m SW	Tramway Sidings	1895	2265362
I	249m W	Railway Sidings	1898	2277598
A	249m SW	Railway Building	1938	2265621
A	249m SW	Railway Building	1930	2183931
A	249m SW	Railway Building	1910	2268148
M	250m NW	Railway Building	1895	2248657
A	251m SW	Railway Building	1933	2196286



ID	Location	Land Use	Date	Group ID
F	252m SW	Coal Depot	1938	2225072
F	252m SW	Coal Depot	1910	2186078
A	252m SW	Railway Building	1938	2226374
B	253m SW	Tramway Sidings	1895	2260784
M	253m NW	Railway Buildings	1895	2183096
M	253m NW	Railway Building	1895	2253302
P	257m SW	Tramway Sidings	1898	2209956
Q	257m E	Smithy	1895	2198231
M	258m NW	Unspecified Commercial/Industrial	1871	2130696
M	259m NW	Railway Station	1981	2279525
M	259m NW	Railway Station	1974	2279525
M	259m NW	Railway Station	1958	2279525
M	259m NW	Railway Station	1965	2279525
M	259m NW	Railway Building	1936	2239292
M	261m NW	Railway Buildings	1948	2183096
Q	261m E	Smithy	1895	2282815
Q	261m E	Smithy	1898	2171954
4	262m SW	Unspecified Pit	1965	2125276
Q	262m E	Smithy	1895	2282815
M	263m NW	Railway Station	1938	2282027
M	263m NW	Railway Station	1938	2201726
J	264m S	Unspecified Ground Workings	1958	2283652
M	264m NW	Railway Building	1933	2239292
O	267m W	Railway Land	1932	2169211
O	268m W	Railway Sidings	1895	2277598
O	268m W	Railway Sidings	1932	2169268
O	268m W	Railway Sidings	1911	2246984
O	269m W	Railway Land	1898	2169044



ID	Location	Land Use	Date	Group ID
O	270m W	Railway Sidings	1938	2169269
O	271m W	Railway Sidings	1932	2169270
M	281m NW	Railway Building	1895	2282507
O	282m SW	Railway Sidings	1898	2277598
M	283m NW	Railway Building	1958	2262965
M	283m NW	Railway Building	1965	2262965
T	283m W	Railway Building	1938	2207307
T	283m W	Railway Building	1930	2263661
T	283m W	Railway Building	1910	2268455
M	284m NW	Railway Building	1895	2282507
M	285m NW	Railway Building	1981	2262965
M	285m NW	Railway Building	1974	2262965
T	286m W	Railway Building	1981	2180856
T	286m W	Railway Building	1974	2180856
T	286m W	Railway Building	1965	2180856
M	288m NW	Railway Building	1911	2270156
T	296m W	Railway Building	1936	2150501
O	301m W	Railway Sidings	1898	2180504
F	302m W	Coal Depot	1930	2187038
V	304m NE	Brick Field	1871	2257414
F	307m SW	Coal Depot	1919	2176663
V	308m NE	Brick Field	1936	2183123
N	309m SW	Old Canal	1936	2217670
J	310m S	Brick Works	1974	2265088
J	310m S	Brick Works	1965	2265088
X	311m NE	Brick Field	1871	2274799
X	315m NE	Brick Field	1936	2274799
F	316m W	Coal Depot	1911	2276775



ID	Location	Land Use	Date	Group ID
F	332m W	Coal Depot	1932	2244526
Y	337m N	Railway Sidings	1898	2279080
F	337m W	Railway Buildings	1981	2205298
F	337m W	Railway Buildings	1974	2205298
5	345m NE	Nursery	1958	2161776
V	345m NE	Unspecified Works	1958	2159503
F	351m W	Railway Building	1958	2197952
F	351m W	Railway Building	1948	2197952
F	355m W	Coal Depot	1981	2189089
F	355m W	Coal Depot	1974	2189089
F	356m SW	Coal Depot	1958	2189089
F	356m SW	Coal Depot	1965	2189089
F	358m W	Railway Building	1932	2241122
F	359m W	Railway Building	1938	2223240
Y	360m N	Railway Sidings	1898	2290873
J	364m S	Unspecified Works	1958	2159499
J	364m S	Brick Works	1948	2253631
J	364m S	Unspecified Pit	1948	2274221
J	367m S	Unspecified Ground Workings	1958	2197810
Y	368m N	Railway Building	1933	2192459
Y	368m N	Railway Building	1948	2209198
Y	370m N	Railway Building	1938	2192459
Y	370m N	Railway Sidings	1938	2293831
F	371m SW	Coal Depot	1948	2220321
Y	371m N	Railway Sidings	1871	2276489
J	373m S	Railway Sidings	1948	2188994
AA	373m SW	Fireworks Manufactory	1895	2277115
F	375m SW	Coal Depot	1932	2245915



ID	Location	Land Use	Date	Group ID
AA	375m SW	Firework Manufactory	1898	2164531
J	377m S	Railway Sidings	1965	2261777
F	377m SW	Railway Building	1938	2150500
J	389m S	Tram Sidings	1958	2143188
J	401m S	Unspecified Quarry	1974	2144967
6	413m SE	Brick Field	1936	2244084
J	420m S	Brick Works	1930	2287033
J	420m S	Brick Works	1910	2250976
J	421m S	Brick Works	1895	2250976
J	422m S	Brick Works	1911	2250976
J	422m S	Brick Works	1895	2250976
J	423m S	Brick Works	1919	2202764
7	424m S	Refuse Heap	1974	2158583
J	427m S	Brick Works	1895	2232330
J	429m S	Brick Works	1898	2250976
8	430m N	Railway Building	1895	2150504
J	447m S	Unspecified Pits	1930	2283155
J	447m S	Unspecified Pits	1910	2220805
J	447m S	Unspecified Ground Workings	1911	2284654
J	449m S	Unspecified Pits	1919	2194236
J	455m S	Bricks Works	1938	2191426
J	455m S	Bricks Works	1938	2191426
AA	456m SW	Railway Sidings	1895	2271134
J	457m S	Brick Works	1933	2181569
J	458m S	Unspecified Ground Workings	1938	2286124
J	458m S	Brick Works	1938	2181569
J	458m S	Unspecified Pit	1933	2243639
J	458m S	Railway Sidings	1933	2229436



ID	Location	Land Use	Date	Group ID
J	460m S	Unspecified Heap	1930	2174698
J	460m S	Unspecified Heap	1910	2239331
AA	461m SW	Railway Sidings	1898	2271134
J	461m S	Tramway Sidings	1938	2248060
J	462m S	Unspecified Heap	1919	2174698
J	463m S	Unspecified Heap	1911	2286568
AE	464m NW	Police Station	1981	2262146
J	466m S	Tramway Sidings	1938	2248060
AE	467m NW	Police Station	1974	2236474
AE	467m NW	Police Station	1965	2236474
AI	496m SW	Unspecified Heap	1974	2229975
AI	496m SW	Unspecified Heap	1965	2229975
9	499m NE	Unspecified Works	1958	2159504

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m

4

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 24**

ID	Location	Land Use	Date	Group ID
D	162m NW	Unspecified Tank	1953	390775
D	162m NW	Unspecified Tank	1953	390775
D	162m NW	Unspecified Tank	1953	390775
D	164m NW	Unspecified Tank	1940	386101

This data is sourced from Ordnance Survey / Groundsure.



2.3 Historical energy features

Records within 500m

77

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 24**

ID	Location	Land Use	Date	Group ID
C	127m S	Electricity Substation	1994	264504
D	133m W	Electricity Substation	1953	279473
D	133m W	Electricity Substation	1972	279473
D	135m W	Electricity Substation	1994	291673
D	135m W	Electricity Substation	1991	291673
D	135m W	Electricity Substation	1994	291673
D	135m W	Electricity Substation	1988	291673
D	135m W	Electricity Substation	1988	291673
D	135m W	Electricity Substation	1953	291673
G	159m S	Electricity Substation	1988	287292
G	159m S	Electricity Substation	1988	287292
G	160m S	Electricity Transformer	1972	250754
G	160m S	Electricity Substation	1994	287292
G	160m S	Electricity Substation	1991	287292
G	160m S	Electricity Substation	1994	287292
H	162m NE	Electricity Substation	1987	284456
H	163m NE	Electricity Substation	1991	284456
H	163m NE	Electricity Substation	1992	284456
H	163m NE	Electricity Substation	1992	284456
D	166m W	Electricity Substation	1988	273621
D	166m W	Electricity Substation	1991	273621
D	167m W	Electricity Substation	1993	273621
D	167m W	Electricity Substation	1997	273621



ID	Location	Land Use	Date	Group ID
D	167m W	Electricity Substation	1992	273621
D	167m W	Electricity Substation	1994	273621
C	192m S	Electricity Substation	1988	290163
C	192m S	Electricity Substation	1988	290163
C	192m S	Electricity Substation	1994	290163
C	192m S	Electricity Substation	1991	290163
C	192m S	Electricity Substation	1972	290163
K	208m E	Electricity Substation	1994	278740
K	208m E	Electricity Substation	1991	278740
K	208m E	Electricity Transformer	1972	250753
K	209m E	Electricity Substation	1994	267963
3	221m N	Electricity Substation	1952	248326
R	259m SW	Electricity Substation	1988	274994
R	259m SW	Electricity Substation	1991	274994
R	259m SW	Electricity Substation	1993	274994
R	259m SW	Electricity Substation	1997	274994
R	259m SW	Electricity Substation	1992	274994
R	259m SW	Electricity Substation	1994	274994
S	262m NE	Electricity Substation	1971	288604
S	262m NE	Electricity Substation	1952	260308
S	263m NE	Electricity Substation	1992	260308
S	263m NE	Electricity Substation	1991	260308
S	263m NE	Electricity Substation	1992	260308
S	267m NE	Electricity Substation	1952	248325
Z	361m E	Electricity Substation	1976	282947
Z	361m E	Electricity Substation	1953	282947
Z	364m E	Electricity Substation	1953	266464
Z	370m E	Electricity Substation	1991	285011



ID	Location	Land Use	Date	Group ID
X	379m N	Electricity Substation	1987	289777
X	380m N	Electricity Substation	1992	268122
X	380m N	Electricity Substation	1991	268122
X	380m N	Electricity Substation	1992	268122
V	389m NE	Electricity Substation	1952	262903
V	389m NE	Electricity Substation	1952	262903
AB	390m NW	Electricity Substation	1991	287035
AB	390m NW	Electricity Substation	1993	287035
AB	390m NW	Electricity Substation	1997	287035
AB	392m NW	Electricity Substation	1988	278316
AB	392m NW	Electricity Substation	1988	278316
AC	395m E	Electricity Transformer	1971	250762
AC	395m E	Electricity Substation	1991	278580
AC	395m E	Electricity Substation	1992	278580
B	434m SW	Electricity Substation	1995	264216
B	434m SW	Electricity Substation	1995	264216
AE	443m NW	Electricity Substation	1993	279368
AE	443m NW	Electricity Substation	1997	279368
AE	443m NW	Electricity Substation	1991	279368
AE	445m NW	Electricity Substation	1988	279368
AE	445m NW	Electricity Substation	1988	279368
AH	494m W	Electricity Substation	1993	284953
AH	494m W	Electricity Substation	1997	284953
AH	494m W	Electricity Substation	1991	284953
AH	495m W	Electricity Substation	1988	284953
AH	495m W	Electricity Substation	1988	284953

This data is sourced from Ordnance Survey / Groundsure.



2.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m

12

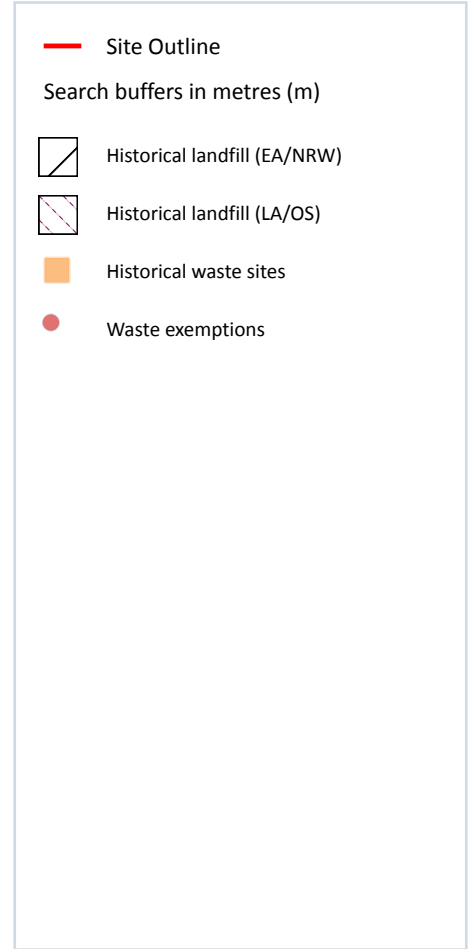
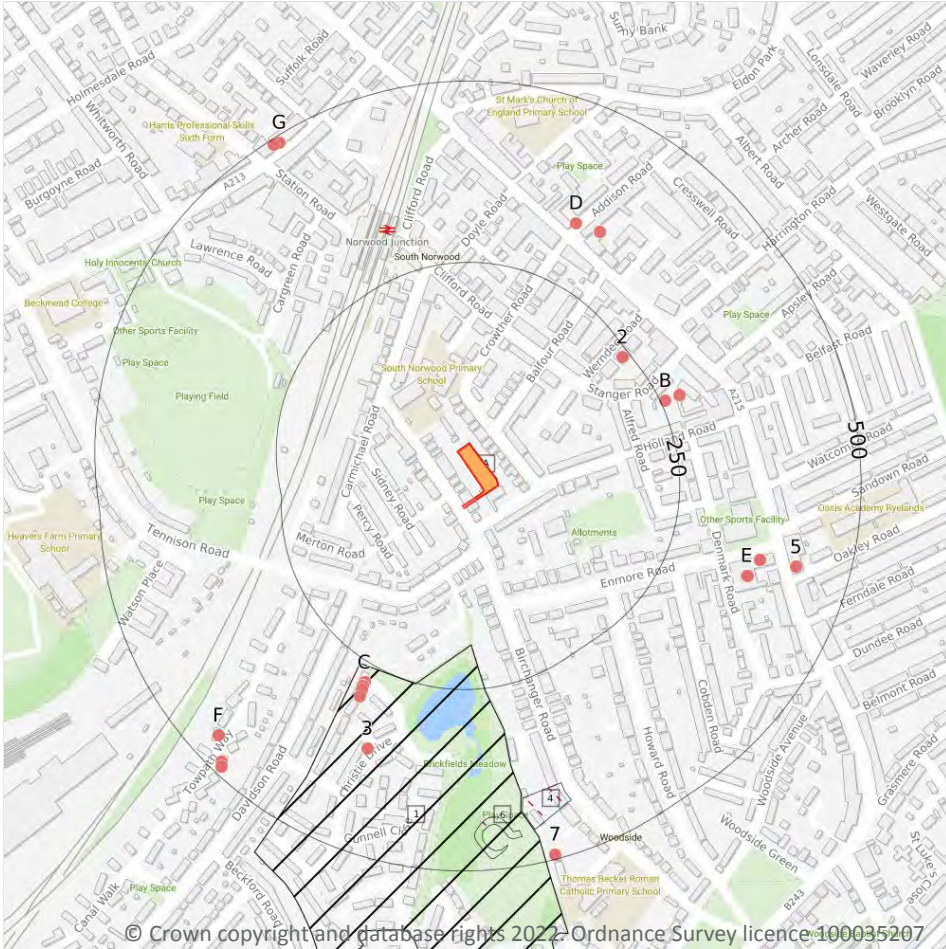
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 24**

ID	Location	Land Use	Date	Group ID
U	290m N	Garages	1952	81117
U	291m N	Garages	1952	81117
W	310m NE	Garage	1971	82330
W	310m NE	Garage	1966	82330
AD	433m E	Garage	1976	84337
AD	433m E	Garage	1963	84337
AF	452m SE	Garages	1953	84798
AF	452m SE	Garages	1953	84798
AG	489m SE	Garage	1976	83163
AG	489m SE	Garage	1963	83163
AG	489m SE	Garage	1996	83163
AG	489m SE	Garage	1991	83163

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m **0**

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m **0**

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m

2

Landfill sites identified from Local Authority records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 37**

ID	Location	Site address	Source	Data type
4	401m S	160 Birchanger Road, Woodside	Croydon council	Polygon
6	428m S	Refuse Tip	1971 mapping	Polygon

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m

1

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 37**

ID	Location	Details		
1	188m S	Site Address: Woodside Brickworks, Woodside, Croyden, London Licence Holder Address: -	Waste Licence: Yes Site Reference: DL027, 8CR001 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 20/12/1977 Licence Surrender: 30/11/1982	Operator: - Licence Holder: Ready Mixed Concrete Limited First Recorded 31/12/1924 Last Recorded: 25/02/1984

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m

4

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 37**



ID	Location	Address	Further Details	Date
A	On site	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1994
A	On site	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1971
A	On site	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1988
A	On site	Site Address: N/A	Type of Site: Scrap Metal Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1988

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m

35

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 37**

ID	Location	Site	Reference	Category	Sub-Category	Description
2	240m NE	1, Werndee Road, South Norwood, SE25 5LB	WEX126954	Disposing of waste exemption	Not on a farm	Burning waste in the open



ID	Location	Site	Reference	Category	Sub-Category	Description
B	256m E	Unit 6, Central Place, Portland Road, London, SE25 4PR	EA/EPR/VP385 9KL/A001	Treating waste exemption	Not on a farm	Repair or refurbishment of WEEE
B	277m E	Unit 6 Portland Road London SE25 4PR	EA/EPR/VP375 2WQ/A001	Treating waste exemption	Non- Agricultural Waste Only	Repair or refurbishment of WEEE
C	278m SW	79, CHRISTIE DRIVE, CROYDON, CR0 6YA	WEX290863	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	278m SW	-	WEX269203	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	278m SW	79, CHRISTIE DRIVE, CROYDON, CR0 6YA	WEX128484	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	283m SW	77, CHRISTIE DRIVE, CROYDON, CR0 6YA	WEX290864	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	283m SW	-	WEX269222	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	283m SW	77, CHRISTIE DRIVE, CROYDON, CR0 6YA	WEX128507	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	288m SW	-	WEX269590	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	297m SW	71, CHRISTIE DRIVE, CROYDON, CR0 6YA	WEX302506	Disposing of waste exemption	Not on a Farm	Burning waste in the open
D	337m N	89-91 portland road london SE25 4UN	EPR/TF0000ZS /A001	Treating waste exemption	Non- Agricultural Waste Only	Recovery of scrap metal
D	341m NE	89-91, PORTLAND ROAD, LONDON, SE25 4UN	WEX286210	Treating waste exemption	Not on a farm	Recovery of scrap metal
D	341m NE	89-91, PORTLAND ROAD, LONDON, SE25 4UN	WEX286210	Storing waste exemption	Not on a farm	Storage of waste in a secure place
D	341m NE	89-91, PORTLAND ROAD, LONDON, SE25 4UN	WEX286210	Storing waste exemption	Not on a farm	Storage of waste in secure containers



ID	Location	Site	Reference	Category	Sub-Category	Description
D	341m NE	89-91, PORTLAND ROAD, LONDON, SE25 4UN	WEX148790	Treating waste exemption	Not on a farm	Recovery of scrap metal
D	341m NE	89-91, PORTLAND ROAD, LONDON, SE25 4UN	WEX148790	Storing waste exemption	Not on a farm	Storage of waste in secure containers
D	341m NE	89-91, PORTLAND ROAD, LONDON, SE25 4UN	WEX148790	Storing waste exemption	Not on a farm	Storage of waste in a secure place
3	358m S	83, christie drive, croydon, cr0 6ya	WEX126507	Disposing of waste exemption	Not on a farm	Burning waste in the open
E	364m E	1 Enmore Road London SE25 5NT	EPR/JF0634VF /A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and de-naturing of controlled drugs for disposal
E	365m E	-	WEX248317	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
E	374m E	1, ENMORE ROAD, LONDON, SE25 5NT	WEX179760	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
E	374m E	1, ENMORE ROAD, LONDON, SE25 5NT	WEX171491	Storing waste exemption	Not on a farm	Storage of waste in secure containers
E	374m E	1, ENMORE ROAD, LONDON, SE25 5NT	WEX171491	Storing waste exemption	Not on a farm	Storage of waste in a secure place
E	374m E	1, ENMORE ROAD, LONDON, SE25 5NT	WEX085573	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
E	374m E	1, ENMORE ROAD, LONDON, SE25 5NT	WEX012951	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
5	425m E	257-259, PORTLAND ROAD, LONDON, SE25 4XB	WEX290058	Storing waste exemption	Not on a farm	Storage of waste in a secure place
F	462m SW	50, towpath way, croydon, cr0 6bw	WEX126518	Disposing of waste exemption	Not on a farm	Burning waste in the open
F	485m SW	66, TOWPATH WAY, CROYDON, CR0 6BX	WEX290629	Disposing of waste exemption	Not on a Farm	Burning waste in the open
F	485m SW	-	WEX269255	Disposing of waste exemption	Not on a farm	Burning waste in the open
F	489m SW	64, TOWPATH WAY, CROYDON, CR0 6BX	WEX290631	Disposing of waste exemption	Not on a farm	Burning waste in the open

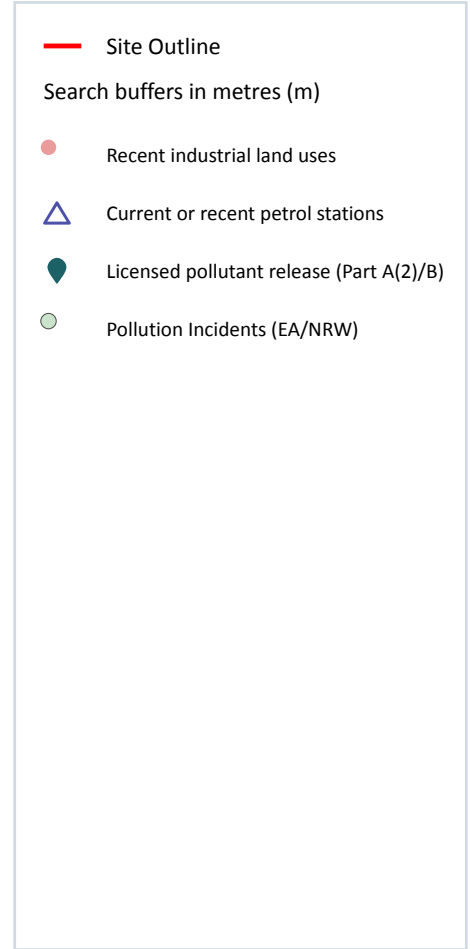
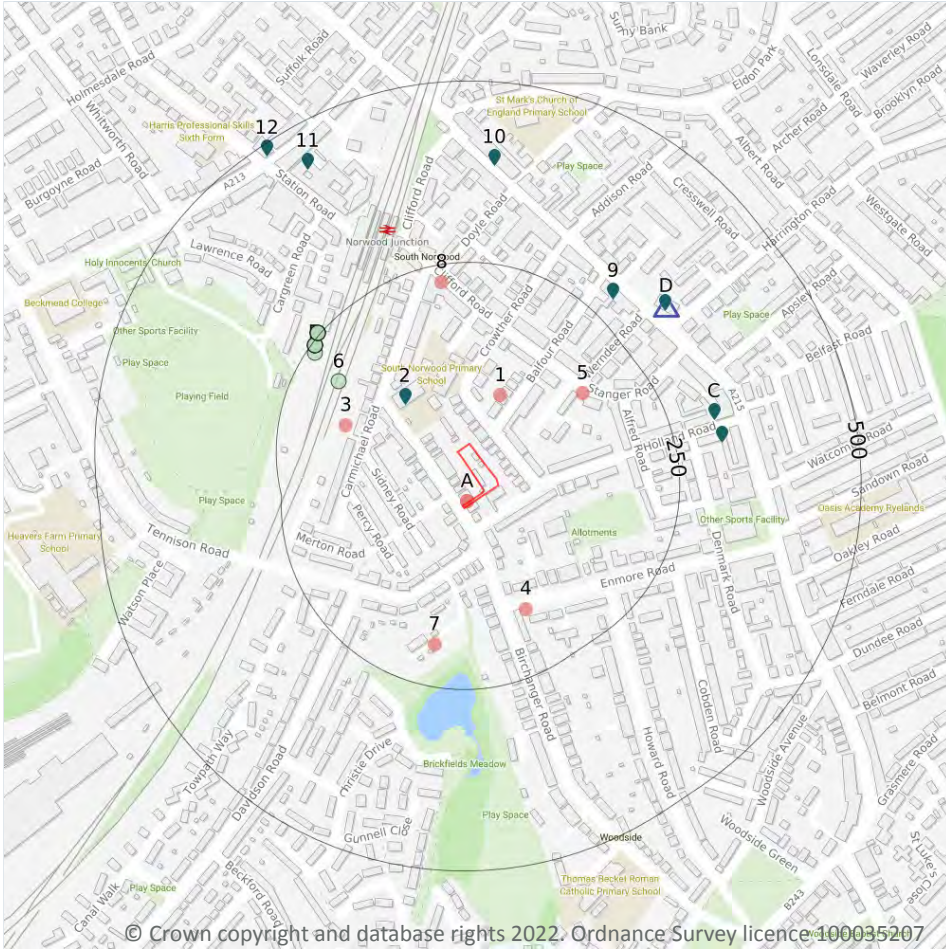


ID	Location	Site	Reference	Category	Sub-Category	Description
F	489m SW	-	WEX269418	Disposing of waste exemption	Not on a farm	Burning waste in the open
G	491m NW	4, HIGH STREET, LONDON, SE25 6EP	WEX032738	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
G	493m NW	3 High Street London SE25 6EP	EPR/UE5881B K/A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and de-naturing of controlled drugs for disposal
7	494m S	8, BECKET CLOSE, LONDON, SE25 5BL	WEX260041	Disposing of waste exemption	Not on a farm	Burning waste in the open

This data is sourced from the Environment Agency and Natural Resources Wales.



4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m

8

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 43**

ID	Location	Company	Address	Activity	Category
A	2m S	Birchanger Garage	35, Birchanger Road, South Norwood, London, Greater London, SE25 5BA	Secondhand Vehicles	Motoring
A	2m S	B L Transverse Mini Metro	Rear of 35 Birchanger Road, Croydon, London, Greater London, SE25 5BA	Vehicle Repair, Testing and Servicing	Repair and Servicing

ID	Location	Company	Address	Activity	Category
1	79m N	Domestic & Commercial Appliance Repairs	Flat 2 36, Balfour Road, South Norwood, London, Greater London, SE25 5JY	Electrical Equipment Repair and Servicing	Repair and Servicing
3	159m W	Electricity Sub Station	Greater London, SE25	Electrical Features	Infrastructure and Facilities
4	163m S	Electricity Sub Station	Greater London, SE25	Electrical Features	Infrastructure and Facilities
5	166m NE	Electricity Sub Station	Greater London, SE25	Electrical Features	Infrastructure and Facilities
7	192m S	Electricity Sub Station	Greater London, SE25	Electrical Features	Infrastructure and Facilities
8	226m N	Electricity Sub Station	Greater London, SE25	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m

1

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 43**

ID	Location	Company	Address	LPG	Status
D	330m NE	SHELL	123-127, Portland Road, South Norwood, London, Outer London, SE25 4UX	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m

0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.



4.4 Gas pipelines

Records within 500m	0
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High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0
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Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0
---------------------	---

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0
---------------------	---

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0
---------------------	---

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m

0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m

0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m

8

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 43**

ID	Location	Address	Details	
2	106m NW	Shell, Portland Rd, SE25 4UN	Process: Petrol Vapour Recovery Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
9	288m NE	Personal Touch, 94 Portland Road, South Norwood, London, SE25 4PJ	Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
C	313m E	S. J Norton Garage, 122-124 Portland Road, South Norwood, SE25 4PL	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
C	315m E	D & S Auto Solutions, 1 Holland Road, South Norwood, Croydon, SE25 5RF	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

ID	Location	Address	Details	
D	331m NE	South Norwood (Shell), 123-127 Portland Road, London, SE25 4UN	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
10	396m N	Williams Dry Cleaners, 33-37 Portland Road, South Norwood, London, SE25 4UF	Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
11	449m NW	Jayam's Auto Mobile, 5-7 Station Road, South Norwood, SE25 5AH	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
12	494m NW	Kings Dry Cleaners, 2A High Street, South Norwood, SE25 6EP	Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m

0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

12

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 43**

ID	Location	Details	
6	190m NW	Incident Date: 29/10/2003 Incident Identification: 198821 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
B	240m NW	Incident Date: 06/05/2003 Incident Identification: 156158 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)

ID	Location	Details	
B	245m NW	Incident Date: 25/06/2003 Incident Identification: 168703 Pollutant: Pollutant Not Identified Pollutant Description: Construction and Demolition Materials and Wastes Not Identified	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
B	245m NW	Incident Date: 25/06/2003 Incident Identification: 168703 Pollutant: Inert Materials and Wastes:Pollutant Not Identified Pollutant Description: Construction and Demolition Materials and Wastes:Not Identified	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
B	245m NW	Incident Date: 25/06/2003 Incident Identification: 168703 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
B	245m NW	Incident Date: 25/06/2003 Incident Identification: 168703 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
B	245m NW	Incident Date: 25/06/2003 Incident Identification: 168703 Pollutant: Inert Materials and Wastes : Pollutant Not Identified Pollutant Description: Construction and Demolition Materials and Wastes :Not Identified	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
B	252m NW	Incident Date: 13/01/2003 Incident Identification: 131527 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)
B	252m NW	Incident Date: 13/01/2003 Incident Identification: 131527 Pollutant: Inert Materials and Wastes Pollutant Description: Rocks and Gravel	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)
B	252m NW	Incident Date: 13/01/2003 Incident Identification: 131527 Pollutant: Inert Materials and Wastes:Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes:Rocks and Gravel	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)



ID	Location	Details	
B	252m NW	Incident Date: 13/01/2003 Incident Identification: 131527 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes Rocks and Gravel	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)
B	252m NW	Incident Date: 13/01/2003 Incident Identification: 131527 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes :Rocks and Gravel	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0
----------------------------	----------

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0
----------------------------	----------

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m	0
----------------------------	----------

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer

5.1 Superficial aquifer

Records within 500m

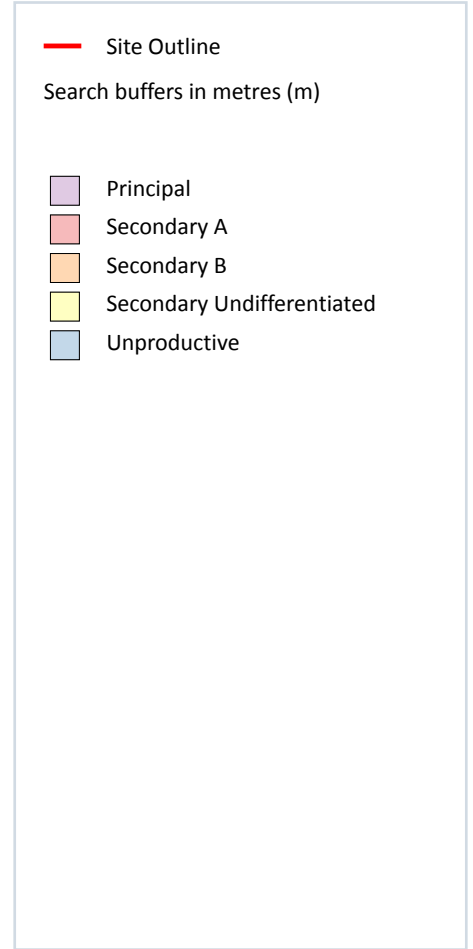
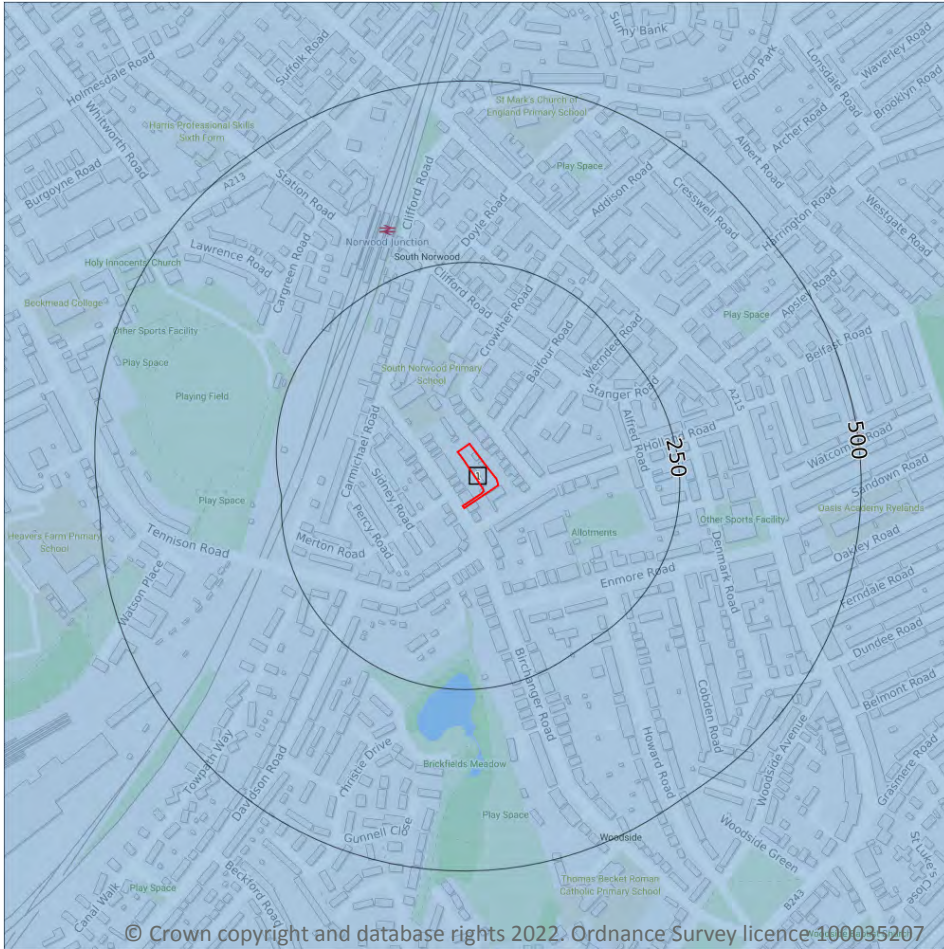
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Aquifer status of groundwater held within superficial geology.

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m

1

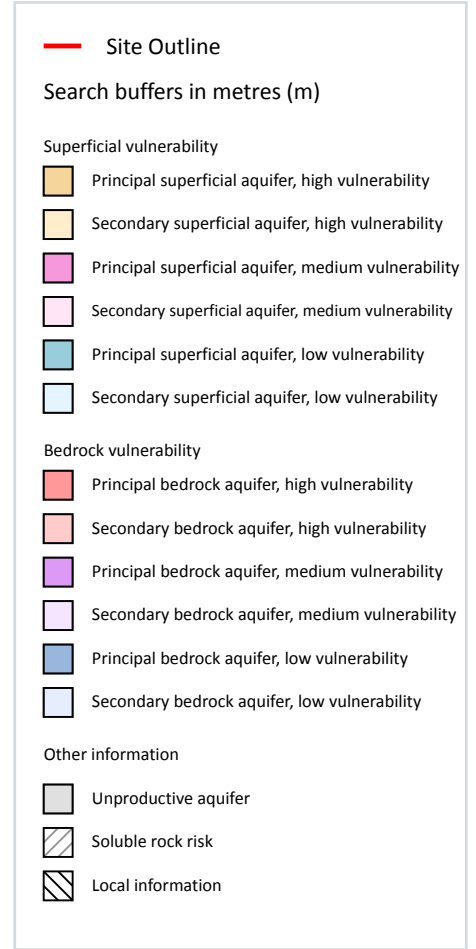
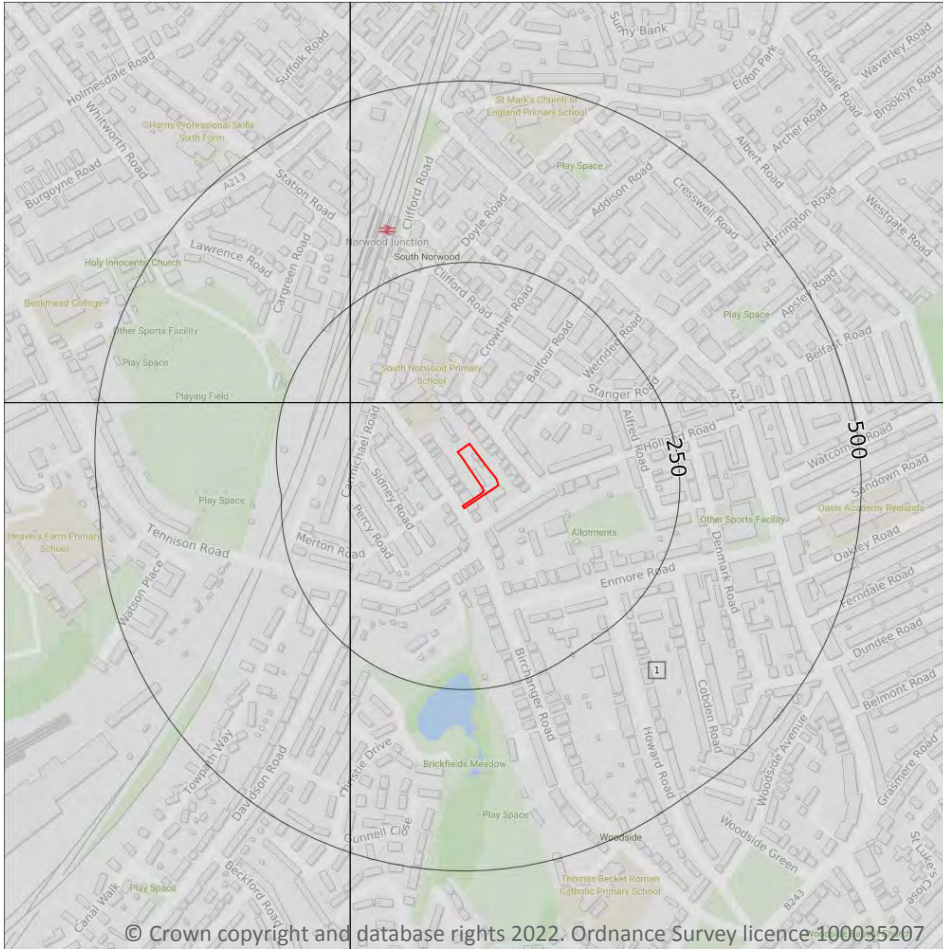
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 52**

ID	Location	Designation	Description
1	On site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 53**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: 300-550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Mixed

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0
------------------------	----------

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

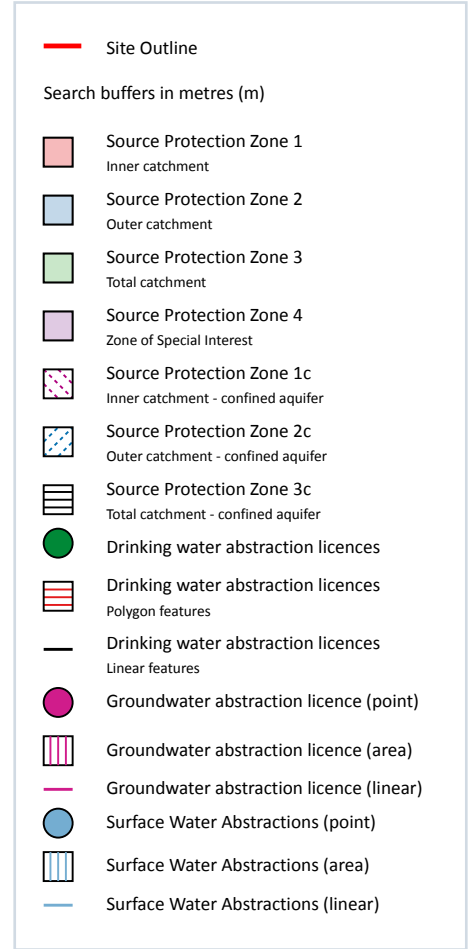
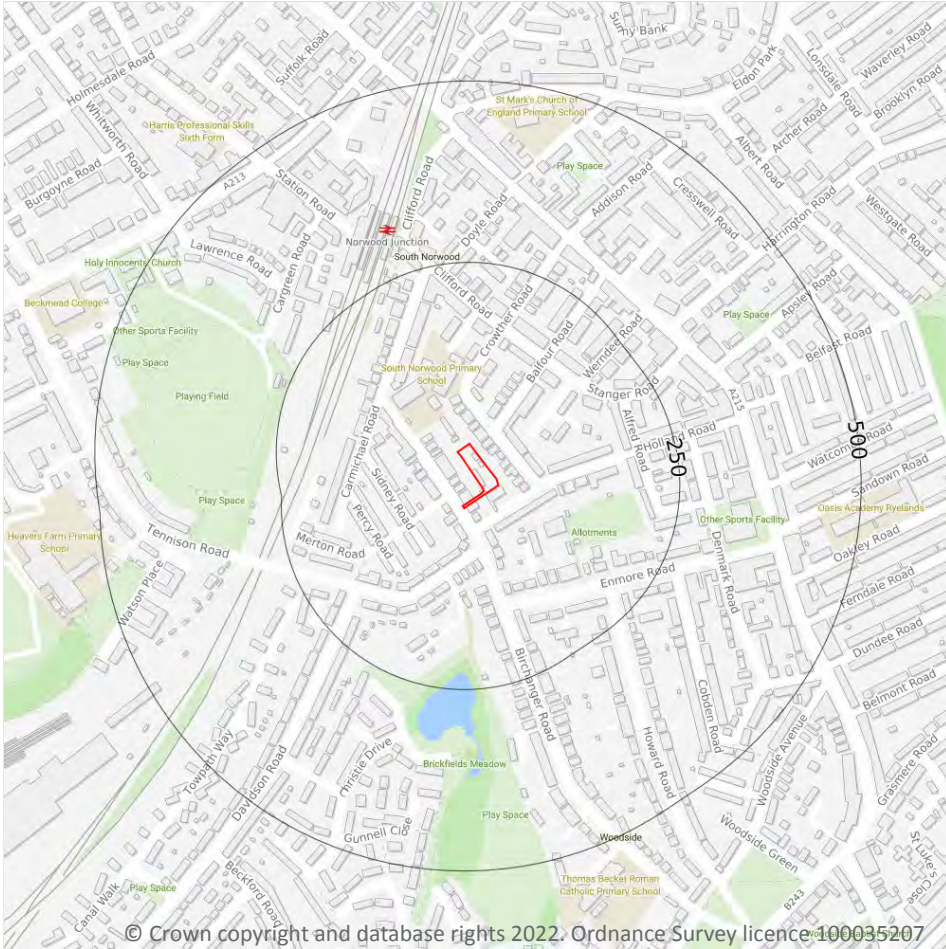
5.5 Groundwater vulnerability- local information

Records on site	0
------------------------	----------

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



5.6 Groundwater abstractions

Records within 2000m

3

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 55**

ID	Location	Details	
-	1525m W	Status: Historical Licence No: 28/39/41/0057 Details: Laundry Use Direct Source: THAMES GROUNDWATER Point: SUNLIGHT LAUNDRY, 226 WHITEHORSE ROAD, CROYDON - BOREHOLE Data Type: Point Name: Berendsen UK Limited Easting: 532700 Northing: 167400	Annual Volume (m ³): 54552 Max Daily Volume (m ³): 272.76 Original Application No: - Original Start Date: 28/07/1983 Expiry Date: - Issue No: 101 Version Start Date: 22/07/2013 Version End Date: -
-	1555m W	Status: Historical Licence No: 28/39/M/0004 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: SELHURST EMERGENCY PUMPING STATION Data Type: Point Name: THAMES WATER UTILITIES LTD Easting: 532700 Northing: 168500	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 11/12/1972 Expiry Date: - Issue No: 100 Version Start Date: 11/12/1972 Version End Date: -
-	1555m W	Status: Active Licence No: 28/39/41/0011 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: SELHURST EMERGENCY PUMPING STATION Data Type: Point Name: Thames Water Utilities Ltd Easting: 532700 Northing: 168500	Annual Volume (m ³): 1,327,140 Max Daily Volume (m ³): 3,636 Original Application No: - Original Start Date: 04/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 14/07/2014 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m

0

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.



5.8 Potable abstractions

Records within 2000m

2

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 55**

ID	Location	Details	
-	1555m W	Status: Historical Licence No: 28/39/M/0004 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: SELHURST EMERGENCY PUMPING STATION Data Type: Point Name: THAMES WATER UTILITIES LTD Easting: 532700 Northing: 168500	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 11/12/1972 Expiry Date: - Issue No: 100 Version Start Date: 11/12/1972 Version End Date: -
-	1555m W	Status: Active Licence No: 28/39/41/0011 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: SELHURST EMERGENCY PUMPING STATION Data Type: Point Name: Thames Water Utilities Ltd Easting: 532700 Northing: 168500	Annual Volume (m ³): 1,327,140 Max Daily Volume (m ³): 3,636 Original Application No: - Original Start Date: 04/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 14/07/2014 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m

0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m

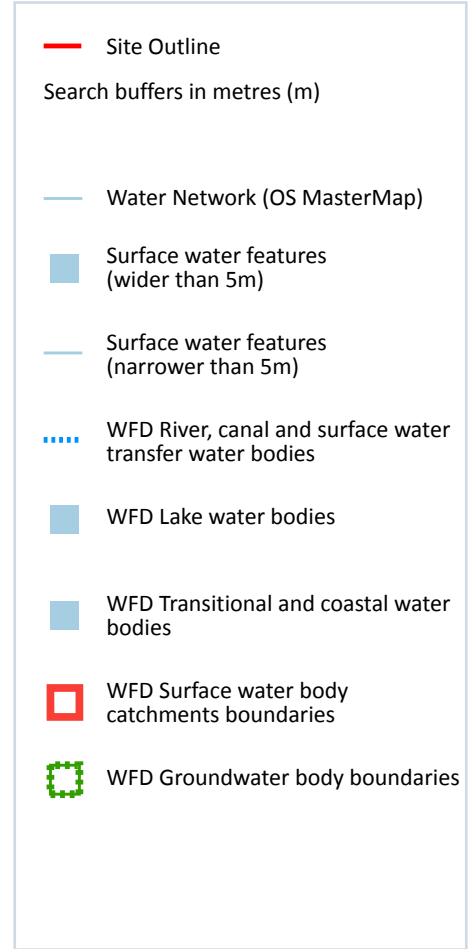
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Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.



6 Hydrology



6.1 Water Network (OS MasterMap)

Records within 250m

0

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

1

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 58**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1
------------------------	----------

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 58**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	On site	River	Pool River	GB106039023250	Ravensbourne	London

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1
---------------------------	----------

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 58**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	3260m NE	River	Pool River	GB106039023250	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site

0

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.



7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m

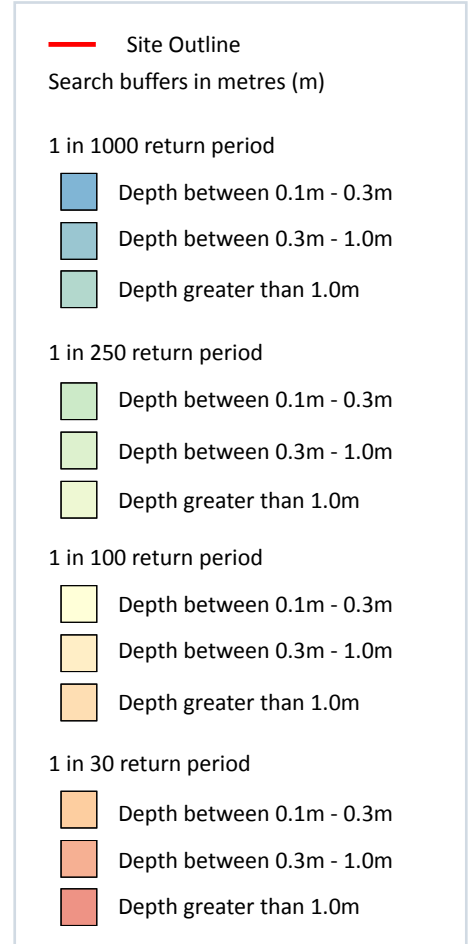
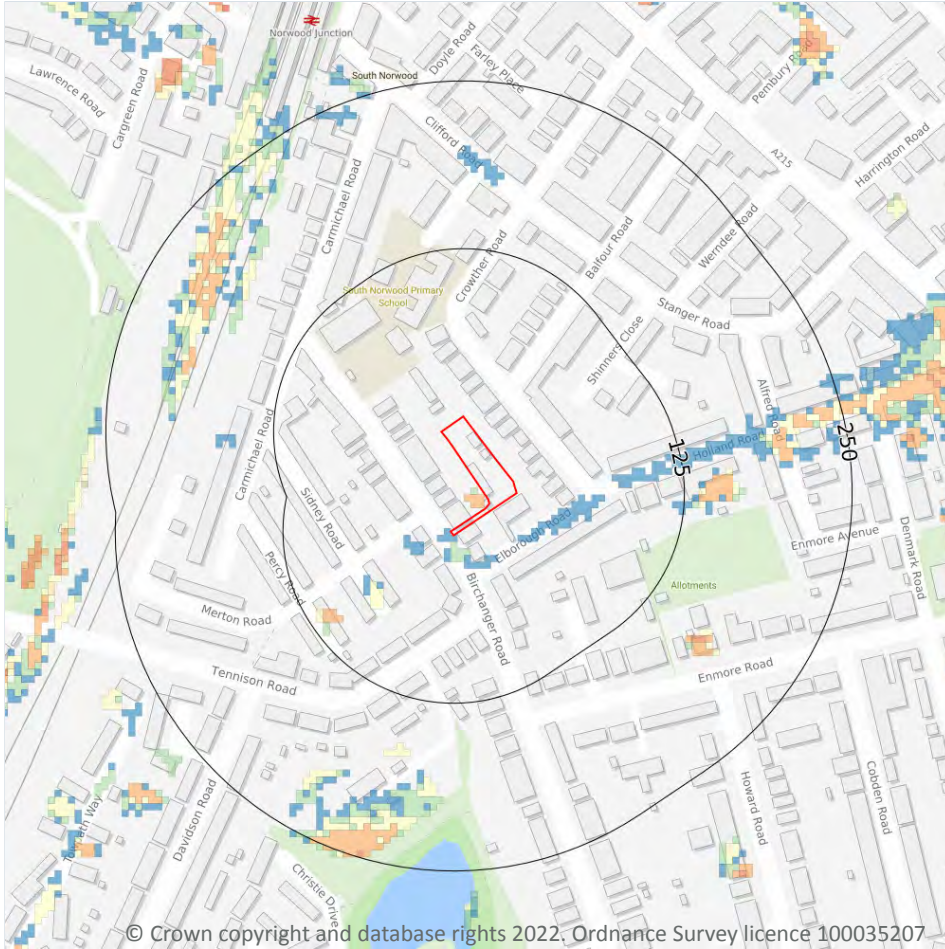
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Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

1 in 1000 year, 0.1m - 0.3m

Highest risk within 50m

1 in 30 year, 0.1m - 0.3m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 64**

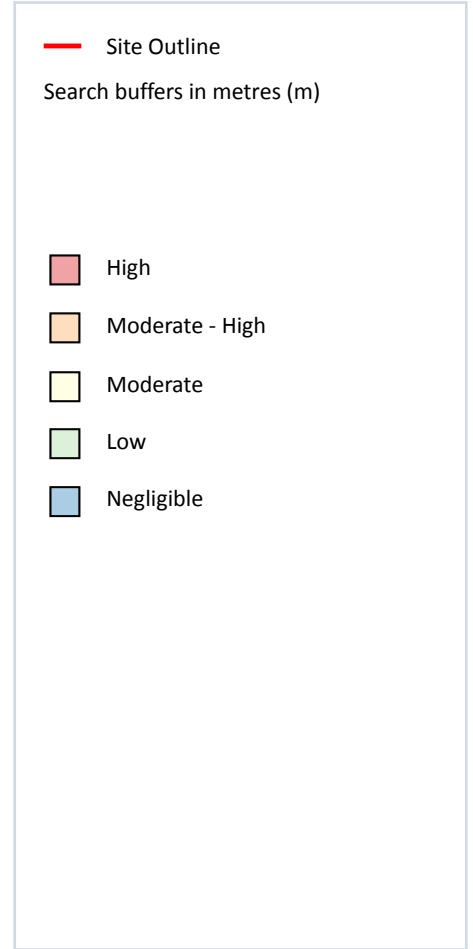
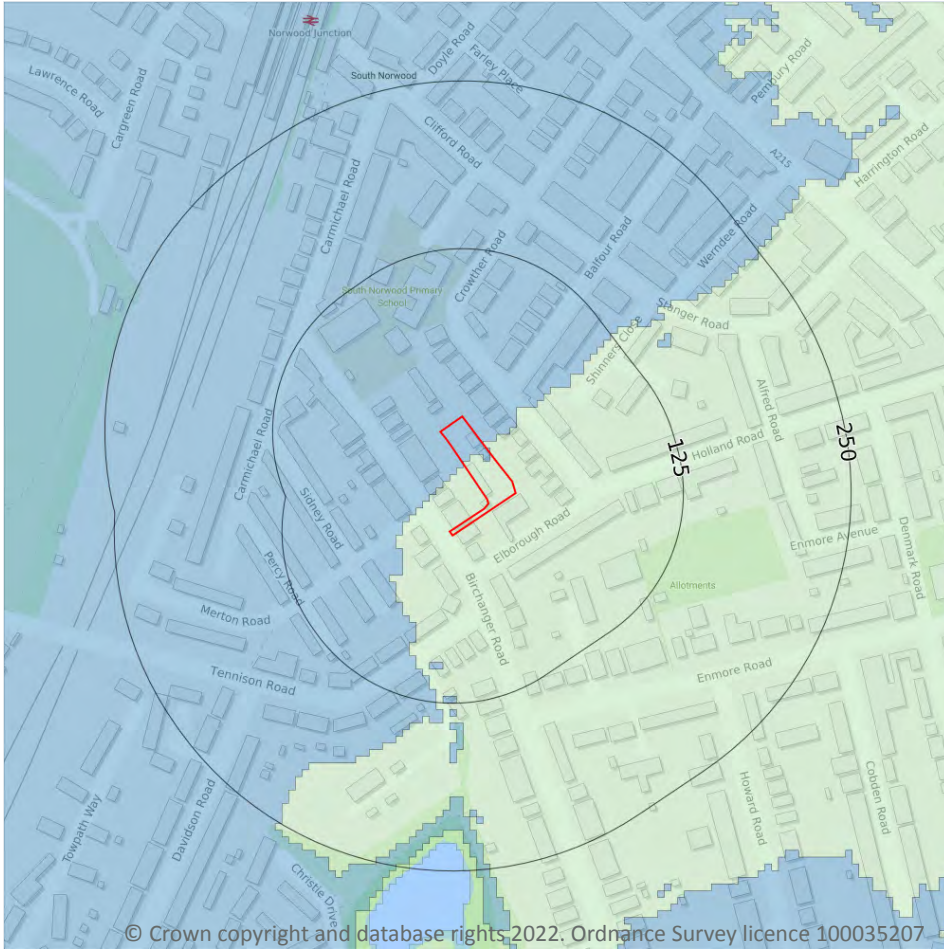
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Low

Highest risk within 50m

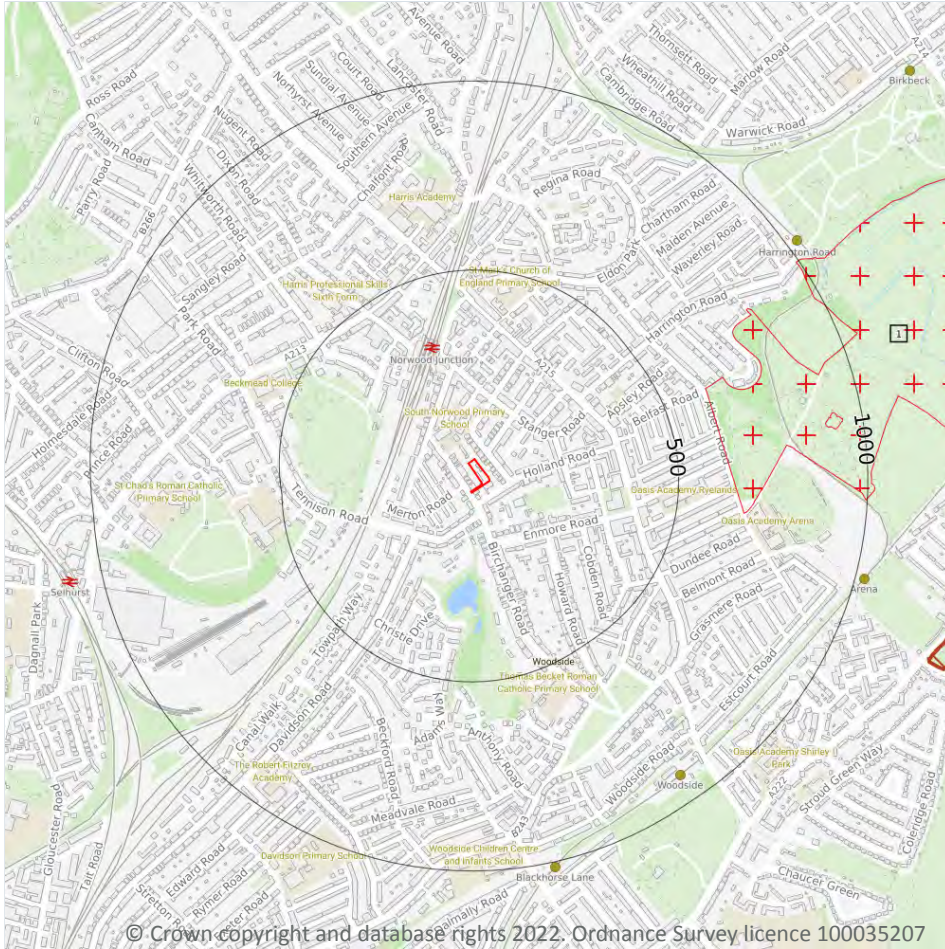
Low

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 66**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



10.6 Local Nature Reserves (LNR)

Records within 2000m**1**

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

Features are displayed on the Environmental designations map on **page 67**

ID	Location	Name	Data source
1	618m E	South Norwood Country Park	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m**2**

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 67**

ID	Location	Name	Woodland Type
A	1253m E	Unknown	Ancient & Semi-Natural Woodland
-	1343m E	Unknown	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m**0**

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m

0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m

0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.



10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m

0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

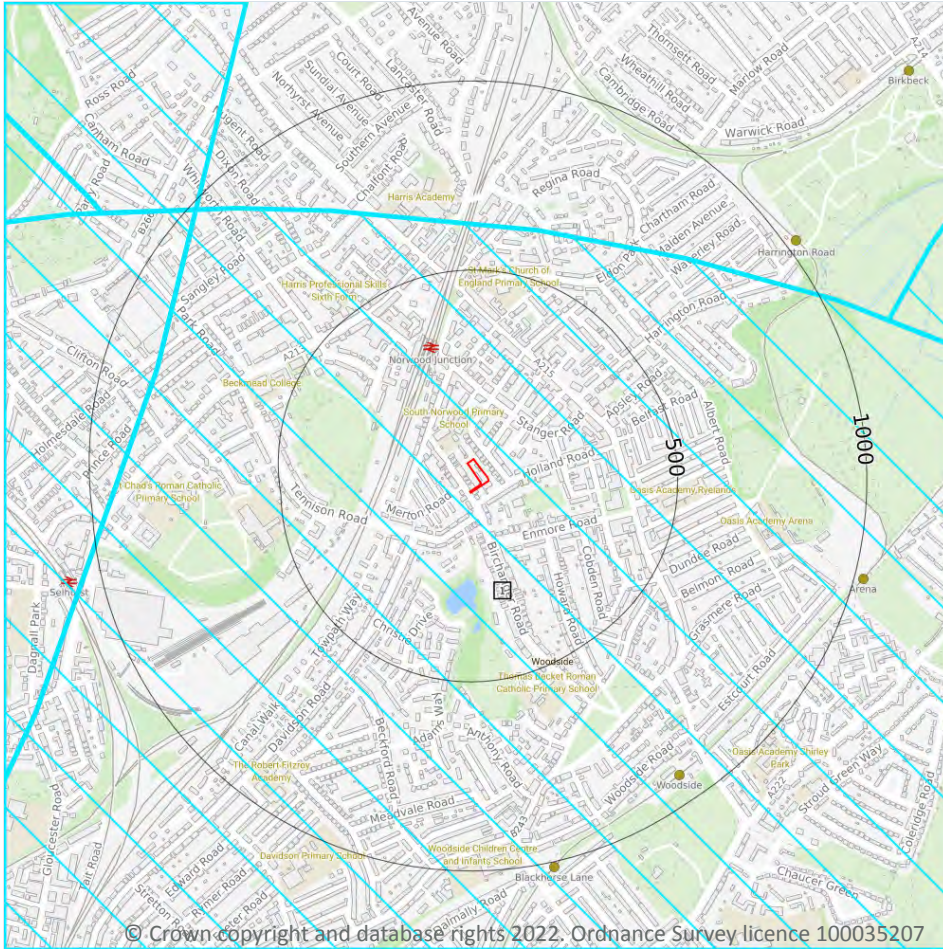
1

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
1080m SW	Wandle (Croydon to Wandsworth) and the R. Gravney NVZ	Surface Water	464	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



- Site Outline
- Search buffers in metres (m)
- SSSI Impact Risk Zones
- SSSI Units
- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site

1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 72**

ID	Location	Type of developments requiring consultation
1	On site	Infrastructure - Airports, helipads and other aviation proposals. Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m², manure stores > 3500t.

This data is sourced from Natural England.



10.18 SSSI Units

Records within 2000m

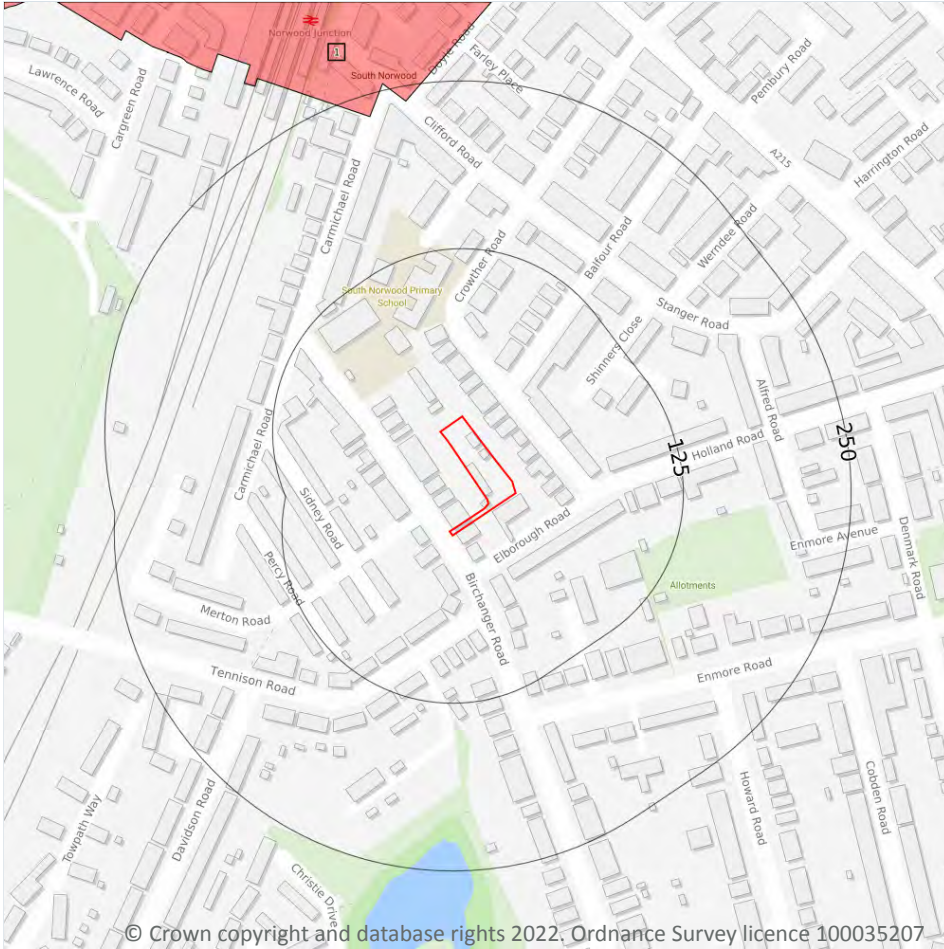
0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.



11 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m

1

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.



Features are displayed on the Visual and cultural designations map on **page 74**

ID	Location	Name	District	Date of designation
1	234m N	South Norwood	Croydon	11/1992

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m

0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

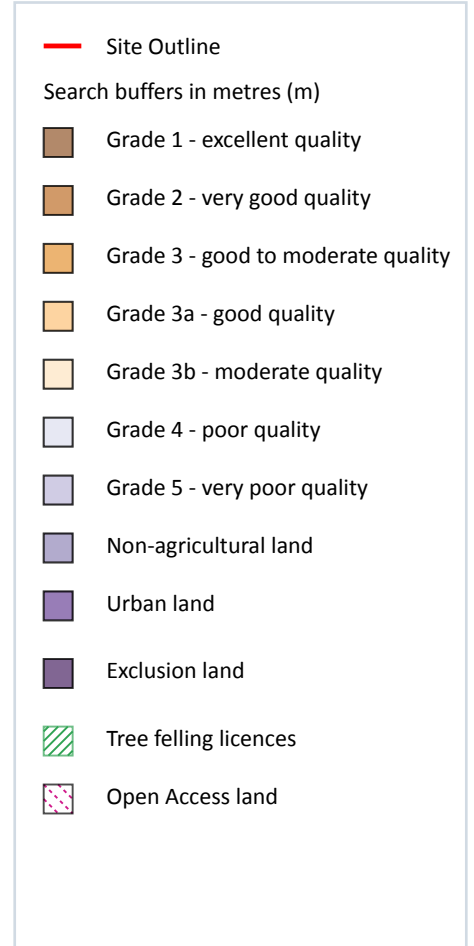
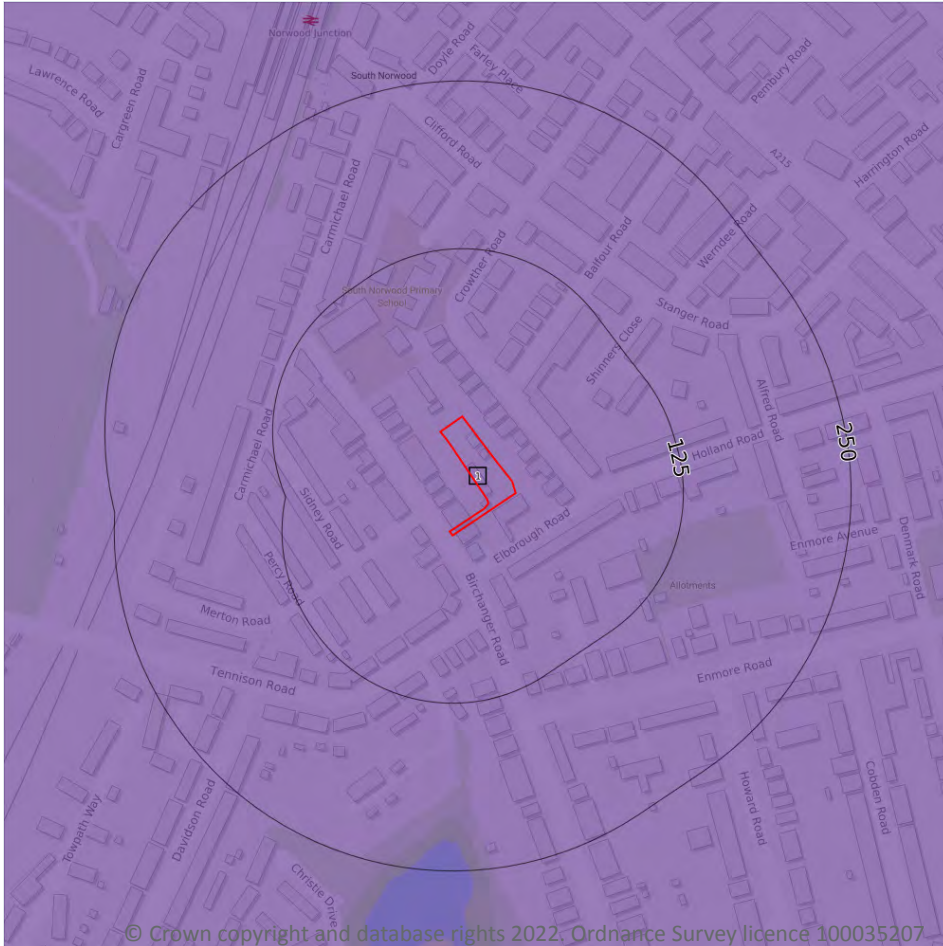
Records within 250m

0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



12.1 Agricultural Land Classification

Records within 250m

1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 77**

ID	Location	Classification	Description
----	----------	----------------	-------------

1	On site	Urban	-
---	---------	-------	---

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m

0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m

0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m

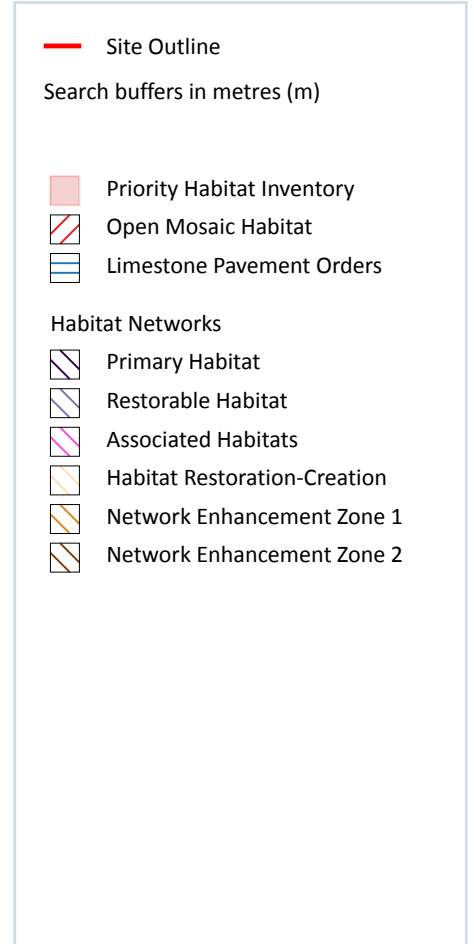
0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.



13 Habitat designations



13.1 Priority Habitat Inventory

Records within 250m

0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

1

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

Features are displayed on the Habitat designations map on **page 79**

ID	Location	Site reference	Identification confidence	Primary source	Secondary source	Tertiary source
1	187m S	Woodside brickworks	Medium	BugLife All Of A Buzz Data	Environment Agency Historic Landfill Sites	-

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



14.1 10k Availability

Records within 500m

1

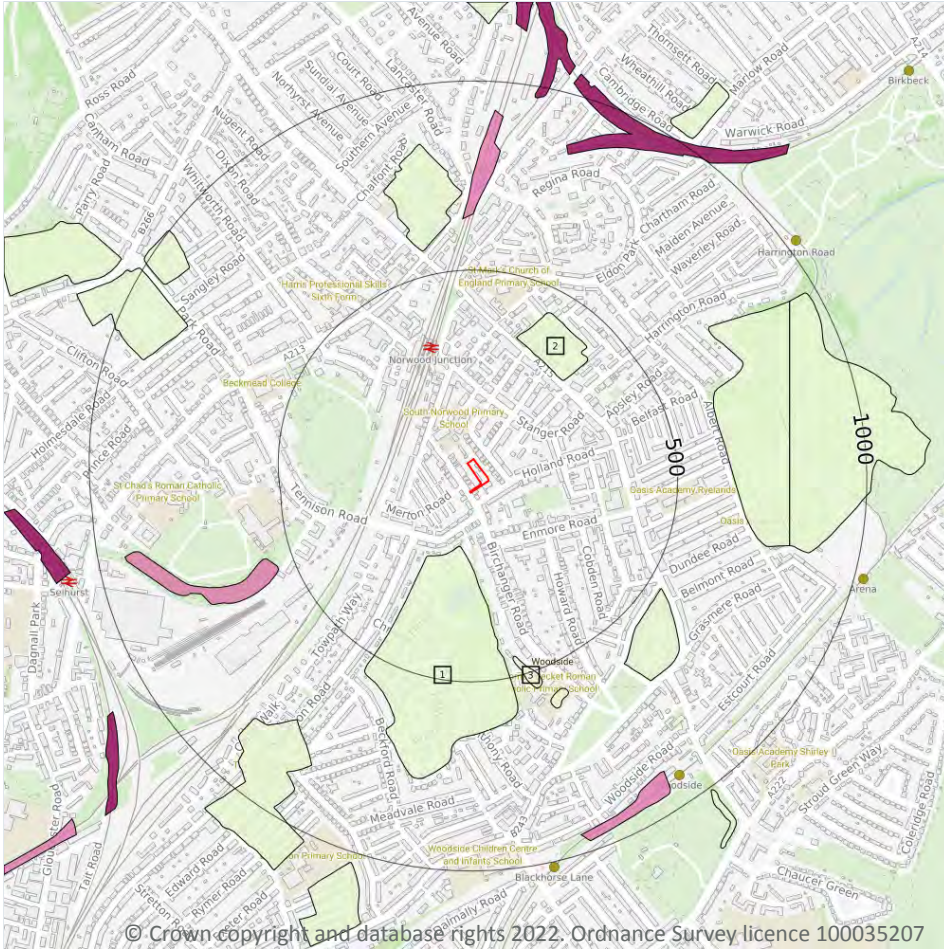
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 81**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	No coverage	TQ36NW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



— Site Outline
Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m

3

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 82**

ID	Location	LEX Code	Description	Rock description
1	145m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
2	312m NE	WMGR-ARTDP	Infilled Ground	Artificial Deposit
3	447m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m

0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

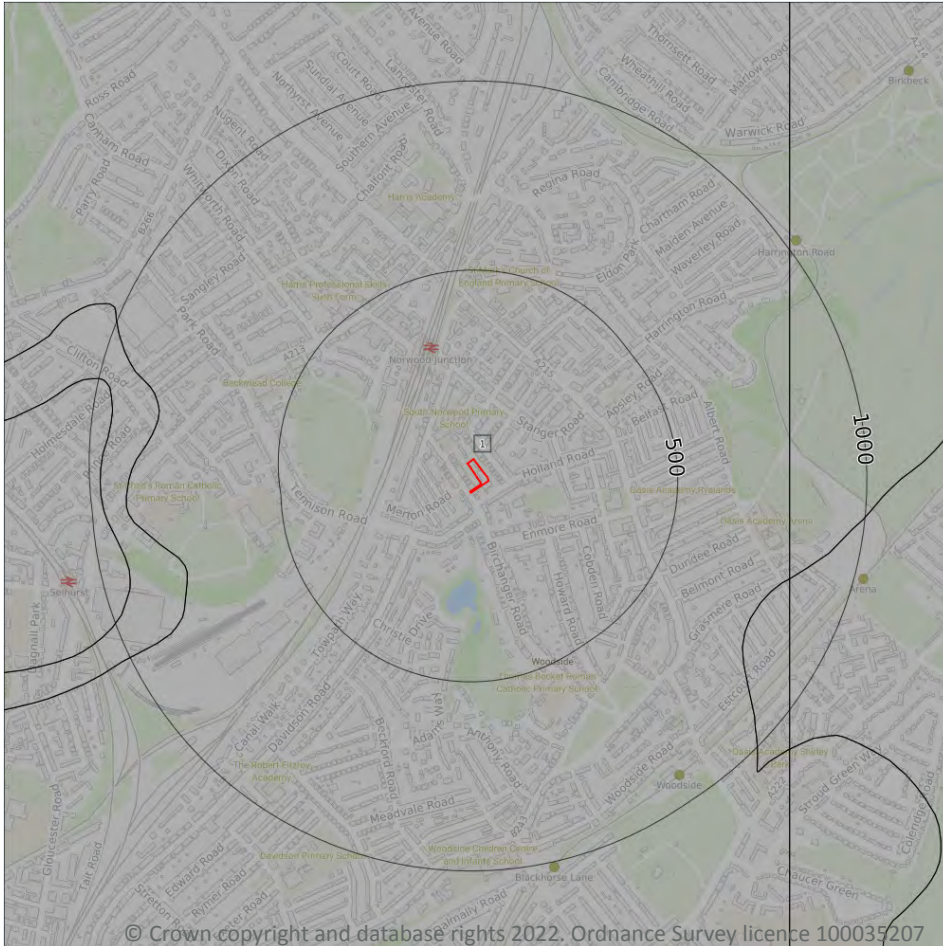
0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (10k)
- Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

1

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 84**

ID	Location	LEX Code	Description	Rock age
1	On site	LC-CLAY	London Clay Formation - Clay	Eocene Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

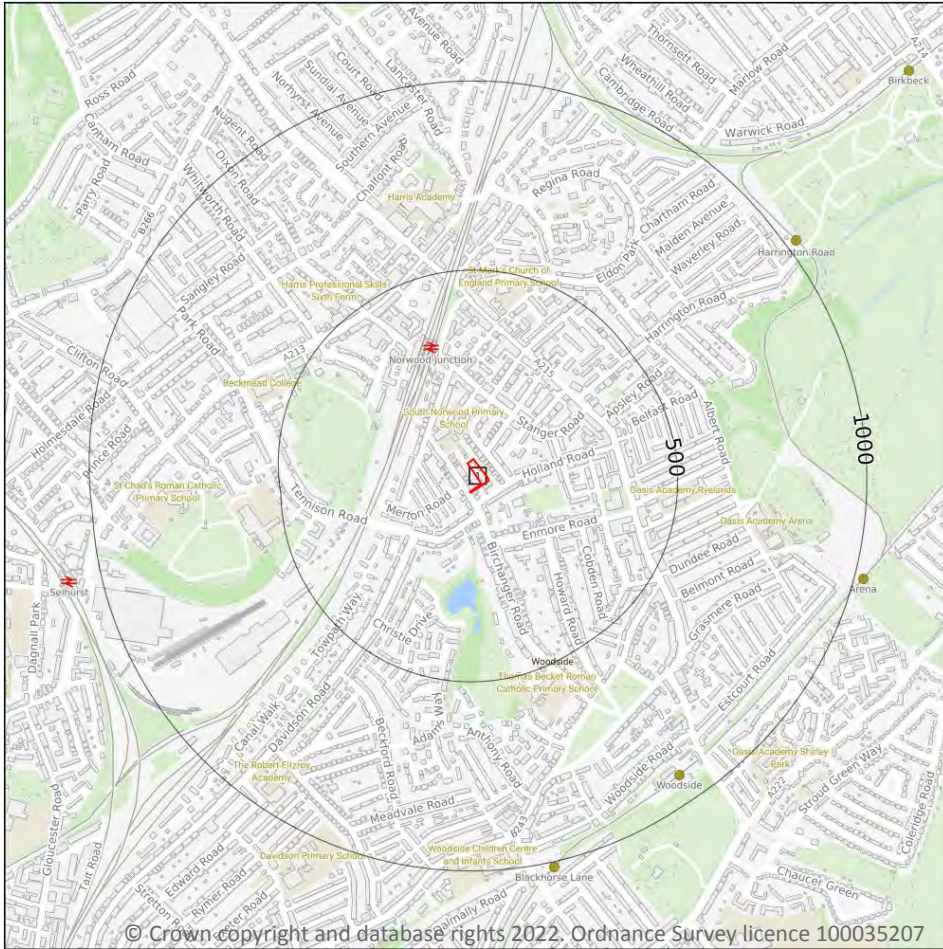
0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline
Search buffers in metres (m)

□ Geological map tile

15.1 50k Availability

Records within 500m

1

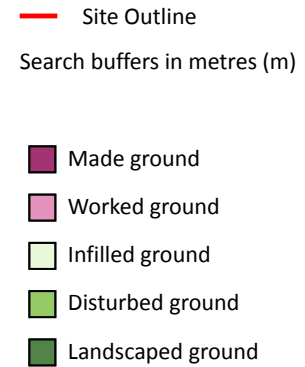
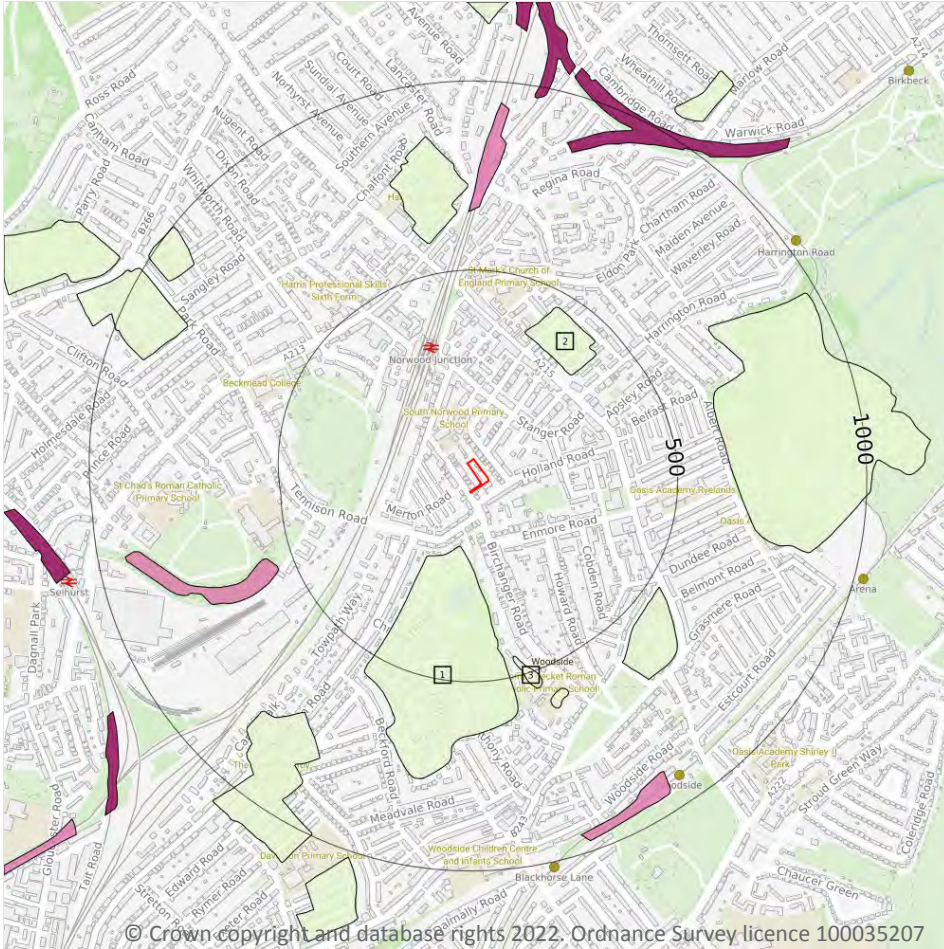
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 86**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	EW270_south_london_v4

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



15.2 Artificial and made ground (50k)

Records within 500m

3

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 87**

ID	Location	LEX Code	Description	Rock description
1	145m S	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
2	337m NE	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
3	447m S	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.



15.3 Artificial ground permeability (50k)

Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial

15.4 Superficial geology (50k)

Records within 500m

0

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m

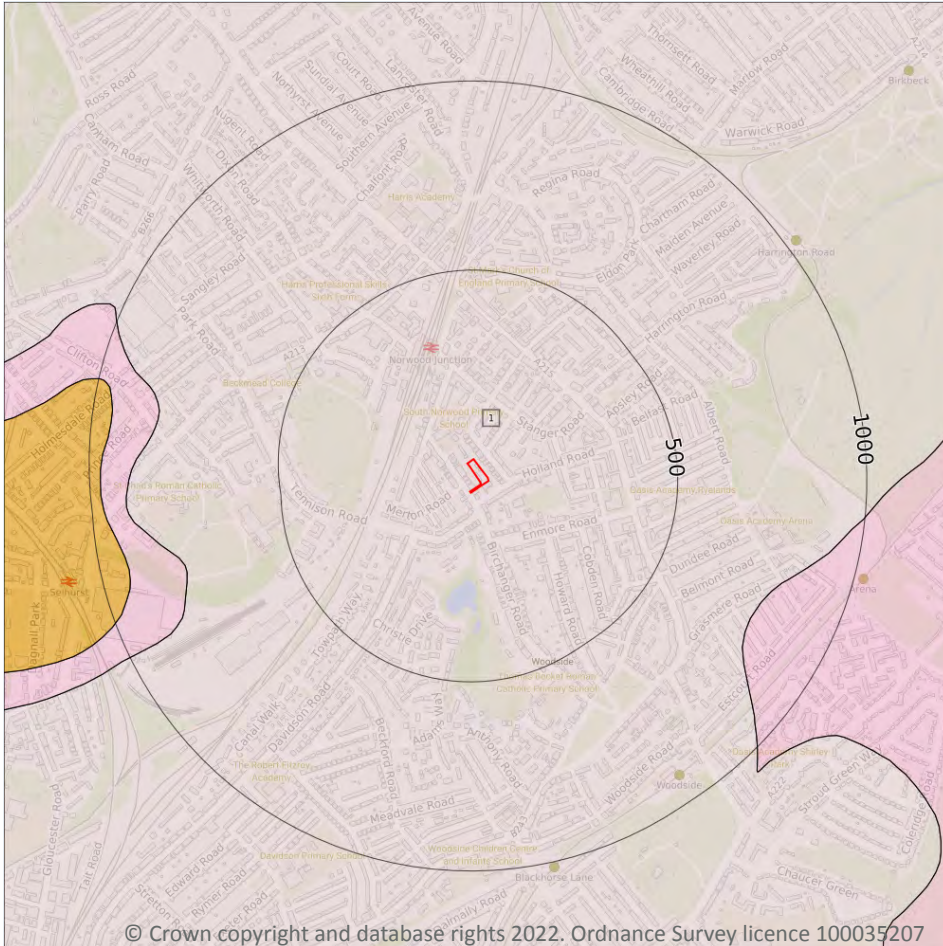
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 90**

ID	Location	LEX Code	Description	Rock age
1	On site	LC-XCZ	LONDON CLAY FORMATION - CLAY AND SILT	YPRESIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	Low	Very Low

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	0
----------------------------	----------

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



— Site Outline
 Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m

1

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

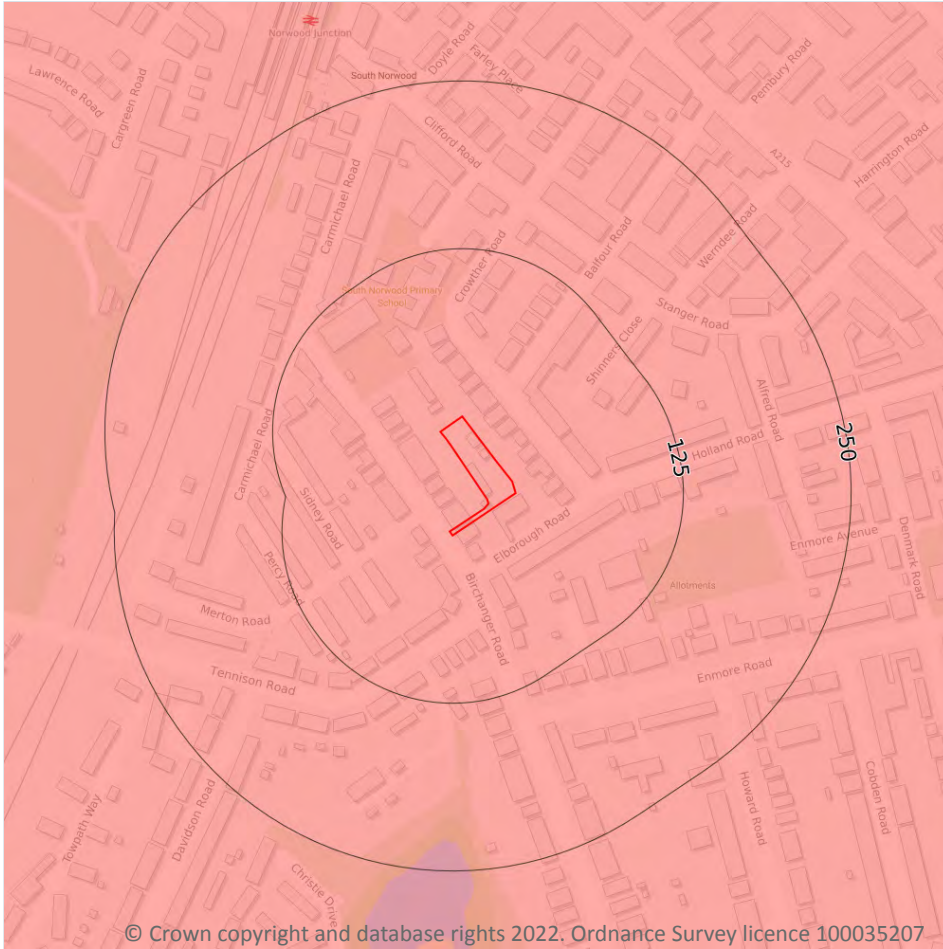
Features are displayed on the Boreholes map on **page 92**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	245m SW	533930 167760	NORWOOD JUNCTION TENNISON RD BRIDGE 3	4.26	N	596286

This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



— Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

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17.1 Shrink swell clays

Records within 50m

1

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

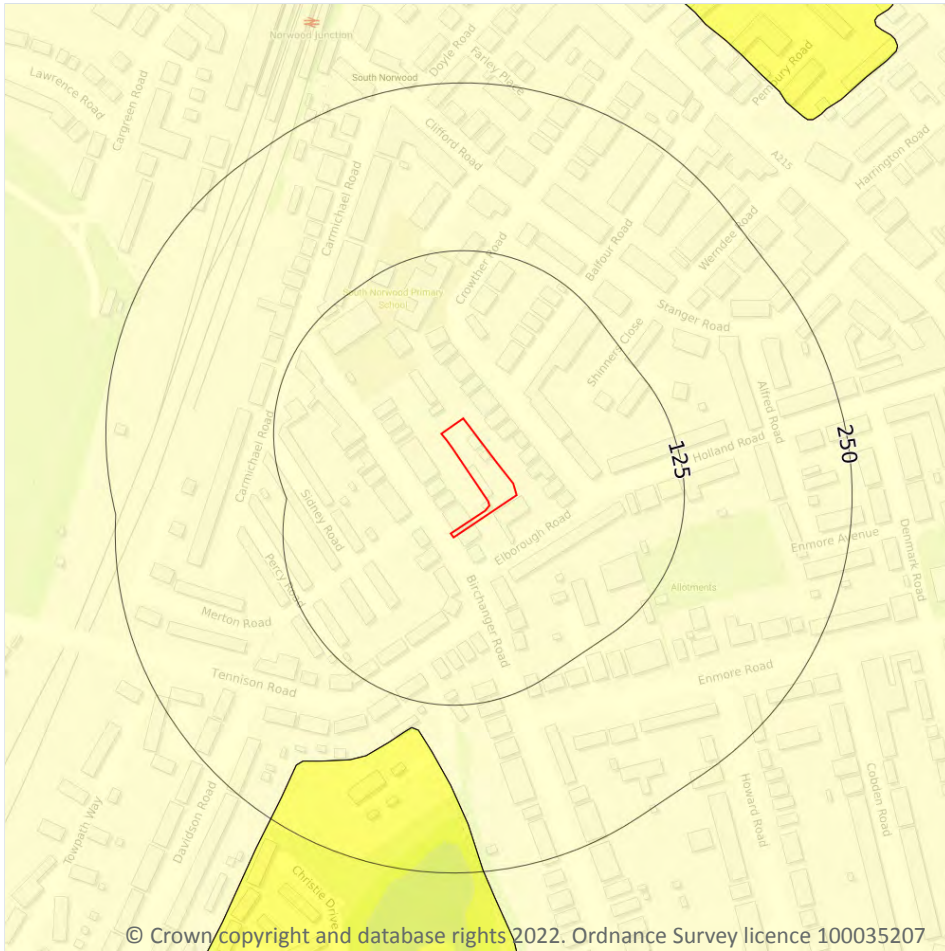
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 93**

Location	Hazard rating	Details
On site	Moderate	Ground conditions predominantly high plasticity.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Running sands



— Site Outline
 Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m

1

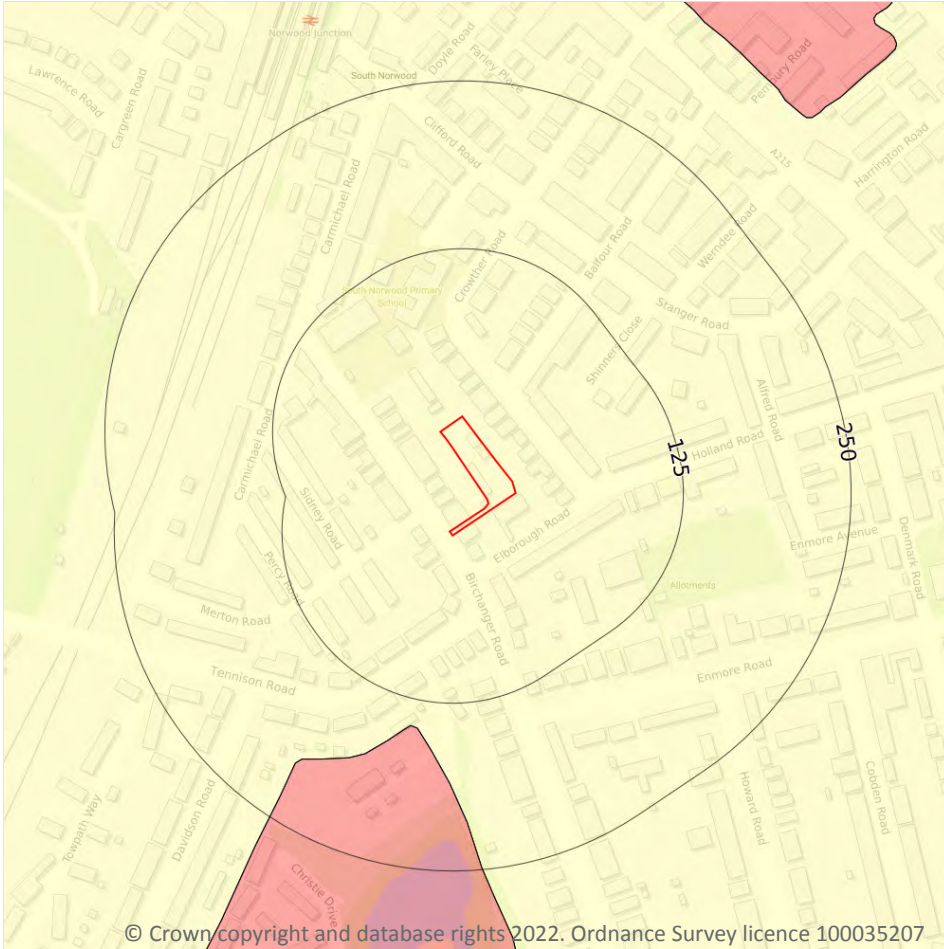
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 94**

Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



— Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m

1

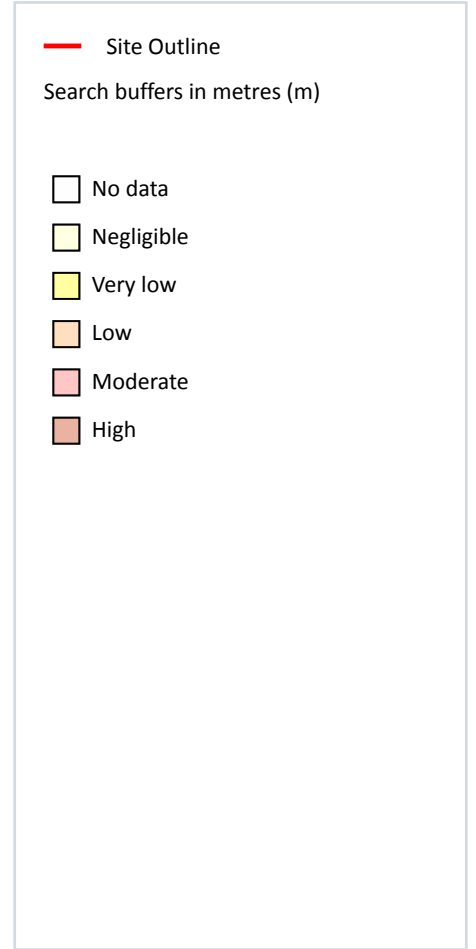
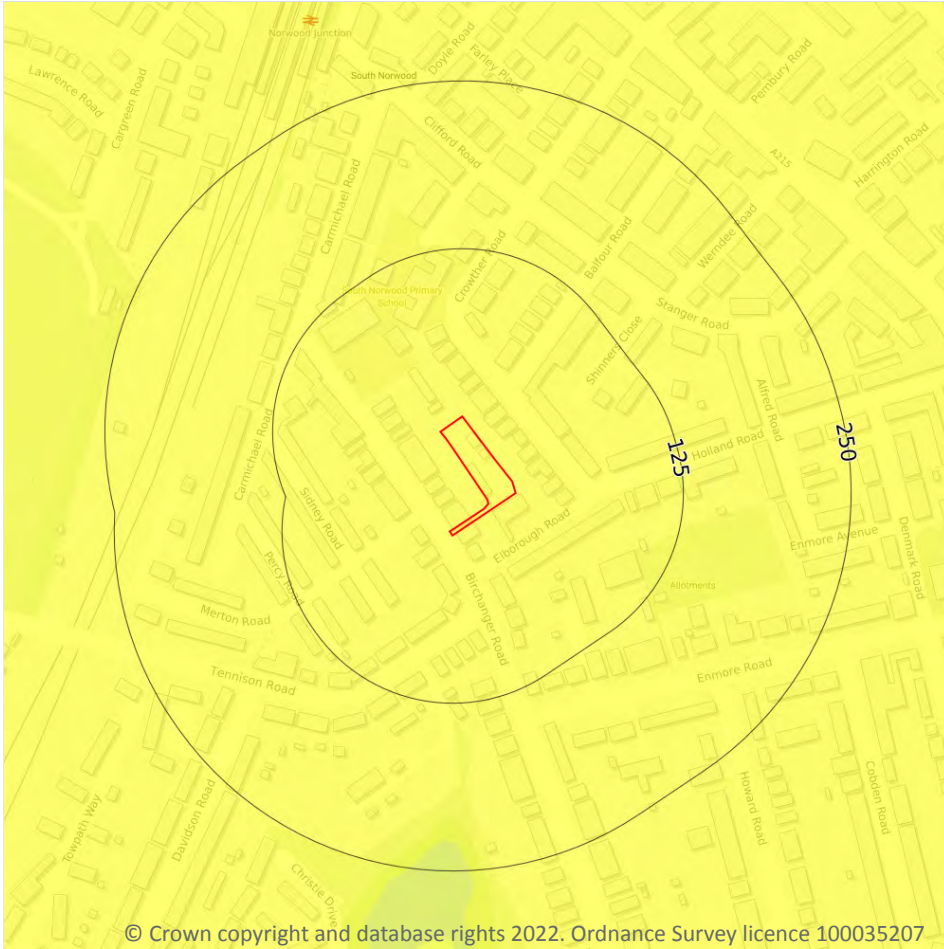
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 95**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



17.4 Collapsible deposits

Records within 50m

1

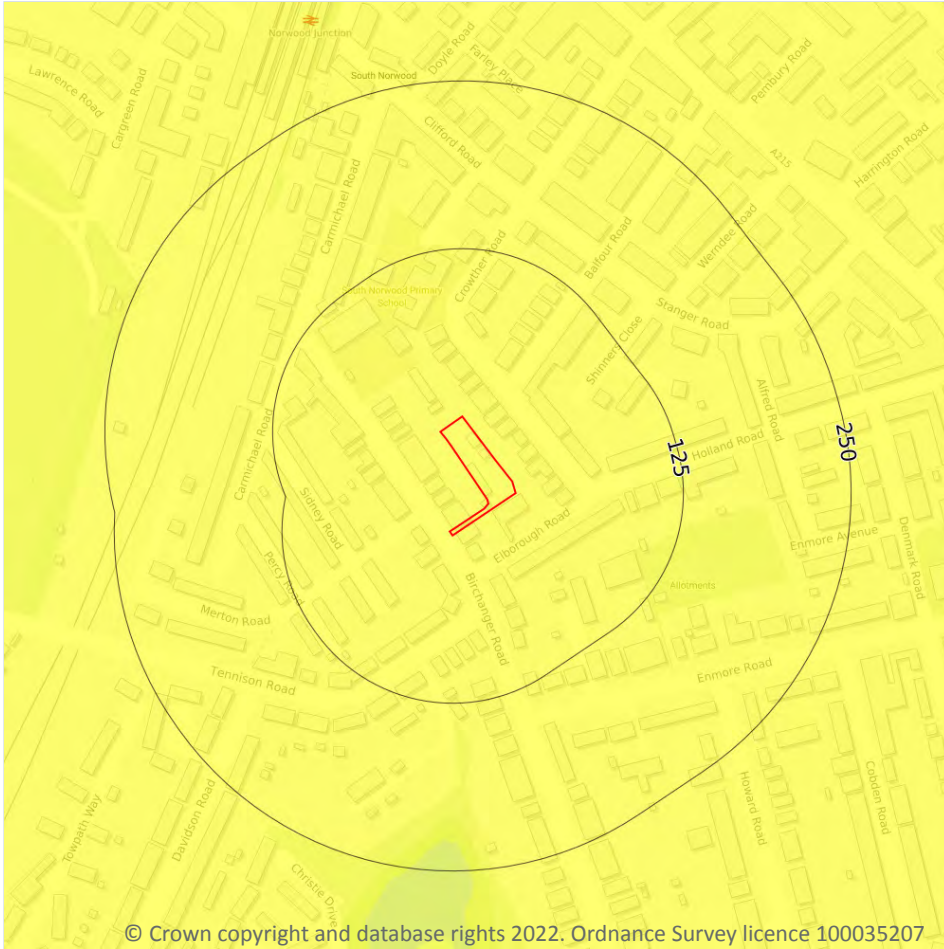
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 96**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



— Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m

1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 97**

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



— Site Outline
 Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m

1

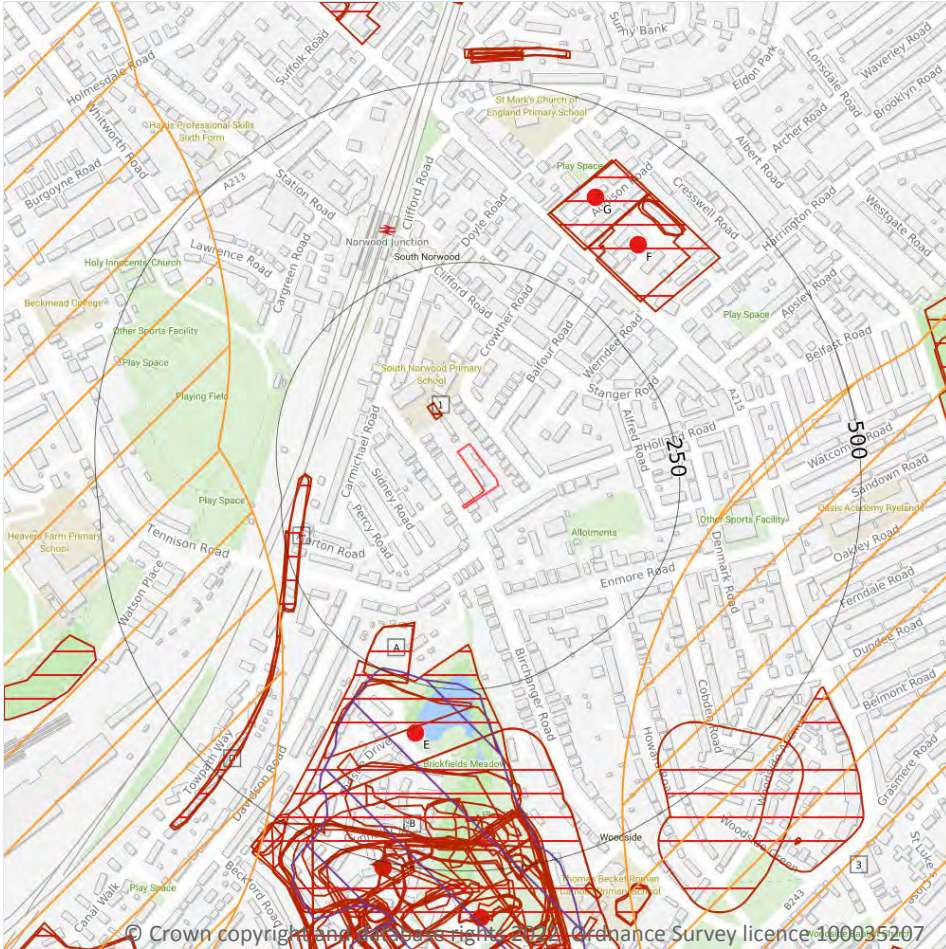
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 98**

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m

3

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 99**

ID	Location	Details	Description
E	316m S	Name: Woodside Brickworks Address: Woodside, CROYDON, Surrey Commodity: Clay & Shale Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
F	359m NE	Name: South Norwood Brick Field Address: South Norwood, LONDON, Greater London Commodity: Clay & Shale Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
G	381m NE	Name: South Norwood Brick Field Address: South Norwood, LONDON, Greater London Commodity: Clay & Shale Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

7

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 99**

ID	Location	Land Use	Year of mapping	Mapping scale
1	54m NW	Pond	1895	1:10560
A	172m SW	Unspecified Ground Workings	1974	1:10000



ID	Location	Land Use	Year of mapping	Mapping scale
A	177m SW	Unspecified Ground Workings	1981	1:10000
B	188m S	Disused Workings	1981	1:10000
C	205m W	Unspecified Heap	1872	1:10560
C	209m W	Unspecified Heap	1871	1:10560
D	242m W	Old Canal	1871	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

1

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

Features are displayed on the Mining, ground workings and natural cavities map on **page 99**

ID	Location	Site Name	Mineral	Type	Planning Status	Planning Status Date
B	242m S	Woodside Brickworks	Brick clay	Surface mineral working	Refused	Not available

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

3

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).



Features are displayed on the Mining, ground workings and natural cavities map on **page 99**

ID	Location	Name	Commodity	Class	Likelihood
2	278m SW	Not available	Chalk	C	Small scale underground mining may have occurred; mine adits, shafts and tunnels may be present. Potential for localised difficult ground conditions are at a level where they should be considered
3	282m SE	Not available	Chalk	C	Small scale underground mining may have occurred; mine adits, shafts and tunnels may be present. Potential for localised difficult ground conditions are at a level where they should be considered
-	796m E	Not available	Chalk	C	Small scale underground mining may have occurred; mine adits, shafts and tunnels may be present. Potential for localised difficult ground conditions are at a level where they should be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m

0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site

0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site

0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.



18.10 Brine areas

Records on site	0
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The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

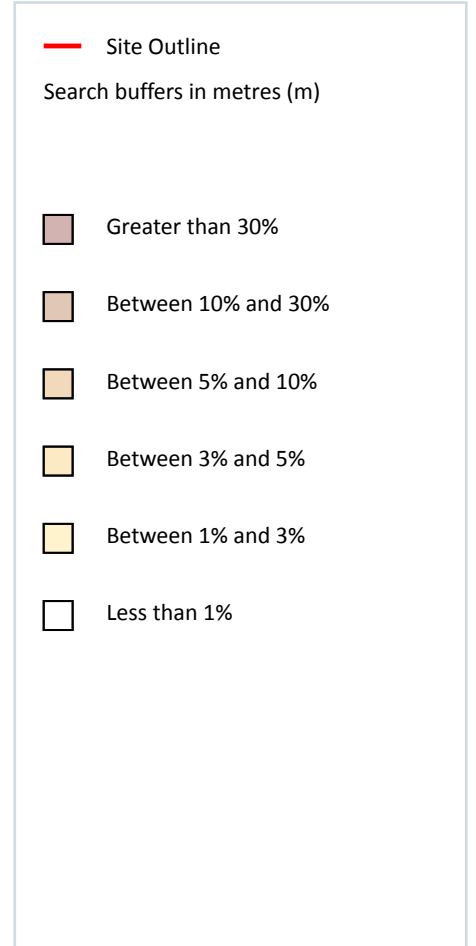
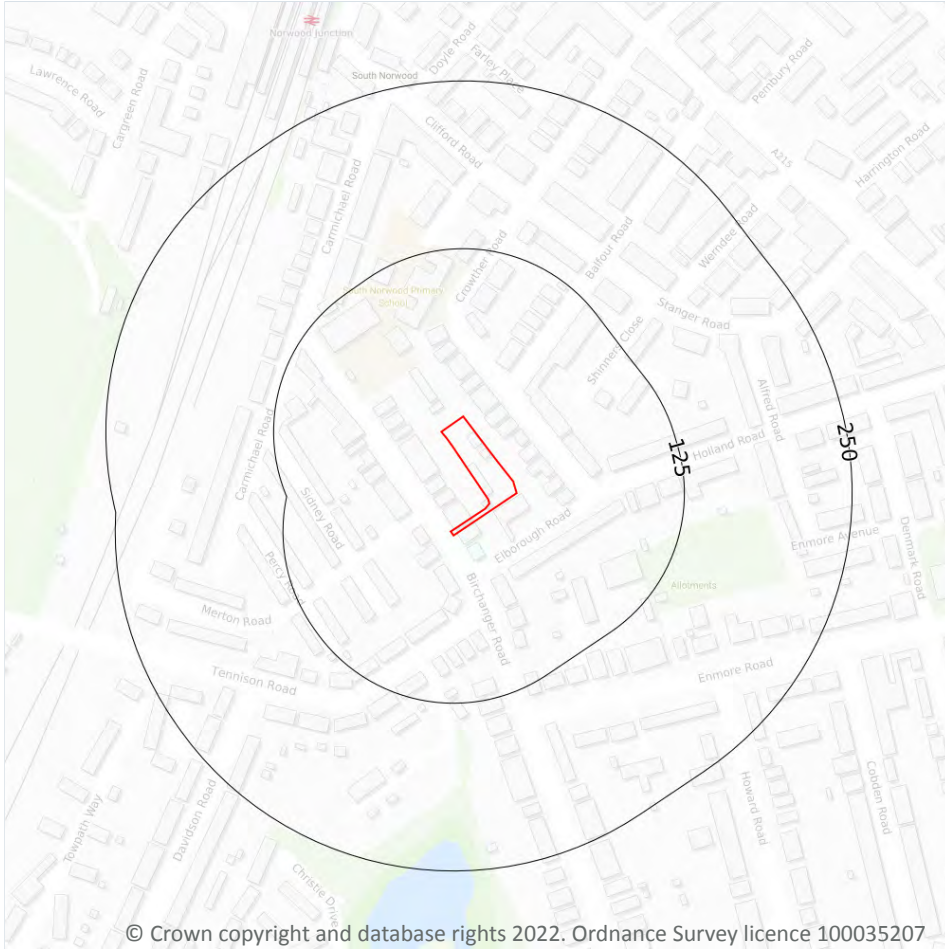
18.13 Clay mining

Records on site	0
-----------------	---

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 104**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

1

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	No data	No data	No data	No data	No data	No data	No data

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

5

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
On site	16	2.8	140	96	0.6	84	65	29	16
On site	17	3	130	89	0.5	90	58	36	16
On site	17	3	147	101	0.5	91	59	36	17
2m E	17	3	159	109	0.8	87	62	31	18
48m W	15	2.6	139	95	0.5	78	65	26	15

This data is sourced from the British Geological Survey.



20.3 BGS Measured Urban Soil Chemistry

Records within 50m

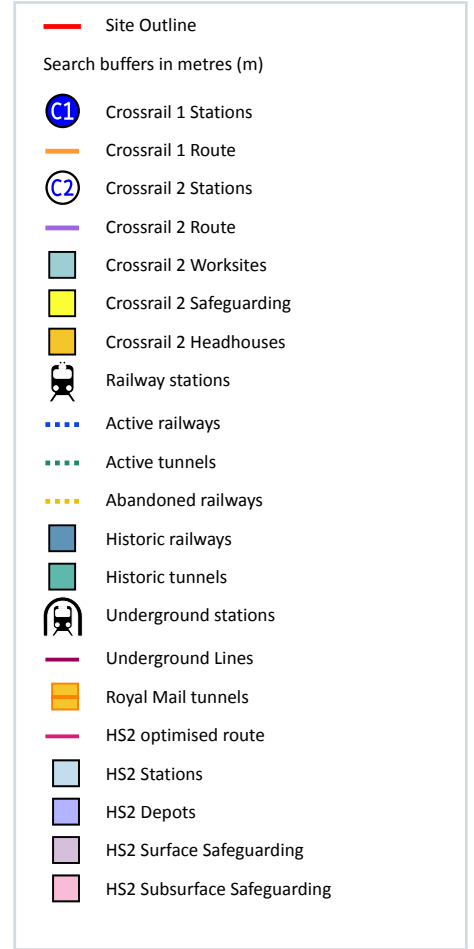
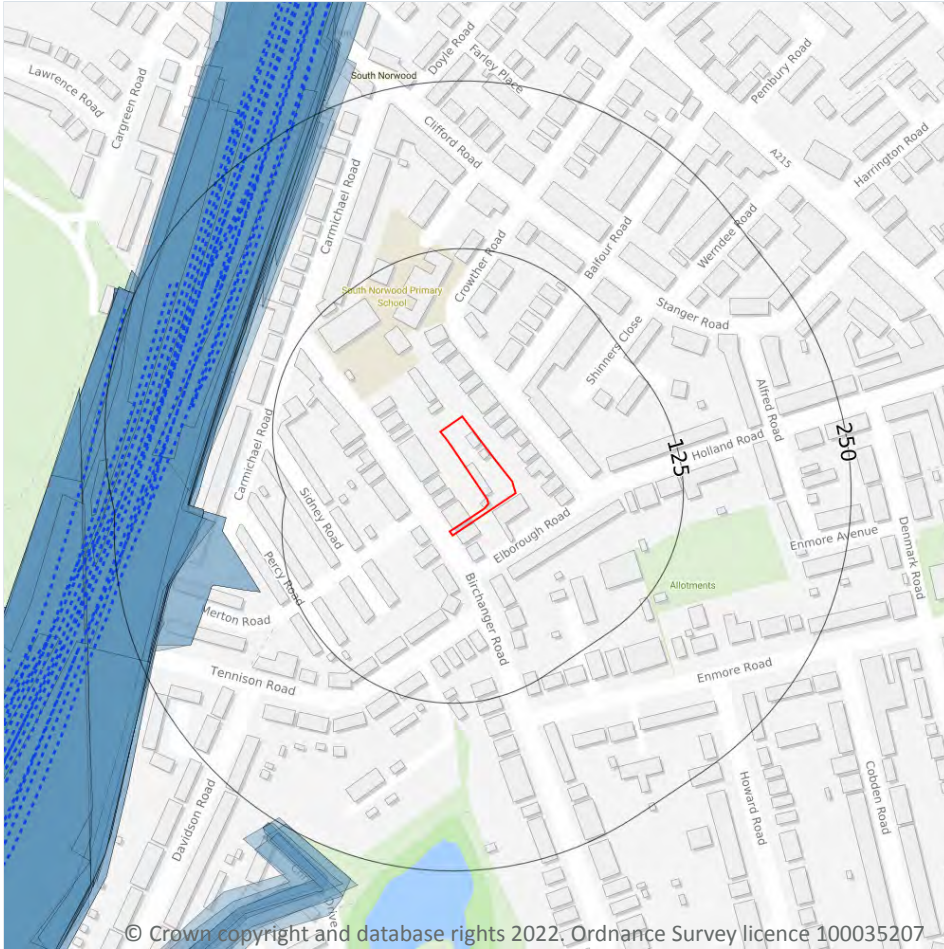
0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects



21.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m

75

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 107**

Location	Land Use	Year of mapping	Mapping scale
148m SW	Railway Sidings	1958	10560
148m SW	Railway Sidings	1948	10560
154m NW	Railway	1887	-
159m W	Railway Sidings	1898	10560
161m W	Railway Sidings	1991	1250
161m W	Railway Sidings	1988	1250
161m W	Railway Sidings	1953	1250
161m W	Railway Sidings	1953	2500
161m W	Railway Sidings	1993	1250
161m W	Railway Sidings	1992	1250
162m NW	Railway	1933	-
162m NW	Railway Sidings	1895	10560
162m NW	Railway Sidings	1895	10560
163m NW	Railway Sidings	1981	10000
163m NW	Railway Sidings	1974	10000
163m NW	Railway Sidings	1965	10560
163m W	Railway Sidings	1913	2500



Location	Land Use	Year of mapping	Mapping scale
163m W	Railway Sidings	1898	2500
163m NW	Railway Sidings	1919	10560
163m W	Railway Sidings	1940	2500
163m W	Railway Sidings	1933	2500
163m NW	Railway Sidings	1933	10560
163m NW	Railway Sidings	1911	10560
164m NW	Railway Sidings	1938	10560
164m NW	Railway Sidings	1938	10560
164m NW	Railway Sidings	1930	10560
164m NW	Railway Sidings	1910	10560
164m W	Railway Sidings	1897	2500
165m NW	Railway Sidings	1938	10560
165m W	Railway Sidings	1872	10560
166m NW	Railway Sidings	1953	2500
167m NW	Railway Sidings	1966	1250
167m NW	Railway Sidings	1971	1250
167m NW	Railway Sidings	1952	1250
168m NW	Railway Sidings	1987	1250
168m NW	Railway Sidings	1997	1250
169m NW	Railway Sidings	1994	1250
169m NW	Railway Sidings	1992	1250
170m NW	Railway Sidings	1991	1250
170m NW	Railway Sidings	1895	10560
170m NW	Railway Sidings	1952	2500
173m NW	Railway Sidings	1871	10560
173m NW	Railway Sidings	1868	2500
174m NW	Railway	1898	-
190m NW	Railway Sidings	1868	2500



Location	Land Use	Year of mapping	Mapping scale
197m W	Railway Sidings	1993	1250
197m W	Railway Sidings	1997	1250
197m W	Railway Sidings	1992	1250
197m W	Railway Sidings	1994	1250
208m W	Railway Sidings	1898	10560
213m W	Railway Sidings	1988	1250
213m W	Railway Sidings	1993	1250
213m W	Railway Sidings	1997	1250
213m W	Railway Sidings	1953	1250
213m W	Railway Sidings	1970	1250
214m W	Railway Sidings	1991	1250
215m NW	Railway	1940	-
218m W	Railway Sidings	1938	10560
228m W	Railway Sidings	1871	10560
234m W	Railway Sidings	1953	1250
234m W	Railway Sidings	1970	1250
235m W	Railway Sidings	1988	1250
244m SW	Railway Sidings	1919	10560
245m W	Railway Sidings	1953	2500
245m W	Railway Sidings	1988	1250
245m W	Railway Sidings	1953	1250
245m W	Railway Sidings	1970	1250
245m W	Railway Sidings	1993	1250
245m W	Railway Sidings	1997	1250
246m W	Railway Sidings	1991	1250
246m W	Railway Sidings	1988	1250
247m SW	Tramway Sidings	1895	10560
247m W	Railway Sidings	1991	1250



Location	Land Use	Year of mapping	Mapping scale
248m SW	Tramway Sidings	1895	10560
249m W	Railway Sidings	1898	10560

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m

0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m

0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m

27

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways. Features are displayed on the Railway infrastructure and projects map on **page 107**

Location	Name	Type
176m NW		rail
180m NW	Not given	Single Track
181m NW		rail
189m NW		rail
190m NW	Not given	Multi Track
193m NW		rail
199m NW		rail



Location	Name	Type
203m NW		rail
203m NW	Not given	Multi Track
205m W		rail
206m W		rail
206m NW		rail
206m W	Not given	Single Track
209m NW	Not given	Single Track
210m W		rail
210m NW		rail
215m W		rail
217m NW	Not given	Single Track
217m W	Not given	Single Track
220m W		rail
224m W		rail
226m W	Up London Bridge Slow	rail
226m W		rail
234m NW		rail
238m NW	Not given	Multi Track
239m NW		rail
246m W		rail

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m

0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.



21.9 Crossrail 2

Records within 500m

0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 Ltd.



Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference>.

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Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

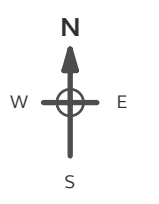
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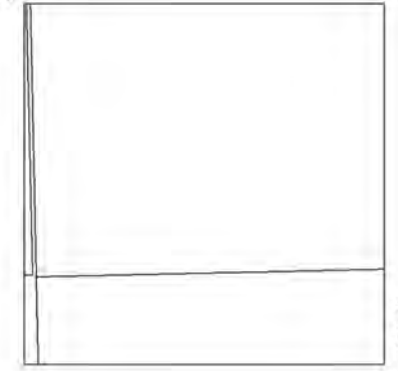
Map date: 1868

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1868
 Revised N/A
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1840
 Revised 1840
 Edition N/A
 Copyright N/A
 Levelled N/A

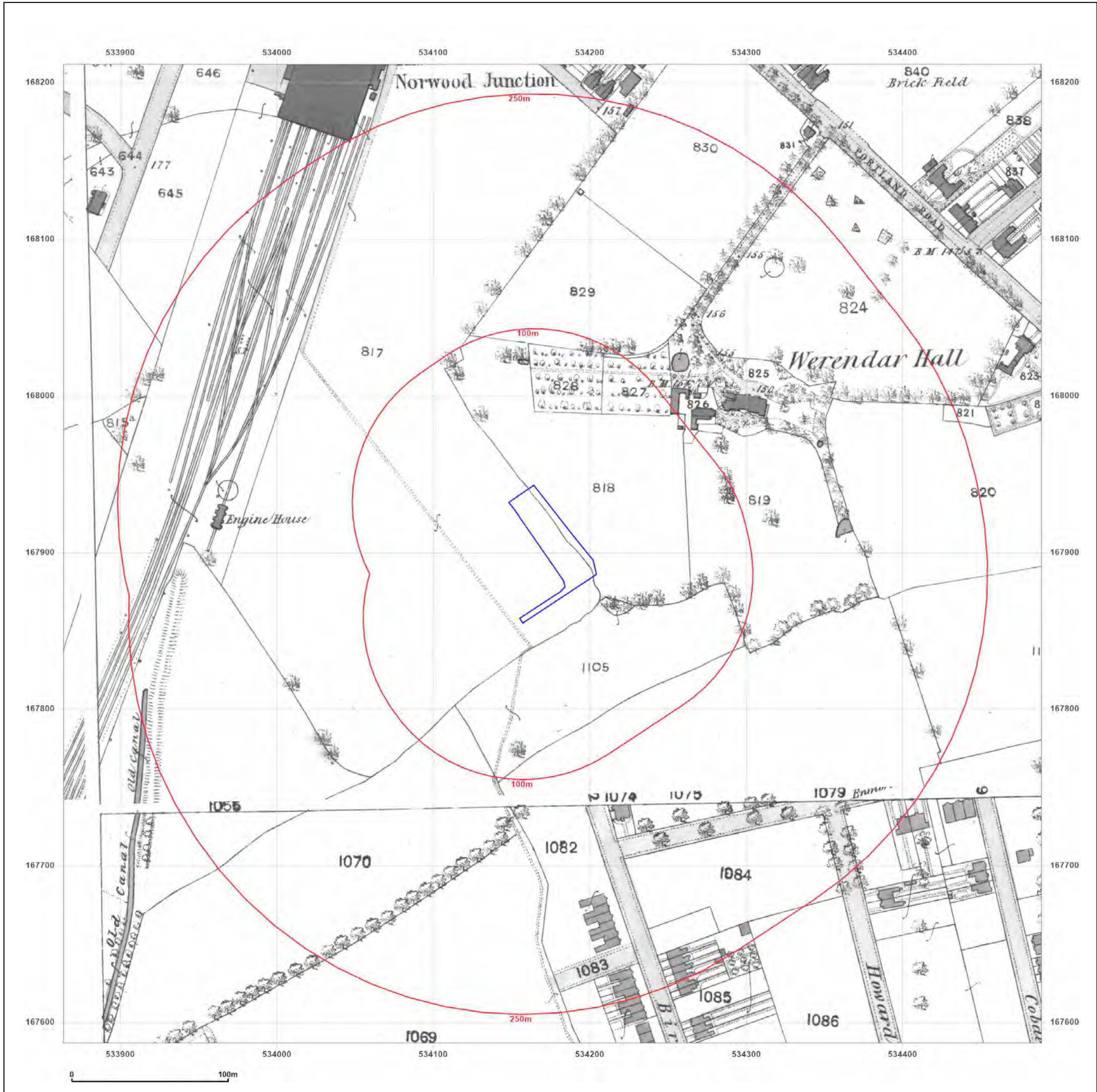


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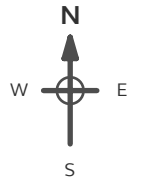
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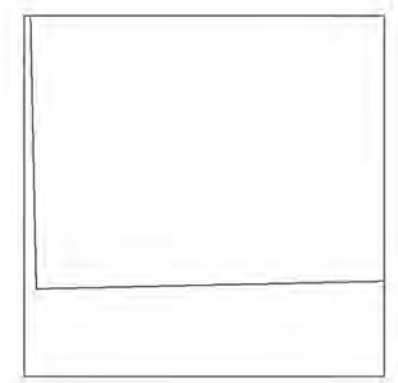
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Surveyed N/A
 Revised 1891
 Edition N/A
 Copyright N/A
 Levelled N/A

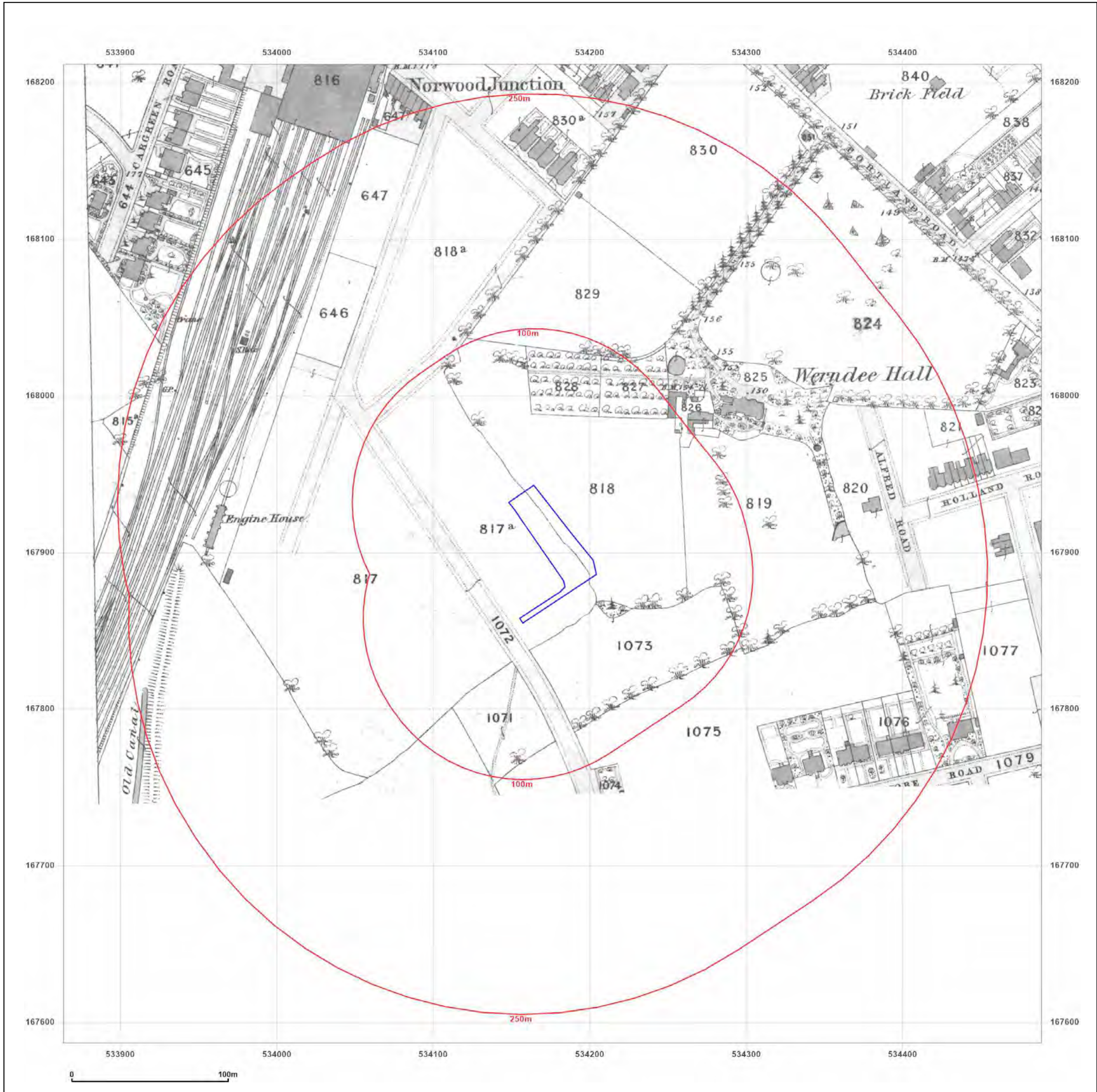


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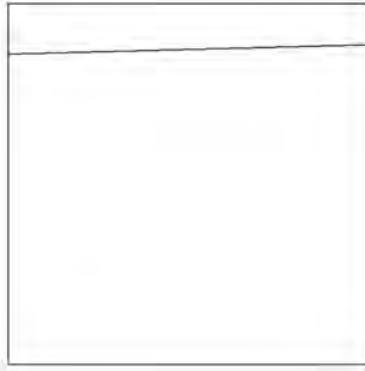
Map Name: 1056 Scale Town Plan

Map date: 1896

Scale: 1:1,056

Printed at: 1:1,056





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Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

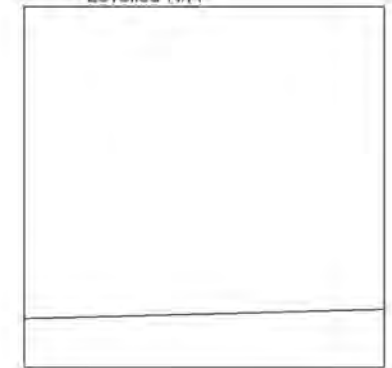
Map date: 1897

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1897
 Revised 1897
 Edition N/A
 Copyright N/A
 Levelled N/A

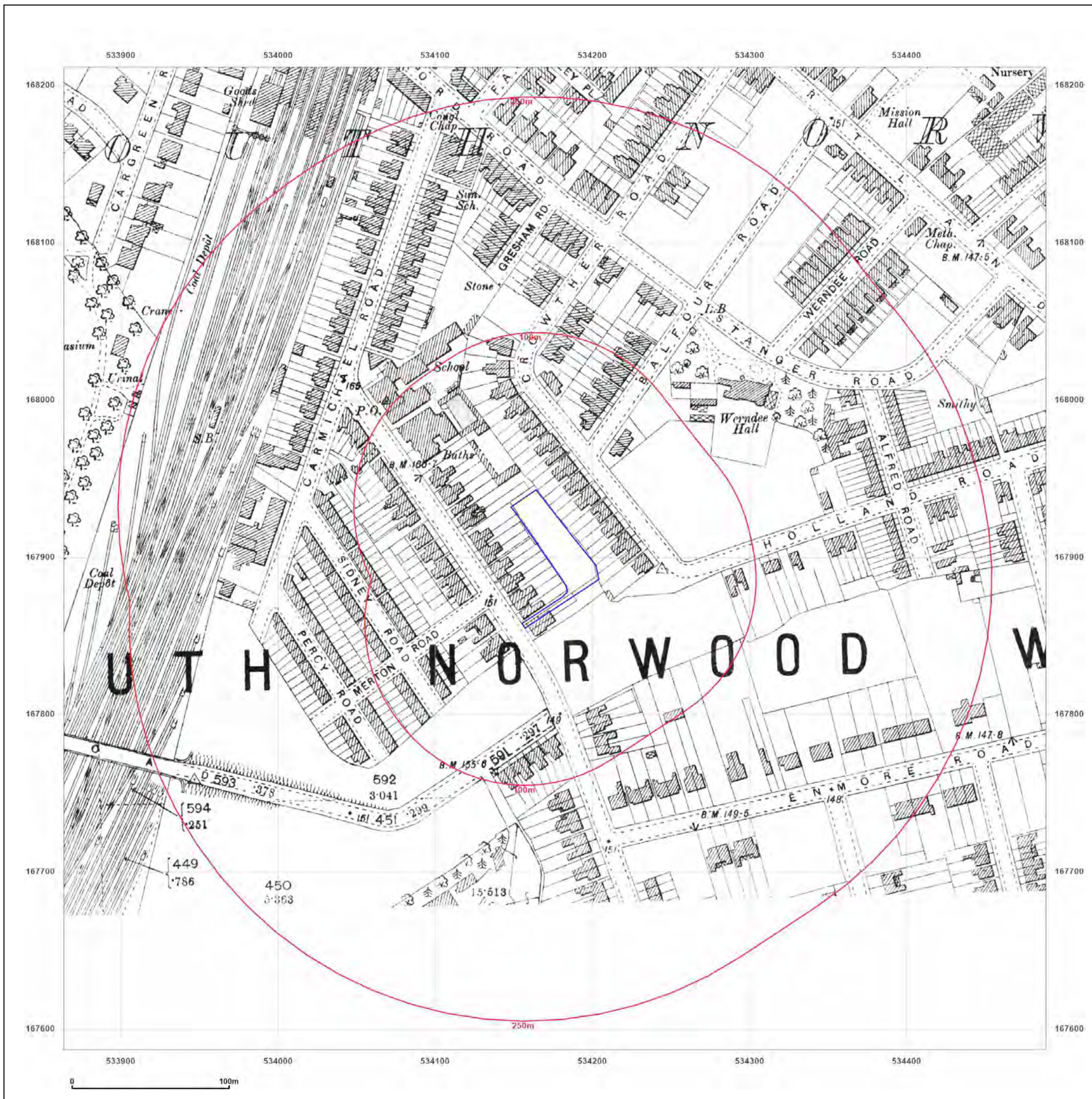


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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

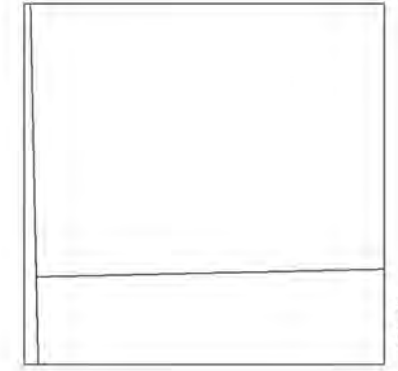
Map date: 1898

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1898
 Revised 1898
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1898
 Revised 1898
 Edition N/A
 Copyright N/A
 Levelled N/A

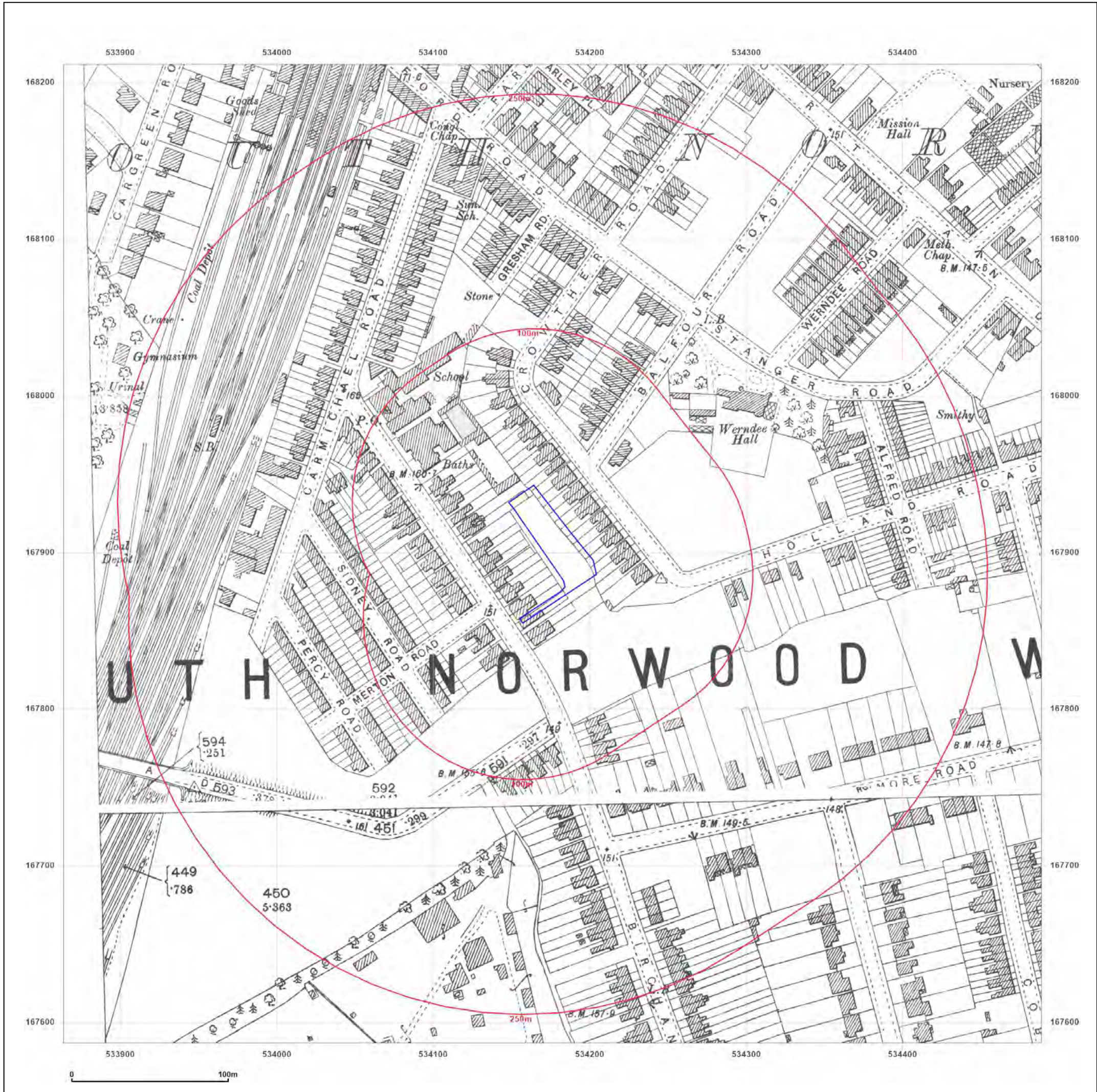


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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1912-1913

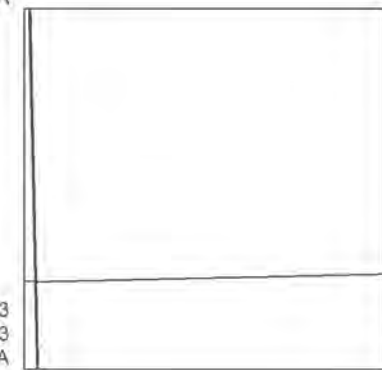
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Printed at: 1:2,500



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

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



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

Surveyed 1912
 Revised 1912
 Edition N/A
 Copyright N/A
 Levelled N/A

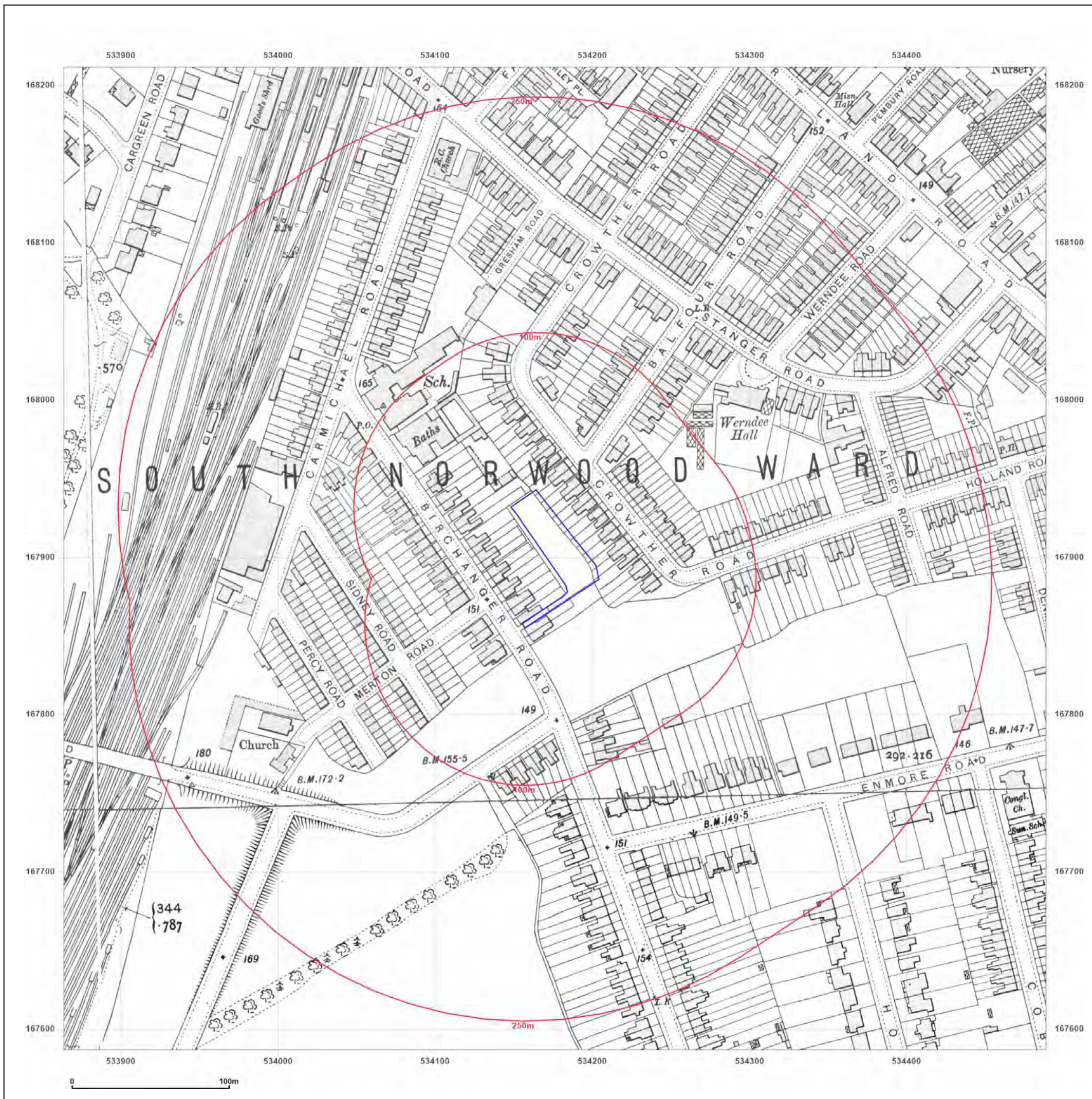


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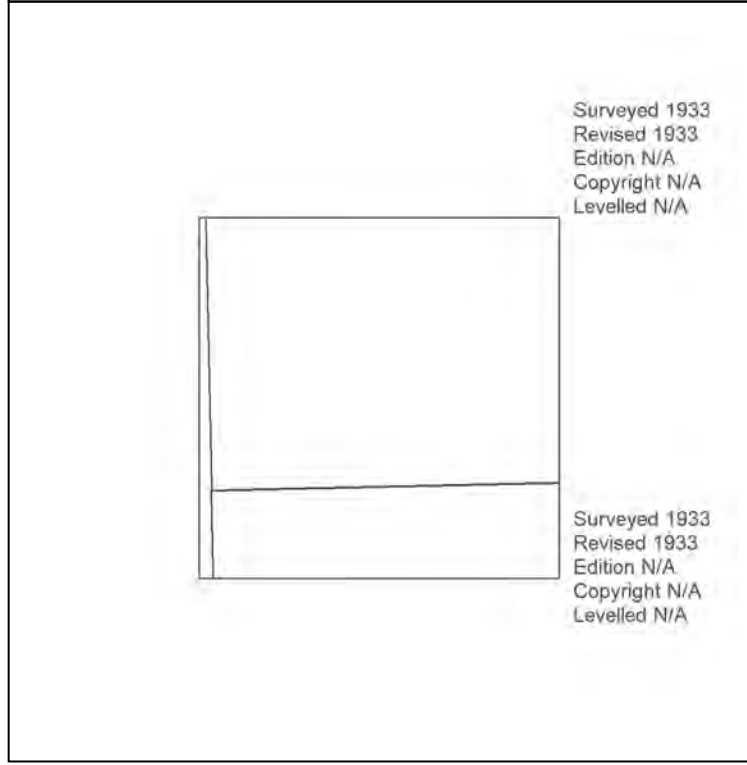
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Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1933

Scale: 1:2,500

Printed at: 1:2,500



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

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



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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1940-1941

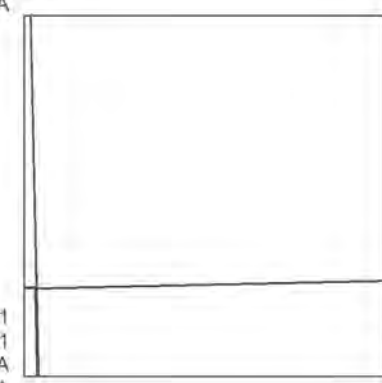
Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1940
 Revised 1940
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1940
 Revised 1940
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1941
 Revised 1941
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1941
 Revised 1941
 Edition N/A
 Copyright N/A
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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1952-1953

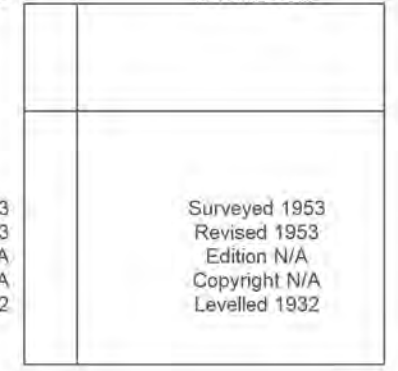
Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1953
 Revised 1953
 Edition N/A
 Copyright N/A
 Levelled 1932

Surveyed 1952
 Revised 1952
 Edition N/A
 Copyright N/A
 Levelled 1932



Surveyed 1953
 Revised 1953
 Edition N/A
 Copyright N/A
 Levelled 1932

Surveyed 1953
 Revised 1953
 Edition N/A
 Copyright N/A
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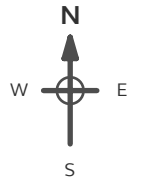
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Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1953-1954

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1953	Surveyed N/A
Revised 1953	Revised N/A
Edition N/A	Edition N/A
Copyright N/A	Copyright N/A
Levelled 1932	Levelled N/A

Surveyed 1953	Surveyed N/A
Revised 1953	Revised N/A
Edition N/A	Edition N/A
Copyright N/A	Copyright N/A
Levelled 1932	Levelled N/A

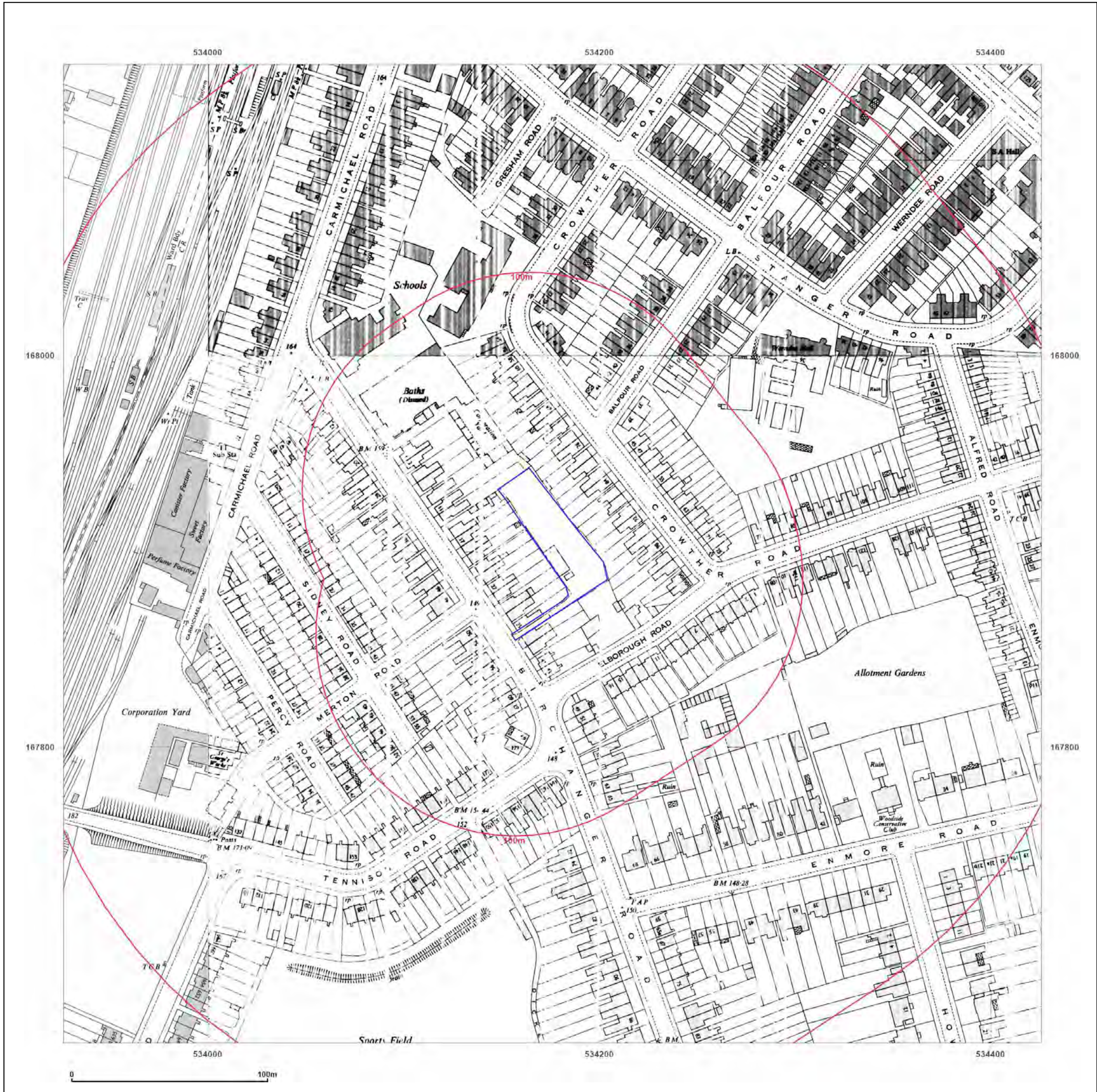


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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1953-1955

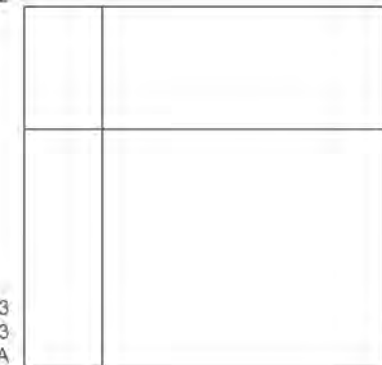
Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1953
 Revised 1953
 Edition 1954
 Copyright N/A
 Levelled 1932

Surveyed 1952
 Revised 1952
 Edition 1954
 Copyright N/A
 Levelled 1932



Surveyed 1953
 Revised 1953
 Edition N/A
 Copyright N/A
 Levelled 1932

Surveyed 1953
 Revised 1953
 Edition 1955
 Copyright N/A
 Levelled 1932



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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

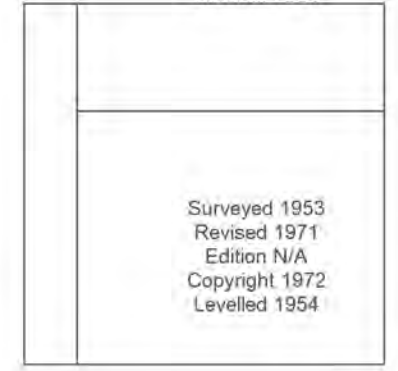
Map date: 1971-1972

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952
 Revised 1970
 Edition N/A
 Copyright 1971
 Levelled 1954



Surveyed 1953
 Revised 1971
 Edition N/A
 Copyright 1972
 Levelled 1954

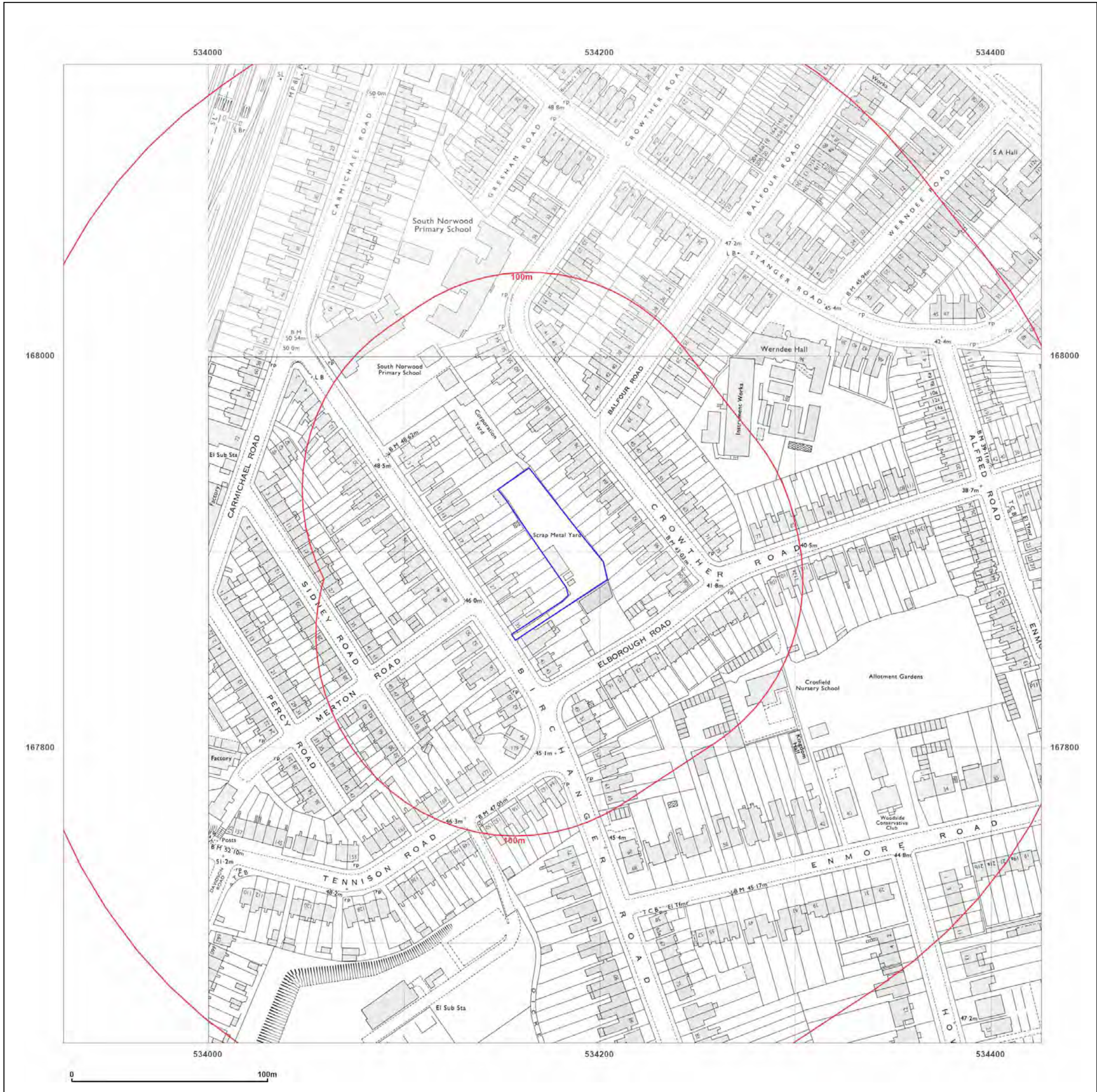


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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

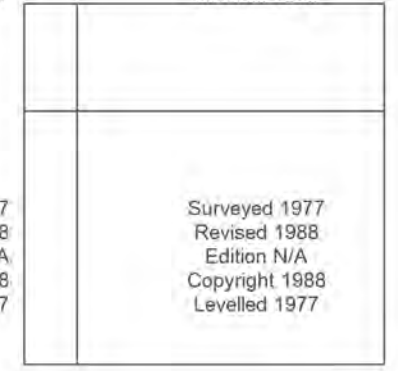
Map date: 1987-1988

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1977 Revised 1988 Edition N/A Copyright 1988 Levelled 1977	Surveyed N/A Revised N/A Edition N/A Copyright 1987 Levelled 1978
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Surveyed 1977 Revised 1988 Edition N/A Copyright 1988 Levelled 1977	Surveyed 1977 Revised 1988 Edition N/A Copyright 1988 Levelled 1977
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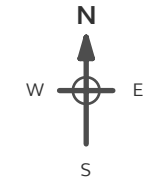
Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1988-1991

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1977 Revised 1988 Edition N/A Copyright 1988 Levelled 1977	Surveyed N/A Revised N/A Edition N/A Copyright 1991 Levelled N/A
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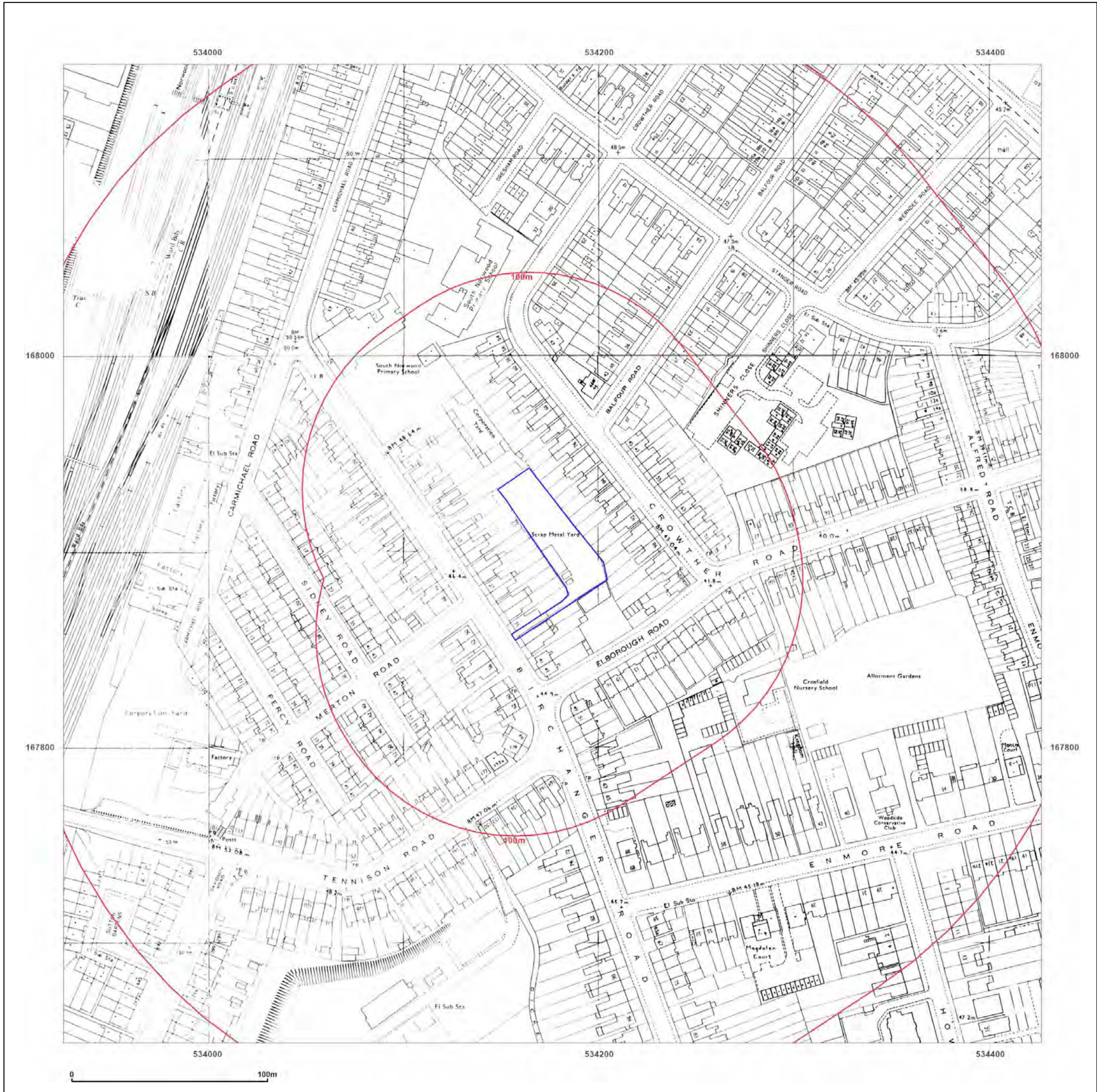


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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1991-1992

Scale: 1:1,250

Printed at: 1:2,000



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

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1992
 Levelled N/A

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1992
 Levelled N/A

Surveyed N/A
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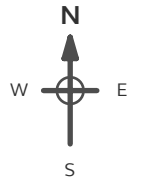


Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid
Map date: 1992-1994
Scale: 1:1,250
Printed at: 1:2,000



Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1992 Levelled N/A
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Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1994 Levelled N/A
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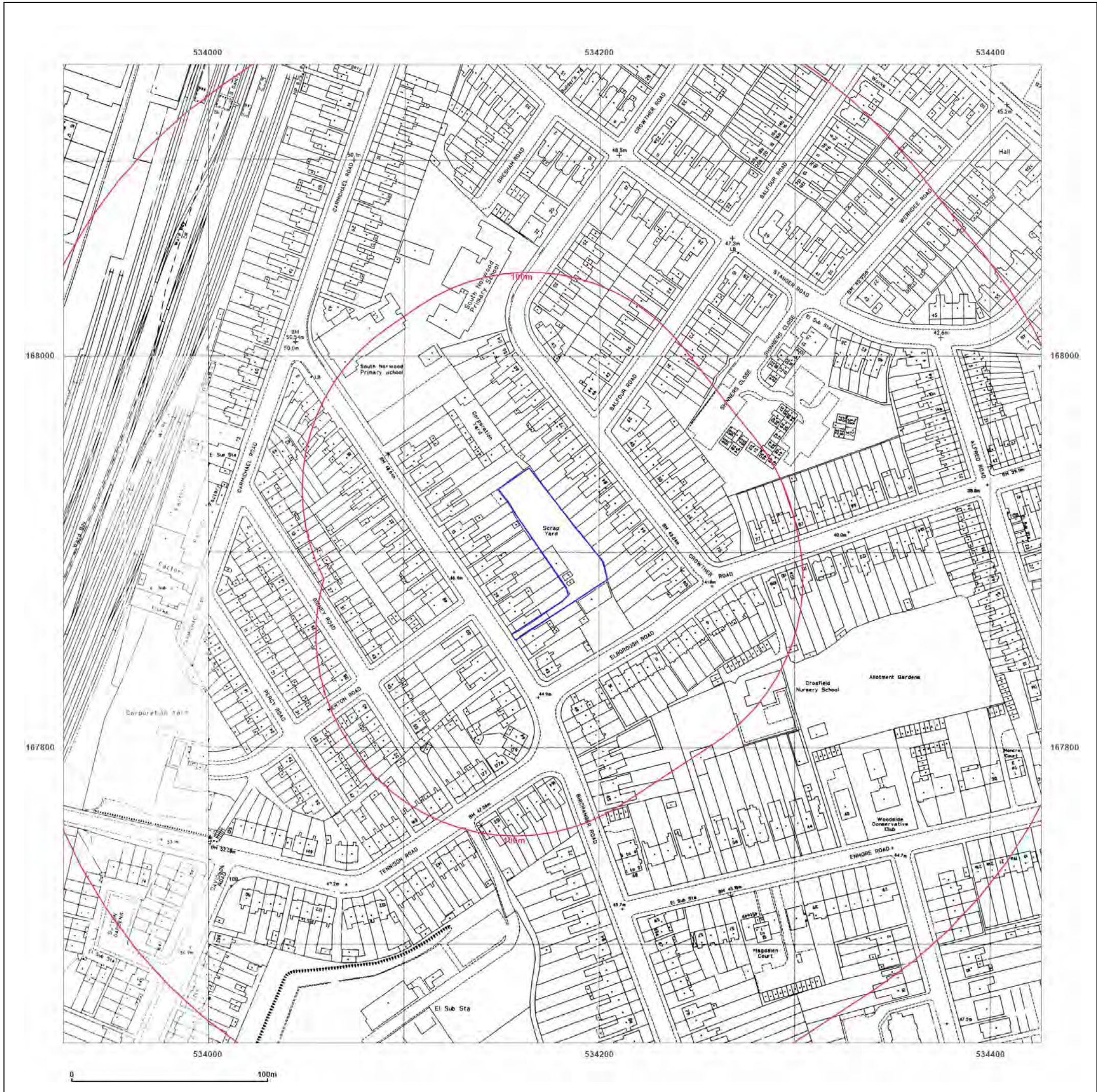


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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1993-1994

Scale: 1:1,250

Printed at: 1:2,000



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

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

Surveyed 1994
 Revised 1994
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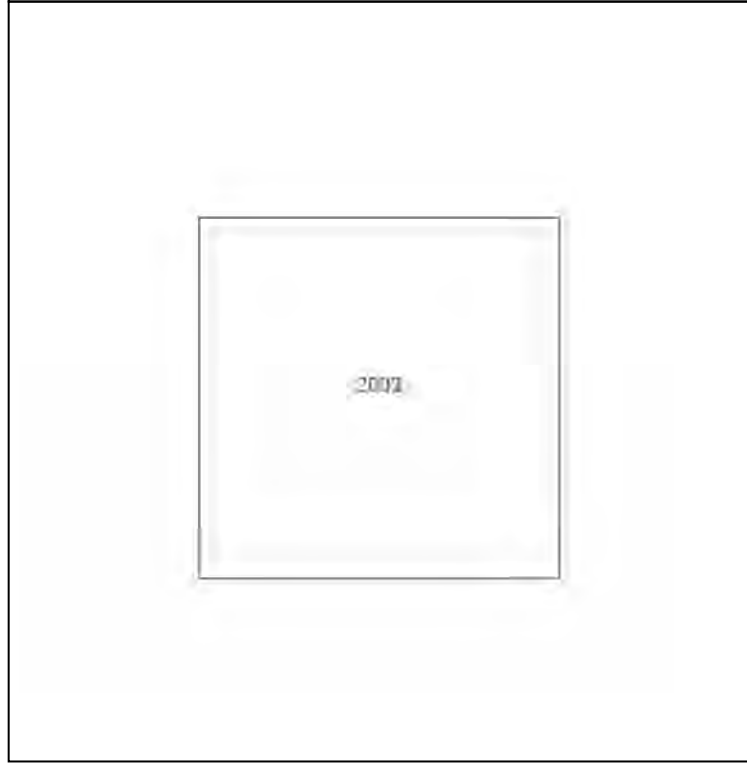
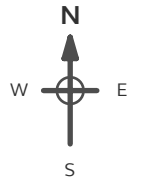
Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1872

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1868
 Revised N/A
 Edition 1872
 Copyright N/A
 Levelled N/A

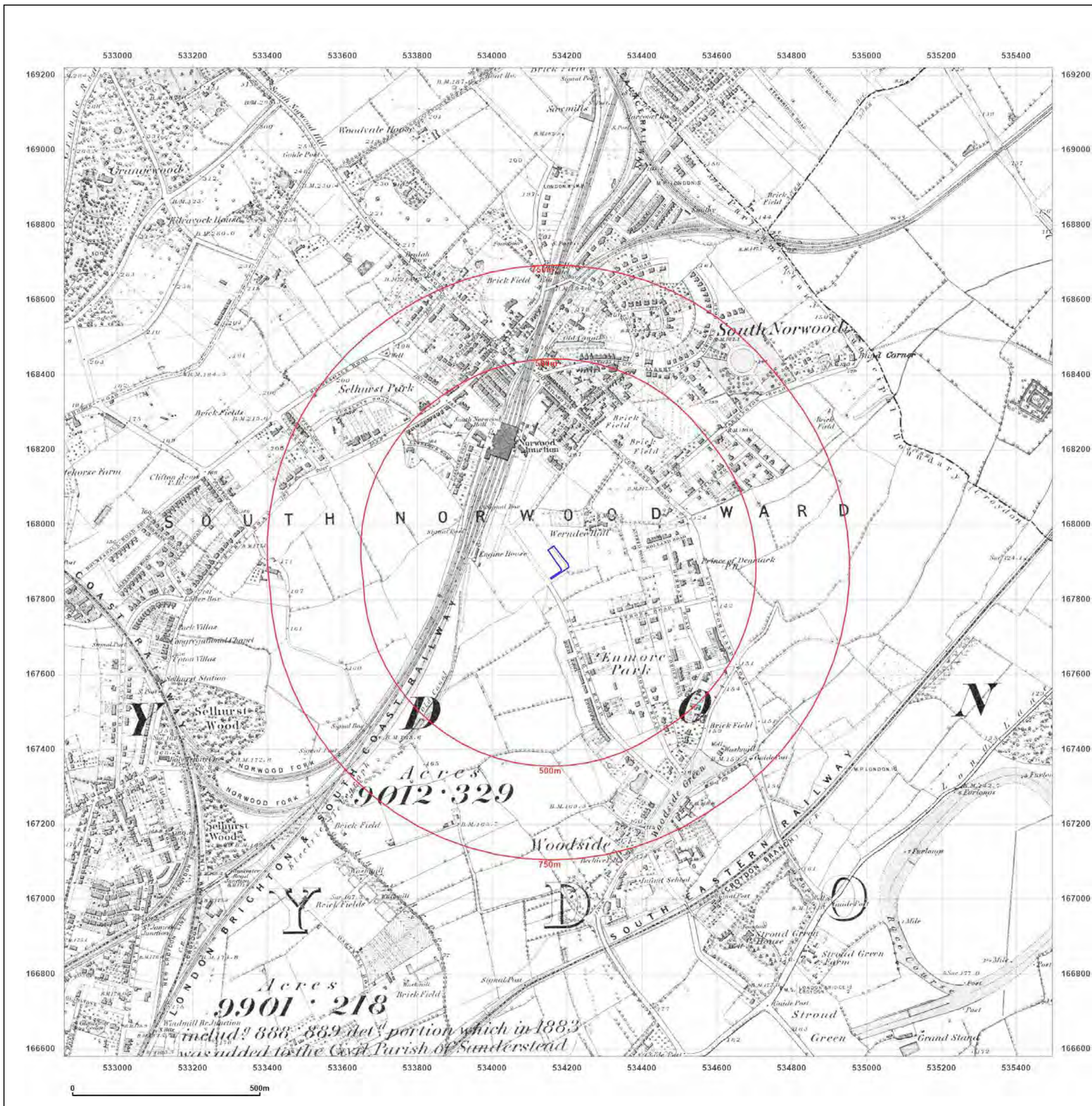


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Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1872

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1868
 Revised 1872
 Edition N/A
 Copyright N/A
 Levelled N/A

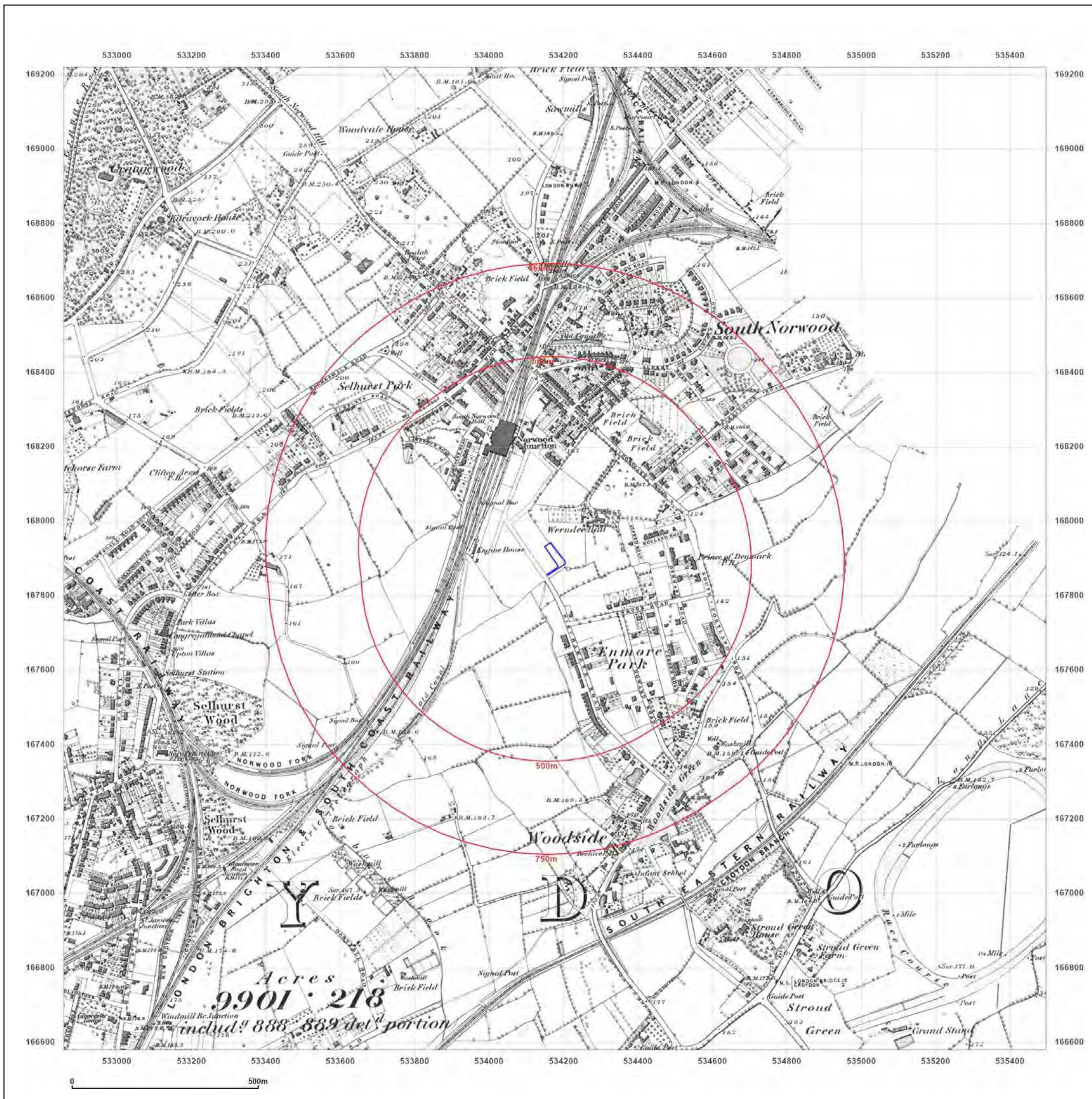


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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



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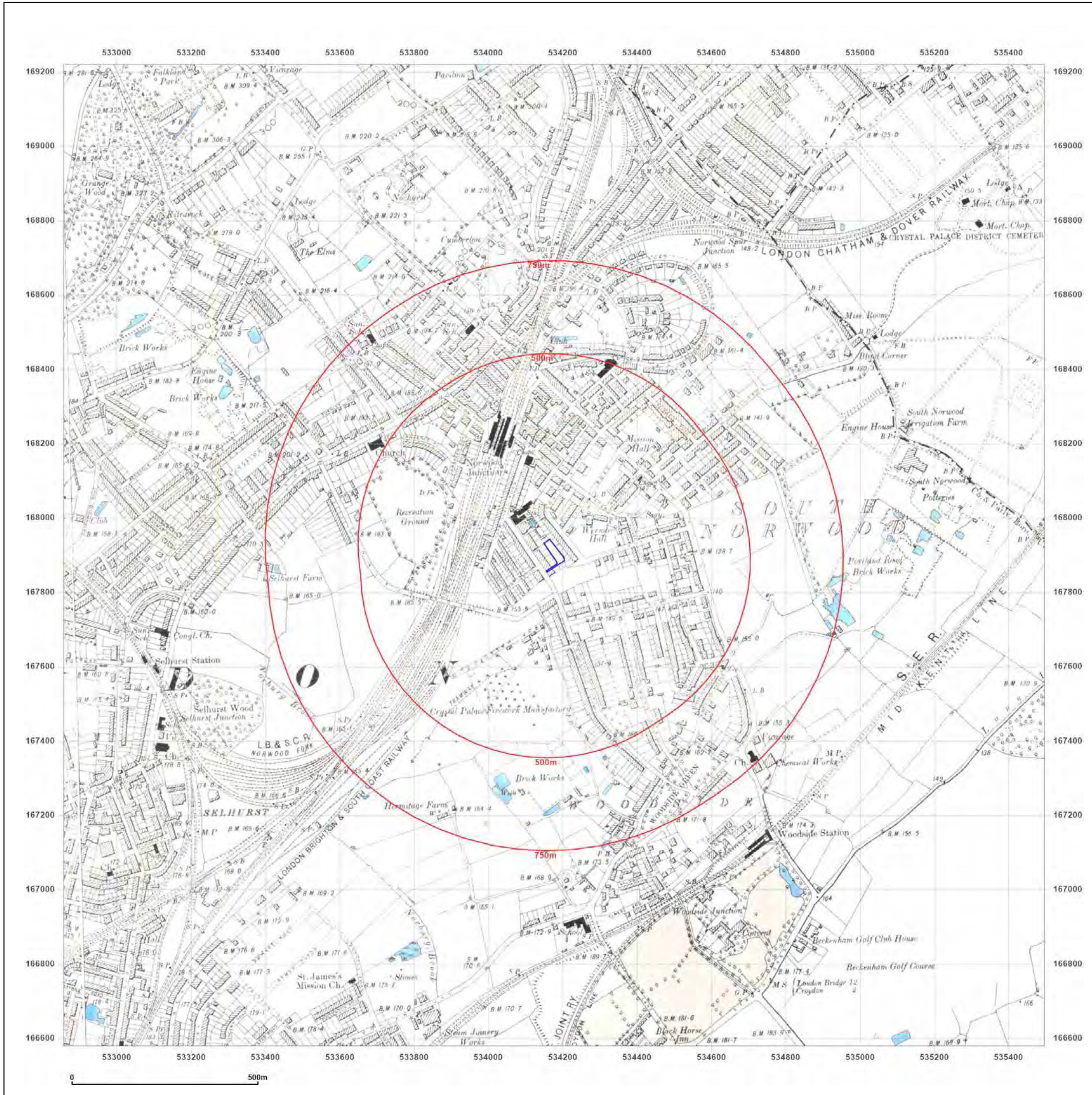


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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1868
 Revised 1895
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1868
 Revised 1895
 Edition N/A
 Copyright N/A
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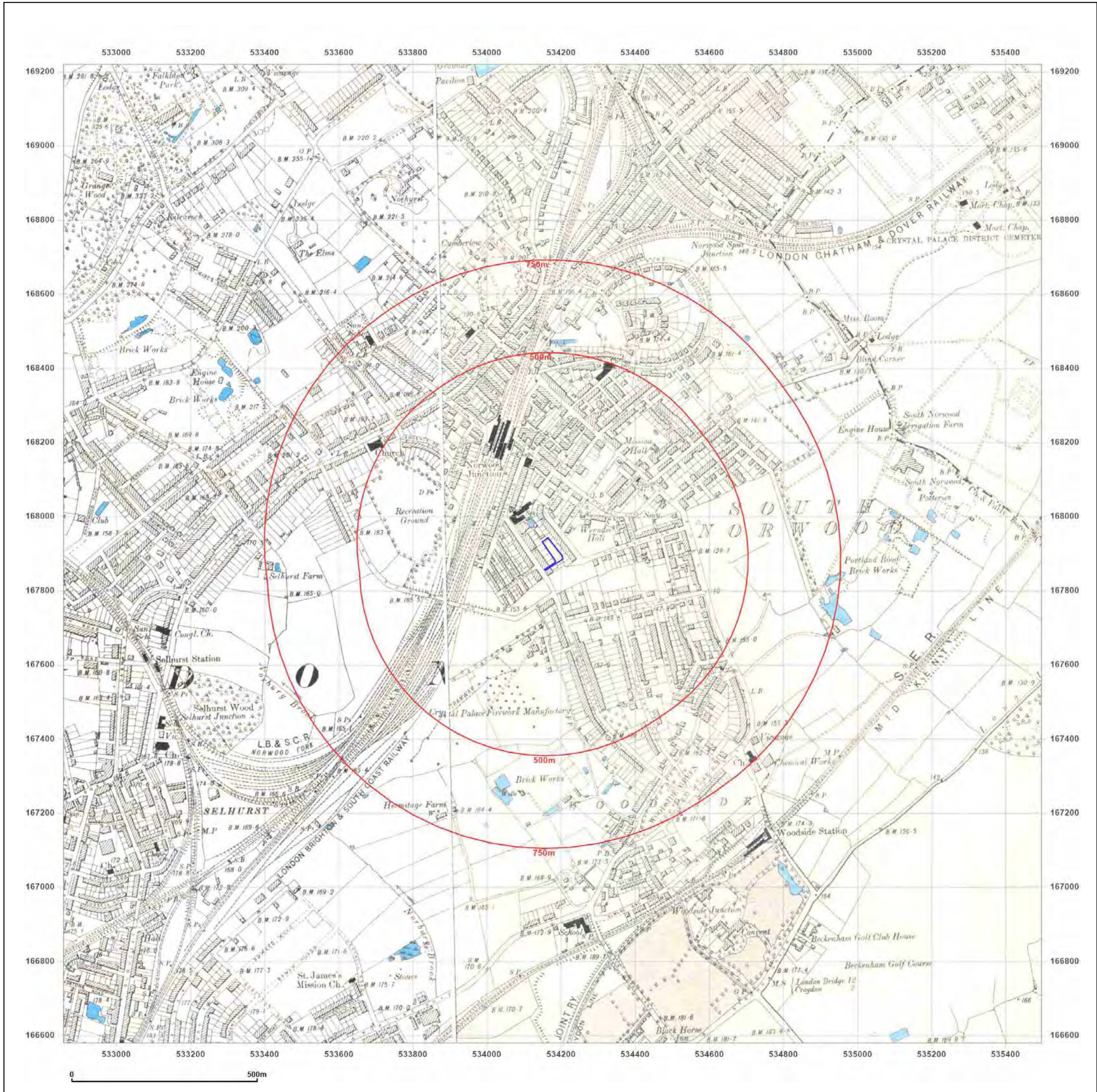


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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1895-1898

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1895
 Revised N/A
 Edition 1898
 Copyright N/A
 Levelled N/A

Surveyed 1861
 Revised 1895
 Edition N/A
 Copyright N/A
 Levelled N/A

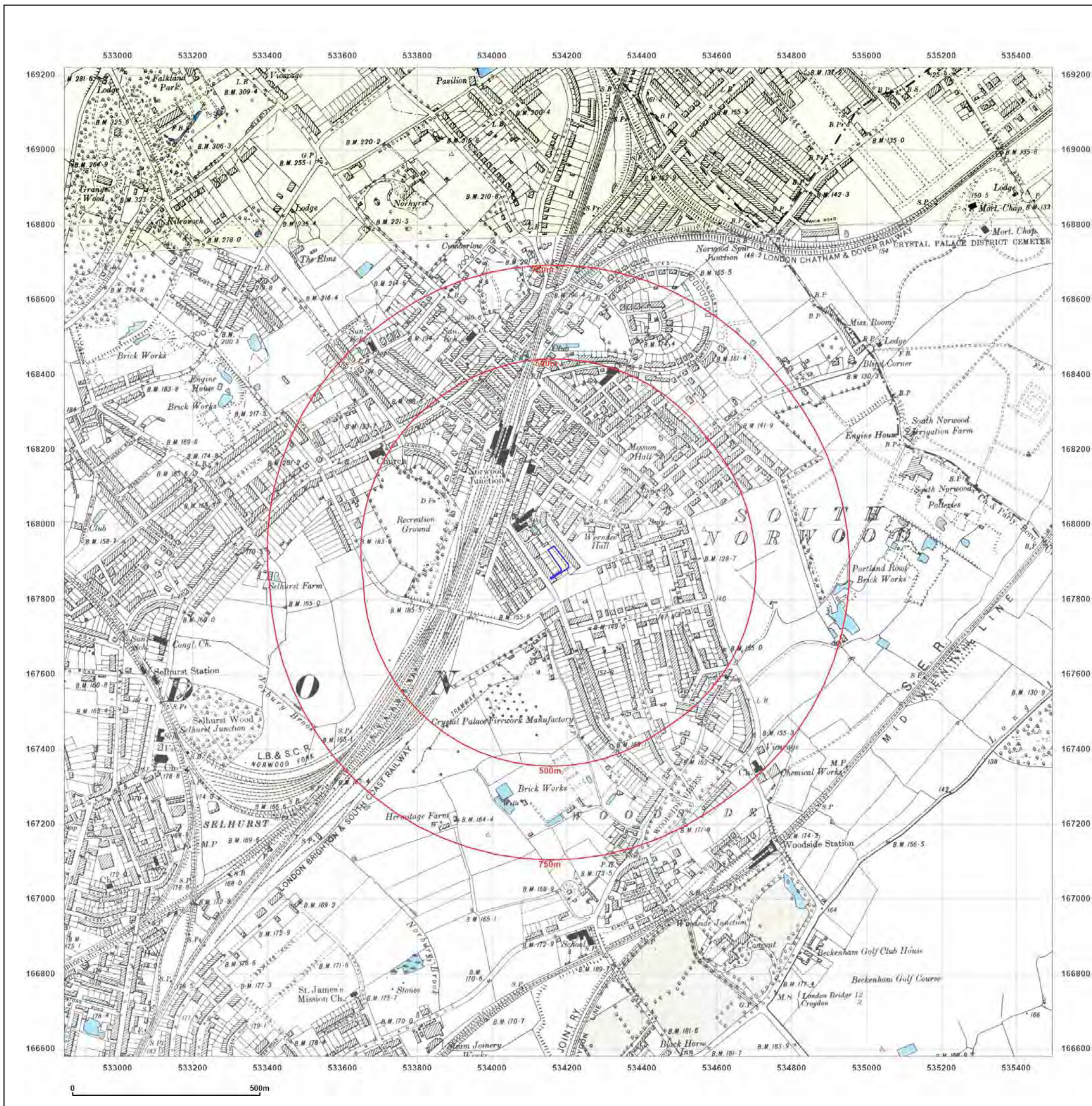


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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1898

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1868
 Revised 1895
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1868
 Revised 1895
 Edition N/A
 Copyright N/A
 Levelled N/A

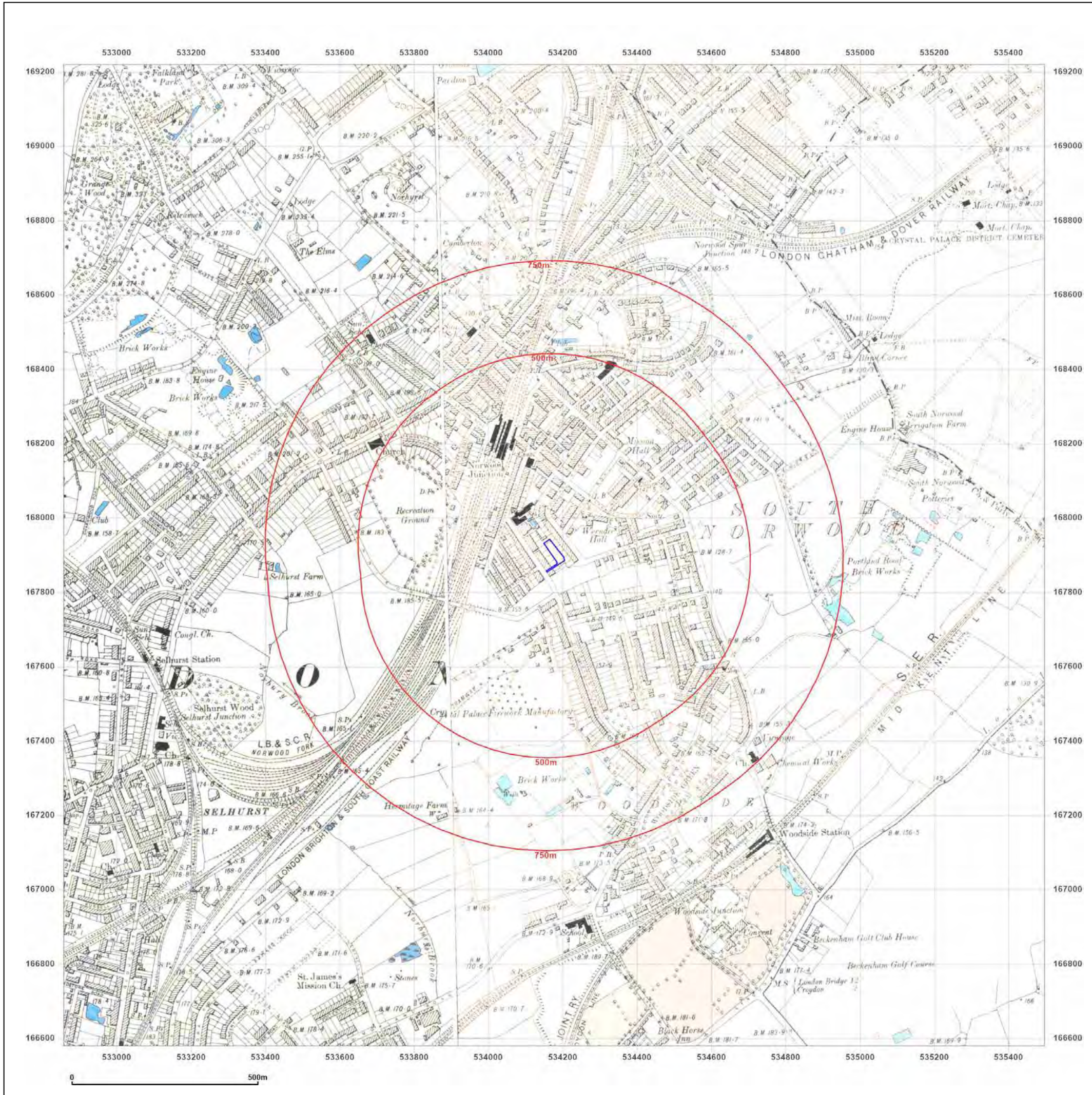


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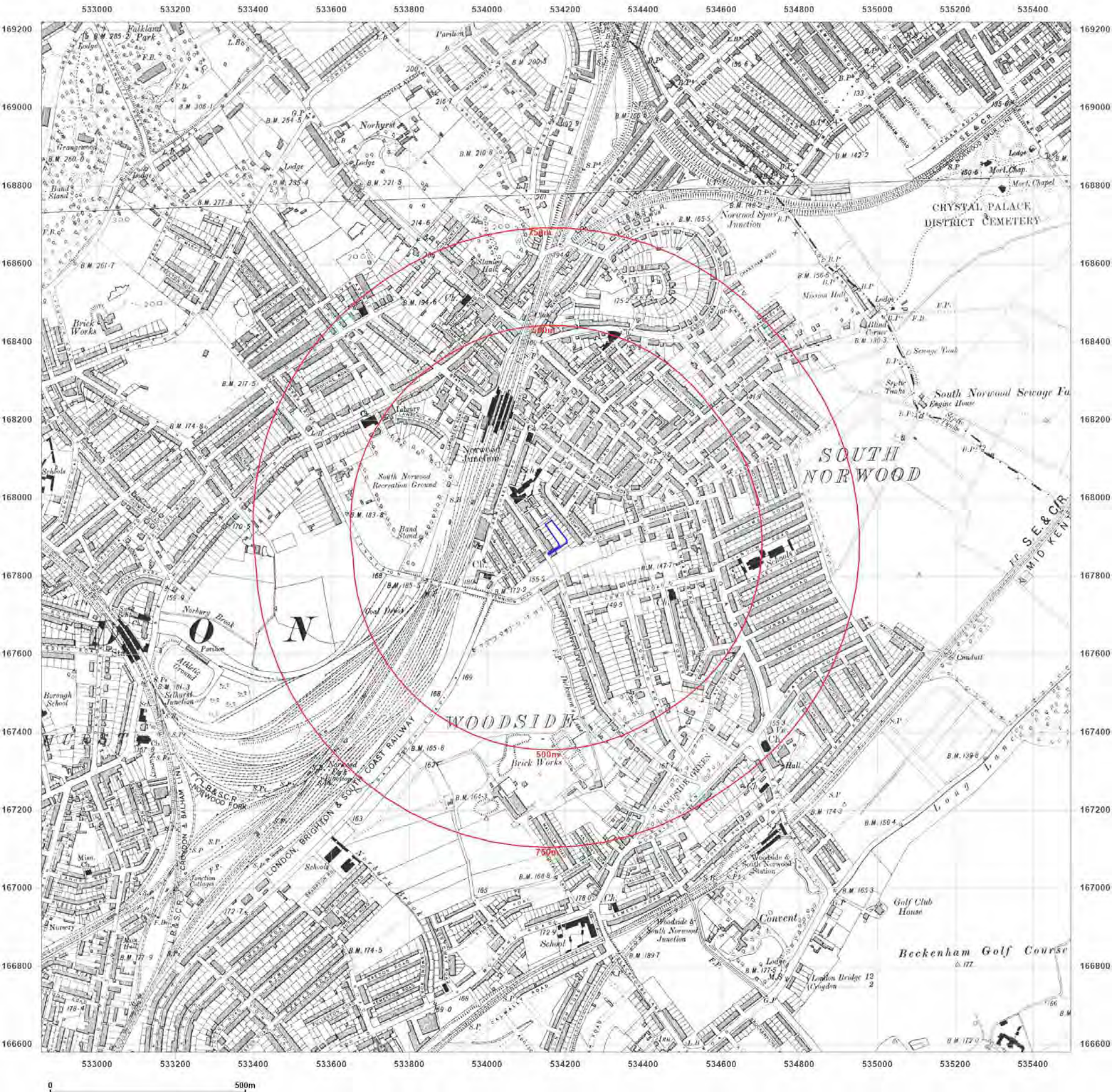
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Grid Ref: 534176, 167899

Map Name: County Series

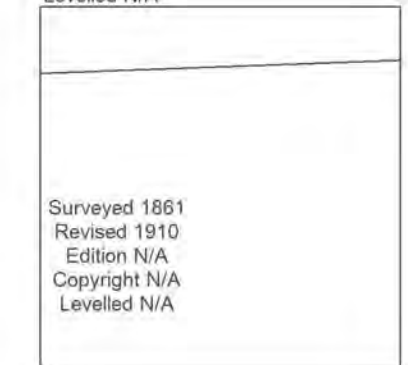
Map date: 1910-1915

Scale: 1:10,560

Printed at: 1:10,560



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 Revised 1915
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1861
 Revised 1910
 Edition N/A
 Copyright N/A
 Levelled N/A



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Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

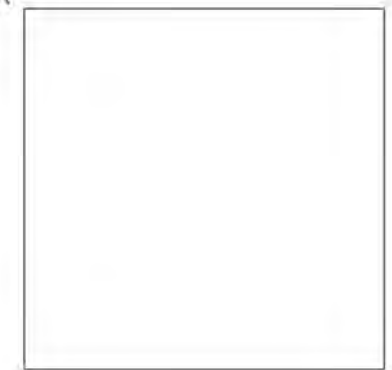
Map date: 1919

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1869
 Revised 1919
 Edition N/A
 Copyright N/A
 Levelled N/A

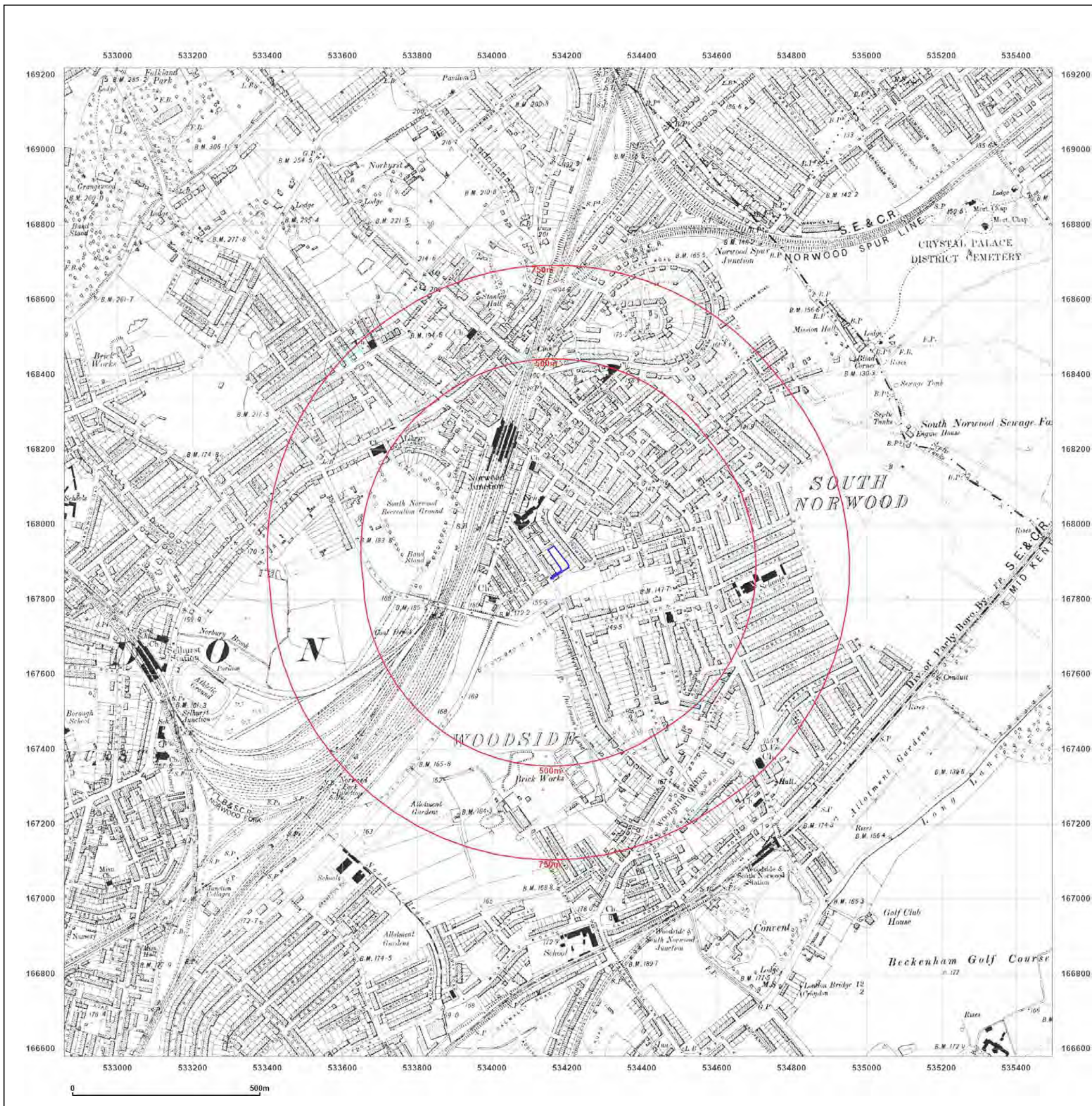


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Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

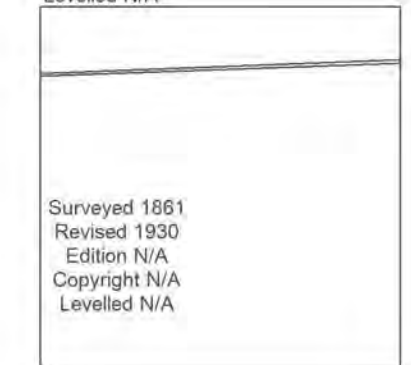
Map date: 1930

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1862
 Revised 1930
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1861
 Revised 1930
 Edition N/A
 Copyright N/A
 Levelled N/A



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Site Details:

REAR OF 35, BIRCHANGER ROAD, SOUTH NORWOOD, LONDON, SE25 5BA

Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1932-1933

Scale: 1:10,560

Printed at: 1:10,560



<p>Surveyed 1868 Revised 1932 Edition N/A Copyright N/A Levelled N/A</p>	<p>Surveyed 1867 Revised 1933 Edition N/A Copyright N/A Levelled N/A</p>
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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1868
 Revised 1938
 Edition 1938
 Copyright N/A
 Levelled N/A

Surveyed 1867
 Revised 1933
 Edition N/A
 Copyright N/A
 Levelled N/A



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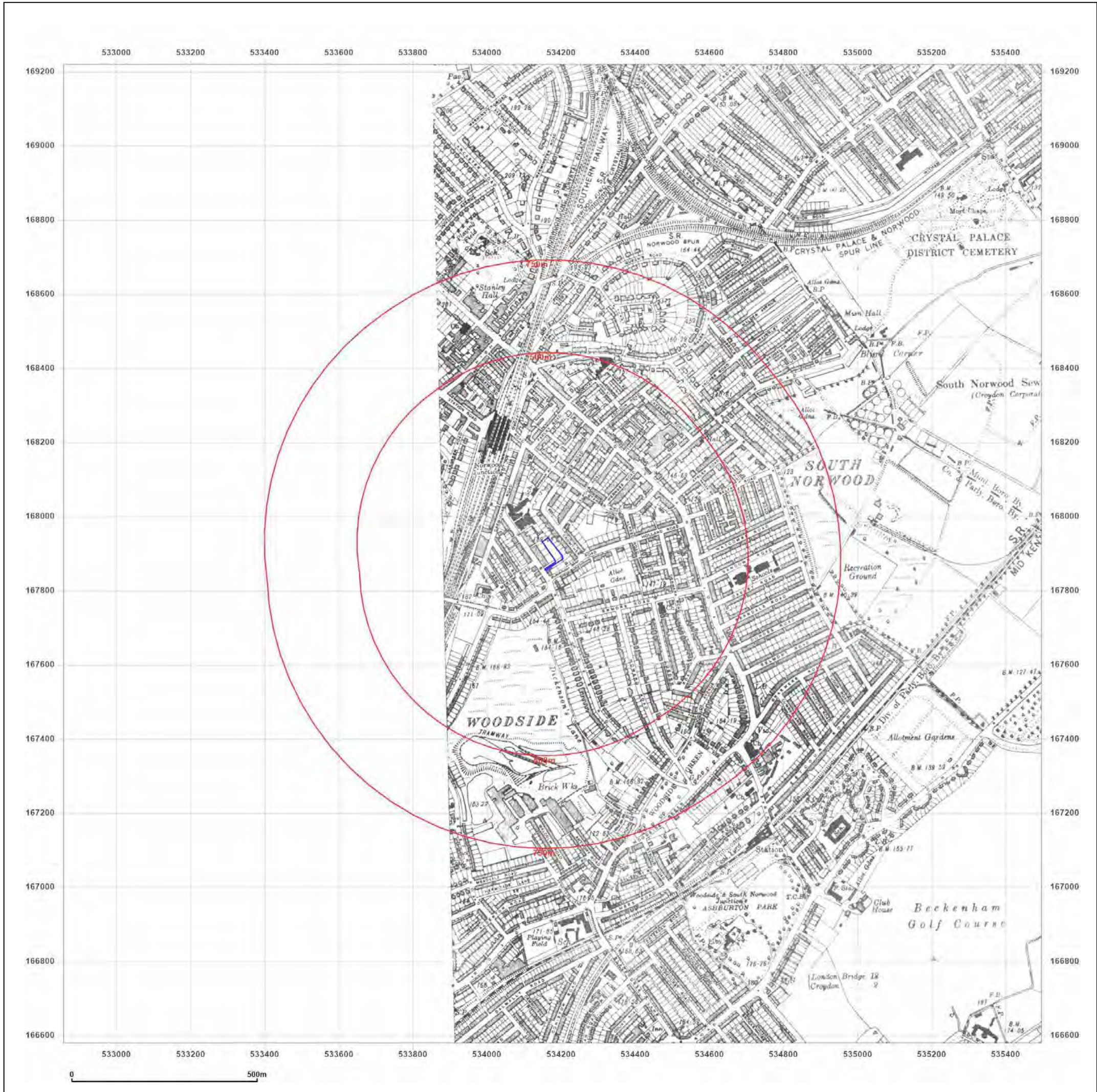
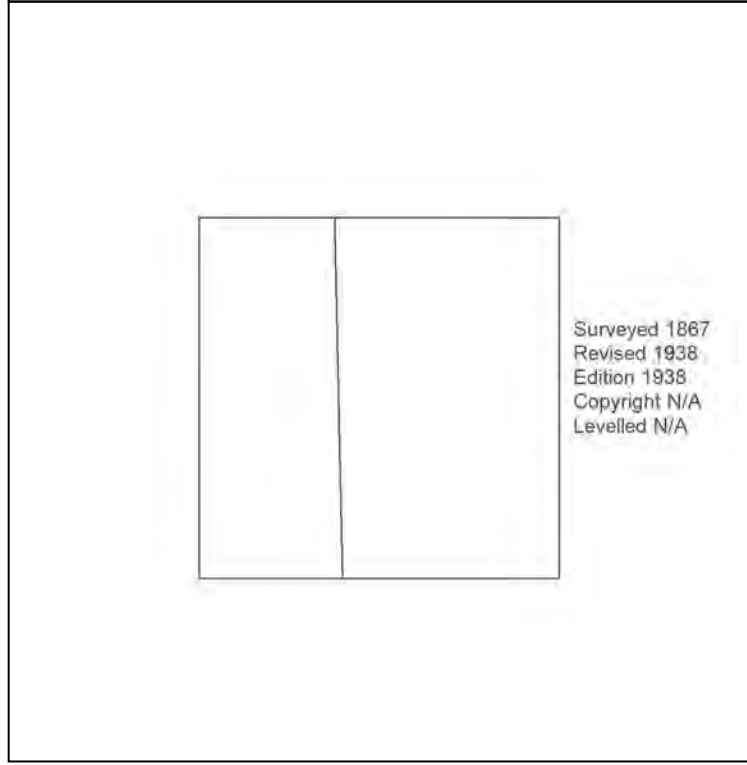
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Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1862
 Revised 1938
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1861
 Revised 1938
 Edition N/A
 Copyright N/A
 Levelled N/A

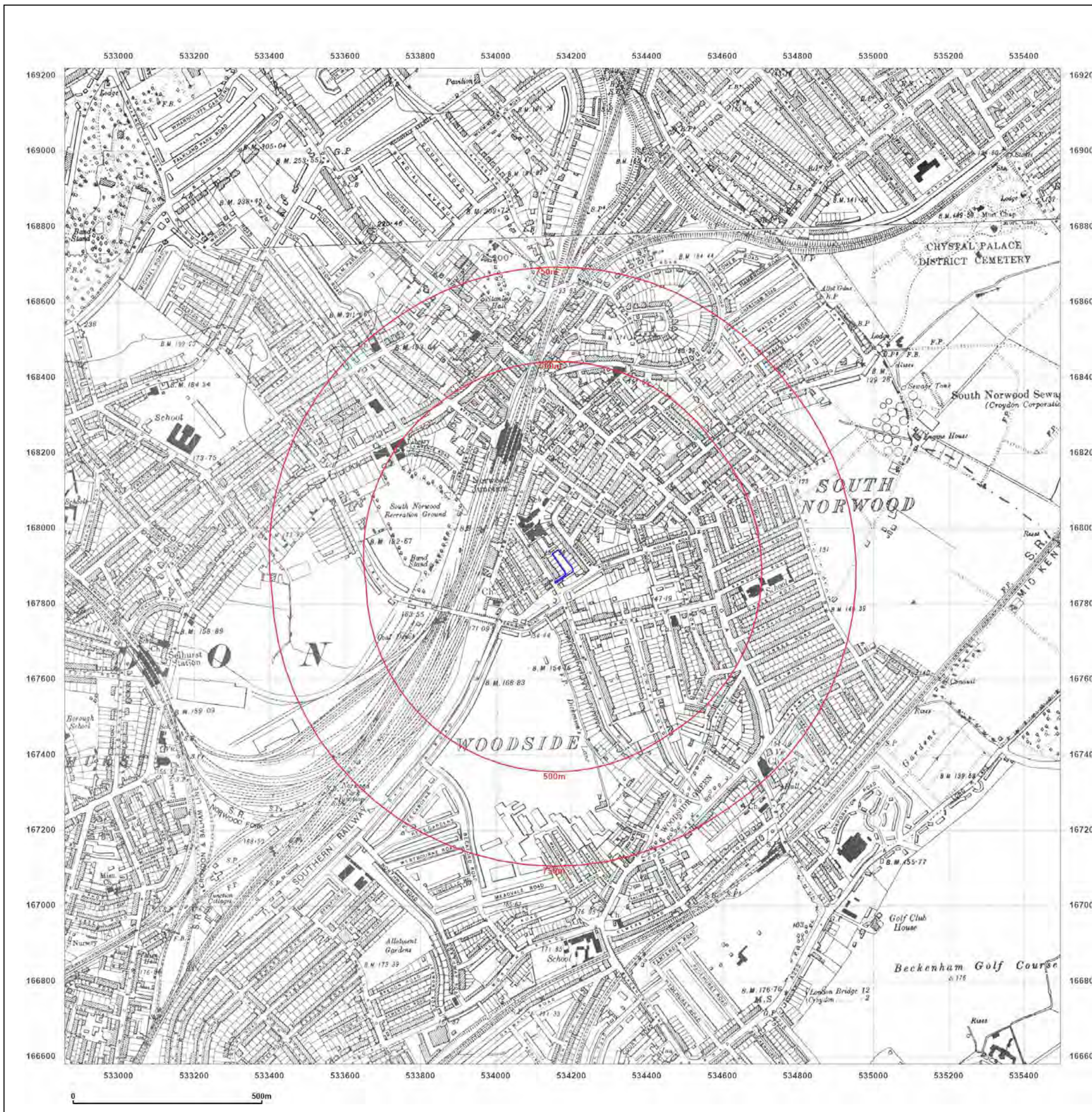


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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: Provisional

Map date: 1948

Scale: 1:10,560

Printed at: 1:10,560



<p>Surveyed N/A Revised 1948 Edition N/A Copyright N/A Levelled N/A</p>	<p>Surveyed N/A Revised 1948 Edition N/A Copyright N/A Levelled N/A</p>
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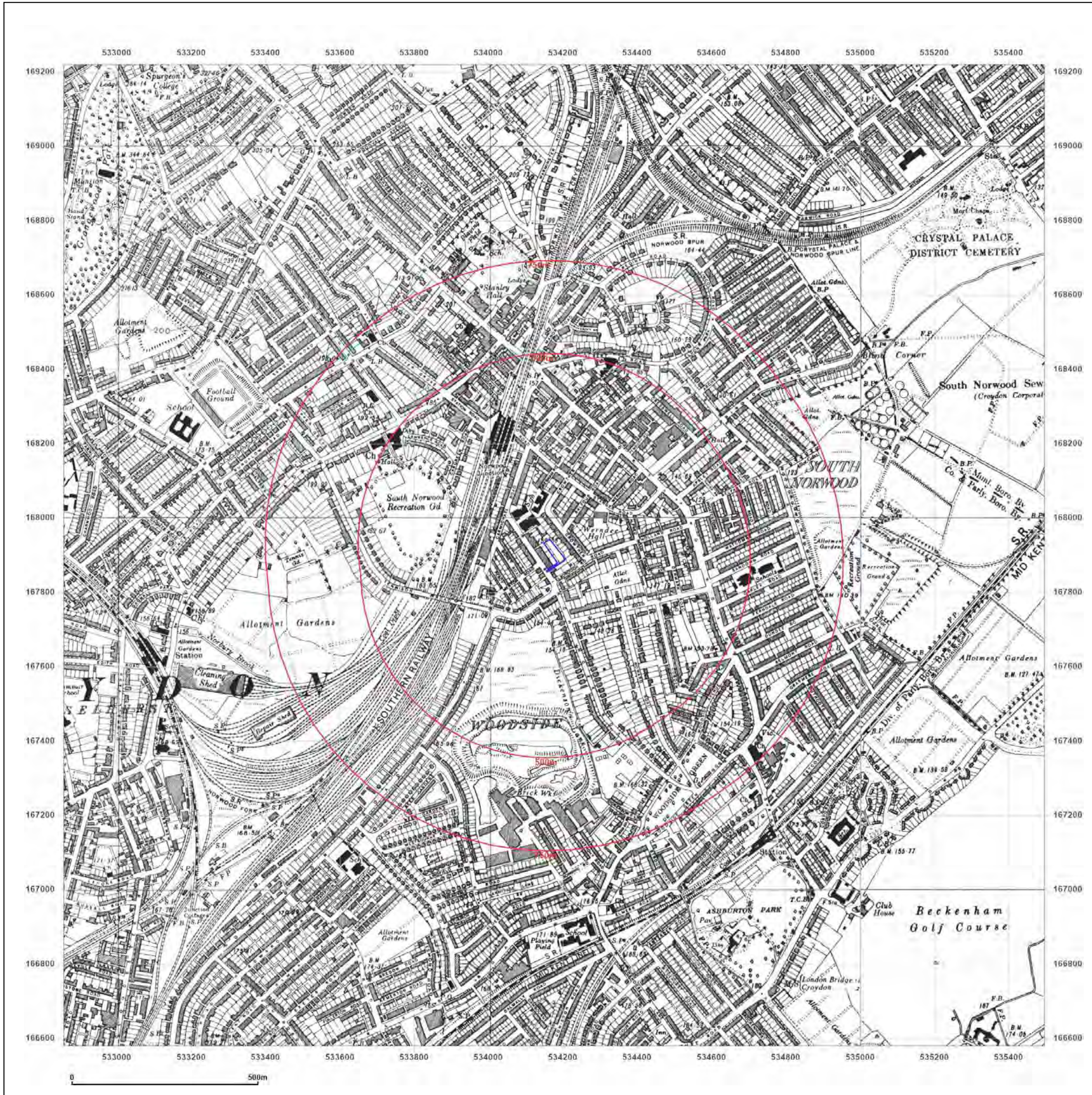


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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: Provisional

Map date: 1957-1958

Scale: 1:10,560

Printed at: 1:10,560



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

Surveyed 1957
 Revised 1957
 Edition N/A
 Copyright N/A
 Levelled N/A

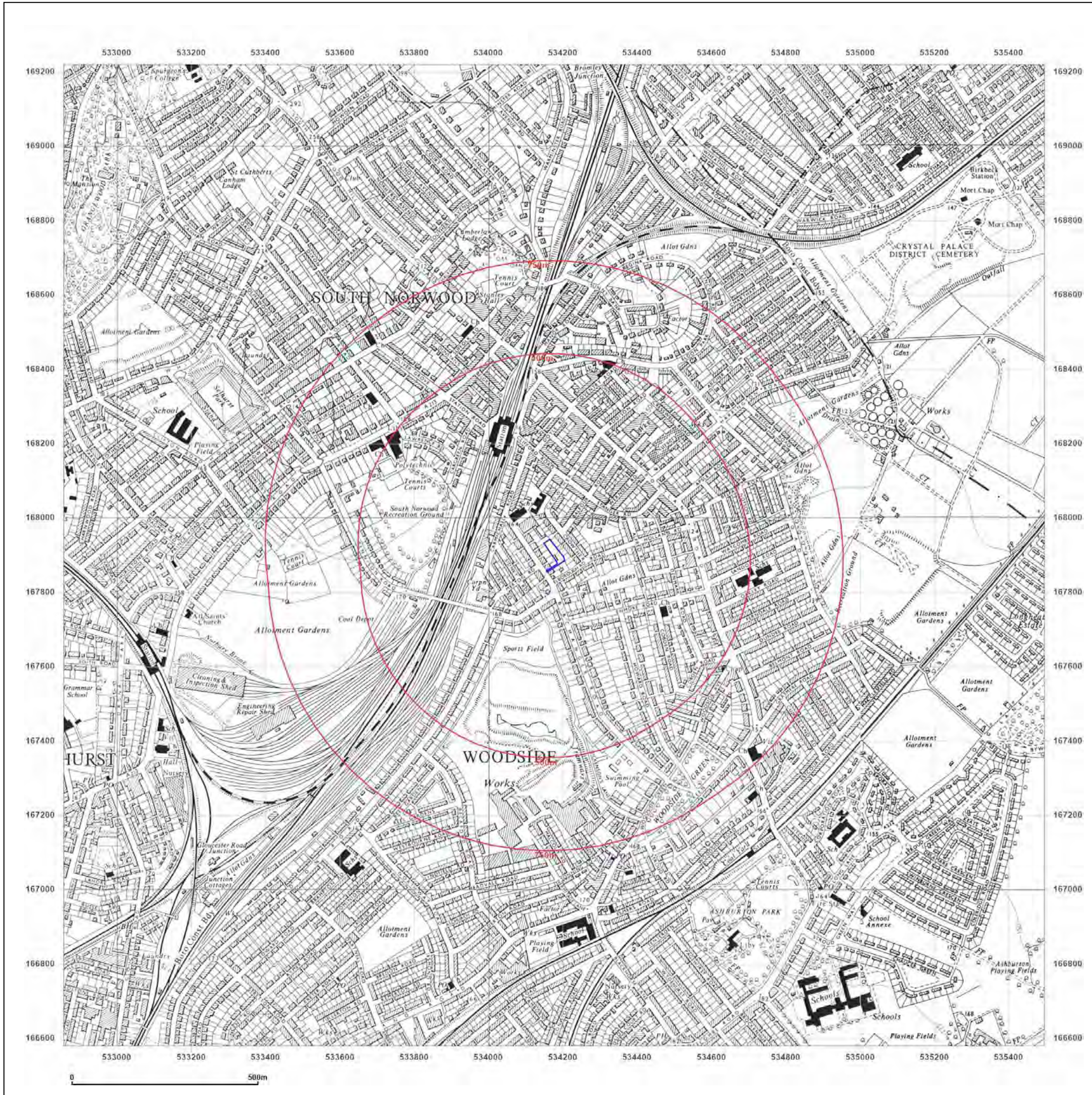


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Site Details:

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: Provisional

Map date: 1965-1968

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1965
 Revised 1965
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1965
 Revised 1965
 Edition N/A
 Copyright 1968
 Levelled N/A

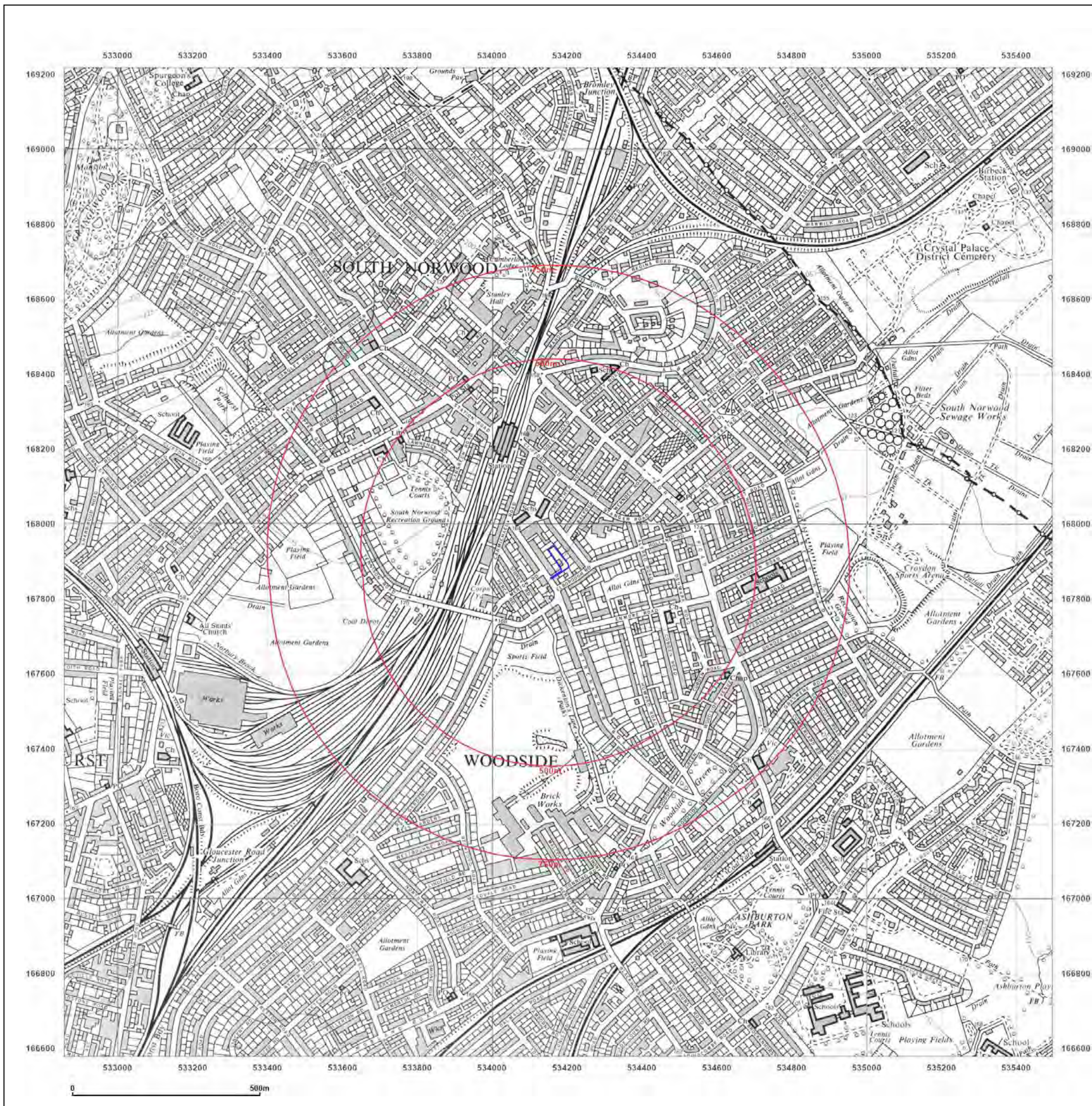


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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1974

Scale: 1:10,000

Printed at: 1:10,000



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

Surveyed 1973
 Revised 1974
 Edition N/A
 Copyright N/A
 Levelled N/A

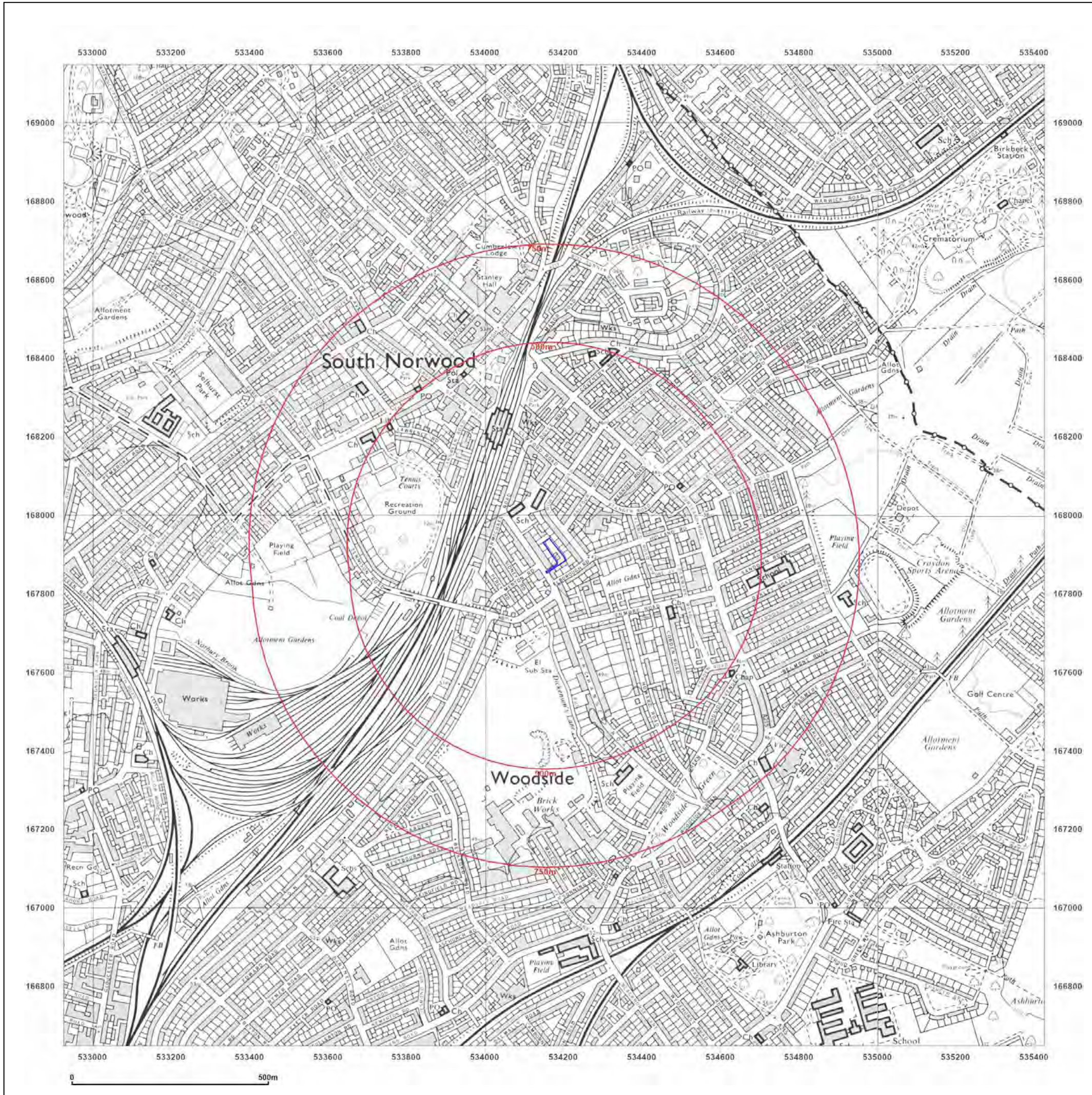


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Production date: 12 November 2022

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Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 1981

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1979
 Revised 1981
 Edition N/A
 Copyright N/A
 Levelled N/A

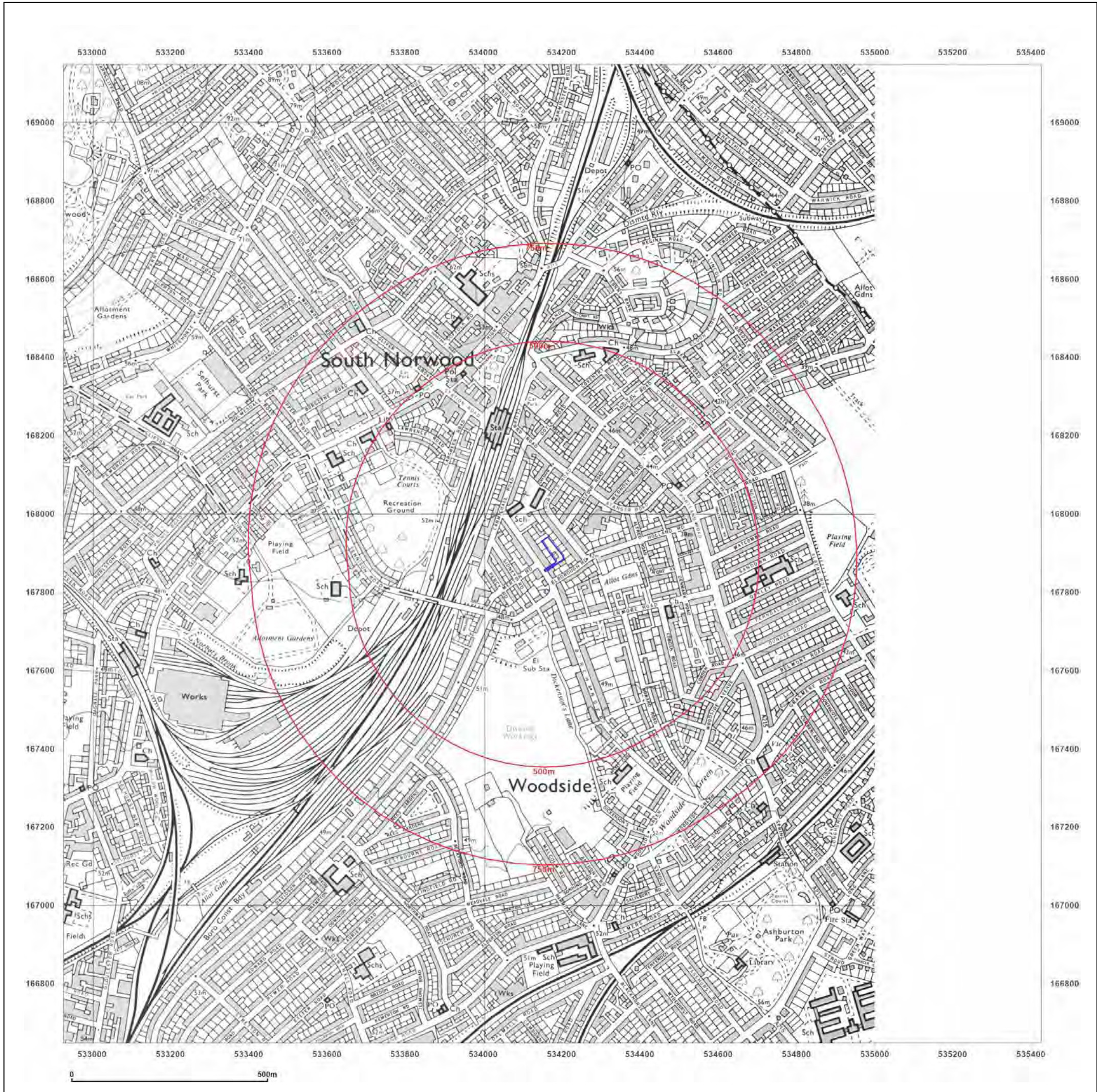


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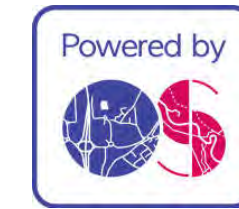
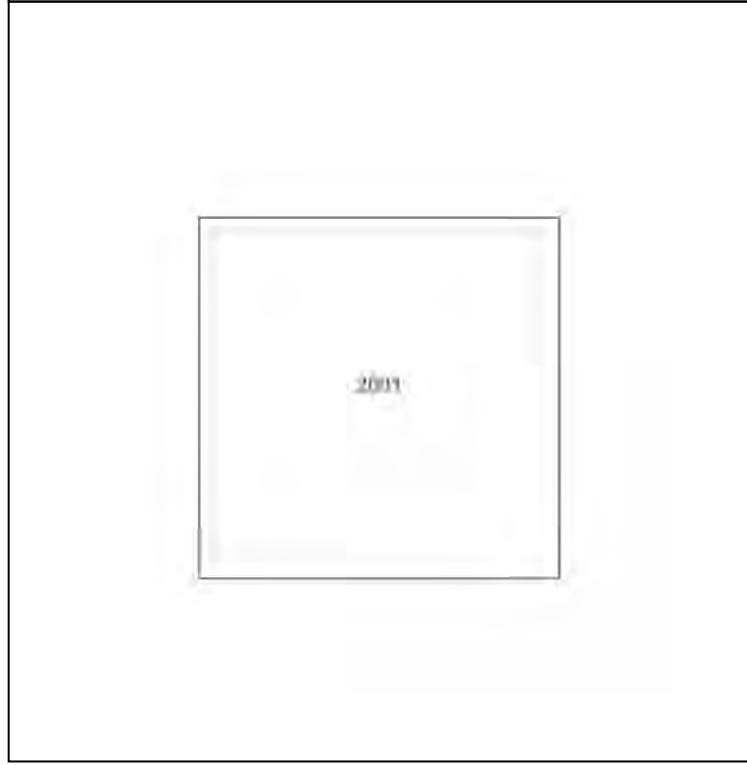
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Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000

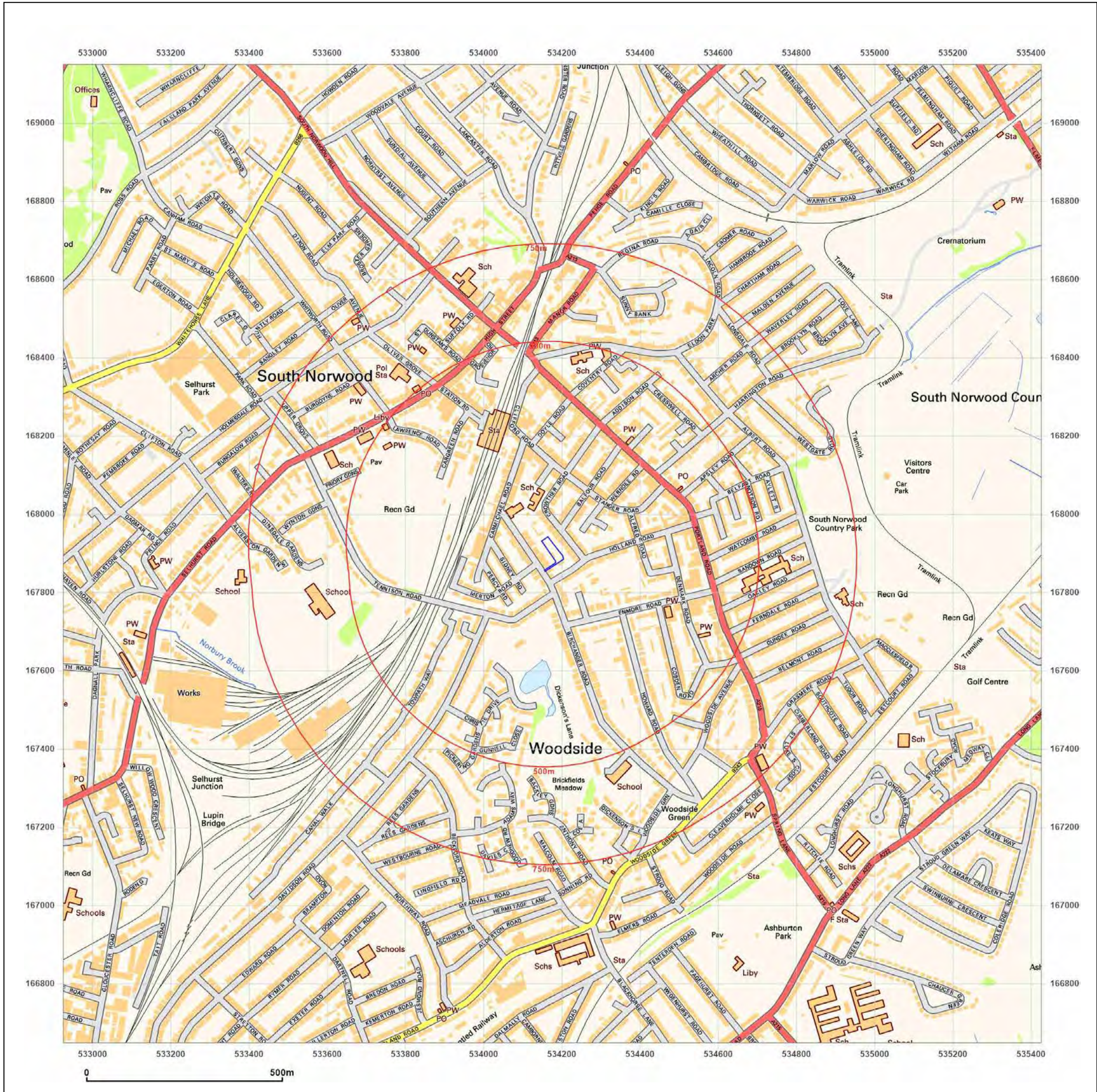


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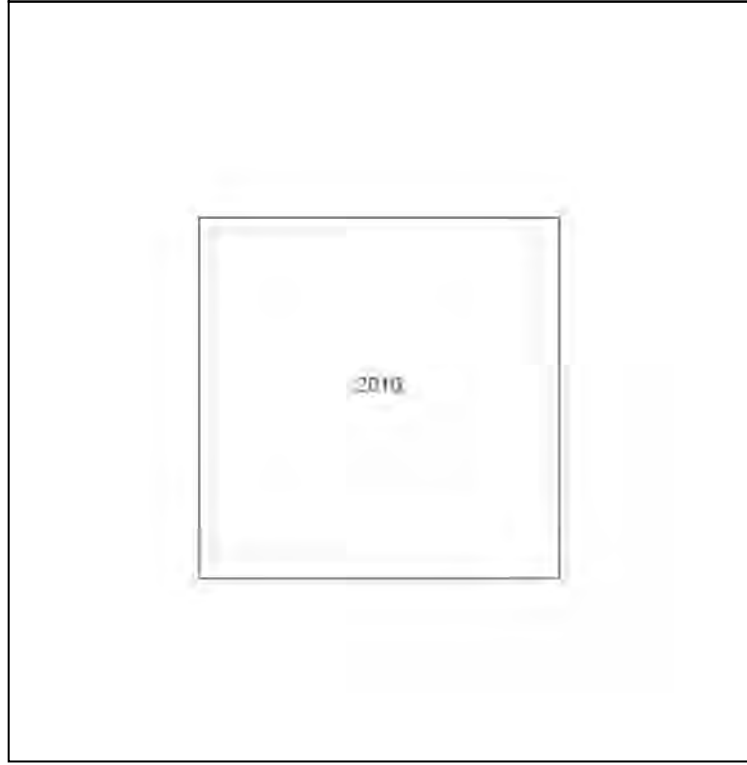
Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

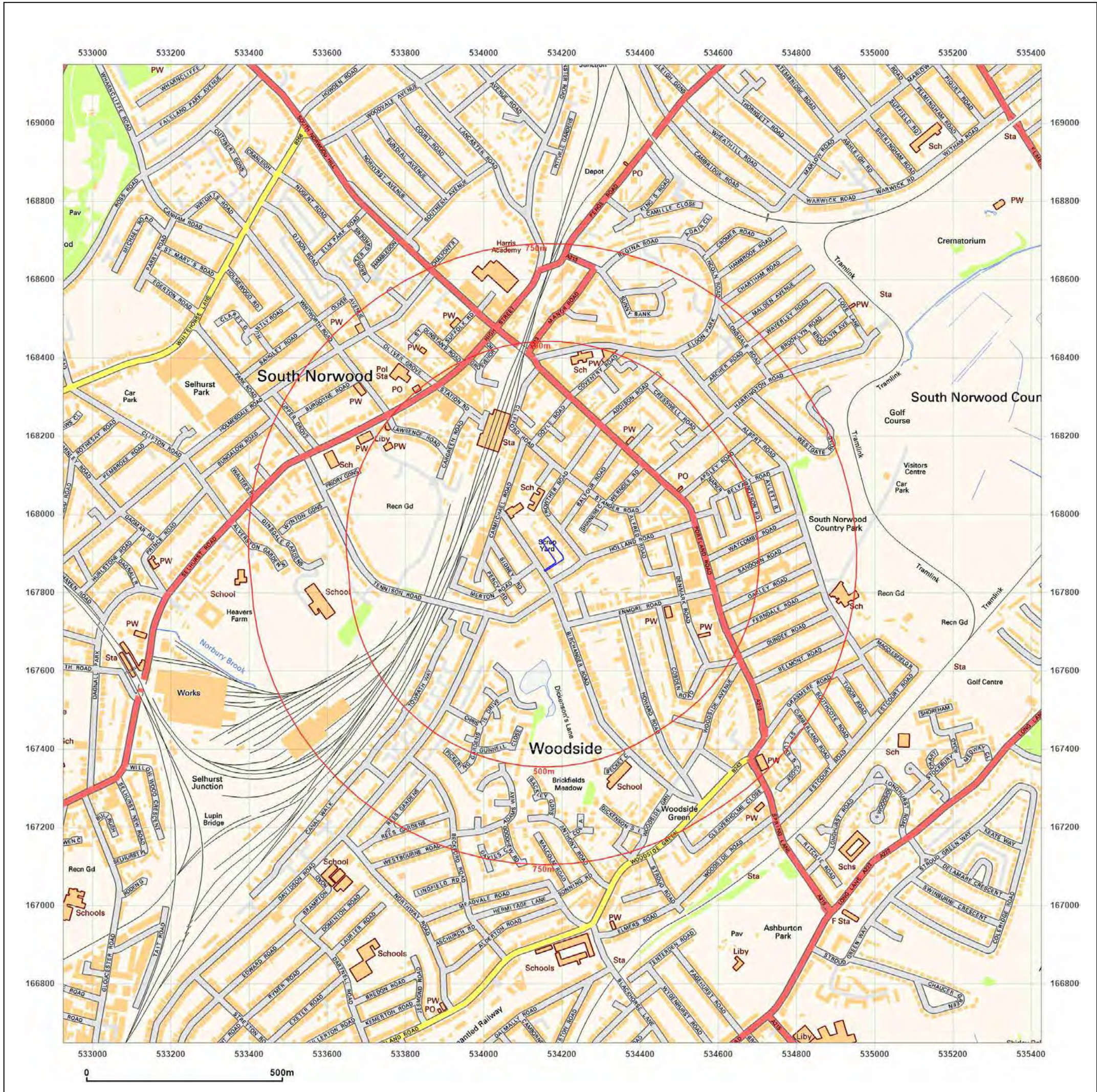


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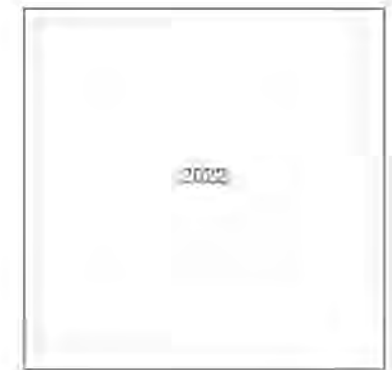
Client Ref: J22-073
Report Ref: GS-9194239
Grid Ref: 534176, 167899

Map Name: National Grid

Map date: 2022

Scale: 1:10,000

Printed at: 1:10,000



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