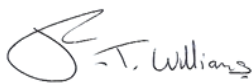


Phase I Desk Study

423-435 Lordship Lane, Wood Green, London N22 5DH

On behalf of Ivorystone Investments Limited

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EXECUTIVE SUMMARY	
PROPOSED DEVELOPMENT	At the time of reporting, March 2023, it was understood the proposed development would comprise the demolition of the existing building and the construction of a of part 1, part 5, part 6 and part 7 storey building comprising commercial units on the ground floor and 50 residential units above.
GEOLOGY AND HYDROGEOLOGY	The BGS Geological Map (Solid and Drift) for the North London area (Sheet No. 256) revealed that the site was underlain by bedrock deposits of the London Clay Formation. No superficial deposits or areas of Made/Worked Ground were noted within a 250m radius of site. A study of the aquifer maps on the Defra Magic Maps website and the Groundsure Enviroinsight datasheets, presented in Appendix E of this report, revealed the site to be located on Unproductive Strata comprising the bedrock deposits of the London Clay Formation. No designation was given for superficial deposits due to their likely absence. Examination of the Environment Agency records showed that the site did not fall within a Groundwater Source Protection Zone as classified in the Policy and Practice for the Protection of Groundwater. The nearest surface water feature to site was a pond associated with the Lordship Recreation Ground, located ~420m to the south-east. A culverted section of the Moselle River appeared to run immediately to the west of the site. Examination of the Environment Agency records showed that the site and its environs were not situated within an area liable to flooding. From analysis of hydrogeological and topographical maps groundwater was anticipated to be encountered at depth (>10m bgl), and it was considered that the groundwater was flowing in an overall east/south-easterly direction in alignment with local topography and towards the River Moselle.
POTENTIAL SOURCES OF CONTAMINATION	Full details can be seen in sections 6.3 and 6.4 of this report. Onsite - The Desk study has revealed the following potential sources of contamination onsite: • Potential for Made Ground (associated with historical construction/demolition onsite) Offsite - The Desk study has revealed the following potential sources of contamination within the site's environs: • Historical Engineering Works / Works • Historical Cuttings • Nearby Obsolete Petrol Stations • Historical Garages • Electrical substations
RECOMMENDATIONS / PHASE II OBJECTIVES	7.1. Soils It is possible that asbestos and asbestos containing materials will be incorporated within any Made Ground. An asbestos management strategy should be

implemented to ensure that any asbestos uncovered during the investigation does not pose a risk to members of the public that use the site.

On the basis of the Phase 1 Site Assessment the following contaminants of concern have been identified and should be included in the chemical analysis suite for the ground investigation:

- Asbestos.
- Semi-metals and heavy metals;
- Poly-cyclic aromatic hydrocarbons (PAHs);
- Speciated TPH including full aliphatic/aromatic split;
- Volatile/semi-volatile organic compounds – BTEX Used as marker compounds;
- Sulphates;

The list above does not imply that these determinands are present on-site or that they are likely to cause contamination issues at the site. The ground investigation will be used to prove the presence or absence of these contaminants. The sampling and testing strategy must be in line with current standards. Targeted sampling of proposed soft landscaped areas may be deemed appropriate. Results should be assessed against suitable assessment criteria to be protective of human health as well as vegetation.

Sub-surface concrete may be damaged due to being in contact with aggressive ground conditions. Sampling should be undertaken where the proposed foundations will be in contact with Made Ground and/or natural ground and tested for aggressive ground conditions (sulphates/pH). Classification should then be undertaken of the ground conditions in accordance with Building Research Establishment Special Digest 1, 2005, 'Concrete in Aggressive Ground'.

Services

The CSM has identified a low/moderate risk for aggressive ground conditions that may affect water supply pipes as part of the development. Consideration should be given to the targeted sampling (0.75 – 1.50m bfgl) and scheduling for contaminants of concern: TPH, Naphthalene, Phenols, BTEX, VOCs and SVOCs.

Groundwater

If analytical results show elevated concentrations of contaminants of concern in the soil samples then there might be a requirement to assess the potential risks of leachability of contaminants migrating into the groundwater. This might mean leachate testing on soils samples is required or groundwater sampling and testing. The risk is low however as a result of unproductive strata.

Ground-gas

The CSM has identified a risk from ground-gases at the site as a result of potential made ground on site and nearby historical garages and obsolete petrol stations. The risk is low however cannot be negligible at this stage. Analysis of soil samples should include Total Organic Carbon (TOC) testing in order to provide an indication of risk from on-site sources. In addition, ground gas monitoring should be undertaken within monitoring wells installed as part of the investigation. At this stage of investigation, in accordance with CIRIA C665 / BS8576:2013, it is

anticipated that a minimum of four spot monitoring visits will be required within the ground gas risk assessment.

Vapours

The CSM has identified sources and associated contaminants that may pose a risk through the vapour pathway. The investigation should comprise a multiple line of evidence approach, comprising the analysis of soil samples taken from appropriate horizons (using BTEX/MTBE for onsite sources) and during the monitoring of the standpipes, a PID should be used in order to identify whether a total VOC concentration is present. Should the PID identify anything over 10ppm, analysis by canister should be undertaken. The risk is low due to the ground conditions but cannot be negligible at this stage.

Any Topsoil imported to site will need to be independently sampled and tested to prove it's suitable for use as part a Validation Strategy.

1. INTRODUCTION

1.1. General

Ground and Water Limited were instructed by Ivorystone Investments Limited on the 1st March 2023 to conduct a Phase I Desk Study on the site at 423-435 Lordship Lane, Wood Green, London N22 5DH. The scope of the investigation was detailed within the fee proposal GW-1744, dated the 1st March 2023.

1.2. Aims of the Investigation

This Phase 1 Desk Study was undertaken to advise the client on risk factors pertaining to the site with special reference to former and present day potential contaminative uses and their impact on sensitive receptors, these being human health, controlled waters, buildings, building materials and services.

This Phase I Desk Study comprises a Tier 1 Preliminary Risk Assessment, under Land Contamination Risk Management (LCRM), with the intention of discharging planning condition 8.

1.3. Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

This report had been created with reference to the previous Ground and Water Ltd. Reports ref: GWPR2333/DS/December 2017 V.1.03 (Phase 1 Desk Study Report) & GWPR1840/GIR/February 2017 V1.00 (Site Investigation). The information and recommendations within this report, supersede the ones made in the Desk Study Report referenced GWPR2333/DS/December 2017 V.1.03 based on current industry standards and quality assurance.

1.4. Technical Glossary

Generic technical terms and their description can be viewed within the glossary provided within Appendix B.

2. SITE SETTING

2.1. Site Location

The site comprised a ~1347m² approximately rectangular shaped plot of land, orientated in an east to westerly direction. The site fronted onto Lordship Lane to the north, with Westbury Avenue to the west and Downhills Avenue to the east. The site was located in north-western Wood Green, in the London Borough of Haringey.

The national grid reference for the centre of the site was approximately TQ 32203 90497. A site location plan is given within Figure 1 and a site development area plan in Figure 2.

2.2. Site Description

A description of the site, as noted during the recent site photographs from February 2023 and Assessment of Google satellite imagery and 'street view' photography dated March 2022, is tabulated below. Photographs can be seen in Appendix C. An Aerial image of the site can be seen in Figure 3.

Site Description Sheet	
Use of site	At the time of the site assessment of Satellite imagery and street photography, March 2023, the site was noted to comprise a row of three storey connected buildings with associated extensions in the rear. March 2022 I imagery showed that the ground level of the building comprised of multiple retail shops/outlets. Site photos taken in February 2023 showed that the site had undergone improvements and alterations in the form of new wooden cladding on the rear residential portions of the site.
Site topography	The site topography was noted to be flat and level.
Area topography	The site is in an area of overall flat and level topography.
Structures onsite	1 x three-storey, brick built residential building with commercial shops at street/ground level.
Structures off-site	Multiple commercial properties were noted along Lordship Lane to the east and the west of the site. Residential properties were noted along roads perpendicular to Lordship Lane in all areas.
Use of surrounding ground	The site was located in a built-up area with commercial properties along Lordship Lane and terraced residential properties along roads perpendicular to Lordship Lane, with associated parking.
Boundary features	North Boundary: Accessible from Lordship Lane. East Boundary: Accessible from Downhills Way South Boundary: ~2.00m high brick wall before residential flats along Penniston Close West Boundary: ~2.00m high brick wall before residential flats along Westbury Avenue
Site covering	The entire site was covered by hard standing, with street paving at the front of the structure and tarmac to the rear of the structure.
Contamination sources onsite	An electrical sub-station was noted to the rear of the structure.
Contamination sources off-site	No off-site contamination sources were noted during the site walkover.
Vegetation onsite	No vegetation was noted on-site during the site walkover.
Vegetation off-site	No vegetation was noted off-site during the site walkover.
Services	None apparent.

2.3. Proposed Development

At the time of reporting, March 2023, it was understood the proposed development would comprise the demolition of the existing building and the construction of a of part 1, part 5, part 6 and part 7 storey building comprising commercial units on the ground floor and 50 residential units

above. A plan and section view of the proposed development can be seen in Figures 4 respectively. The proposed development plan can be seen within Figure 5.

2.4. Geology

The BGS Geological Map (Solid and Drift) for the North London area (Sheet No. 256) revealed that the site was underlain by bedrock deposits of the London Clay Formation. No superficial deposits or areas of Made/Worked Ground were noted within a 250m radius of site.

London Clay Formation

The London Clay Formation comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of Gypsum (Selenite) are often found within the weathered part of the London Clay Formation, and precautions against sulphate attack to concrete are sometimes required. The lowest part of the formation is a sandy bed with black rounded gravel and occasional layers of sandstone and is known as the Basement Bed.

A BGS borehole (TQ39SW643) located ~675m south-east of the site revealed a 0.15m capping of Topsoil over Made Ground to 0.95m bgl followed by a firm yellow brown and orange brown silty clay to 1.90m bgl. A firm to stiff fissured brown silty clay was then noted for the remainder of the borehole, a depth of 3.30m bgl. No groundwater was noted.

2.5. Hydrogeology and Hydrology

A study of the aquifer maps on the Defra Magic Maps website and the Groundsure Enviroinsight datasheets, presented in Appendix E of this report, revealed the site to be located on **Unproductive Strata** comprising the bedrock deposits of the London Clay Formation. No designation was given for superficial deposits due to their likely absence.

Superficial drift deposits are described as permeable unconsolidated (loose) deposits e.g. sands and gravels. The bedrock is described as solid permeable formations e.g. sandstone, chalk and limestone. **Unproductive Strata** are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

Examination of the Environment Agency records showed that the site did **not** fall within a Groundwater Source Protection Zone as classified in the Policy and Practice for the Protection of Groundwater.

The nearest surface water feature to site was a pond associated with the Lordship Recreation Ground, located ~420m to the south-east. A culverted section of the Moselle River appeared to run immediately to the west of the site.

Examination of the Environment Agency records showed that the site and its environs were not situated within an area liable to flooding.

From analysis of hydrogeological and topographical maps groundwater was anticipated to be encountered at depth (>10m bgl), and it was considered that the groundwater was flowing in an

overall east/south-easterly direction in alignment with local topography and towards the River Moselle.

2.6. Radon

BRE 211 (2015) Map 5 of the London, Sussex and west Kent area indicated that the site **was not** located within an area where mandatory protection measures against the ingress of radon were likely to be required.

A review of the freely available UK Health Security Agency radon database, UK Radon, indicated that the site was located within a 1km grid square, where the maximum radon potential of 1 – 3% was recorded. Basic radon protection measures are required in areas where more than 3% of houses are at or above the Action Level.

The site was in an area where a risk assessment was not required.

2.7. Internet Search (Site Setting)

2.7.1. Available Unexploded Ordnance (UXO) Map Review

A review of the data available on www.zeticauxo.com/ revealed the site was located within the London high-risk area associated with unexploded ordnance (UXO). The London area is further separated into 25No. categories based on bombing densities, where green is indicated for areas having <10 bombs dropped per km² and red is indicated for areas having >150 bombs dropped per km². The site is situated within the light orange area, ~one third through the spectrum.

Further UXO risk assessment is recommended.

2.7.2. Historical Landfill Tool Review

A review of the data available on www.groundsure.io/ revealed no historical or active landfills were noted within a 500m radius of the site area.

3. HISTORICAL REVIEW

3.1. Historical Map Review

The object of this search was to report on the history of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day and downloaded from Groundsure. In the following sections dealing with individual maps, only features considered to have a potential contaminative impact on the site and usually within a notional 250 metre radius of the site boundaries are discussed. Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. The north point and approximate extent of the site are indicated on each figure. The historical maps referred to are given within Appendix D. The implications of the map search are discussed later within this report.

Environmental Significance of Data from Historical Maps		
Maps Dated Between	Site	Environs
1864 - 1879	The site comprised an area of open farmland/field, assumed to be part of 'Grainger's Farm'.	The site's environs comprised buildings associated with 'Grainger's Farm' ~10 – 50m west of site. The Moselle River was noted immediately to the west of site, running west to south-east, and a road was noted immediately to the north. A pond ~20m x 20m was present ~160m north-west.
1896 - 1897	No significant change recorded.	New outbuildings associated with Grainger's Farm noted ~20m west of site, and a new residential development, with housing and associated access roads, had been constructed ~40 - >250m north-west. 'Lordship Hall' was noted ~190m north-west. 1894 – 1897 mapping noted a continued large residential development to the west/northwest named 'Noel Park'.
1913 - 1920	No significant change recorded.	Grainger's Farm was no longer noted. Large-scale residential development had occurred from ~30m to the north-east, north, northwest, west, south-west and south, including a School ~130m northwest. The pond noted to the north-west was no longer noted. A Saw Mill was noted ~300m to the south-east.
1935 -1966	A complex of buildings had been constructed across site in mapping dated 1935, similar to those as the existing development.	Continued residential development had occurred to the north and south-east of site, with associated access roads and garden areas. The Saw Mill to the south-east was no longer noted, and the Moselle River appeared to have been culverted. 1952 mapping noted continued residential development had occurred surrounding site. A Recreation Ground was noted from ~160m to the south-east. 1955 mapping noted Works ~80m south-west and ~150m north of site, and Garages were present ~40m south-west and ~80m north. An Electricity Sub-station was noted ~120m to the east.
1971 - 1991	No significant development	Historical Mapping dated 1971 – 1991 The Garage to the south-west had been redeveloped, and the Engineering Works to the north was no longer noted. Electricity substations had been constructed ~200m north and ~240m south-west. No significant changes were recorded between 1975 – 1991.
1991 - 2023	No significant development	1991 – 1995 mapping recorded three blocks of flats had been constructed immediately to the south of site. Further residential development was noted from ~80 – 190m south.

		2010 mapping noted that the garage building present to the south-west appeared to have been redeveloped. The most recent mapping recorded Three nearby Electric Vehicle charging points 80m west, ~100m north-west and ~245m south-east.
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3.2. Historical Aerial Photography Review

The object of this search was to report on the history of the site and its immediate environs from available Aerial Photography dating from the mid-20th Century to the present day and downloaded from Google Earth and Groundsure. Any distances quoted for features remote from the site have been scaled from the photography and are only approximate.

At the time of the earliest aerial photography, 1945 and 1985, the site appears to be occupied by a building structure in the current site area. The 1999 aerial photography showed buildings on occupying the site. The aerial photography did not note any significant changes between 1999 and 2022.

4. ENVIRONMENTAL AND GEOLOGICAL INSIGHT

4.1. Groundsure Datasheets

Groundsure Environmental and Geological Datasheets were obtained for the site. Unless the data indicates a significant risk, only information within a 250m buffer zone has been included. The GroundSure Datasheets are also presented in Appendix E and a summary is given below and overleaf(s).

Environmental Insight	
Source	Nearest Distance from Site/Dated/Type
Past Land Use	
Historical industrial land uses	5 records within a 250m radius: 4 Cuttings – On-site (x2), 13m north-west (x2); 1869 – 1879. 1 Unspecified Works – 250m south; 1991.
Historical Tank Database	None within a 250m radius.
Historical Energy Features Database	14 records within a 250m radius: 14 Electricity-sub-stations – 120m east, 125m east (x3), 126m east (x3), 205m north (x2), 228m south-west (x4), 229m south-west; 1955 – 1995.
Historical Petrol Stations Database	None within a 250m radius.
Historical Garages Database	10 records within a 250m radius: 10 Garages – 3m west, 4m west, 5m west (x4), 46m north, 47m north (x3); 1955 – 1995.
Historical Military Land	None within a 250m radius.
Waste and Landfill	
Active or recent landfill	None within a 250m radius.
Historical landfill (BGS records)	None within a 250m radius.
Historical landfill (LA/mapping records)	None within a 250m radius.
Historical landfill (EA/NRW records)	None within a 250m radius.
Historical waste sites	None within a 250m radius.
Licensed waste sites	None within a 250m radius.
Waste exemptions	8x records within a 250m radius: 2x 37m west – Treating Waste Exemption, 1x 97m north-west – Treating Waste Exemption, 2x 113m west – Treating Waste Exemption, 2x 150m west – Treating Waste Exemption, 1x 152m west – Treating Waste Exemption.
Current Industrial Land Use	
Recent Industrial Land Uses	13 records within a 250m radius: 1x Dali Tyres (Motoring) 47m north-west, 1x Cavallino Cars (Motoring) 55m south-east, 1x Lordship Lane Tyres (Motoring) 92m east, 3x Electricity Substations (Infrastructure and Facilities) – 132m east, 208m north and 231m north-west. 1x Tyres 4 Us (Motoring) 134m east, 1x Gemec Ltd (Engineering Services) 150m east, 1x Micmac Margins (Industrial Products) 153m south, 1x Bushey Car Spares (Motoring) 162m west, 1x Made Easy Cars Ltd (Motoring) 163m north, 1x Gas Governor (Infrastructure and Facilities) 164m north, 1x Technimerc (Repair and Servicing) 175m north-west,
Current or recent petrol stations	2 records within a 250m radius: 1x OBSELETE Petrol station 33m west, 1x OBSELETE petrol station 106m north.
Sites determined as Contaminated Land	None within a 250m radius.

Control of Major Accident Hazards (COMAH)	None within a 250m radius.
Regulated explosive sites	None within a 250m radius.
Hazardous substance storage/usage	None within a 250m radius.
Licensed pollutant release (Part A(2)/B)	1 record within a 250m radius: 1x Step Ahead Dry Cleaners (Historical Permit – No Enforcement Notified) 52m north-west.
Radioactive Substance Authorisations	None within a 250m radius.
Licensed Discharges to controlled waters	None within a 250m radius.
Pollutant release to surface waters (Red List)	None within a 250m radius.
Pollutant release to public sewer	None within a 250m radius.
List 1 Dangerous Substances	None within a 250m radius.
List 2 Dangerous Substances	None within a 250m radius.
Pollution Incidents (EA/NRW)	None within a 250m radius.
Pollution inventory substances	None within a 250m radius.
Pollution inventory waste transfers	None within a 250m radius.
Pollution inventory radioactive waste	None within a 250m radius.
Hydrogeology	
Superficial Aquifer	None within a 250m radius.
Bedrock Aquifer	1 record onsite: 1x Unproductive Aquifer.
Groundwater Vulnerability	1 record onsite: 1x Unproductive bedrock aquifer –Unproductive, leaching class: Low.
Groundwater Vulnerability – Soluble Rock Risk	None within a 250m radius.
Groundwater Vulnerability - local information	None within a 250m radius.
Groundwater Abstractions	None within a 250m radius.
Surface Water Abstractions	None within a 250m radius.
Potable Abstraction	None within a 250m radius.
Source Protection Zones	None within a 250m radius.
Hydrology	
Water Network (OS MAsterMap)	1x record within a 250m radius: 1x Inland River not Influenced by normal tidal action – River Moselle (Underground River).
Surface Water Features	None within a 250m radius.
WFD Surface Water Body Catchments	1 record within a 250m radius: 1x On-site River Moselle Brook.
WFD Surface Water Bodies	1 record within a 250m radius: 1x On-site River Moselle Brook.
WFD Groundwater Bodies	None within a 250m radius.
Environmental Designations	
Sites of Special Scientific Interest (SSSI)	None within a 250m radius.
Conserved wetland sites (Ramsar sites)	None within a 250m radius.
Special Areas of Conservation (SAC)	None within a 250m radius.
Special Protection Areas (SPA)	None within a 250m radius.
National Nature Reserves (NNR)	None within a 250m radius.
Local Nature Reserves (LNR)	None within a 250m radius.
Designated Ancient Woodland	None within a 250m radius.
SSSI Units	None within a 250m radius.
Visual and Cultural Designations	
Areas of Outstanding Natural Beauty (AONB)	None within a 250m radius.
National Parks	None within a 250m radius.
Registered Parks and Gardens	None within a 250m radius.
Agricultural Designations	

Agricultural Land Classification	1x records within a 250m radius: 1x Urban on-site.
Habitat Designation	
Priority Habitat Inventory	None within a 250m radius.

Geological Insight	
Source	Nearest Distance from Site/ Type
Artificial and Made Ground (1:10,000 Scale)	None within a 250m radius.
Superficial Geology (1:10,000 Scale)	None within a 250m radius.
Landslip (1:10,000 Scale)	None within a 250m radius.
Bedrock Geology (1:10,000 Scale)	1 on-site records: 1x London Clay Formation.
Bedrock Faults and Other Linear Features (1:10,000 Scale)	None within a 250m radius.
Artificial ground and permeability (1:50,000 scale)	None within a 250m radius.
Superficial Geology and Permeability (1:50,000 scale)	None within a 250m radius.
Landslip Permeability (1:50,000 scale)	None within a 250m radius.
Bedrock Geology and Permeability (1:50,000 scale)	1 record onsite: 1x London Clay Formation. Flow Type –Mixed, Maximum Permeability –Moderate, Minimum Permeability – Very Low.
Bedrock faults and other linear features (60k)	None within a 250m radius.
Boreholes	
BGS recorded boreholes	None within a 250m radius.
Natural Hazard Findings	
Shrink-Swell Clay	Moderate hazard onsite.
Running Sands	Very Low hazard onsite.
Compressible Deposits	Negligible hazard onsite.
Collapsible Deposits	Very Low hazard onsite.
Landslides	Very Low hazard onsite.
Ground Dissolution of Soluble Rocks	Negligible hazard onsite.
Mining, Ground Working and Natural Cavities	
Records of Natural Cavities	None within a 250m radius.
Records of BritPits	None within a 250m radius.
Records of Surface Ground Workings	4x records within a 250m radius: 2x On-site Cuttings (1869 – 1879), 2x Off-site Cuttings (1869 – 1879) 13m north-west.
Records of Underground Workings	None within a 250m radius.
Records of Historical Mineral Planning Areas	None within a 250m radius.
Records of Non-coal Mining	1 on-site record: On-site sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered.
Records of Mining Cavities	None within a 250m radius.
Records of JPB Mining Areas	None within a 250m radius.
Records of Coal Mining	None within a 250m radius.
Records of Brine areas	None within a 250m radius.
Records of Gypsum Areas	None within a 250m radius.
Records of Tin Mining	None within a 250m radius.
Records of Clay Mining	None within a 250m radius.
Radon	

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.
Estimated Background Soil Chemistry	
Records of BGS estimated background soil chemistry	2 records within a 250m radius: On-site (x2) Arsenic: No Data, Lead: No Data, Cadmium: No Data, Chromium: No Data, Nickel: No Data.
Records of BGS Estimated Urban Soils Chemistry	4 records within a 250m radius: 4x records on-site. Arsenic: 17 – 19 mg/kg, Lead: 514 – 589 mg/kg, Cadmium: 0.70 – 0.90 mg/kg, Chromium: 67 – 69 mg/kg, Nickel: 29 – 31 mg/kg.
Records of BGS Measured Urban Soil Chemistry	None within a 250m radius.
Railway Infrastructure and Projects	
Records of Underground railways (London)	None within a 250m radius.
Records of Underground railways (Non-London)	None within a 250m radius.
Records of Railway Tunnels	None within a 250m radius.
Records of Historical Railway and Tunnel Features	None within a 250m radius.
Records of Royal Mail Tunnels	None within a 250m radius.
Records of Historical Railways	None within a 250m radius.
Records of Railways	None within a 250m radius.

5. ONLINE REVIEW AND HISTORICAL INVESTIGATIONS

5.1. Online Council Planning Database

A review of the Haringey London Borough Council Planning Database revealed that twenty-three planning applications had been filed for the 423-435 Lordship Lane, Wood Green, London N22 5DH. Those pertinent to the site development area are tabulated below.

Planning Applications from the London Borough of Haringey Council Planning Database			
Application No./Date	Address	Proposed	Decision
HGY/2021/1573 07/06/2021	423-435 Lordship Lane London N22 5DH	Approval of details pursuant to condition 32 (ultra-low NOx boilerst) attached to Appeal decision APP/Y5420/W/19/3223654 (original planning reference HGY/2017/3679)	Approved with Conditions 21/07/2021
HGY/2021/1379 20/05/2021	423-435 Lordship Lane London N22 5DH	Approval of details pursuant to condition 33 (noise levels arising from the use of the new boiler plant and associated equipment) attached to Appeal decision APP/Y5420/W/19/3223654 (original planning reference HGY/2017/3679).	Approved with Conditions 19/07/2021
HGY/2021/1378 20/05/2021	423-435 Lordship Lane London N22 5DH	Approval of details pursuant to conditions 14 (Secured by Design - partial discharge only) attached to Appeal decision APP/Y5420/W/19/3223654 (original planning reference HGY/2017/3679)	Approved with Conditions 23/07/2021
HGY/2021/1017 08/04/2021	423-435 Lordship Lane London N22 5DH	Approval of details pursuant to condition 9 (scheme to protect the dwellings hereby approved from external noise) attached to Appeal decision APP/Y5420/W/19/3223654 (original planning reference HGY/2017/3679).	Approved with Conditions 08/06/2021
HGY/2021/0245 14/01/2021	429 Lordship Lane London N22 5DH	Erection of a single storey rear infill extension and minor internal alterations.	Approved with Conditions 11/03/2021
HGY/2019/2236 21/06/2019	Pavement at 437 Lordship Lane London N22 5DJ	Installation of 1No BT InLink unit outside 437 Lordship Lane, London, N22 5DH and the removal of 1No BT call box at Westbury Avenue, London, N22 6BL (02088890325) and 1No BT call box at O/S 554 Lordship Lane London, N22 5BY (02088898001).	Not Proceeded With 11/06/2020
HGY/2017/3679 21/12/2017	423-435 Lordship Lane London N22 5DH	Demolition of existing building and erection of part 1, part 5, part 6 and part 7 storey building comprising commercial uses (use class A1, A2, A3, A4, A5) at ground floor and 50 residential dwellings above.	Refused 31/8/2018

		Provision of waste refuse storage, cycle parking, disabled car parking and amenity space.	
HGY/2016/3517 24/10/2016	435 Lordship Lane, London N22 5DH	Change of use from authorised use as retail (Use Class A1) to restaurant/café (Use Class A3), removal of existing unauthorised single storey side extension and extract ventilation duct and relocation of new extract duct to the rear of the premises.	Grant permission 06/12/2016
HGY/2015/0629 02/03/2015	Westbury Court, Lordship Lane, London N22 5DH	Addition of two further storeys to the existing three storey building, comprising 8 additional residential units.	Grant permission 18/03/2016
HGY/2013/2202 28/10/2013	435 Lordship Lane, Wood Green, London Borough of Haringey, London N22 5DH	Flexible Change of use under Class D of the Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2013 starting from 28/10/2013: Existing Use Class A1 - Proposed Use Class A3	Flexi Change of Use Granted 28/10/2015
HGY/2013/1628 06/08/2013	425B Lordship Lane, London N22 5DH	Extension of existing shopfront and installation of temporary shutters	Refused 25/09/2013
HGY/2013/0823 29/04/2013	425B Lordship Lane, London N22 5DH	Extension of existing shopfront and installation of temporary shutters	Refused 24/06/2013
HGY/2010/2049 03/11/2010	423 Lordship Lane, London N22 5DH	Display of 1 x externally illuminated fascia sign and 2 x externally illuminated projecting signs	Grant permission 23/12/2010
HGY/2010/2048 03/11/2010	423 Lordship Lane, London N22 5DH	Alterations to shopfront, installation of air conditioning units to rear and associated works	Grant permission 23/12/2010
HGY/2010/0879 14/05/2010	425 - 435 Lordship Lane, London N22 5DH	Erection of additional storey comprising of 5x two flats with amenity space and refuse area	Refused 07/07/2010
HGY/2008/2123 28/10/2008	435 Lordship Lane, Wood Green, London N22 5DH	Change of use from A1 to A1 & A3 (restaurant), erection of single storey rear extension.	Refused 19/12/2008
HGY/2008/1188 03/06/2008	435 Lordship Lane, Wood Green, London N22 5DH	Change of use from A1 to A4 (drinking establishment).	Refused 29/08/2008
HGY/2006/2388 06/12/2006	429 Lordship Lane, Wood Green, London N22 5DH	Display of internally illuminated ATM fascia signage.	Grant permission 26/01/2007
HGY/2006/2384 06/12/2006	429 Lordship Lane, Wood Green, London N22 5DH	Installation of ATM.	Grant permission 24/01/2007

HGY/2001/1478 09/10/2001	Westbury Court, 423 Lordship Lane, London N22 5DH	The erection of a telecoms base station consisting of 6 tripod mounted antenna, equipment cabin, meter cabinet and ancillary equipment on the rooftop of the public house.	Refused 04/02/2002
HGY/1995/1431 06/12/1995	427 Lordship Lane, London N22 5DH	Display of internally illuminated fascia sign and projecting box sign.	Grant permission 24/01/1996
HGY/1995/1383 23/11/1995	427 Lordship Lane, London N22 5DH	Installation of new shopfront.	Grant permission 24/01/1996
HGY/1995/0783 06/07/1995	William Hill Bookmakers, 427 Lordship Lane, London N22 5DH	Change of use of ground floor from Class A1 (Retail) to Class A2 (Licensed Betting Office).	Grant permission 08/08/1995

5.2. Internet Search

An internet search did not identify any other information pertinent to this report.

5.3. Previous Site Investigations

A site investigation was undertaken on-site by Ground and Water Limited in February 2017 (ref. GWPR1840/GIR/February 2017) to investigate the ground conditions underlying the site.

The investigation encountered Made Ground comprising grey-brown to orange-brown gravelly sand, underlain by dark brown to dark grey slightly sandy gravelly silty clay from ground level to a depth of between 0.50 – 1.00m bgl. The sand was fine to coarse grained and the gravel was occasional to abundant, fine to coarse, sub-angular to sub-rounded flint, brick, concrete and clinker. The Made Ground was underlain by Head Deposits comprising a brown, locally dark grey, mottled silty clay to between 1.50 – 1.80m bgl. Fine gravels were noted at 1.30m bgl within WS2. Underlying the Head Deposits for the remaining depth of the boreholes were soils of the London Clay Formation, comprising an orange-brown to dark grey-brown, locally dark blue-grey, silty clay, with localised pockets of silt. Selenite crystals and claystone fragments were noted from 5.00m bgl within BH1.

Roots were noted to 0.50m bgl within WS1, and a groundwater strike was encountered at 5.10m bgl within BH1. Groundwater was noted standing at 1.10m bgl within the TP/FE2.

No visual or olfactory evidence for hydrocarbon contamination was identified during the investigation.

6. PRELIMINARY RISK ASSESSMENT

6.1. Contaminant Source-Pathway-Receptor Model

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For a risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If one of these three elements are absent, it is considered that there is no risk of harm. If, however, there is a linkage between any given source

and any given receptor, then a risk-based approach is used to assess the significance or impact of the pollutant linkage.

This Phase 1 Desk Study has been used to identify potential on-site and off-site sources of contamination, which are summarised in this section of the report. Additional potential sources of contamination identified within the Desk Study have been discounted based on the absence of a realistic SPR linkage (i.e. the distance from the site or the nature or age of any potential contamination sources).

In line with the requirements of BS 21365:2020, *Soil Quality – Conceptual site models for potentially contaminated sites*, the Conceptual Site Model (CSM) can be described in text, tabulated or presented as a figure. A tabulated CSM is provided in Section 6.6 of this report, where each component is discussed in the following sections. A diagrammatic CSM is provided within Figure 6.

6.2. Potential On-site Sources of Contaminants

This Desk Study revealed that at the time of the earliest historical mapping (1864) the site comprised an area of open farmland / fields associated with the neighbouring farm 'Graingers Farm'. The site remained unchanged up to mapping dated 1935 which saw the site developed with a complex of multiple buildings built across the whole site (similar to those seen as existing buildings). These buildings were subsequently labelled as Westbury Court. No significant changes were noted up to the most recent historical mapping dated 2023.

Recent site photos taken in February 2023 show that minor alterations had taken place to parts of the buildings in the rear in the form of new decorative cladding installed on the buildings.

The Phase 1 Desk Study revealed the following on-site sources of contamination:

Demolition and construction activities are likely to have created a capping of Made Ground containing demolition debris. Building materials used in the early 20th Century may have included asbestos for partitions and insulative lagging. Lead, cadmium and other heavy metal based paints may also have been used. Fires may have taken place on the site as part of any demolition processes to remove waste. Potential pollutants such as carcinogenic PAHs in the tars produced by combustion of timber and other materials may be present in the near surface soils. Oil spills may have also occurred.

Due to the historical construction activities that have taken place on site the risk level is considered **Moderate**.

The Groundsure datasheets, presented in Appendix E of this report, revealed two records of Cuttings on-site between 1869 and 1879. Although the poor scale of the historic maps means no evidence of these cuttings is apparent, it is assumed that they relate to an embankment for Lordship Lane immediately to the north or the culverting of the Moselle River.

These features are not considered likely to pose a contamination/ground-gas risk to the site.

6.3. Potential Off-site Sources of Contaminants

The Phase 1 Desk Study revealed the following potential off-site sources of contamination:

- Historical Mapping dated 1869 – 1879 and Groundsure Datasets recorded 5No. historical industrial Records of Cuttings 2No. on-site (associated with a former road to the north/adjacent) and 2No. off site 13m north-west and an Unspecified Works 250m south. Contaminants associated with such industrial works include metals and semi-metals; asbestos; oil/fuel hydrocarbons, PAHs, solvents and inorganic chemicals (R&D Publication CLR 8, 2002). Fill imported to site from such industries may have contained such materials; however, attenuation of volatile hydrocarbons during excavation, transport and deposition is likely. Given the limited changes in site layout, it is unlikely fill from these industries would have been imported to site.

The anticipated groundwater flow direction beneath the site and its environs was to the east/south-east. The two industrial sites are therefore parallel to the anticipated groundwater gradient of site, and so any contaminants present in the soil are unlikely to impact the groundwater quality underneath the site.

- By the 1955 historic map Garages were noted ~40m south-west and ~80m north. By the 1971 – 1972 historic map the Garage to the south-west was no longer noted, and by the 2010 historic map the Garage to the south-west appeared to have been redeveloped. The Groundsure datasheets revealed ten records of Historical Garages and Motor Vehicle Repair Centres within a 250m radius of site, comprising ten Garages 3m west, 4m west, 5m west (x4), 46m north and 47m north (x3) (1955 – 1995).

Potential sources of contamination associated with a garage include: lubricant oils; brake fluids (constitute mainly of polymerised glycols and ethers. Waste fluid is generated during repair work on brake systems); solvents (chlorinated hydrocarbons, carbon tetrachloride, paraffin and proprietary degreasing compounds); paints (lead-based paints, zinc-rich epoxy primers, polyurethanes as decorative finishes); gasoline, diesel, paraffin (*Department of the Environment Industry Profile, Road vehicle fuelling, service and repair: garages and filling stations 1996*).

Potential sources of contamination associated with garage services, motor body repair works and body/paint spray workshop include:

- Lubricant oils (engine and transmission lubricating oils, both used and new);
- Contaminants from used oils and paints include: lead, copper and a range of other heavy metals, unburnt fuel, Polycyclic Aromatic Hydrocarbons (PAHs);
- Anti-freeze – ethylene glycol and propylene glycol, along with methanol, is used as an anti-freeze in coolant systems;
- Brake fluids (constitute mainly of polymerised glycols and ethers);
- Waste fluid generated during repair work on brake systems;
- Solvents (chlorinated hydrocarbons, carbon tetrachloride, paraffin and proprietary degreasing compounds);
- Paints (lead-based paints, zinc-rich epoxy primers, polyurethanes as decorative finishes, Volatile Organic Compounds (VOCs));
- Gasoline;
- Diesel;

- Asbestos.

(Department of the Environment Industry Profile, Road vehicle fuelling, service and repair: garages and filling stations 1996).

Despite the proximity of one Garage from the site, the time since construction and its relatively recent demolition, the lack of site layout changes on the subject site the risk of fill from such a source being disposed of onsite was **low**. Given the cohesive ground conditions anticipated, the risk of contaminants migrating and affecting the soils/groundwater quality of site is considered to be **low**.

- Groundsure Datasets recorded two 'Obsolete' Petrol Stations located 33m west and 106m north. Petrol stations can be a source of contaminants including Hydrocarbons, VOCs, PAHs and TPHs as well as bio-genic ground gases and vapours such as carbon dioxide, carbon monoxide, methane and hydrogen sulphide. Due to the impermeable lithology (cohesive London Clay formation) underlying the site and the sites environs the risk level is considered **Low** but cannot be discounted from this stage.
- By the 1955 historical map an Electricity Sub-station was noted ~120m to the east, and by the 1971 – 1972 historic map further sub-stations had been constructed ~200m north and ~240m south-west.

The Groundsure Datasheets, presented in Appendix D of this report, identified fourteen records of historical energy features were noted within a 250m radius of the site comprising fourteen Electricity-sub-stations 120m east, 125m east (x3), 126m east (x3), 205m north (x2), 228m south-west (x4) and 229m south-west (1955 – 1995).

High-voltage electricity sub-stations may be a potential source for Polychlorinated Biphenyls (PCBs), especially in pre-1970's sub-stations. PCB oils and other cable/transformer oils, together with a series of waxes are commonly used in mainly high voltage applications. PCBs are generally toxic; however, newer (post-1970's) forms of non-toxic oils and waxes have replaced the use of PCBs. All cable oils are extremely viscous and adhere strongly to soil particles and do not tend to migrate far from the point of leakage or spillage.

Given the distance of the sub-stations from the site and the relatively modern construction of all but one sub-station, the risk of PCB's being transported to site is considered to be **negligible**.

- Study of the historic maps revealed that from 1955 a number of Works were noted surrounding the site, including an Engineering Works ~150m north and a Building Material Works ~80m south-west. By the 1971 – 1972 historic map the Engineering Works to the north were no longer noted. Groundsure Datasets identified thirteen recent / current industrial sites that were considered to be significant within a 250m radius. These included Motoring industries 47m north-west, 55m south-east, 92 – 150m east, 162m west and 163m north. Industrial Infrastructure and facilities in the form of Electricity substation and gas governors 132m east, 163 – 204m north and 231m north-west.

Some industries (to the north) may be up groundwater gradient, however due to the predominant cohesive ground conditions in the entire area and beneath the site, in combination with the distance from site, the risk was considered as negligible.

6.4. Potential Receptors

At the time of reporting, March 2023, it was understood the proposed development would comprise the demolition of the existing building and the construction of a of part 1, part 5, part 6 and part 7 storey building comprising commercial units on the ground floor and 50 residential units above. The proposed development plan can be seen within Figure 5.

Based on the proposed development, the potential receptors are presented below and comprise:

Human Health

- End users of the site (Residents/Future site visitors);
- Construction workers during redevelopment;
- Site operatives during maintenance works.

Building Materials and Services

- Buildings;
- Buried concrete;
- Confined spaces; and
- Underground services (Water Pipes).

Controlled Waters

- River Mosselle (Underground River) -Immediately to the West of the site, However this controlled water receptor is not considered to be at risk from the proposed development.

6.5. Contaminant Absorption Pathways

The potential pathways for contaminant absorption between the identified sources and the identified receptors are as follows:

Human Health – Commercial: Soil Contamination

- Direct ingestion of soil and soil derived dust;
- Dermal contact of soil and soil derived dust;
- Ingestion of soil with elevated concentration of determinants;
- Dermal contact with impacted soils;
- Inhalation of impacted dust (indoors and outdoors) with elevated concentration of determinants;
- Inhalation of volatiles (indoors and outdoors) with elevated concentration of determinants.

Given the proposed development, commercial ground floor and 100% hardstanding, the absorption pathways highlighted are considered to be broken.

Groundwater

- Surface water runoff;
- Migration in Made Ground;
- Via anthropogenic pathways.

6.6. Tabulated Conceptual Site Model

The tabulated Conceptual Site Model developed as part of this Desk Study is outlined overleaf. For ease of reference and understanding, the risks have been classified within this risk assessment against four possible levels / categories, summarised in the table below.

Risk Categories used in the Tabulated CSM	
Negligible	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is no plausible risk. Therefore, there is no need to further assess this potential source of contamination.
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors. However, it is considered that further investigation to confirm this is recommended.
Moderate Risk	Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use in its current condition and there may be an unacceptable risk to receptors. Further investigation is required to confirm this.
High Risk	Regarding this potential SPR linkage, the site is probably or certainly not suitable for proposed end-use and there is likely to be an unacceptable risk to receptors. Contaminants probably or certainly present and urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary			(On-Site Sources)
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/ demolition activities: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Ingestion of home-grown produce, and soils attached - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Moderate
	- Anthropogenic (man-made) pathways - Vertical and lateral migration in permeable strata - Surface water runoff	Controlled Waters River Moselle (Underground River)	Low
Aggressive ground conditions with Made Ground and natural ground, including groundwater: - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)	Moderate
Ground gases generated by Made Ground: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces	Low
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services	Low

Tabulated Conceptual Site Model – Pollutant Linkage Summary			(Off-Site Sources)
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Historical Engineering Works 150m north & Building Material Works 80m south-west - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Negligible
	Direct uptake of groundwater	Flora and Fauna Vegetation within soft landscaped areas	Negligible
Historical Cuttings on site and off site (1869 – 1879) and Unspecified Works 250m south. - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Negligible
	Direct uptake of groundwater	Flora and Fauna Vegetation within soft landscaped areas	Negligible
Historical Garages and Obsolete Petrol stations located 33m west and 106m north recorded by historical mapping and Groundsure datasets: - Hydrocarbons, - Lubricants, - VOCs, - PAHs, - TPHs	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Low
	Direct uptake of groundwater	Flora and Fauna Vegetation within soft landscaped areas	Low
Ground gases and Vapours Historical Garages and Obsolete Petrol stations located 33m west and 106m north recorded by historical mapping and Groundsure datasets:	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces	Low

Tabulated Conceptual Site Model – Pollutant Linkage Summary			(Off-Site Sources)
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
- Carbon Dioxide - Carbon Monoxide - Methane - Hydrogen Sulphide	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services	Low
Historical Energy features including Electricity Substations 120m east, 125m east (x3), 126m east (x3), 205m north (x2), 228m south-west (x4) and 229m south-west (1955 – 1995).	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Negligible
PCBs	Direct uptake of groundwater	Flora and Fauna Vegetation within soft landscaped areas	Negligible
Recent / Current industrial land uses including Motoring industries 47m north-west, 55m south-east, 92 – 150m east, 162m west and 163m north. Industrial Infrastructure and facilities in the form of Electricity substation and gas governors 132m east, 163 – 204m north and 231m north-west.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works	Negligible
- Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	Direct uptake of groundwater	Flora and Fauna Vegetation within soft landscaped areas	Negligible

7. RECOMMENDATIONS AND PHASE II OBJECTIVES

This section of the report will present recommendations for the further investigation of each plausible pollutant linkage identified by the Conceptual Site Model.

This section of the report will present recommendations for the further investigation of each plausible pollutant linkage identified by the Conceptual Site Model.

It is recommended that an intrusive ground investigation is undertaken at the site to evaluate the risk that contaminants of concern within the soils and groundwater may affect end-users. This should determine the underlying ground and groundwater conditions and include an assessment of the level of contamination to enable the quantification of the ground-related risks associated with the proposed redevelopment.

Consideration should be given to the testing of soil samples recovered from exploratory holes for chemical laboratory testing. The testing should be for a broad range of contaminants in accordance with DEFRA / CLEA methodologies and include the contaminants of concern identified within the Conceptual Site Model.

Recommendations in this report should be applied on site post demolition but prior to the construction of the proposed developed. Any Demolition should be carried out in a controlled manner and environment. Prior to any demolition work it is also recommended that an Asbestos Survey be undertaken on the existing buildings which are to be demolished.

7.1. Soils

It is possible that asbestos and asbestos containing materials will be incorporated within any Made Ground. An asbestos management strategy should be implemented to ensure that any asbestos uncovered during the investigation does not pose a risk to members of the public that use the site.

On the basis of the Phase 1 Site Assessment the following contaminants of concern have been identified and should be included in the chemical analysis suite for the ground investigation:

- Asbestos.
- Semi-metals and heavy metals;
- Poly-cyclic aromatic hydrocarbons (PAHs);
- Speciated TPH including full aliphatic/aromatic split;
- Volatile/semi-volatile organic compounds – BTEX Used as marker compounds;
- Sulphates;

The list above does not imply that these determinands are present on-site or that they are likely to cause contamination issues at the site. The ground investigation will be used to prove the presence or absence of these contaminants. The sampling and testing strategy must be in line with current standards. Targeted sampling of proposed soft landscaped areas may be deemed appropriate. Results should be assessed against suitable assessment criteria to be protective of human health as well as vegetation.

Sub-surface concrete may be damaged due to being in contact with aggressive ground conditions. Sampling should be undertaken where the proposed foundations will be in contact with Made Ground and/or natural ground and tested for aggressive ground conditions (sulphates/pH). Classification should then be undertaken of the ground conditions in accordance with Building Research Establishment Special Digest 1, 2005, 'Concrete in Aggressive Ground'.

7.2. Services

The CSM has identified a low/moderate risk for aggressive ground conditions that may affect water supply pipes as part of the development. Consideration should be given to the targeted sampling (0.75 – 1.50m bfgl) and scheduling for contaminants of concern: TPH, Naphthalene, Phenols, BTEX, VOCs and SVOCs.

7.3. Groundwater

If analytical results show elevated concentrations of contaminants of concern in the soil samples then there might be a requirement to assess the potential risks of leachability of contaminants migrating into the groundwater underlying the site. This might mean leachate testing on soils samples is required or groundwater sampling and testing. The risk is low however, as a result of the ground conditions.

7.4. Ground-gas

The CSM has identified a risk from ground-gases at the site as a result of potential made ground on site and nearby historical garages and obsolete petrol stations off site. The risk is low due the ground conditions however cannot be negligible at this stage. Analysis of soil samples should include Total Organic Carbon (TOC) testing in order to provide an indication of risk from on-site sources. In addition, ground gas monitoring should be undertaken within monitoring wells installed as part of the investigation. At this stage of investigation, in accordance with CIRIA C665 / BS8576:2013, it is anticipated that a minimum of four spot monitoring visits will be required within the ground gas risk assessment.

7.5. Vapours

The CSM has identified sources and associated contaminants that may pose a risk through the vapour pathway. The investigation should comprise a multiple line of evidence approach, comprising the analysis of soil samples taken from appropriate horizons (using BTEX/MTBE for onsite sources) and during the monitoring of the standpipes, a PID should be used in order to identify whether a total VOC concentration is present. Should the PID identify anything over 10ppm, analysis by canister should be undertaken. The risk is low due to the ground conditions but cannot be negligible at this stage.

7.6. Geotechnical Review

7.6.1. General

The BGS have identified the following natural hazards on-site and within a 50m buffer.

Natural Hazards	
Shrink-Swell Clay	Moderate hazard on-site.
Running Sands	Very Low hazard on-site.
Compressible Deposits	Negligible hazard on-site.
Collapsible Deposits	Very Low hazard on-site.
Landslides	Very Low hazard on-site.
Ground Dissolution of Soluble Rocks	Negligible hazard on-site.

No pits/quarrying or mining features were identified on-site or off site.

When designing foundations, the potential presence of aggressive ground conditions should be taken into consideration. Further investigation may be required in accordance with the guidance established in BRE Special Digest 1 (SD1) (2005) 'Concrete in aggressive ground'. The BGS do not record any details regarding the potential for aggressive ground conditions within shallow units identified at the site.

It is recommended that as part of the site-specific ground investigation on-site, geotechnical testing is undertaken to determine the underlying ground conditions and to evaluate any geotechnical related risks associated with the proposed redevelopment of the site.

The Groundsure datasheets have indicated that the bedrock London Clay Formation is likely to have a very low to moderate permeability and may not be suitable for surface water disposal.

FIGURES

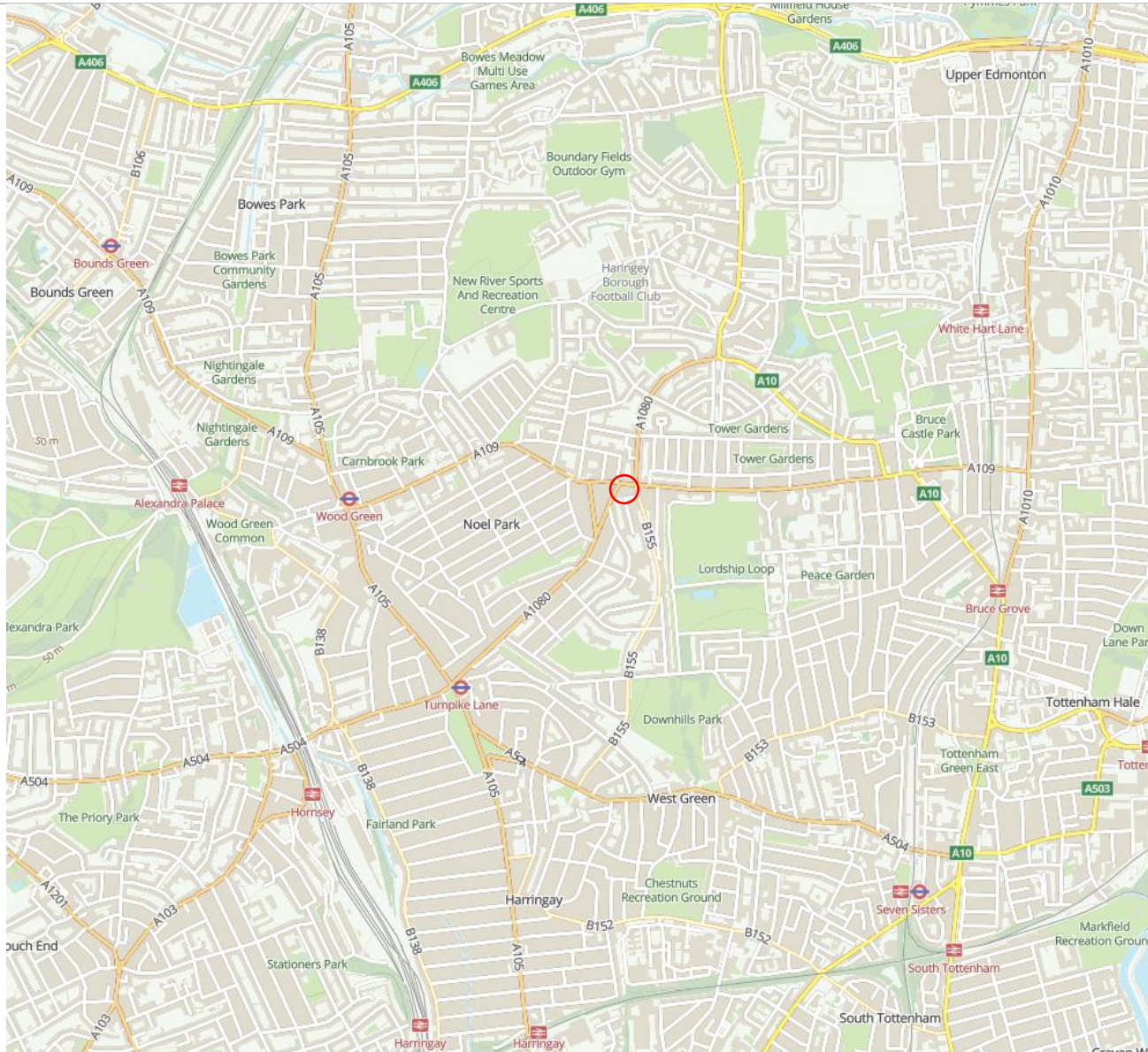


Figure 2 – Site Development Area

423 – 435 Lordship Lane, Tottenham, London N22 5DH

Ivorystone Investments Limited

March 2023

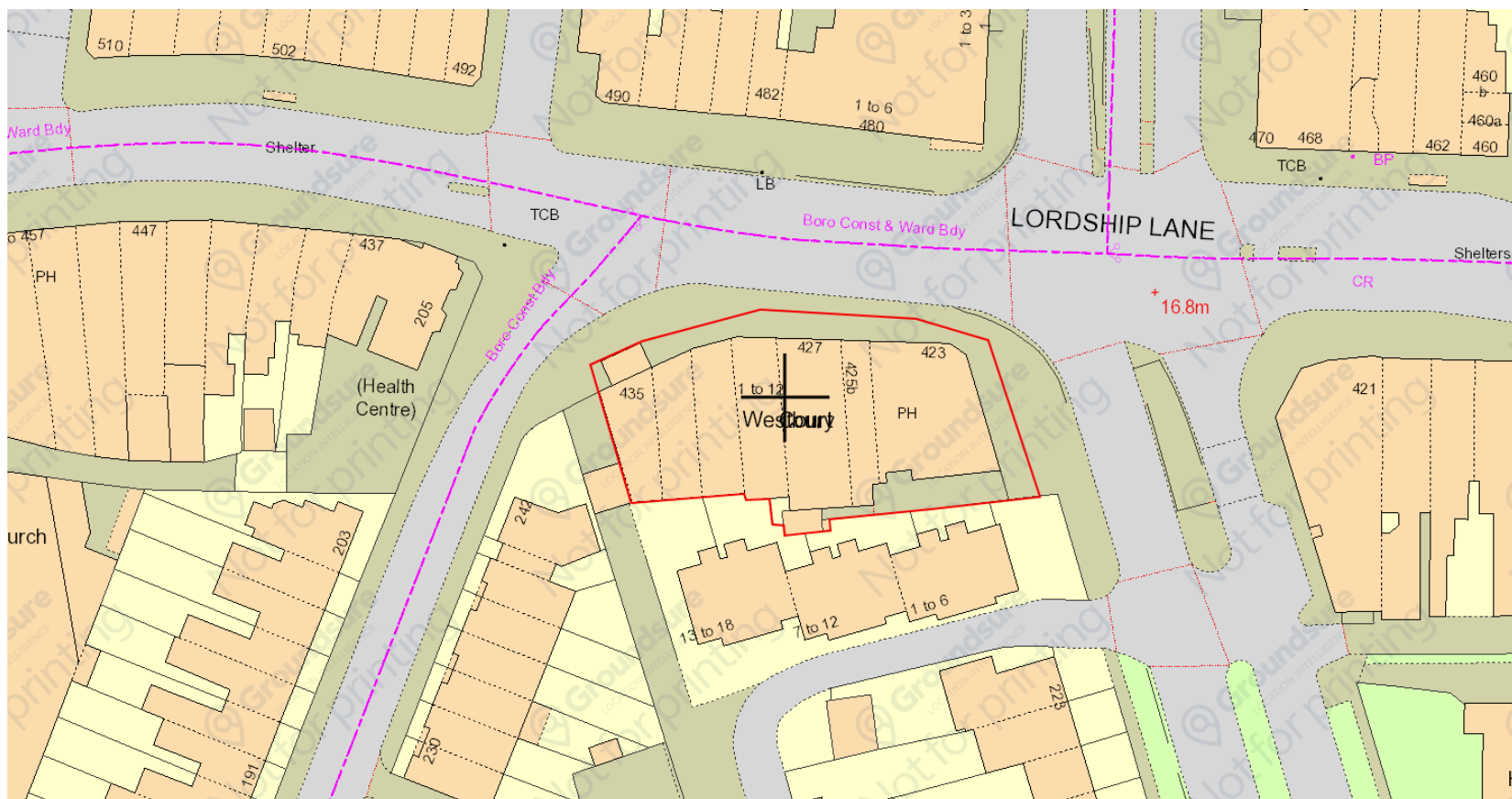
Figure 1 – Site Location Plan

GWPR5273





Site Boundary



423 – 435 Lordship Lane, Tottenham, London N22 5DH

Ivorystone Investments Limited

March 2023

Figure 2 – Site Development Area

GWPR5273





Site Boundary

423 – 435 Lordship Lane, Tottenham, London N22 5DH

Ivorstone Investments Limited

March 2023

Figure 3 – Aerial View of the Site

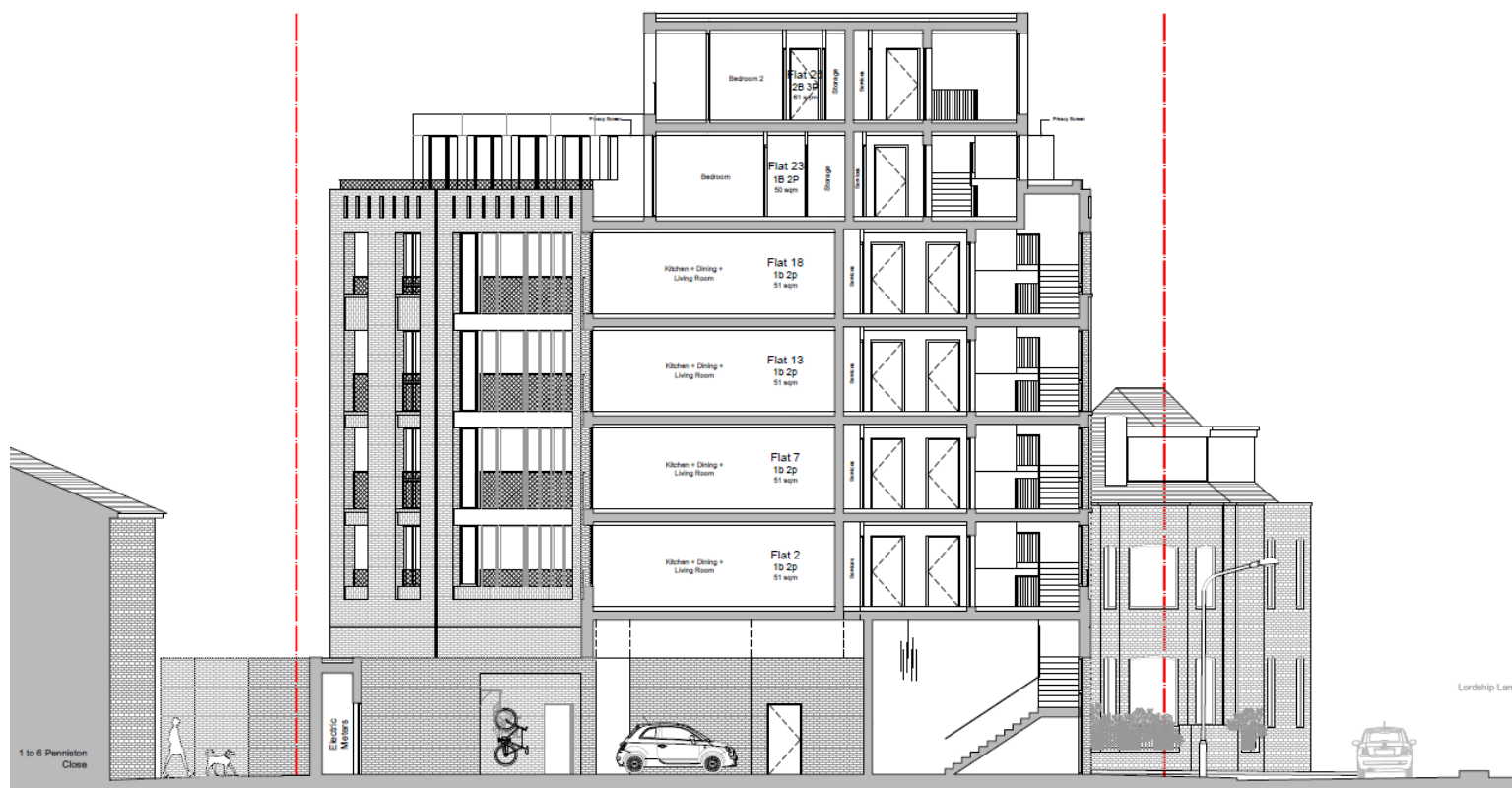
GWPR5273





 Existing Building Footprint

NTS



423 – 435 Lordship Lane, Tottenham, London N22 5DH

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March 2023

Figure 4 – Proposed Development Section

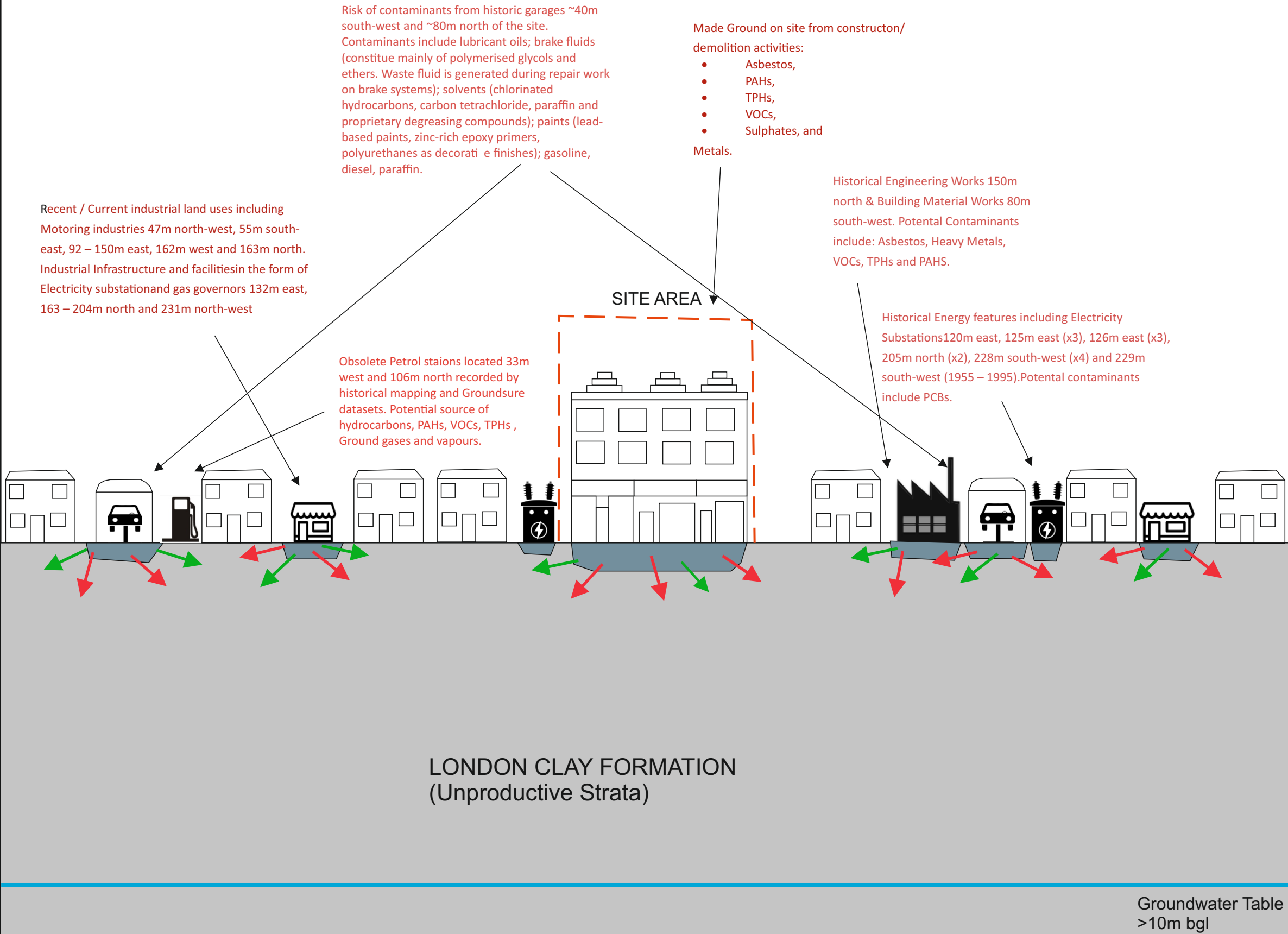
GWPR5273



GENERAL AREA

N

S



SITE AREA

MADE GROUND

LONDON CLAY FORMATION

GROUNDWATER TABLE

POTENTIAL CONTAMINANT PATHWAY

POTENTIAL GROUND GAS PATHWAY

PROJECT

423-435 Lordship Lane, Wood Green, London N22 5DH

CLIENT

Ivorystone Investments Limited

DRAWING TITLE

Conceptual Site Model

DRAWING NUMBER

GWPR5273 - Figure 6

DATE

March 2023

DRAWN BY

RJ

CHECKED BY

MM

gw

ground&water

2 The Long Barn, Norton Farm, Selborne Road,
Selborne, Alton, Hampshire, GU34 3NB

APPENDIX A: Conditions and Limitations

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground

conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist.

The conclusions and recommendations relate to 423-435 Lordship Lane, Wood Green, London N22 5DH.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B:

Technical Glossary

TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

HYDROGEOLOGY:

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1% or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

IN-SITU STRENGTH GEOTECHNICAL TESTING:

Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

APPENDIX C: Site Photographs



423 – 435 Lordship Lane, Tottenham, London N22 5DH

Ivorystone Investments Limited

March 2023

Appendix C: Photoplates

GWPR5273





423 – 435 Lordship Lane, Tottenham, London N22 5DH

Ivorystone Investments Limited

March 2023

Appendix C: Photoplates

GWPR5273



APPENDIX D: Historical Maps

Site Details:

423, LORDSHIP LANE, WOOD
GREEN, LONDON, N22 5DH

Client Ref: GWPR5273
Report Ref: GS-9406661
Grid Ref: 532202, 190501

Map Name: County Series

Map date: 1864

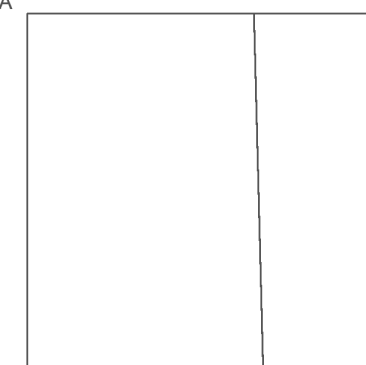
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Revised 1864
Edition N/A
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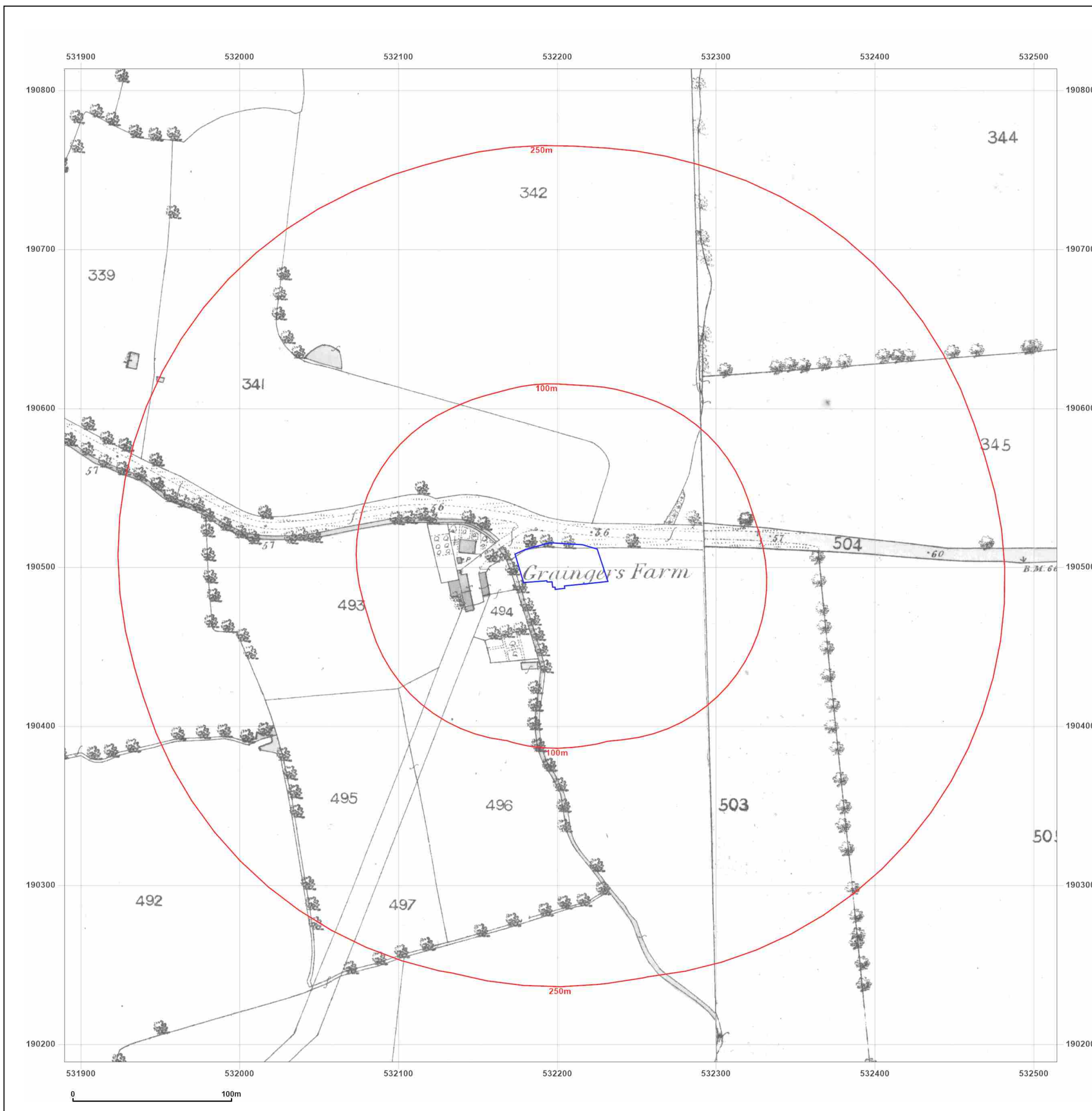


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Site Details:

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GREEN, LONDON, N22 5DH

Client Ref: GWPR5273
Report Ref: GS-9406661
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Map Name: County Series

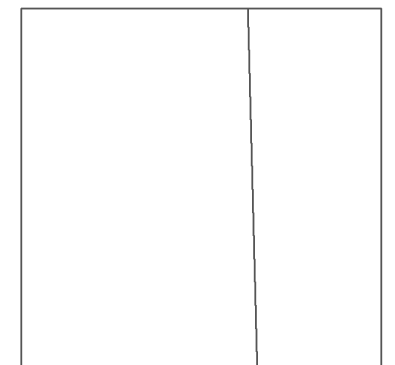
Map date: 1867

Scale: 1:2,500

Printed at: 1:2,500



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Revised 1867
Edition N/A
Copyright N/A
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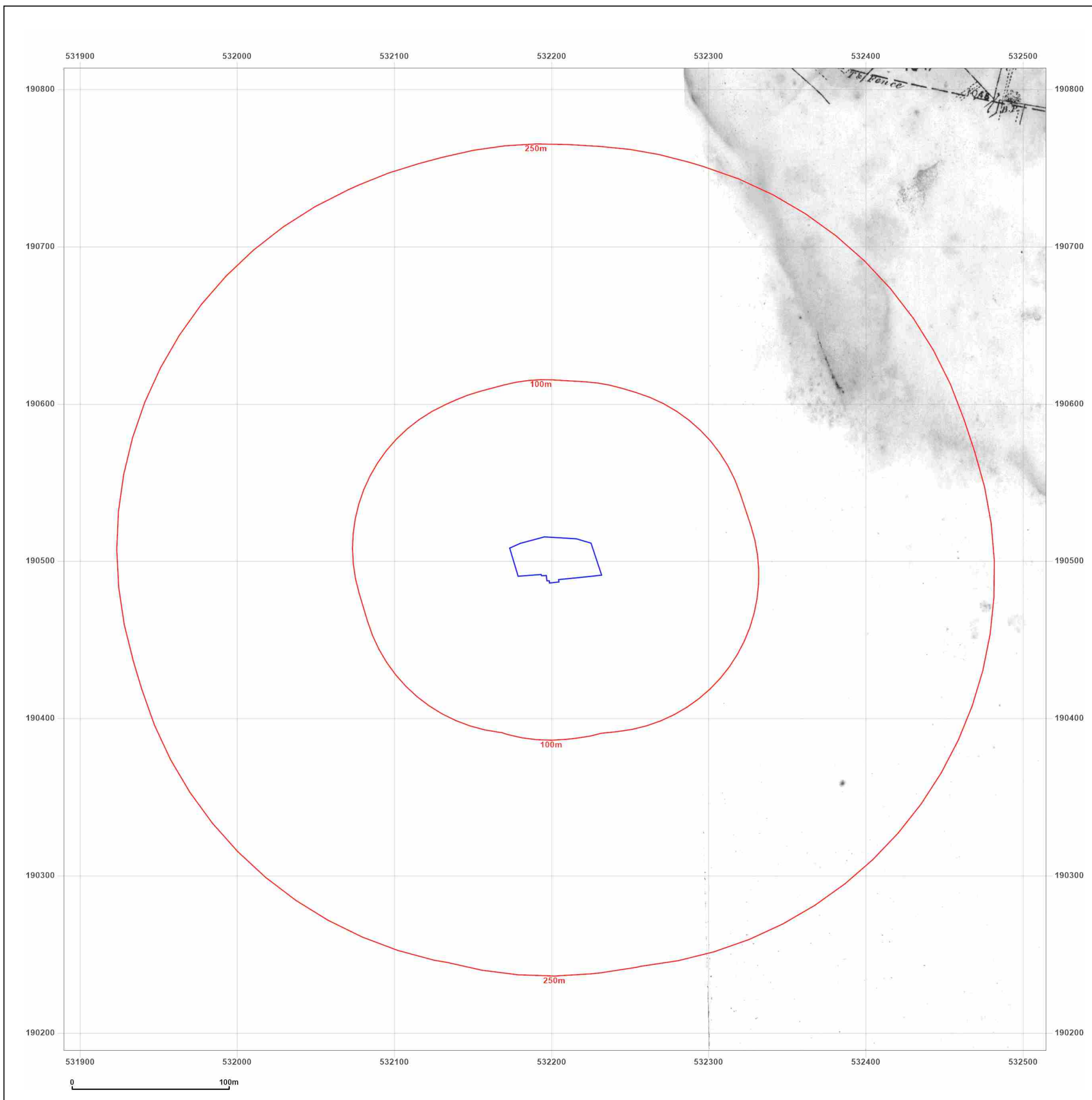


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GREEN, LONDON, N22 5DH

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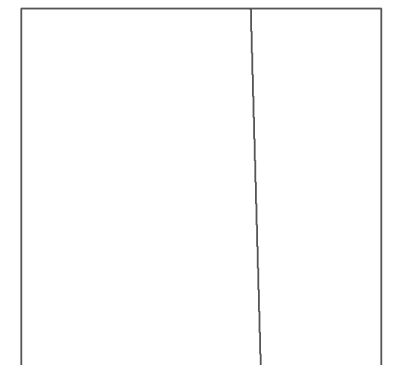
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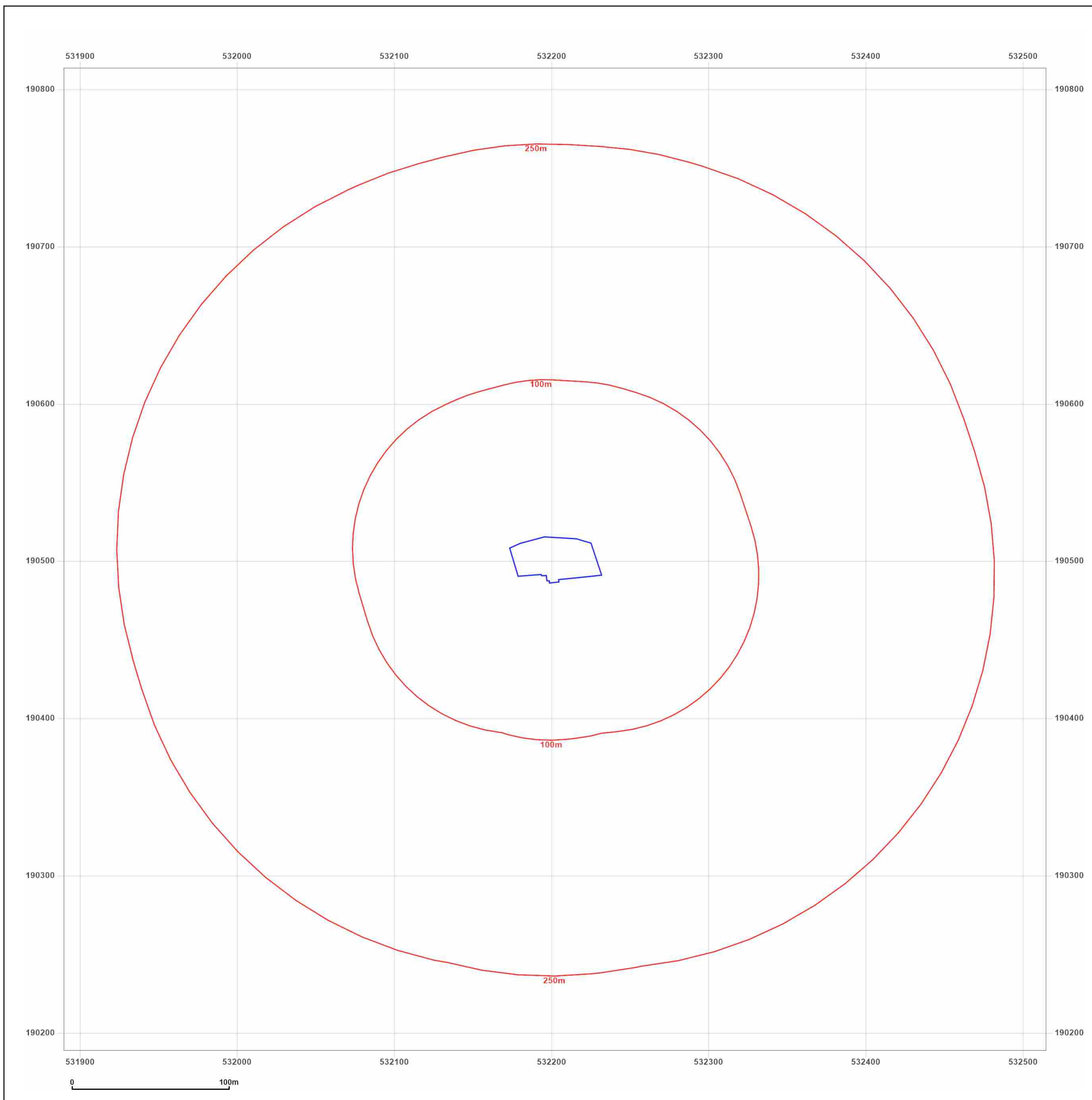


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GREEN, LONDON, N22 5DH

Client Ref: GWPR5273
Report Ref: GS-9406661
Grid Ref: 532202, 190501

Map Name: 1056 Scale Town Plan

Map date: 1896

Scale: 1:1,056

Printed at: 1:1,056



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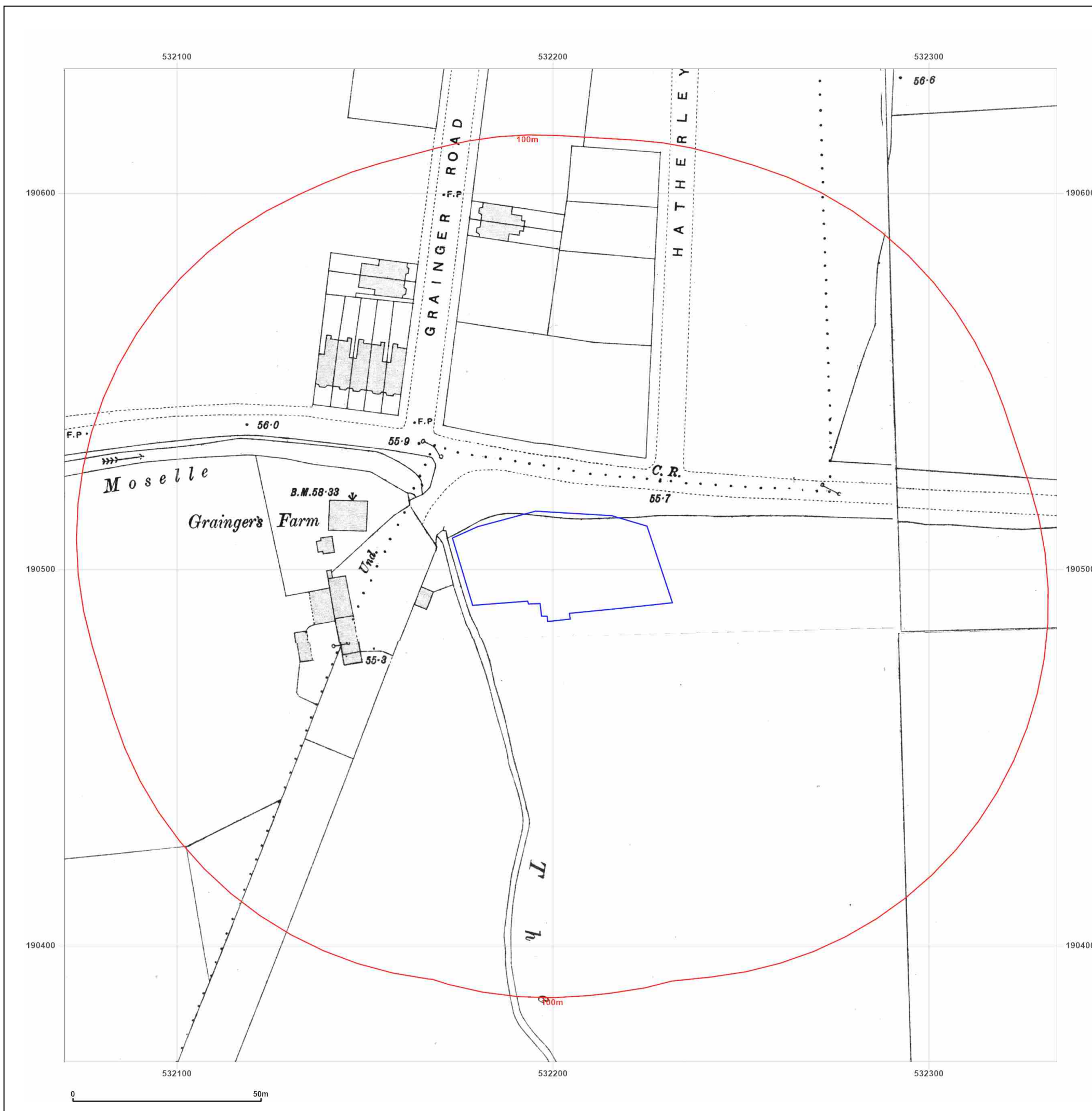


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Map date: 1896

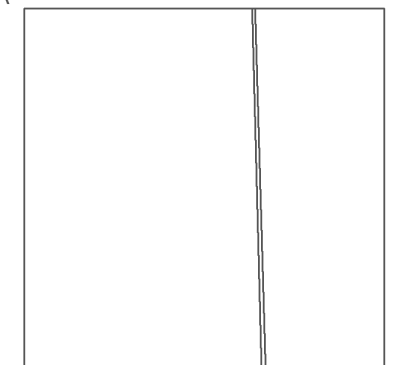
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423, LORDSHIP LANE, WOOD
GREEN, LONDON, N22 5DH

Client Ref: GWPR5273
Report Ref: GS-9406661
Grid Ref: 532202, 190501

Map Name: County Series

Map date: 1913-1914

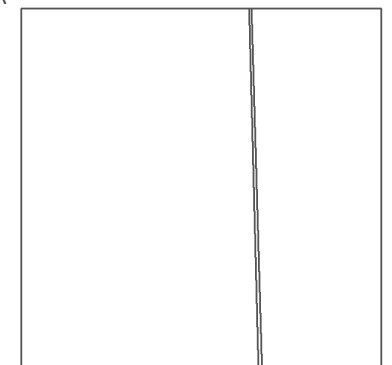
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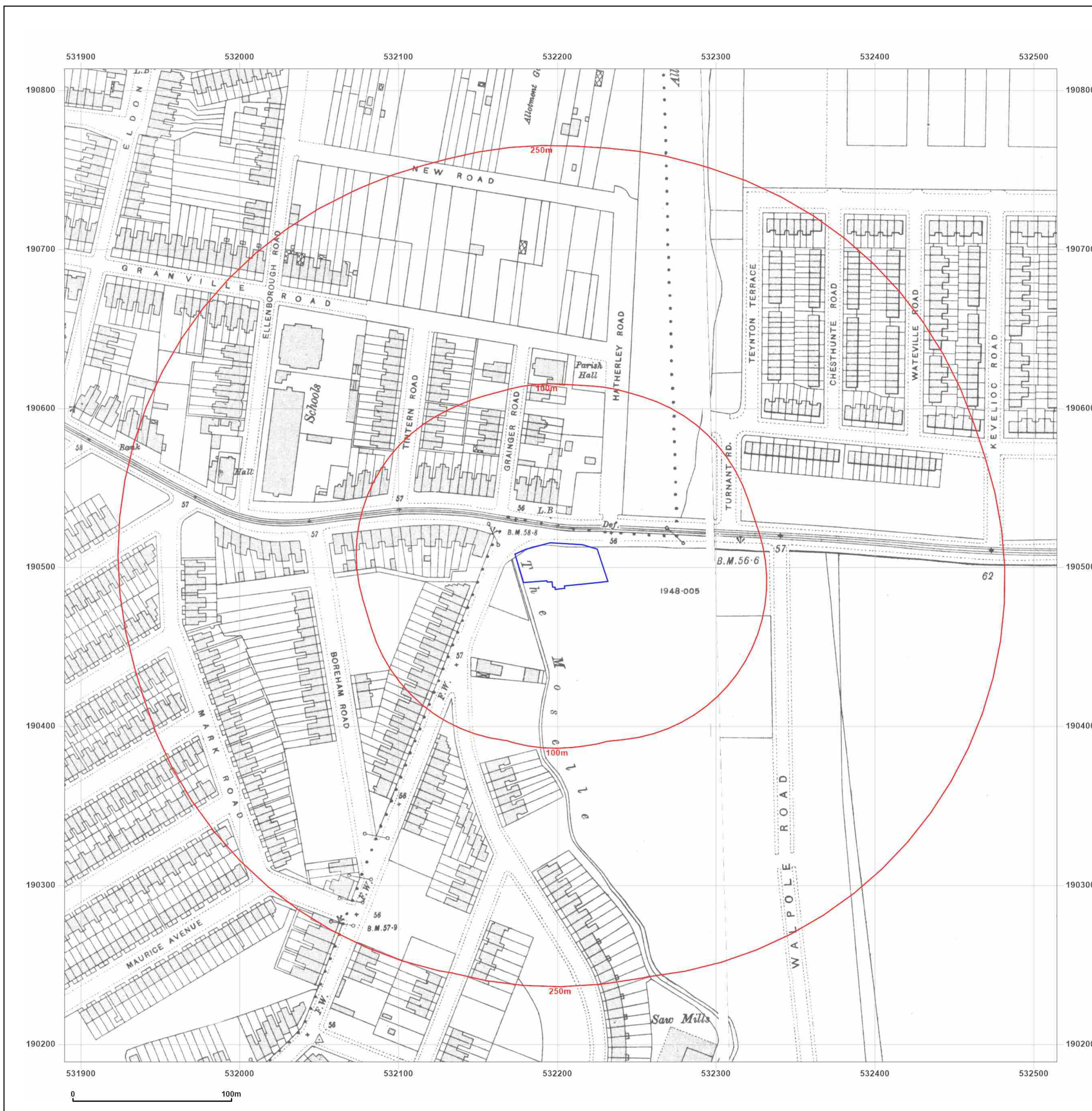


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Client Ref: GWPR5273
Report Ref: GS-9406661
Grid Ref: 532202, 190501

Map Name: County Series

Map date: 1935

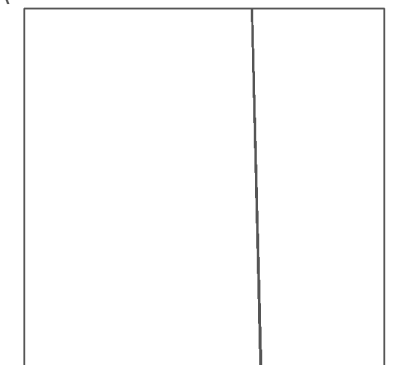
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Report Ref: GS-9406661
Grid Ref: 532202, 190501

Map Name: National Grid

Map date: 1955

Scale: 1:1,250

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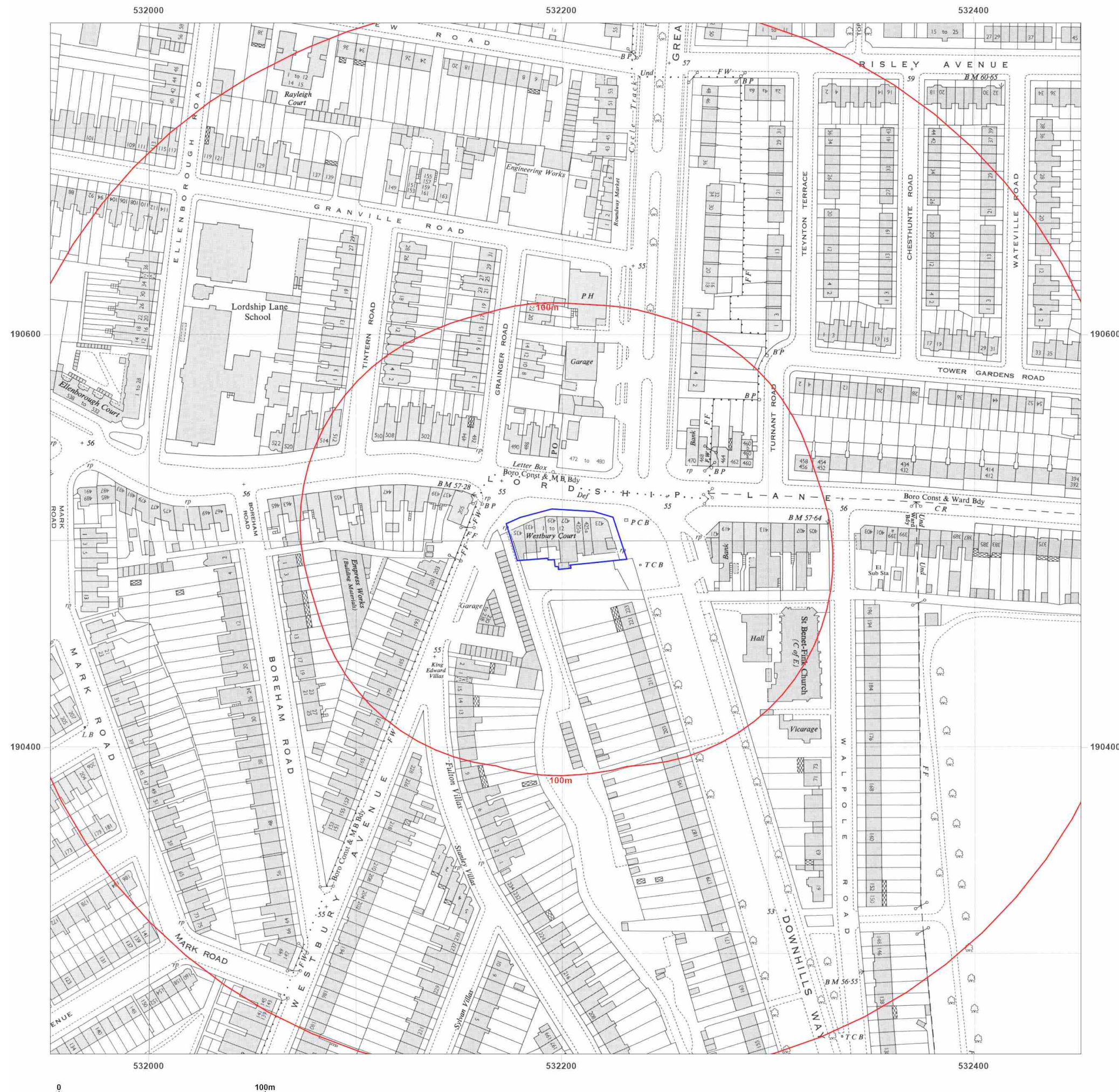


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Client Ref: GWPR5273
Report Ref: GS-9406661
Grid Ref: 532202, 190501

Map Name: National Grid

Map date: 1956

Scale: 1:1,250

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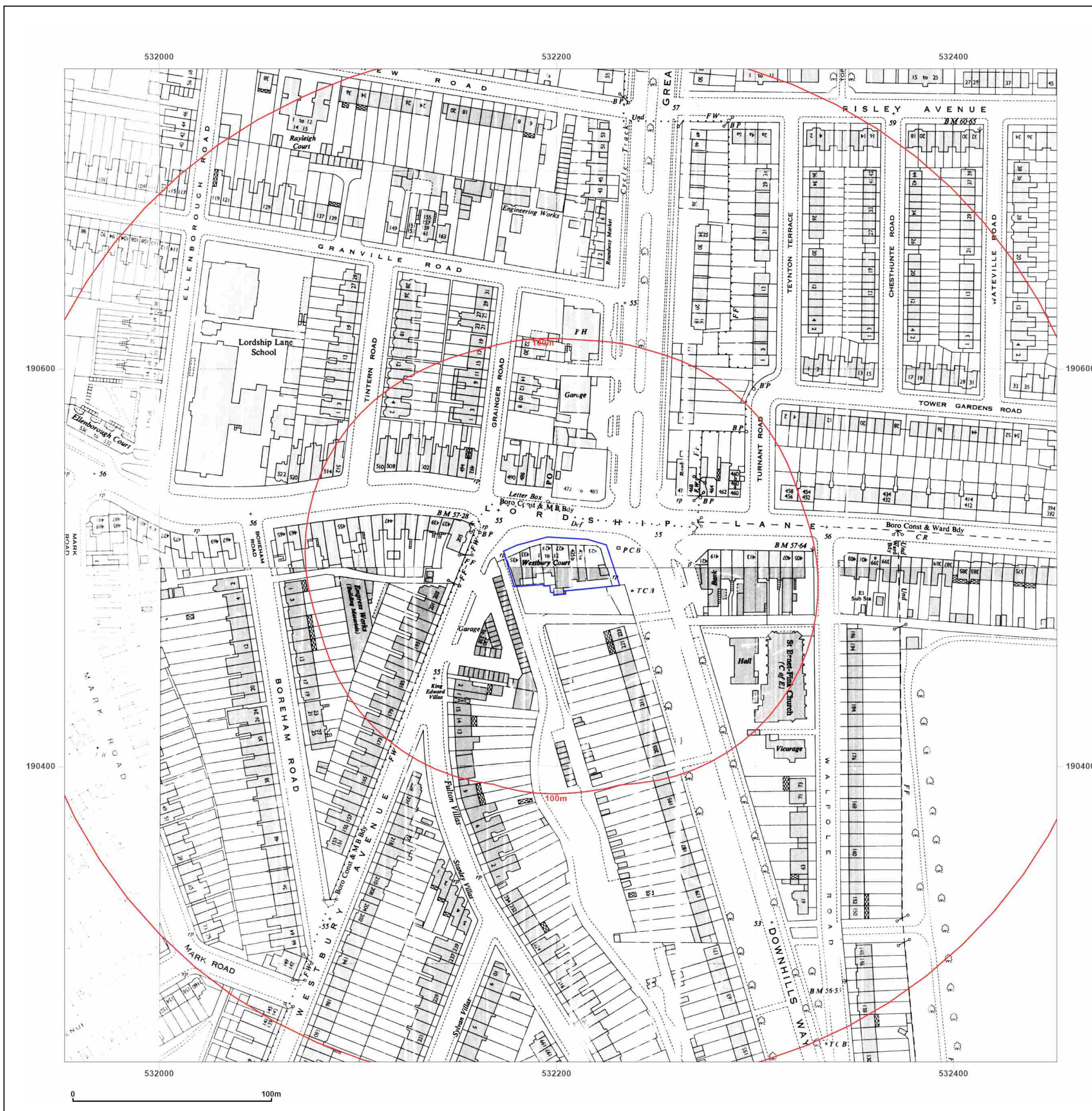


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Report Ref: GS-9406661
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Map Name: National Grid

Map date: 1956

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Client Ref: GWPR5273
Report Ref: GS-9406661
Grid Ref: 532202, 190501

Map Name: National Grid

Map date: 1971-1972

Scale: 1:1,250

Printed at: 1:2,000



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