



GROUNDTECH
CONSULTING

OCTAGON ENERGY CENTRE

PRELIMINARY RISK ASSESSMENT

MANCHESTER ENERGY PARTNERSHIP
LIMITED

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Plans

<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
GRO-24025-P01	-	Project Location Plan
GRO-24025-P02	-	Preliminary Development and Constraints Plan
GRO-24025-P03	-	Illustrative Preliminary CSM

1.0 INTRODUCTION

1.1 Project Objectives

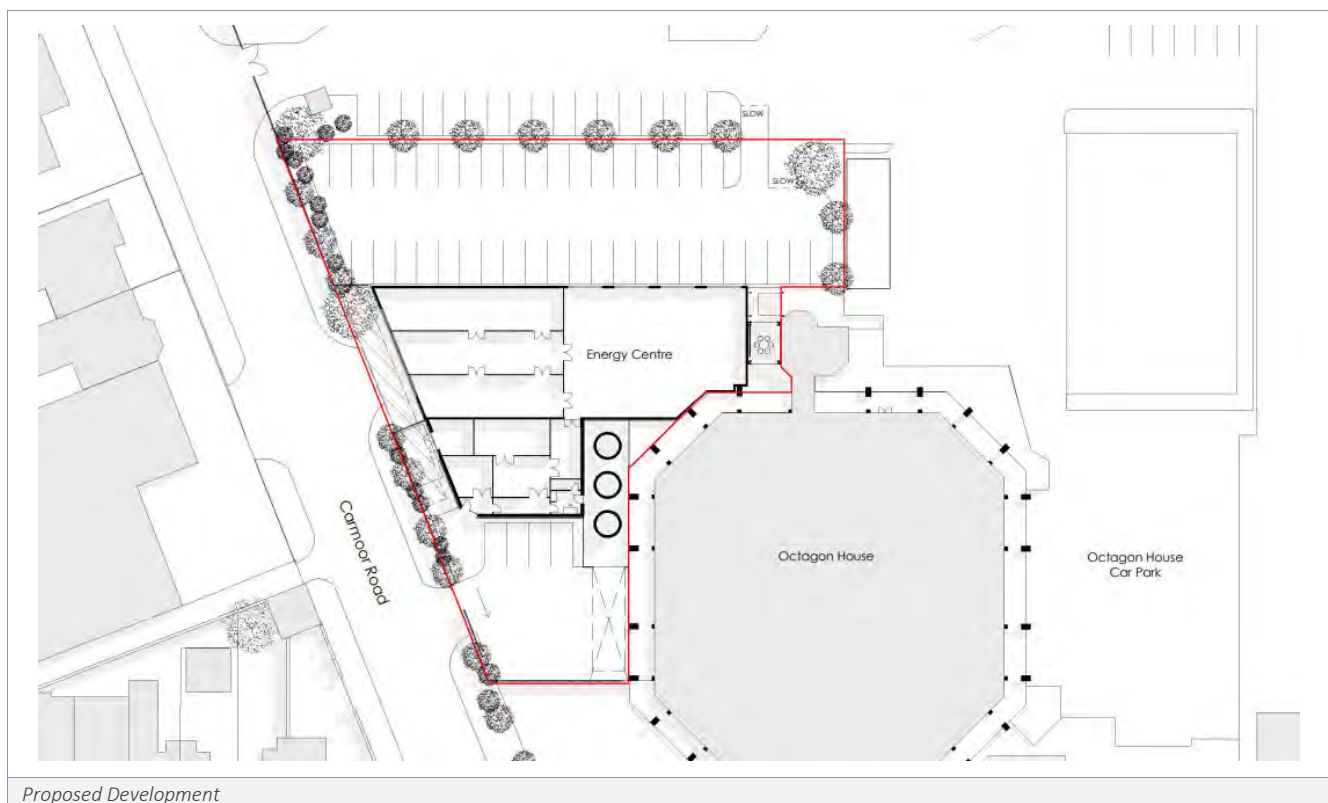
Groundtech Consulting Limited have been instructed by Artform Architects on behalf of Manchester Energy Partnerships to undertake a Preliminary Risk Assessment for a site at Octagon Energy Centre in Manchester.

The objectives of the Preliminary Risk Assessment were to establish the sites environmental and geotechnical background in order to generate a Conceptual Site Model to identify any potential constraints and linkages which may affect the redevelopment of the site.

The report has been undertaken to fulfil the requirements of a preliminary risk assessment in accordance with LCRM guidance.

1.2 Proposed Development

The proposed development is commercial end use comprising the construction of a new energy centre with associated car park hardsurfacing and soft landscaping.



Proposed Development

1.3 Limitations

This Preliminary Risk Assessment is based on information obtained from a number of sources, and the information is assumed to be correct.

Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.

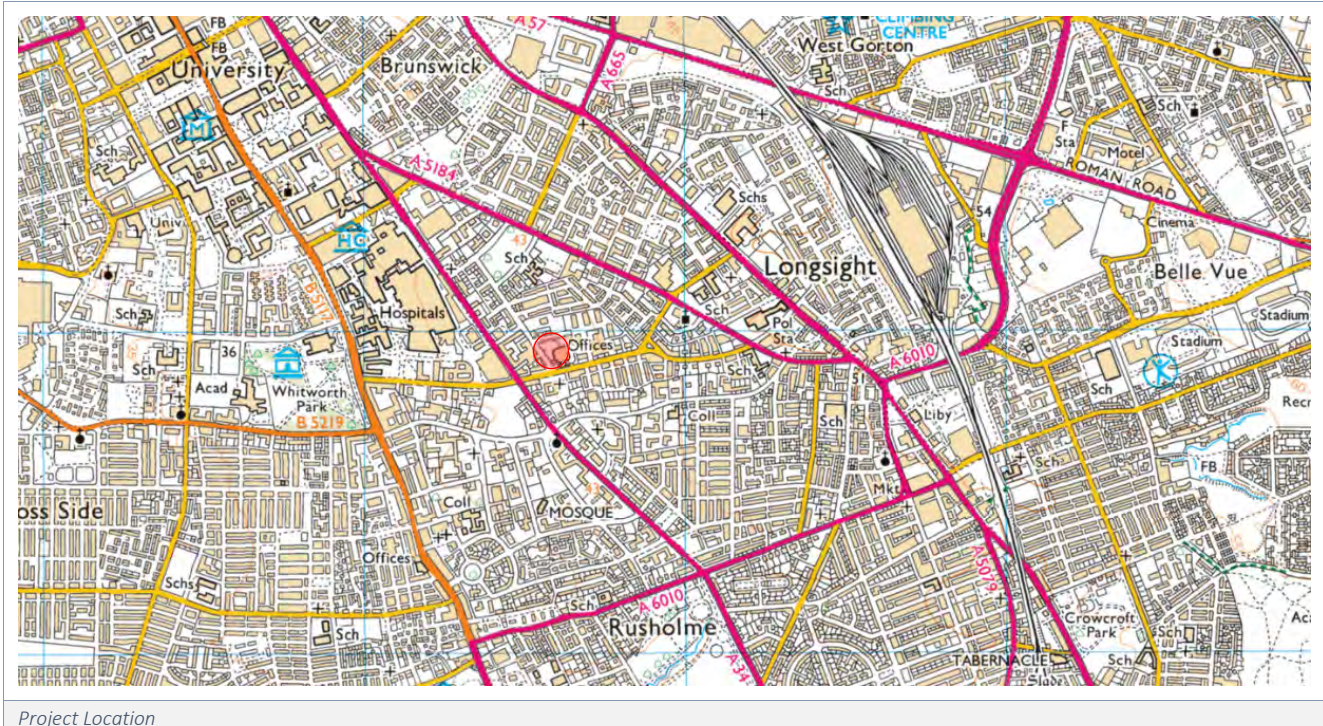


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2.0 SITE SETTING

2.1 Location

The site is located circa 1.6 miles southeast of Manchester City Centre, as shown on the Project Location Plan GRO-24025-P01. The site is approximately centred on National Grid Reference 385576, 395950.



Access to the site is gained off Carmoor Road to the west of the site.

2.2 Site Description

The site is irregular in shape and approximately 0.23 hectares in area. The topography of the site and surrounding area is generally level.

Site Features

The site is currently used as a carpark for Octagon House and is predominantly hardsurfaced by tarmac with a small grass overlay situated across the northern and western border of the site.

Areas of soft landscaping grass and shrubbery are sparsely located throughout the northern and western section of site associated with the car park.

Boundaries and Surrounding Land Uses

The northern, western and southern site boundaries are formed by metal security fencing with overgrown vegetation. Several semi-mature and mature trees are present along the southwestern boundary of site. The eastern boundary of site is formed by the adjoining Octagon building.

The site is surrounded by the following features/land uses:

- North - Private road and industrial land use.
- East - Octagon House and industrial land use followed by residential apartments.
- South - Derelict land and Hasthersage Road followed by residential apartments.
- West - Carmoor Road and commercial properties.

Site photographs are presented in *Appendix 2*, and relevant features are recorded on the Preliminary Development Constraints Plan *GRO-24025-P02*.

3.0 ENVIRONMENTAL SETTING

3.1 Site History

Available historical maps have been obtained, a list of dates and scale are listed in the table below:

Scale	Date
1:500	1891
1:1,056/1:1,250	1850/51, 1949/50, 1950/51, 1967/70, 1976/80, 1984/86, 1986/91, 1991/92, 1992/93, 2003
1:2,500	1893, 1908, 1922, 1933, 1949/50, 1961, 1991
1:10,000/10,560	1848/49, 1890/92, 1905, 1923, 1932/34, 1938, 1955/56, 1965/68, 1980/83, 1895/95, 1988/91, 2001, 2010, 2024

The plans were examined and potential issues have been identified and summarised in the table below:

Date	Site	Surrounding Area
1848/49	Unoccupied field.	Roads present immediately north and west of site. Remaining area generally occupied by fields. Ponds indicated c.10m south, c.90m east, c.125m west & c.150m north.
1890/92	Eight semi-detached dwellings occupy the central and western section. A track is present in the eastern section and several unspecified outbuildings are located in the northeastern extent.	Residential dwellings constructed immediately south and west. Ponds in surrounding area backfilled .
1908	No significant change.	Residential expansion including on field c.100m north. Laundry c.60m west. Chimney associated with public baths c.140m east. Tramway c.40m south of site.
1922	No significant change	Chimney associated with laundry c.60m west.
1933	No significant change.	Tip Top Bakery constructed c.180m north. Industrial buildings constructed c.25m northeast. Surrounding area generally residential.
1949/50	Two dwellings remain onsite with the rest being demolished . Two outbuildings remain at the centre of site.	Industrial buildings c.25m northeast listed as Electricity Mains Depot . Electricity substation c.120m southwest and c.190m north. Allotment Gardens c.140m south. Engineering works indicated c.180m northeast. Coach Building Works and associated tank c.180m northwest. Laundry no longer labelled and chimney no longer present. Tramway no longer present.
1961	No significant change.	Depot c.50m north east. Surrounding area remains predominantly residential with exception of industrial land use c.20m north.
1967/70	Garage constructed in the centre of site, replacing outbuildings, potentially comprises a Petrol Filling Station (PFS) with potential Underground Storage Tanks (USTs)	Electricity substations c.15m north. Depot c.30m west. Allotment gardens no longer indicated.

	<i>Unspecified building present in the northern area in place of demolished dwelling. Buildings in northeastern section demolished.</i>	
1976/80	<i>Garage and associated buildings demolished. Site is now occupied by hardsurfacing utilised as a car park.</i>	<i>Bakery no longer indicated. Coach works c.180m northwest now labelled garage. Adjoining office buildings constructed to the east.</i>
1986/91	<i>No significant change.</i>	<i>Garage indicated c.90m west. Engineering works c.180m northeast no longer indicated. Surrounding land use changed to mostly commercial.</i>
2003	<i>No significant change.</i>	<i>Garage c.90m west no longer indicated.</i>
2024	<i>Site remains occupied by a car park.</i>	<i>Industrial land use present immediately north associated with electricity substation. Remaining areas are predominantly commercial.</i>

The historical plans are presented in *Appendix 3*.

3.2 Geology

The following British Geological Survey (BGS) records and other available information were inspected to accurately determine the geology underlying the site:

- *1:50,000 Scale Geological Sheet 85, Manchester - Bedrock and Superficial*
- *1:50,000 Scale Geological Sheet 85, Manchester - Bedrock*
- *BGS Records*

Made Ground

The BGS maps indicate that Made Ground is not anticipated to be present beneath the site. However, due to previous developments on the site, Made Ground is likely to be present.

Superficial Deposits

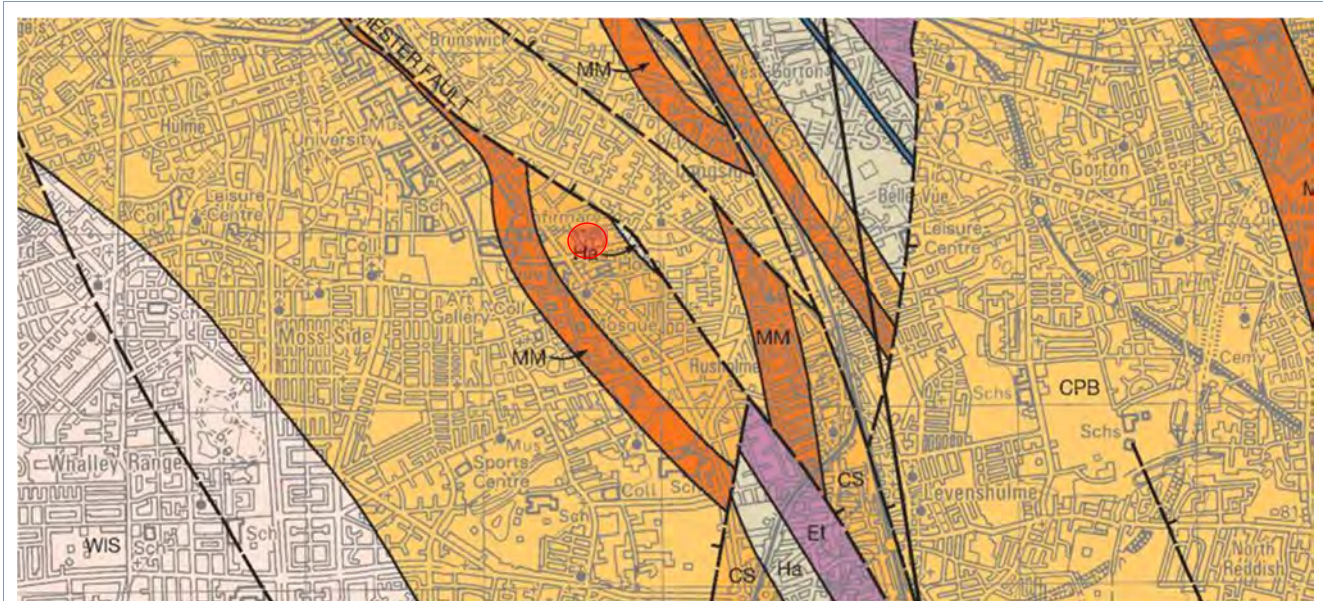
The site is indicated to be underlain by Devensian Till (Diamiction), this strata characteristically comprises Clay, silt, sand and gravel.



Geological Map – Superficial and Bedrock Deposits

Solid Geology

The solid geology underlying the site is indicated to be the Collyhurst Sandstone Formation.



Geological Map – Solid Geology

A fault is shown c. 190m north east of the site.

BGS Records

Two BGS borehole logs are located within 250m of the site, the closest is circa 120m southwest of the site and comprised the following strata:

- Tarmac surfacing to 0.15m bgl.
- Made Ground with minor constituents of brick, cinders and ash to 0.75m bgl.

- *Natural very stiff brown silty sandy slightly laminated Clay to 9.0m bgl where the borehole was terminated.*

No groundwater was encountered within the borehole.

The BGS records are presented in *Appendix 4*.

3.3 Hydrogeology

The superficial deposits in this area are classified by the Environment Agency as a Secondary Undifferentiated Aquifer (Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type).

The bedrock is classified as a Principal Aquifer (Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers).

The soil is indicated as having a low leaching potential, and the superficial and bedrock aquifers are of low vulnerability.

The site lies 404m northeast of a Source Protection Zone, Zone III, Total Catchment (the area needed to support the discharge from the protected groundwater source) for a groundwater abstraction well.

There are no potable water abstractions within 2km of site. There nearest active groundwater abstraction well is 1676m west of the site relating to a borehole at Moss Side Manchester used for general cooling. The closest historic groundwater abstraction point was 774m north of the site relating to a heat pump at G T Energy UK Ltd.

3.4 Hydrology

There are no surface water features within 500m of the site boundary, the nearest named watercourse is the River Medlock located 1.85km north west of the site.

There are no surface water abstraction points within 2km of the site.

There are two historic discharge consents within 500m of the site, the closest is 172m south of the site relating to sewage discharge.

Environment Agency information indicates that the site is outside a flood risk zone and is not at Risk of Flooding from Rivers and Sea (RoFRaS).

3.5 Environmental Consultations

A request has been submitted to the Contaminated Land Officer at Manchester City Council for information pertaining to the site and this information will be forwarded on receipt.

An environmental consultation has been conducted through Groundsure, which accesses British Geological Survey and Environment Agency databases. The complete EnviroInsight Report can be found in *Appendix 5*, a summary of the more relevant points are presented in the table below.

Record	<250m	250 – 500m	Description
Authorised Processes	1	4	Four licensed pollutant release within 500m of the site, the closest being 206m northwest relating to unloading petrol into storage at services.
Pollution Incidents	-	-	-
Landfill and Waste Treatment	8	13	4 licenced waste sites within 250m of the site, the closest is 155m west at Manchester Royal Infirmary relating to a clinical waste transfer facility.
Discharge Consents	2	-	Two discharge consents 172m south of the site relating to sewage storm overflow.
Petrol Filling Stations	1	-	Esso Petrol filling Station 234m northwest.
Current industrial Uses	18	-	Garage located 32m west of the site. Electricity substation 33m north, 145m northeast and south west, 163m, 169m and 218m west, 200m south and 242m north. Chimney 133m east and 213m west. Works 227m north. Tank 238m and 245m west.

3.6 Radon

The latest maps published by UKHSA have been examined which defines areas requiring radon protective measures. The probability is less than 1% and the site is not an area requiring radon precautions in foundations in accordance with BRE Report 211 'Radon – Guidance on protective measures for new dwellings' 2015 Edition.

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain and indicates that the probability is less than 1% which confirms that no radon measures are required. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

3.7 Coal Authority Consultation

The site lies in an area where the Law Society and Coal Authority recommends a mining search is undertaken due to past or current mining possible affecting the site.

A search was carried out with the Coal Authority, the report is presented in *Appendix 6*, the main findings are outlined below.

Past Mining

The property is not within a surface area that could be affected by any past recorded underground coal mining.

Present Mining

The site is not within the zone of influence of any present underground coal workings.

Future Mining

The property is not in an area where the Coal Authority are determining whether to grant a licence to remove coal by underground workings.

The property is not in an area likely to be affected at the surface by any planned underground workings.

Reserves of coal exist in the local area that may be worked in the future.

No notice of the risk of land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine Entries

There are no records of any mine entries on or within 20m of site boundary.

Coal Mining Geology

The Authority is not aware of any damage arising to geological faults or lines of weakness that have been affected by coal mining.

Opencast Coal Mining

The property is not in an area affected by past or present coal mining extracted by opencast methods. The property is also not in an area affected by a proposed opencast coal mine.

Subsidence

The Coal Authority has not received a damage notice or claim for the subject property or within 50m since 31 October 1994.

Mine Gas

There is no record of mine gas emission requiring action by the Coal Authority within the boundary of the property.

Withdrawal of Support

The property is not in an area which notice of entitlement to withdraw support has been published.

3.8 Unexploded Ordnance (UXO)

The site is classified as being in an area of moderate UXO risk according to Zetica Risk maps and a Preliminary UXO Risk Assessment has been carried out.

The Preliminary UXO Risk Assessment indicates that the site falls within a *Low* UXO risk, however a detailed UXO risk assessment has been recommended to better determine the location and effects of bombing incidents across the site locality.

The findings of the Preliminary UXO Risk Assessment are presented in *Appendix 7*.

3.9 Petroleum Officers Search

Due to the potential presence of a historical PFS at the site as identified in the historical maps between 1967 and 1970 enquiries have been made to the petroleum officer for information pertaining to the site to determine the presence of UST's and any other corresponding information.

4.0 LAND QUALITY CONCEPTUAL SITE MODEL AND RISK ASSESSMENT

4.1 Introduction

The potential level of risk posed by contaminants in soil and/or groundwater will be influenced by the type and concentration of the contamination at source, the likelihood of exposure occurring, the potential pollution linkages and the likely chronic or acute effects on the receptors.

A contaminant is defined as a substance that has the potential to cause harm, a risk is considered to exist if such a substance is present at sufficient concentrations to cause harm and if a pathway is present a receptor could be exposed to the contaminant.

Section 4.0 compiles the information from the previous sections to assemble a Conceptual Site Model to inform the risk assessment process. The potential sources identified on the site and off the site that are within influencing distance are assessed to determine if pollution linkages exist and an unacceptable risk is posed to human health and controlled waters. The assessment has been carried out on a qualitative basis and aims to produce a complete and comprehensive Preliminary Conceptual Site Model, the potential pollution linkages are displayed on GRO-24025-P03 Illustrative Preliminary CSM.

Three potential types of impacts exist for a site and all three need to be considered in the qualitative preliminary risk assessment:

- *Impacts from sources on the subject site*
- *Impacts to the surrounding area from the subject site*
- *Impacts to the subject site from the surrounding area*

4.2 Potential Contamination Sources

Onsite Sources and Associated Contaminants of Concern (CoC)

From the information obtained during the preliminary risk assessment, limited onsite sources of contamination have been identified which may affect the redevelopment of the site for commercial end use.

The site has predominantly been occupied historically by residential dwellings and associated outbuildings. These buildings could be a source of Made Ground which may contain general contaminants including heavy metals, Polycyclic Aromatic Hydrocarbons (PAHs), asbestos and permanent ground gases.

An electrical substation is located at the site which may be a source metals, Polychlorinated Biphenyls (PCBs) and mineral oils.

The former usage as a garage is also a source of Made Ground and a potential source of metals, fuels/oils (hydrocarbons) and volatile organic compounds (VOCs). The former garage also suggests this may have been a PFS with associated UST's, associated contaminants are referenced within the DoE industry profile and comprise anti-oxidants, metal deactivators, detergents, corrosion inhibitors, cetane improvers and combustion modifiers. As well as the above if inspection pits were apart of the garage then locally deep made ground and potential substructures may be present at the site.

Offsite Sources and Associated Contaminants of Concern (CoC)

Several potential offsite sources of contamination have been identified with may affect the redevelopment of site and include:

- *Backfilled ponds c.10m south, c.90m east, c.125m west, c.150m north*
- *Historic laundry 65m west*
- *Historic chimneys c.65m west and 135m east*
- *Electricity Mains Depot and associated substations 18m north east*
- *Electricity substations 33m north, 145m north east and south west, 163m, 169m and 218m west, 200m south and 242m north*
- *Depot c.30m west*
- *Historic garage c.90m west*

The backfilled ponds may be a source of permanent ground gases including carbon dioxide and methane, depending on the nature of the backfill material.

Contaminants associated with laundry works may include inorganics, dye products, acids/alkalis, Volatile Organic Compounds (VOCs) and heavy metals.

The depots and works could be sources of fuel derived hydrocarbons, speciated PAHs, Volatile Organic Compounds (SVOCs), VOCs and heavy metals. The garages are a potential source of hydrocarbons, fuels and oils.

The historic chimneys are likely to be a source of speciated PAHs, ash, clinker and ground gases.

The DoE industry profile for electrical works indicate that associated contaminants of concern include metals, Polychlorinated Biphenyls (PCBs) and mineral oils.

The nearby electricity substations are a source of PCBs depending on the age of the transformers.

4.3 Pollution Linkages

The definition of a pollution linkage is a medium which allows a contaminant to impact a receptor. Potential pollution linkages have been recognized for the commercial development from the identified contamination sources that exist.

At this stage the contaminants identified above are considered to potentially pose an unacceptable risk human health and controlled waters through the following pollution linkages:

- *Direct soil and dust ingestion*
- *Dermal contact with soil both indoor and outdoors*
- *Indoor air inhalation from soil and vapour*
- *Outdoor inhalation of soil and vapour*
- *Migration and accumulation of ground gas into internal space.*
- *Impaction of groundwater from soil contamination (diffuse and point)*
- *Impaction of groundwater from groundwater plume*
- *Migration of soil and groundwater contamination impacting surface waters*

4.4 Receptors

Receptors generally fall into the categories of human health or controlled waters within the river basin system. The recognized receptors are listed below:

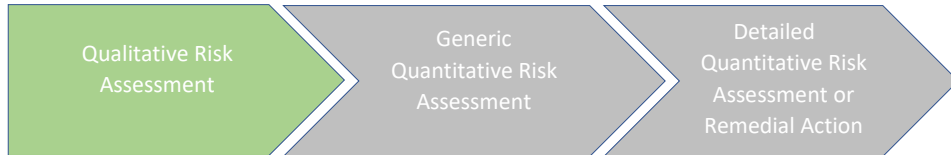
- *Site end users*
- *Adjacent site users*

- *Clean potable water supply pipe*
- *Principal Aquifer in bedrock*

4.5 Preliminary Conceptual Site Model (CSM)

The factual information obtained from the consultations and summarised in Section 2.0 and 3.0 has been used to compile a Preliminary CSM. Using Source-Pathway-Receptor assessment criteria that is applicable in the UK, a risk assessment has been completed to determine if a plausible pollution linkage exists between the identified contaminants and receptors. The risk classification has been estimated in accordance with the CIRIA 552 assessment criteria outlined in *Appendix 8*.

Human Health Pollution Linkage Assessment



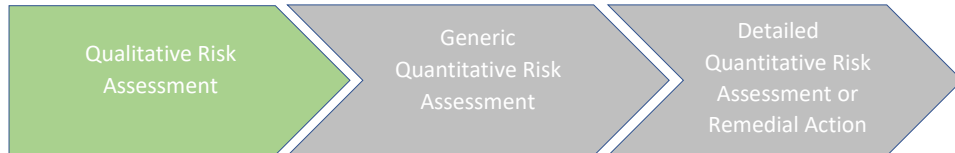
- The table below represents the first stage in the land quality risk assessment process - **the Qualitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Qualitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Unlikely	Medium	Moderate to Low	Pollution Linkage 1 refers to proposed site users coming into contact with contaminated soils on the site. The site has historically been occupied by residential buildings with associated outbuildings from 1890, until a garage occupied the site between 1967 and 1980, this garage potentially houses a petrol filling station which potentially contained Underground storage tanks. Since then, the site has been utilised as a car park for surrounding commercial buildings. Made Ground of varying depth is anticipated beneath the site associated with the former developments and may be a source of metals, speciated PAHs and asbestos. The historic garage may also be a source of fuels/oils and VOCs which may have migrated into the ground. The electrical mains depot located 18m north east and nearby substations may be a source of PCBs based on the age of the transformers. However, the PCBs are relatively immobile and the topography of the surrounding area is level, therefore they are

Conceptual Site Model					Qualitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						unlikely to have migrated onto site. Furthermore, the superficial deposits are glacial till which will limit the migration of PCBs. All of the remaining potential sources of contamination are at distances where they are unlikely to have any notable impact to the subject site due the migration distances involved. The proposed development is for the construction of a new commercial building and the majority of site will be hardsurfaced which will break the pollution linkage between contaminated soils and end site users. However, areas of soft landscaping are proposed and therefore a plausible pollution linkage is present.
PL2	Contaminated Soils	Inhalation of vapour.	Low likelihood	Medium to Severe	Moderate	There is potential for hydrocarbon contamination to be present within the shallow Made Ground soils in the central area of site due to the former usage as a garage and associated spills/leakages of fuels and oils.
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	No sources of mobile contamination have been identified through the PRA. The surrounding topography is generally level and the superficial deposits are indicated to be glacial till which will inhibit migration of contaminants offsite. A viable pollution linkage has not been identified.

Conceptual Site Model					Qualitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL4	Contaminated Soils	Attacking potable water supply pipe.	Likely	Medium	Moderate	Pollution Linkage 4 refers to the possible contaminants permeating potable water pipes and consumption by the future site end users of the tainted water supply. Made Ground may be present at installation depth associated with the former developments onsite and may be contaminated with a range of contaminants including organics. A potential pollution linkage has been identified.
PL5	Ground Gas	Migration and accumulation of ground gas in internal spaces.	Likely	Medium to Severe	Moderate	Made Ground of varying depth is anticipated beneath the site associated with the former residential and commercial land use. No significant sources of ground gas have been identified through the PRA, the Made Ground on the site and nearby infilled ponds are a source of permanent ground gases such as carbon dioxide and methane. An intrusive investigation comprising the installation of gas monitoring wells is recommended to confirm the gas risk.

Controlled Waters Pollution Linkage Assessment



- The table below represents the first stage in the land quality risk assessment process – **Qualitative Risk Assessment**.
- In order for a development site to be deemed ‘suitable for use’ the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Qualitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL6	Contaminated Soils	Impaction of groundwater from soil contamination (diffuse and point). Impaction of groundwater from groundwater plume.	Unlikely	Medium	Low	The site has historically been occupied by residential buildings until 1967 when a garage was constructed. The garage was demolished in 1976/80 and the site has since been occupied by a car park. Geological maps indicate that the site is underlain by Glacial Till (Secondary Undifferentiated Aquifer) and the bedrock is the Collyhurst Sandstone Formation (Principal Aquifer). The soils have been classed as having a low leaching potential and low groundwater vulnerability. There are no active groundwater or potable water abstractions within 1.5km of site and the site is not located within an SPZ. No significant sources of mobile contamination have been identified through the PRA, there is potential evidence of a petrol filling station associated with the historic garage at the site which may have contained underground storage tanks. The anticipated impermeable superficial deposits will restrict the downwards migration of any

Conceptual Site Model					Qualitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
						contaminants of concern into the groundwater present within the bedrock. No pollution linkage exists.
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Likely	Medium	Low	There are no surface water features within 250m of site. Potential significant sources of mobile contamination have been identified on site in the form of a petrol filling station which may have been present at the site associated with the former garage which may have had associated underground storage tanks. The anticipated underlying impermeable cohesive deposits will restrict lateral migration of any potential contaminants, and the receptor is considered to be a significant distance from site to allow for natural attenuation. No risk and pollution linkage to surface waters is considered to exist.

5.0 GROUND ENGINEERING RECOMENDATIONS AND POTENTIAL LIMITATIONS

5.1 Preliminary Foundation Assessment

The site is currently occupied by a car park with limited areas of standing present throughout. Made Ground is anticipated beneath the site based on the previous developments and subsequent demolition. The underlying superficial geology is indicated to be Devensian Till and the bedrock is the Collyhurst Sandstone Formation.

Depending on the depth of Made Ground, traditional trench and/or pad foundations are anticipated to be suitable for the proposed commercial development. If deeper Made Ground is present beneath the site or greater loadings are required, alternative deeper foundation solutions such as piles will be an option.

There is potentially deep Made Ground due to former UST's present at the site associated with the former garage.

All existing foundations and substructure will be required to be grubbed up as part of the enabling works. Existing basements may be present at the footprint of the former residential buildings onsite and localised areas of deep Made Ground may be present. There is also potential for deeper Made Ground in the central area of site associated with the former garage if inspection/service pits were utilised. Based on the age of the garage, it is considered likely.

The proposed commercial building is anticipated to be adjoining to the existing Octagon House immediately east and the potential for differential settlement should be considered. It is anticipated that movement joints will be required depending on the preferred foundation solution.

Several semi-mature to mature trees are located on the western side of the site and due to the anticipated cohesive soils, it is likely that heave precautions will be required within foundations.

The above preliminary foundation recommendations are based on desk based information and should be confirmed by a Ground Investigation in accordance with current guidance.

5.2 Additional Limitations

The use of SuDS drainage is unlikely to be feasible for the proposed development due to the anticipated cohesive deposits beneath the site. This should be confirmed or otherwise through completing soakaway tests in accordance with BRE Digest 365.

The Preliminary UXO Risk Assessment indicates that the site falls within a *Low* UXO risk, however a detailed UXO risk assessment has been recommended to better determine the location and effects of bombing incidents across the site locality.

6.0 CONCLUSIONS AND GROUND INVESTIGATION RATIONALE

6.1 Land Quality

The site has historically been occupied by a field until 1890 when several residential dwellings with associated outbuildings were constructed. The majority of buildings were demolished in 1949/50, the remaining buildings were demolished in 1967 and a garage was constructed in the centre of the site which appears to have comprised of a PFS and so there is potential for UST's to be present at the site. The garage was demolished in 1976/80 and the site has remained a car park since.

It is proposed to construct a new commercial building with hardsurfacing car parking and sparse areas of soft landscaping.

The risk to human health is considered to be *Moderate to Low* as the site will mostly covered with hardsurfacing which will break the pollution linkage however areas of soft landscaping are proposed.

Based on the historic site use as a garage, a *Moderate* risk of vapours has been identified.

The ground gas risk is considered to be *Moderate* based on anticipated Made Ground and backfilled ponds identified within the surrounding area.

Groundwater is not considered to be a sensitive resource and there are no surface water features within 250m. No gross mobile contamination is anticipated therefore, the risk to controlled waters is considered to be *Low*.

There is potential for UST's to be present at the site associated with the potential former PFS associated with the former garage at the site, enquiries have been made to the Petroleum Officer to determine the presence of UST's and any other associated contaminants.

6.2 Ground Engineering

Variable Made Ground is anticipated beneath the site associated with the former developments. It is anticipated traditional shallow trench and/or pad foundations will be a suitable option for the proposed structure in the Clay. A Ground Investigation is required to determine the appropriate foundation solution.

Trees are present along the western area of site. As cohesive deposits are likely to be present beneath the site, foundations should be designed in accordance with NHBC Chapter 4.2 'Building Near Trees'. The influence of trees may result in a deeper foundation solution being required.

6.3 Additional Considerations

There is potential for historic basements and inspection pits to have been present beneath the site and deep Made Ground may be present.

It is anticipated that the proposed building will be adjoining the existing Octagon House and the potential for differential settlement should be considered.

The use of a SuDS drainage system is unlikely to be feasible for the proposed development due to the presence of Glacial Till deposits.

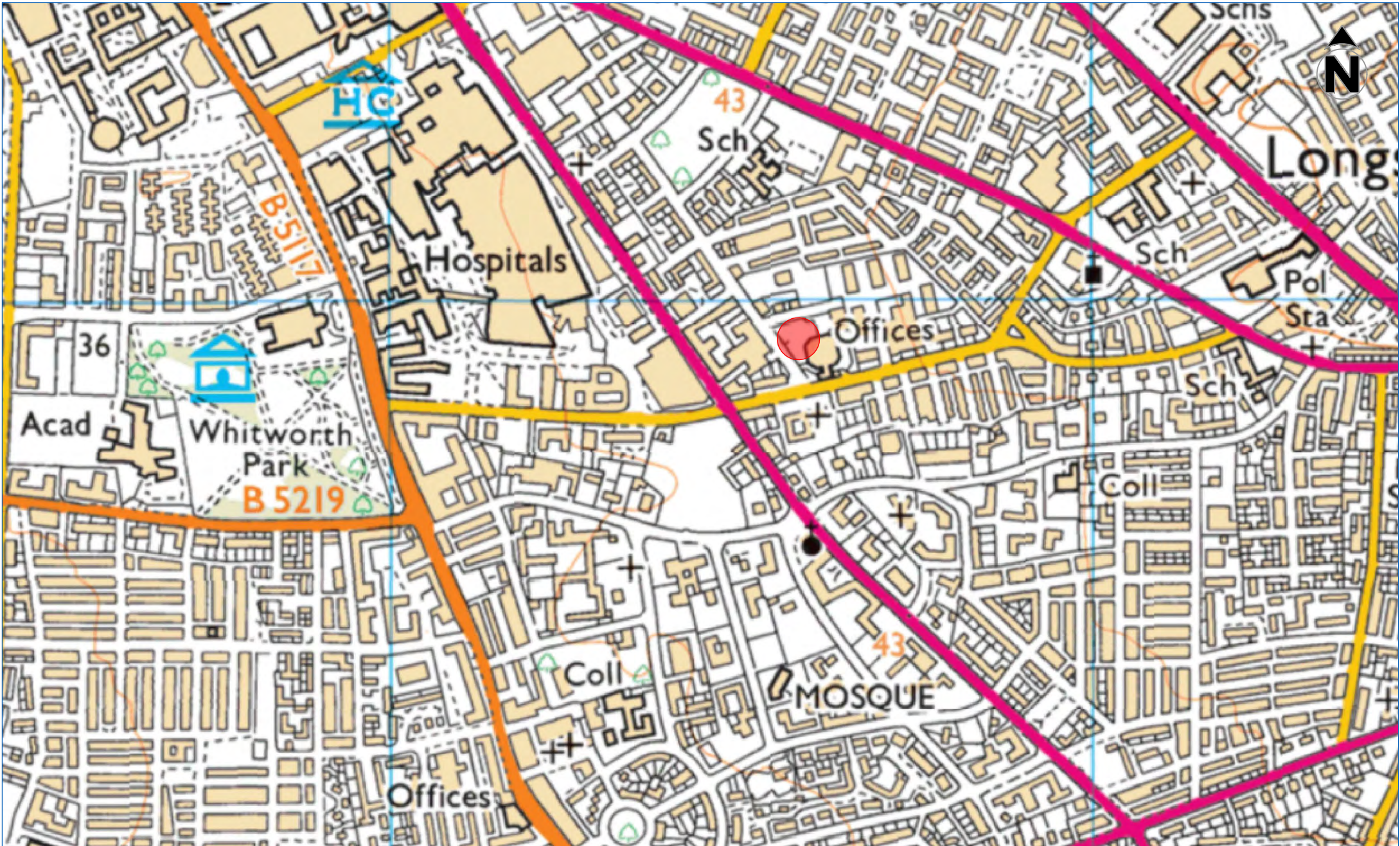
6.4 Recommended Ground Investigation Scope

Based on the information in this report we consider a main investigation is required in accordance with BS 10175:2017 and Eurocode 7. The following scope of works is recommended based on the Preliminary CSM compiled, additional works may be required as the result of planning conditions for the proposed development:

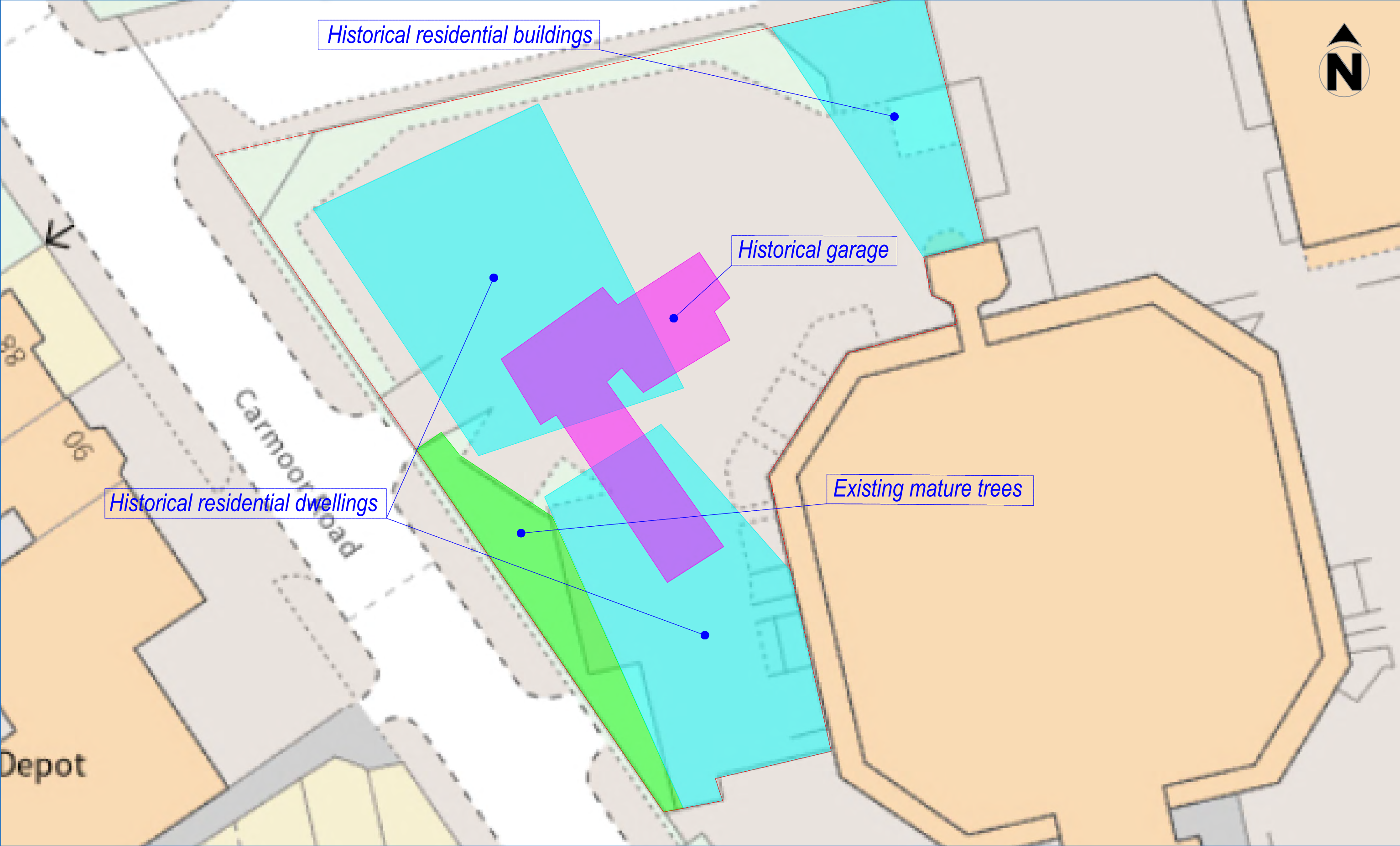
Method of Investigation	G / E
<i>5 No. windowless sample boreholes to 4m to 5m bgl</i>	<i>G/E</i>
<i>Potentially deeper boreholes (depending on depth of Made Ground and proposed loadings)</i>	<i>G/E</i>
<i>Shallow gas monitoring installations</i>	<i>E</i>
<i>Geo-Environmental testing comprising heavy metals, speciated PAHs, TPH and asbestos.</i>	<i>E</i>
<i>Geotechnical testing comprising aggressivity, classification, strength and stiffness.</i>	<i>G</i>
<i>Permanent Ground Gas Monitoring</i>	<i>E</i>

Note **Environmental (E) / Geotechnical (G)**

APPENDIX 1 - Plans



GROUNDTECH CONSULTING	CLIENT	MANCHESTER ENERGY PARTNERSHIP LIMITED	DATE	FEBRUARY 2024				Status	Notes	
	PROJECT TITLE	OCTAGON ENERGY CENTER	SCALE	NTS				Preliminary		Site Location
	PLAN TITLE	PROJECT LOCATION PLAN	PLAN NUMBER	GRO-24025-P01				Draft		
								Issued		
					Rev.	Details	Date	For Comment		
								Approved		

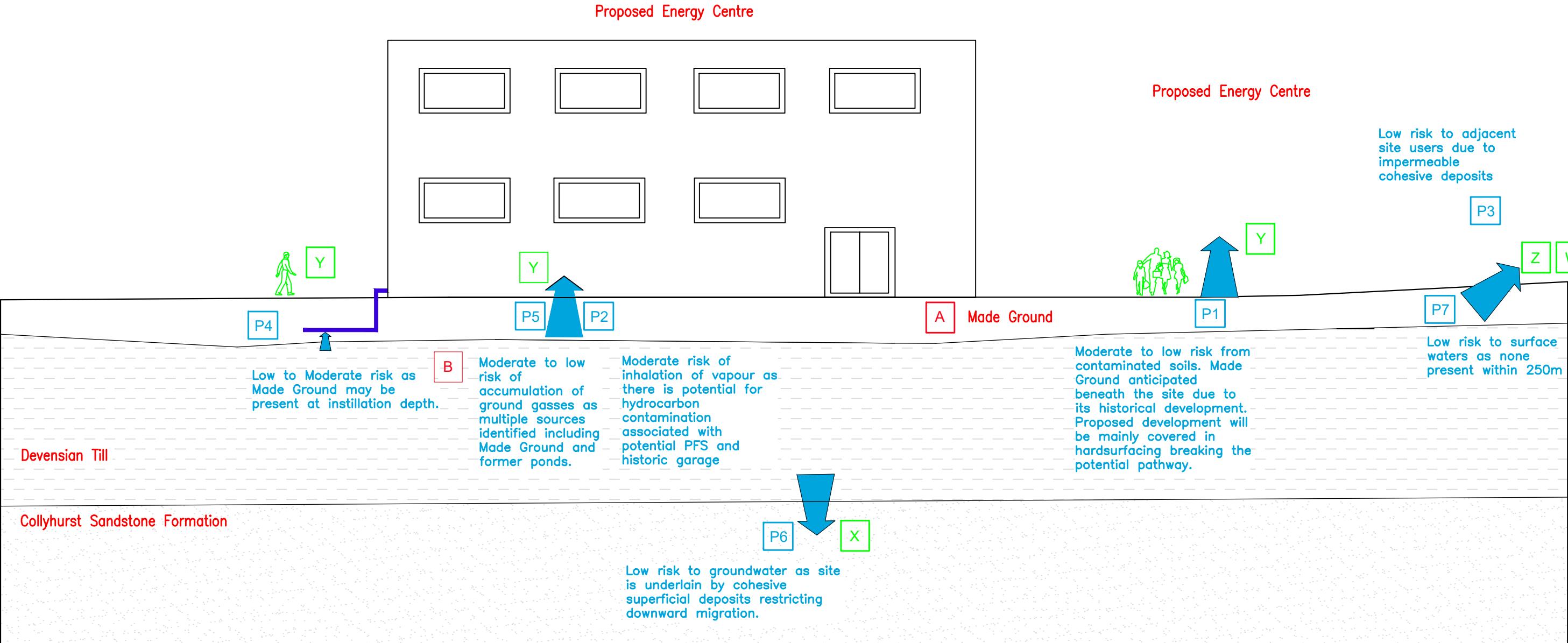


GROUNDTECH CONSULTING 	CLIENT	MANCHESTER ENERGY PARTNERSHIP LIMITED	DATE	FEBRUARY 2024				Status		Notes SITE BOUNDARY DEVELOPMENT CONSTRAINTS
	PROJECT TITLE	OCTAGON ENERGY CENTER	SCALE	NTS				Preliminary		
	PLAN TITLE	PRELIMINARY DEVELOPMENT AND CONSTRAINTS PLAN	PLAN NUMBER	GRO-24025-P02				Draft		
								Issued		
								For Comment		
								Approved		
	Rev.	Details			Date					

SOURCES
A. Contaminated soils / Made Ground. B. Ground gas.

POLLUTION LINKAGES
P1. Ingestion of soil and dust. P2. Inhalation of vapour. P3. Inhalation of soil dust by adjacent site users. P4. Attacking of potable water supply pipe. P5. Migration and accumulation of ground gas in internal places. P6. Impaction of groundwater from soil contamination. P7. Migration of soil and groundwater contamination impacting surface waters.

RECEPTORS
W. River Mersey c.2.05 miles north west of the site X. Groundwater within the underlying Principle Bedrock Aquifer Y. Site end users Z. Adjacent site users



GROUNDTECH CONSULTING G	CLIENT	DATE			Status		Notes
	MANCHESTER ENERGY PARTNERSHIP LIMITED	FEBRUARY 2024			Preliminary		
	PROJECT TITLE	SCALE			Draft		
	OCTAGON ENERGY CENTRE	NTS			Issued	●	
	PLAN TITLE	PLAN NUMBER			For Comment		
	ILLUSTRATIVE PRELIMINARY CSM	GRO-24024-P03	Rev.	Details	Date	Approved	



APPENDIX 2 - Site Photographs



Photograph 1 - Central Carparking Area



Photograph 2 - Electrical Substation

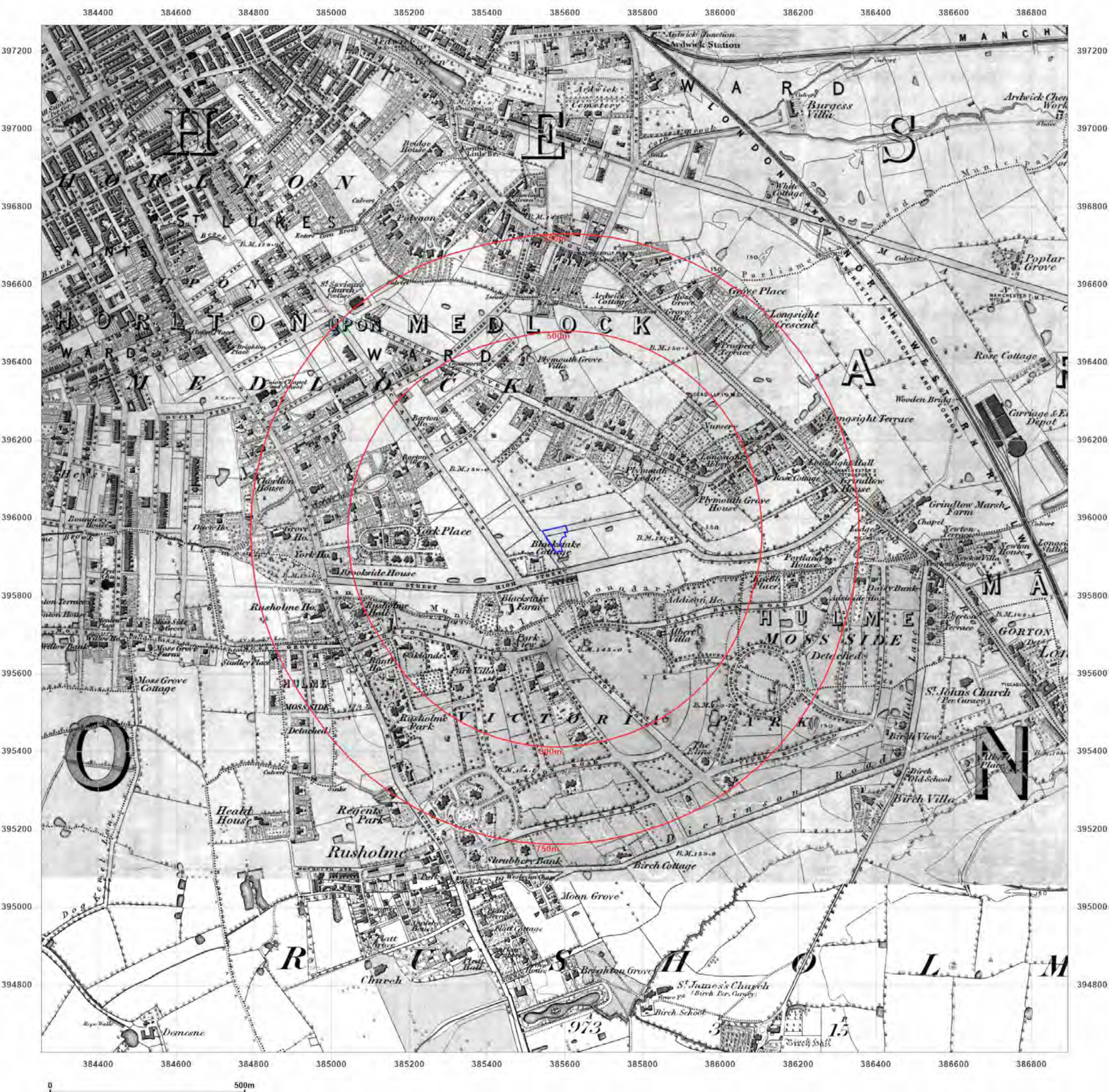


Photograph 3 - Area of Soft Landscaping



Photograph 4 - Central Carparking Area

APPENDIX 3 - Historical Maps



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Site Details:	
Octagon Centre , Manchester, M13 0FN	
Client Ref:	EMS_923550_1145236
Report Ref:	EMS-923550_1176607
Grid Ref:	385573, 395946
Map Name:	County Series
Map date:	1848-1849
Scale:	1:10,560
Printed at:	1:10,560



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Edition 1848
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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1890-1892

Scale: 1:10,560

Printed at: 1:10,560



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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1905

Scale: 1:10,560

Printed at: 1:10,560



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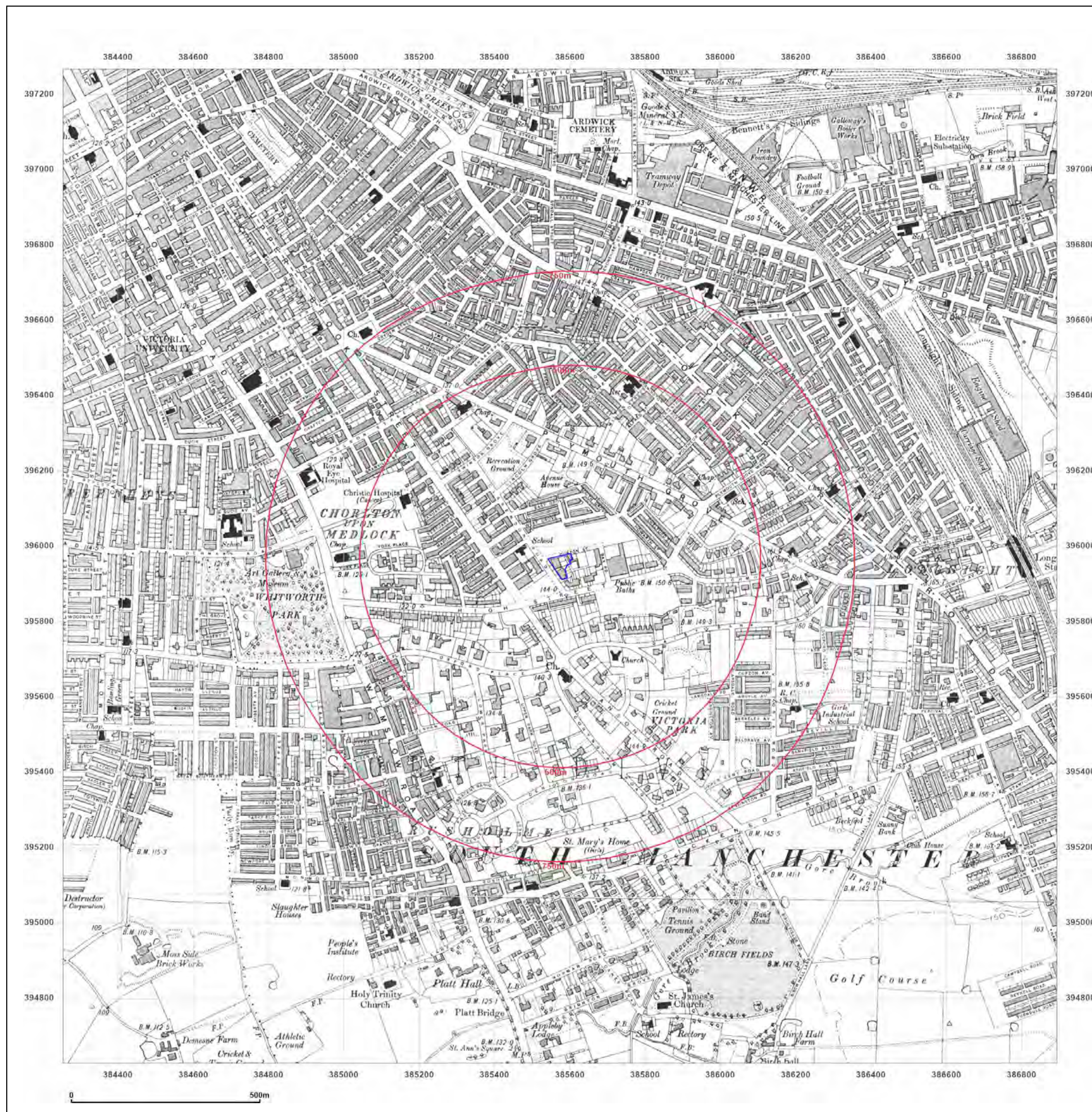


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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1923

Scale: 1:10,560

Printed at: 1:10,560



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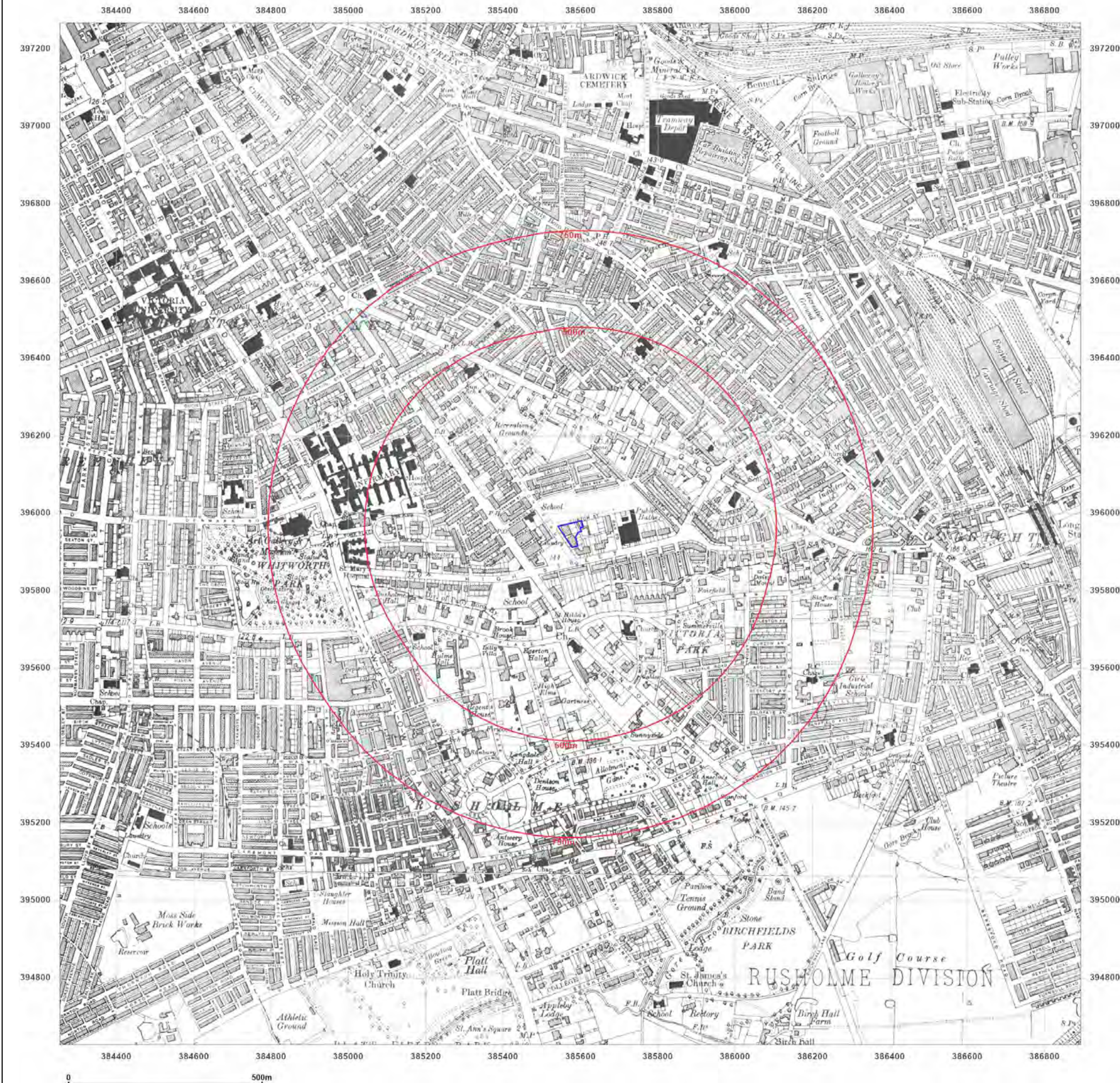


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Map Name: County Series

Map date: 1923

Scale: 1:10,560

Printed at: 1:10,560



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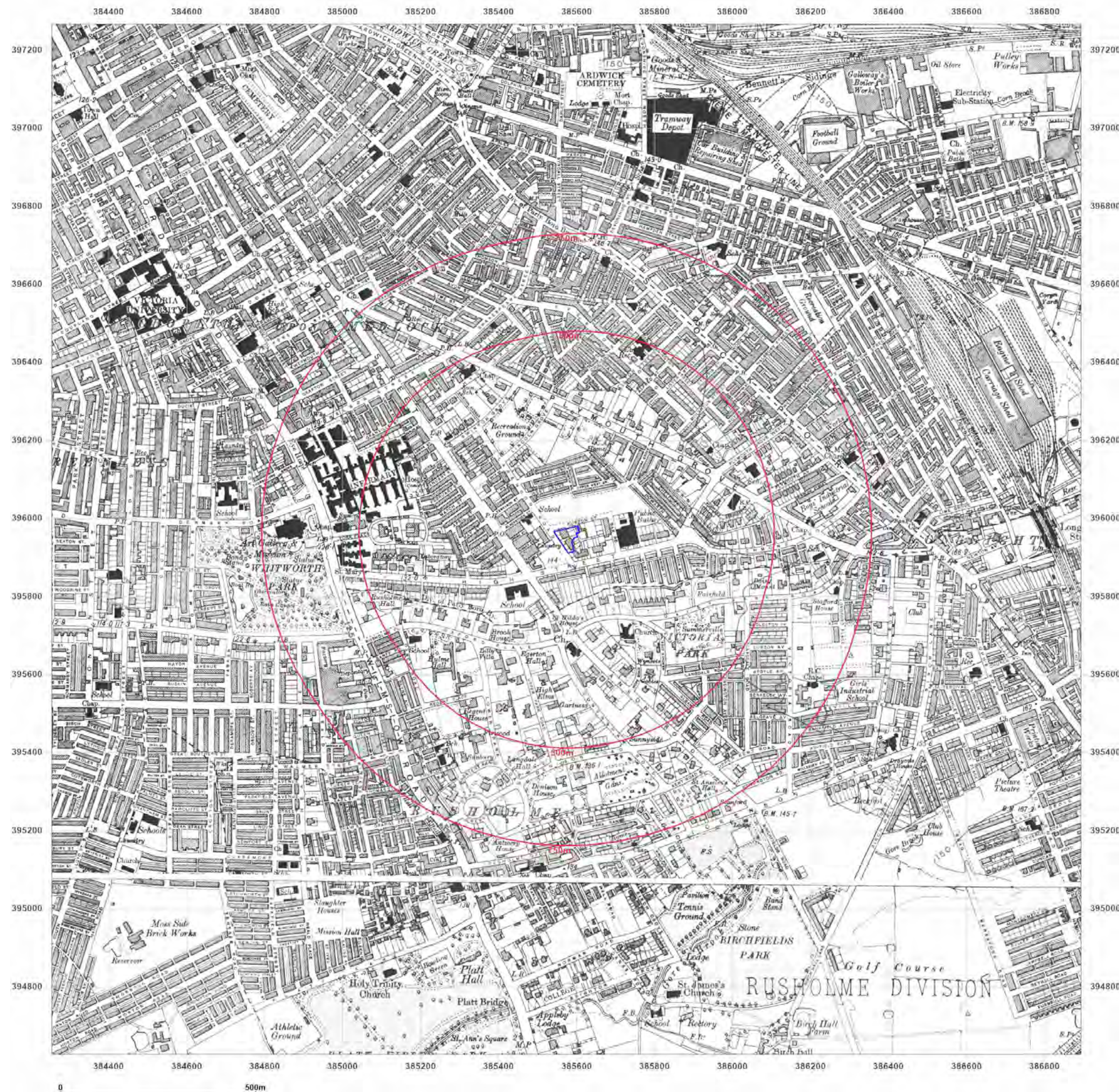


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Map Name: County Series

Map date: 1932-1934

Scale: 1:10,560

Printed at: 1:10,560



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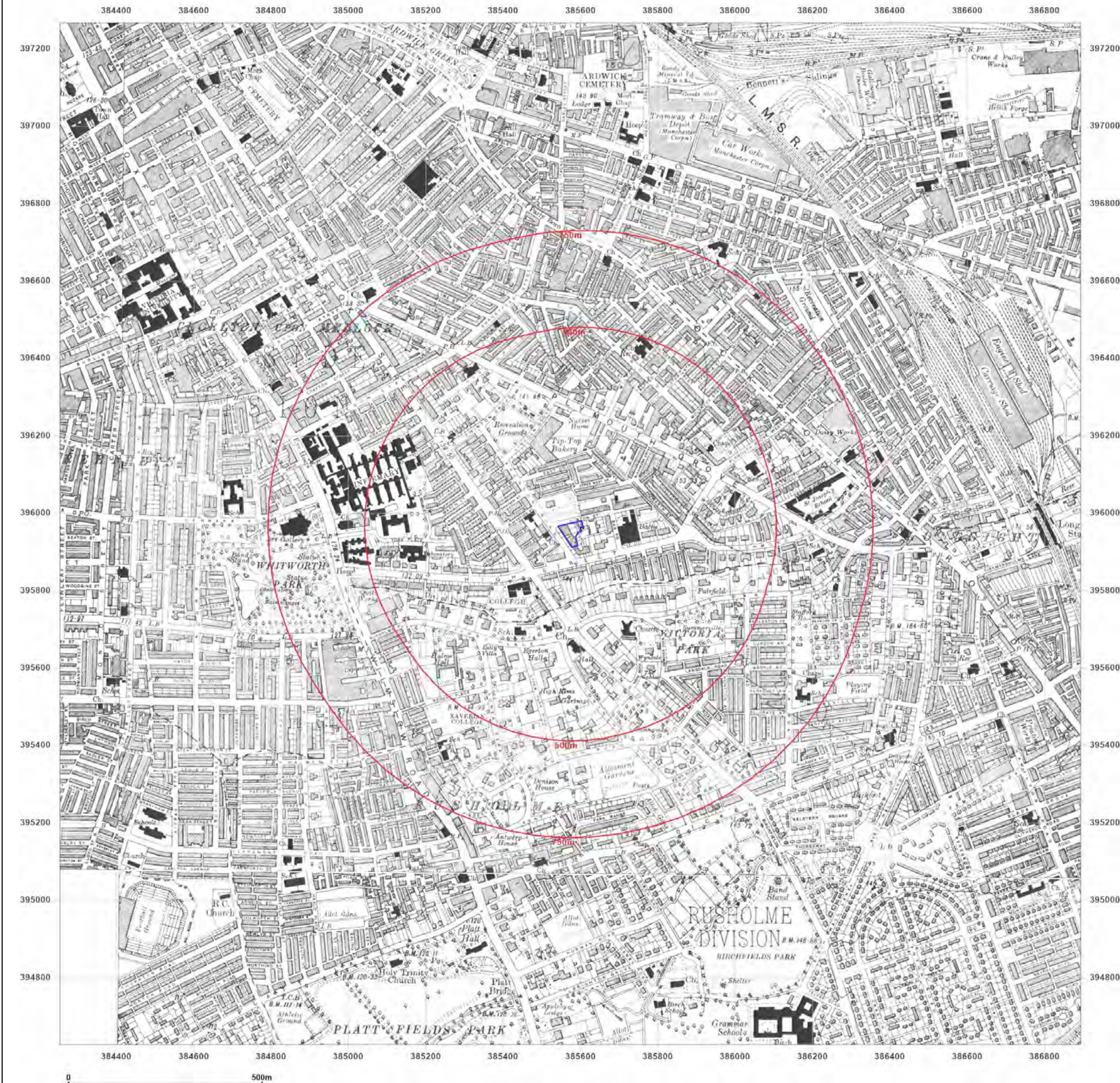


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Grid Ref: 385573, 395946

Map Name: Provisional

Map date: 1965-1968

Scale: 1:10,560

Printed at: 1:10,560



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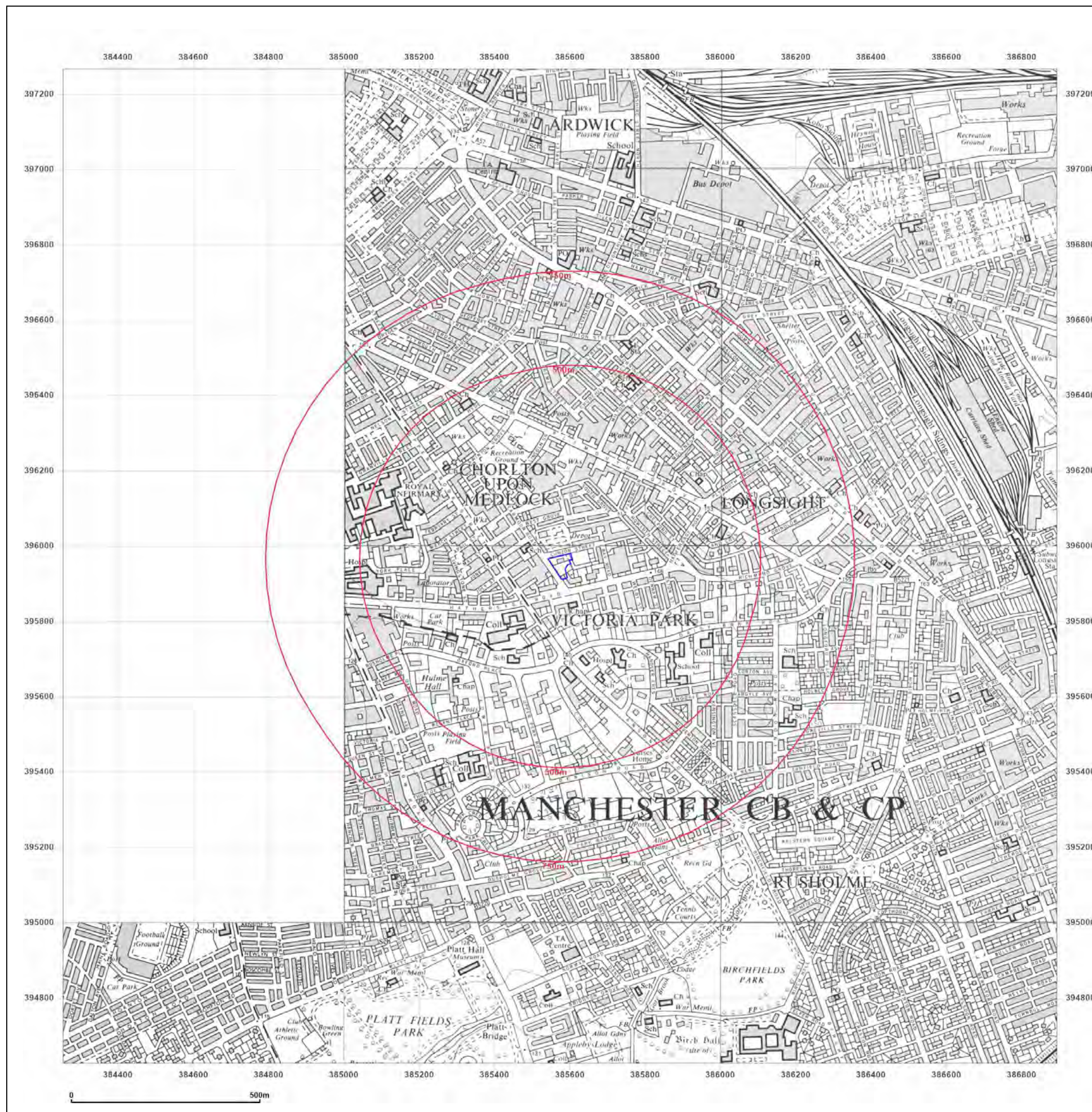


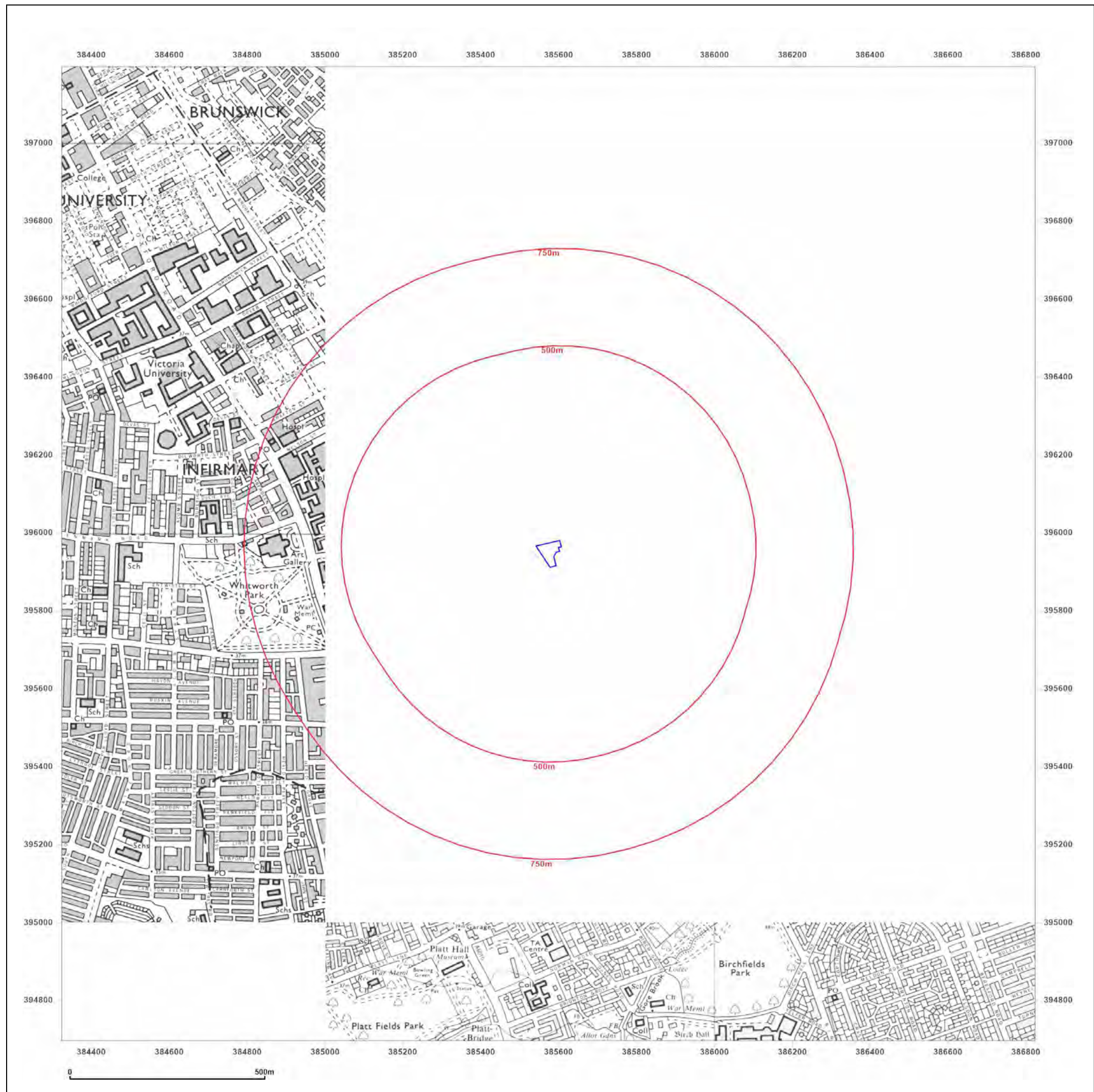
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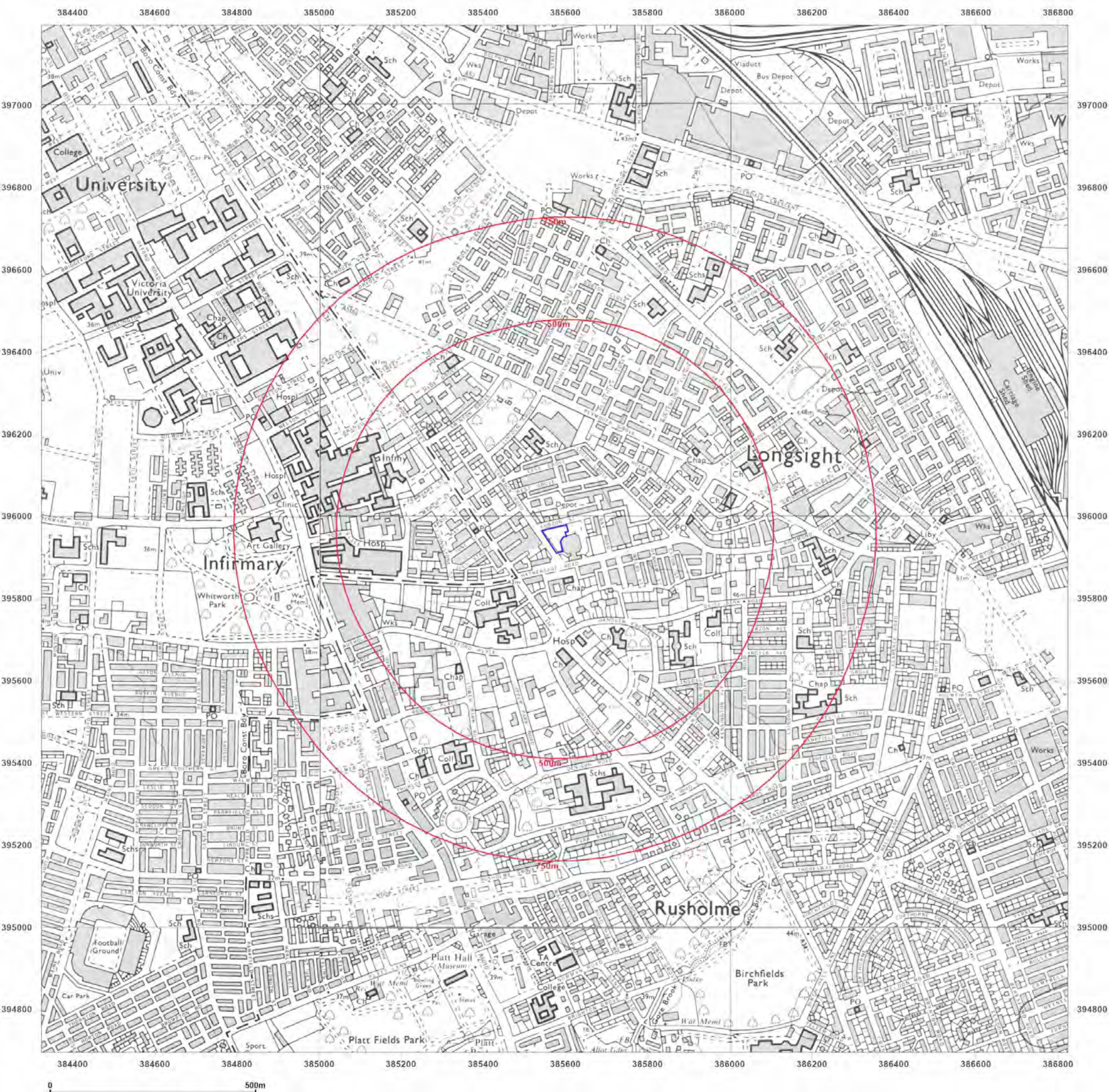
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Grid Ref: 385573, 395946

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Grid Ref: 385573, 395946

Map Name: National Grid

Map date: 1985-1989

Scale: 1:10,000

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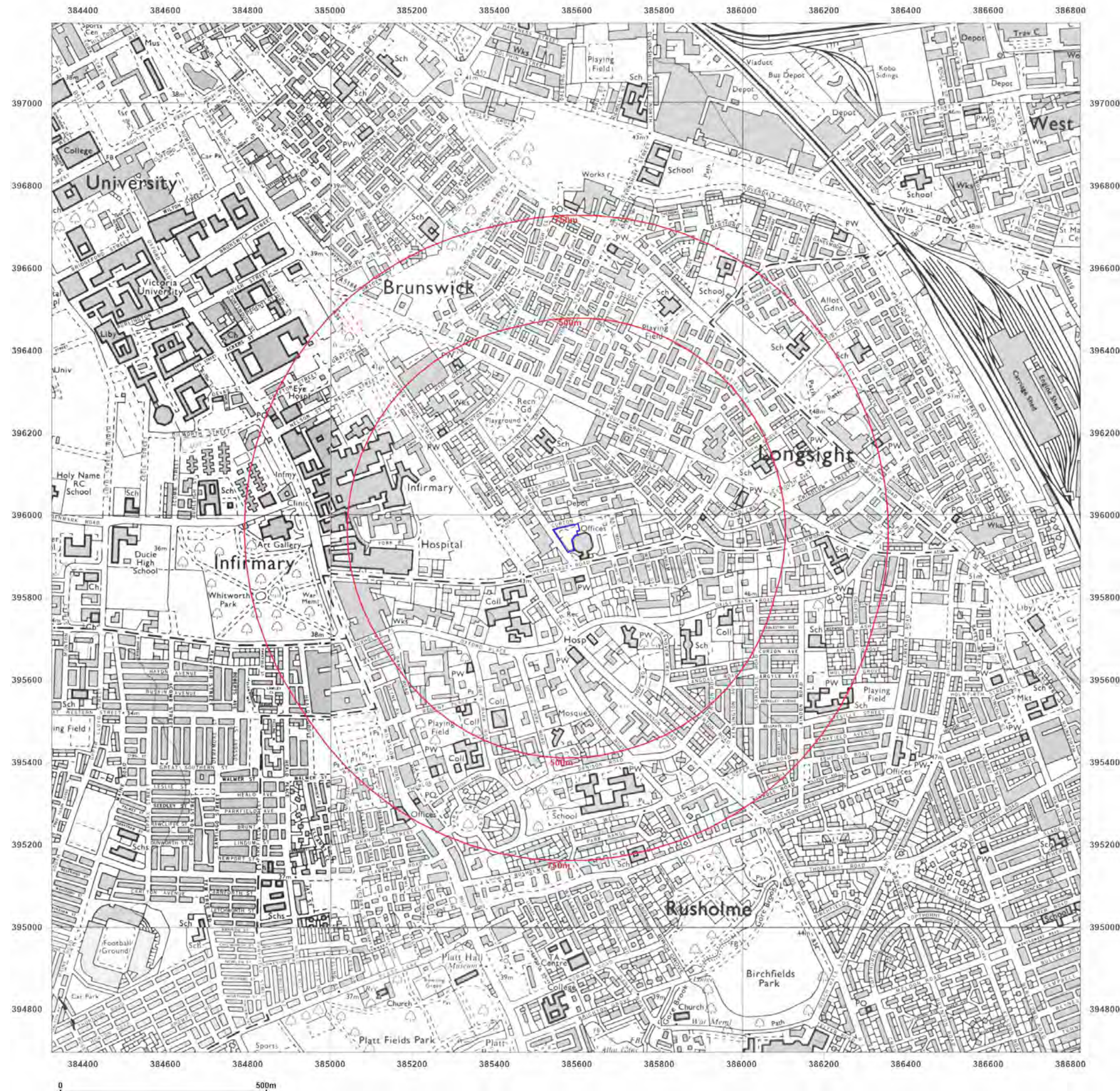


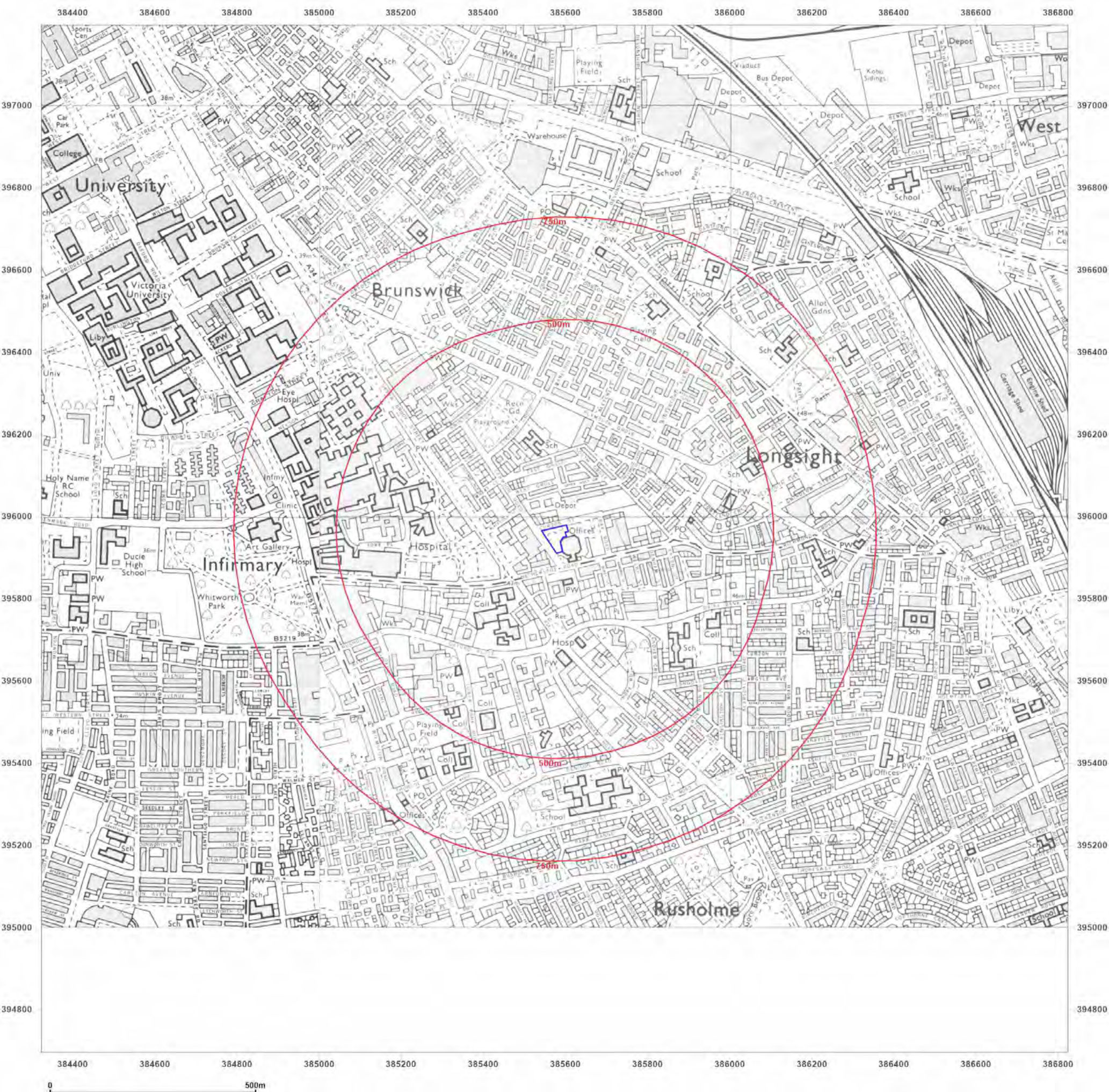
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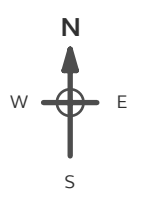
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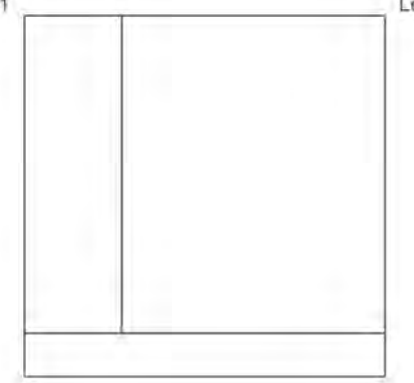
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Map date: 1988-1991
Scale: 1:10,000
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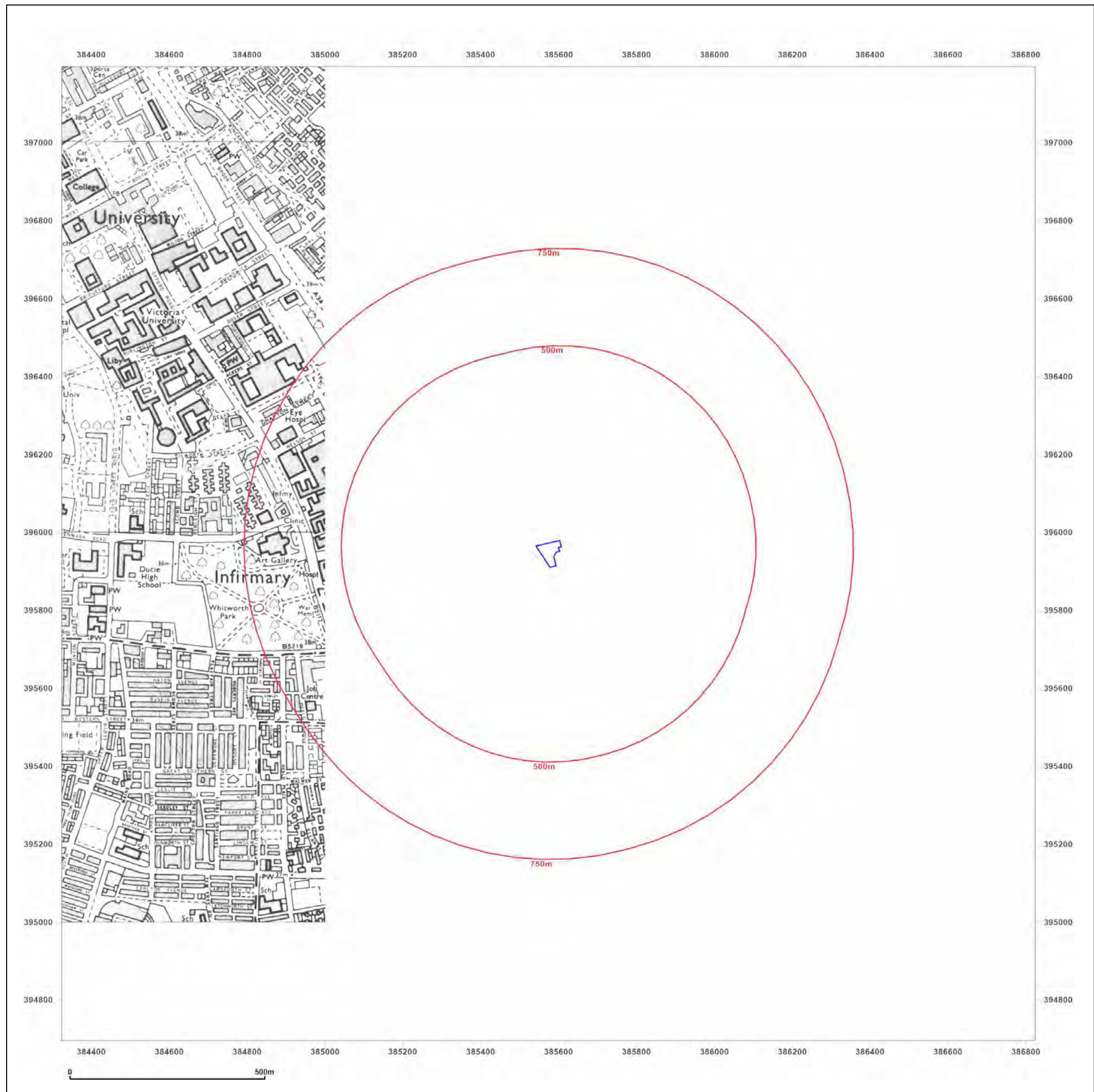


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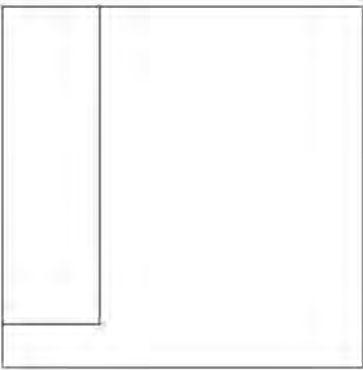
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Grid Ref: 385573, 395946

Map Name: National Grid

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Grid Ref: 385573, 395946

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Map date: 2010

Scale: 1:10,000

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Grid Ref: 385573, 395946

Map Name: National Grid

Map date: 2024

Scale: 1:10,000

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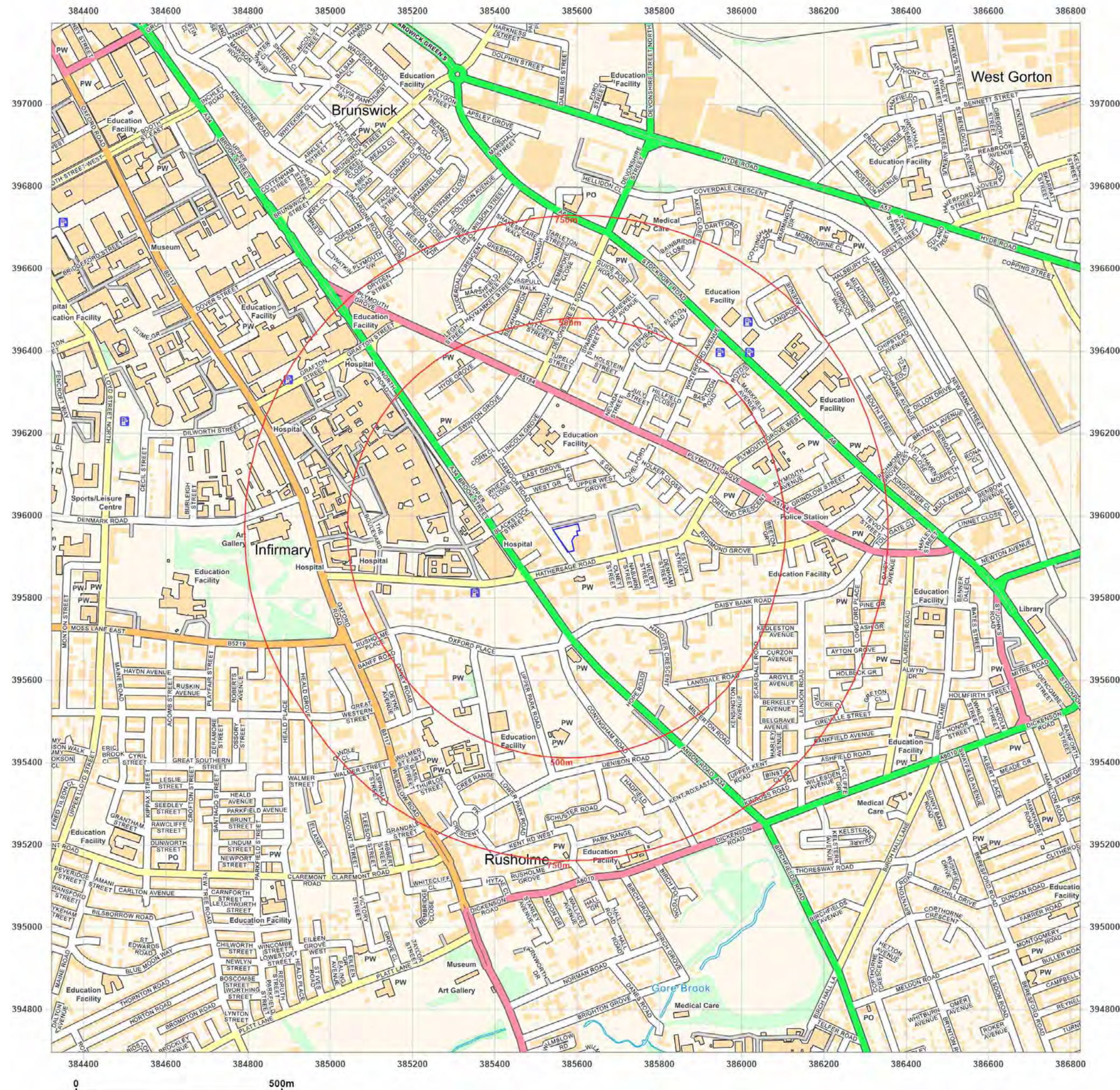


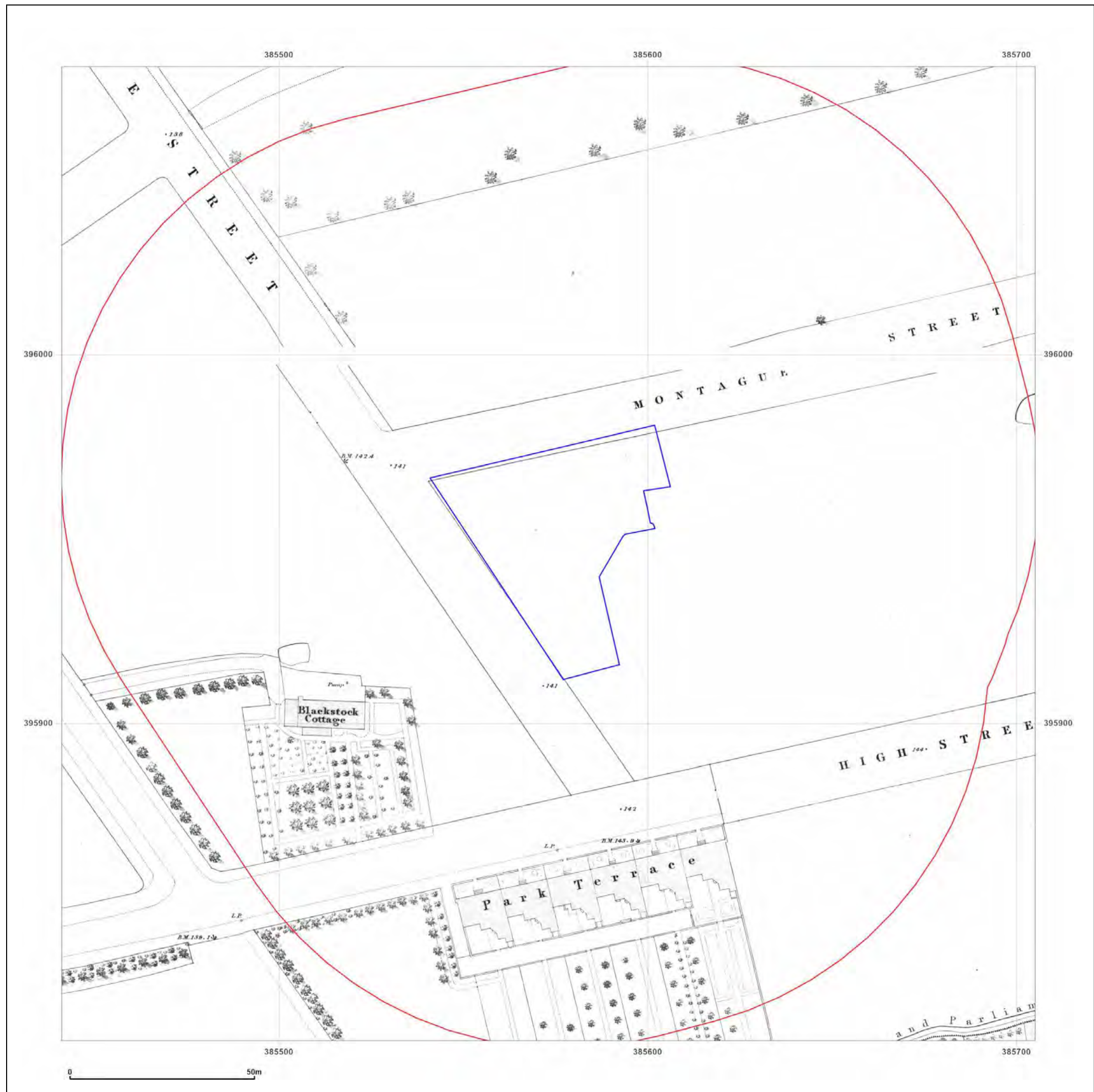
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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: 1056 Scale Town Plan

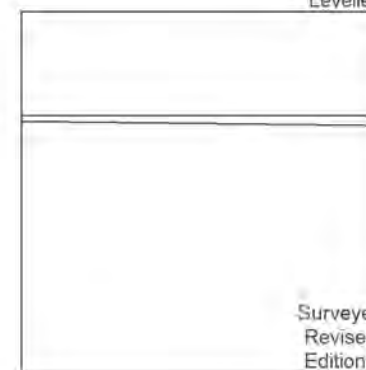
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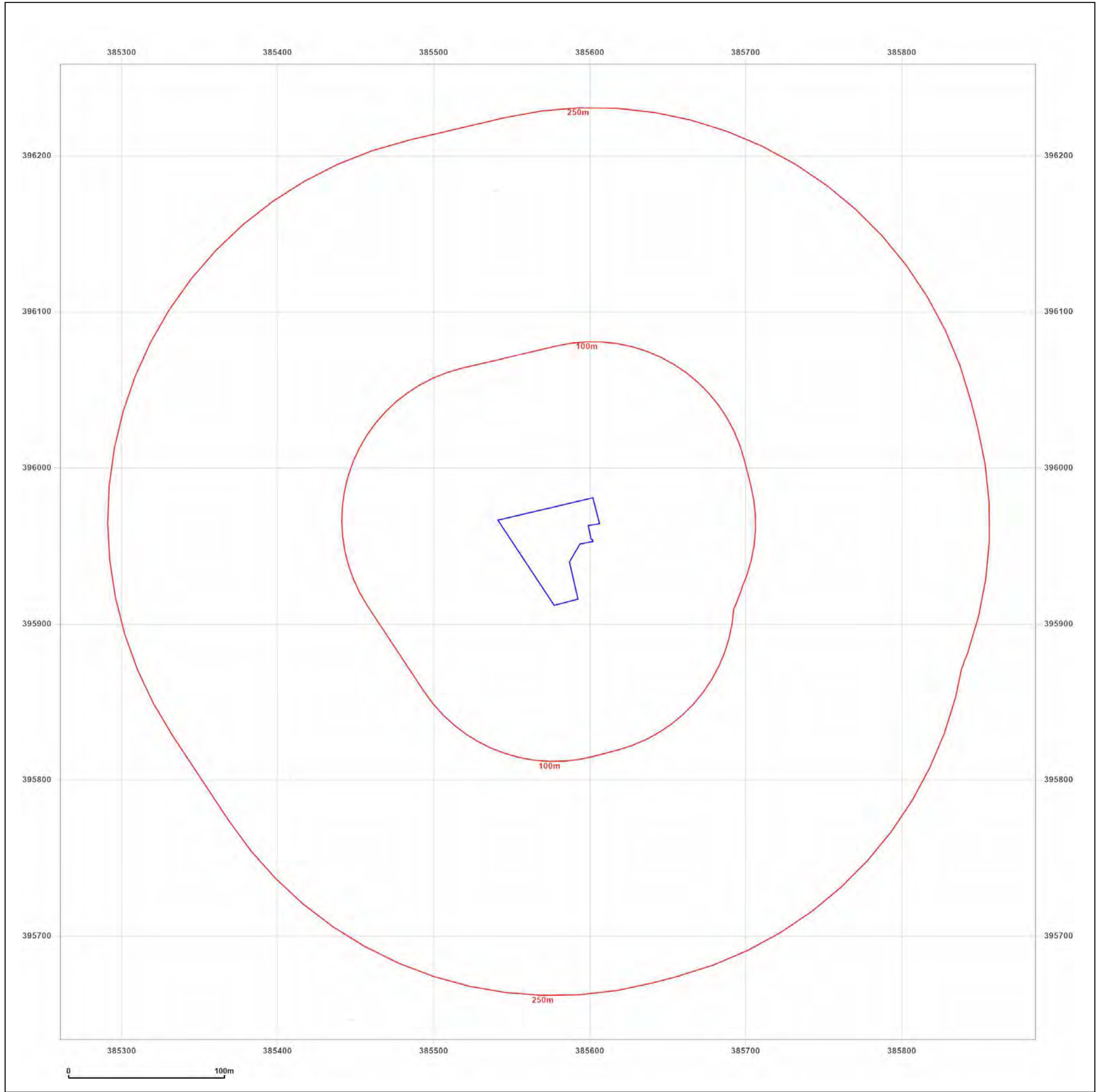


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Site Details:

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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1881

Scale: 1:2,500

Printed at: 1:2,500



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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series Town Plan

Map date: 1891

Scale: 1:500

Printed at: 1:1,000



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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1893

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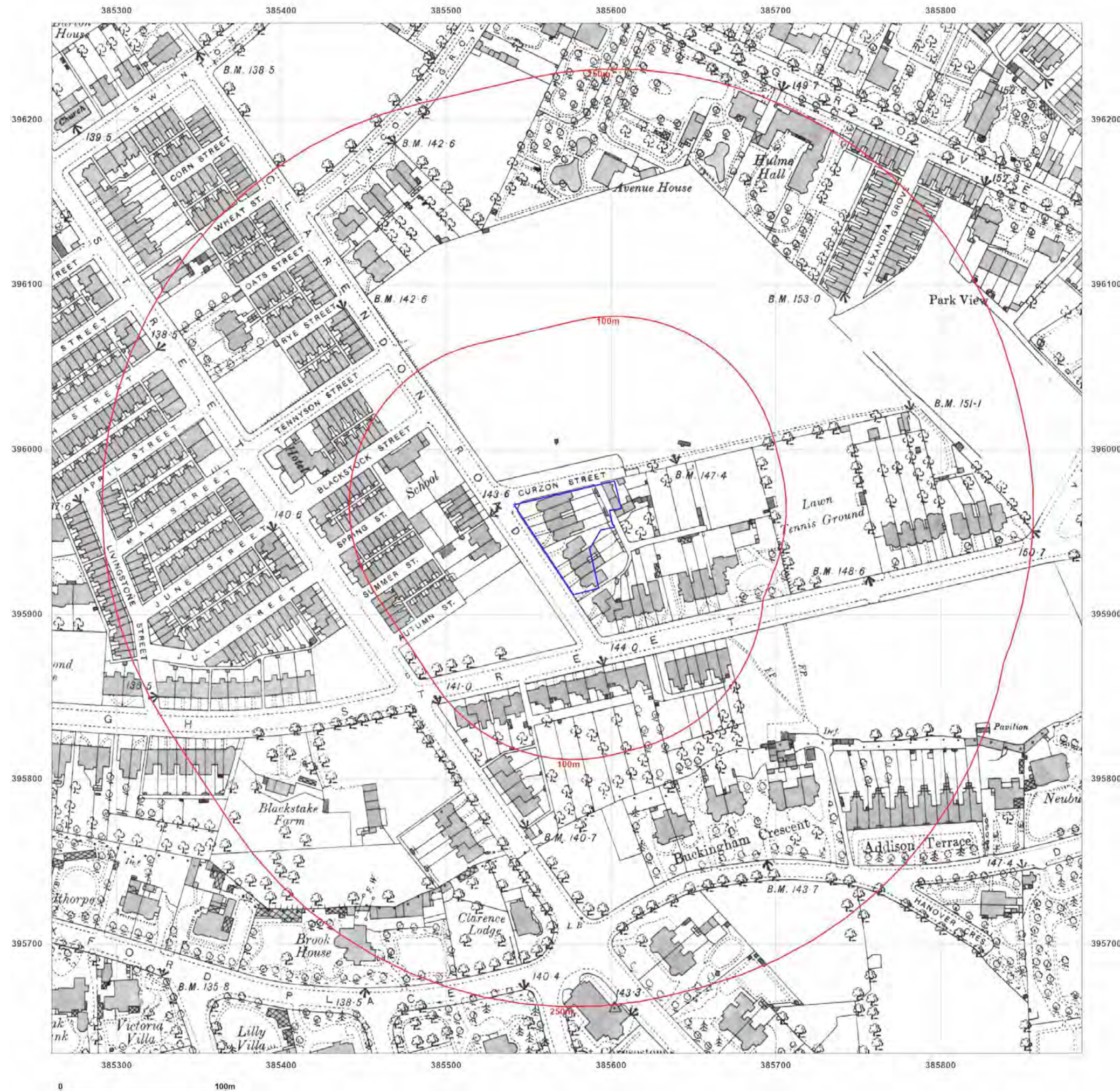


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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1908

Scale: 1:2,500

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Edition 1908
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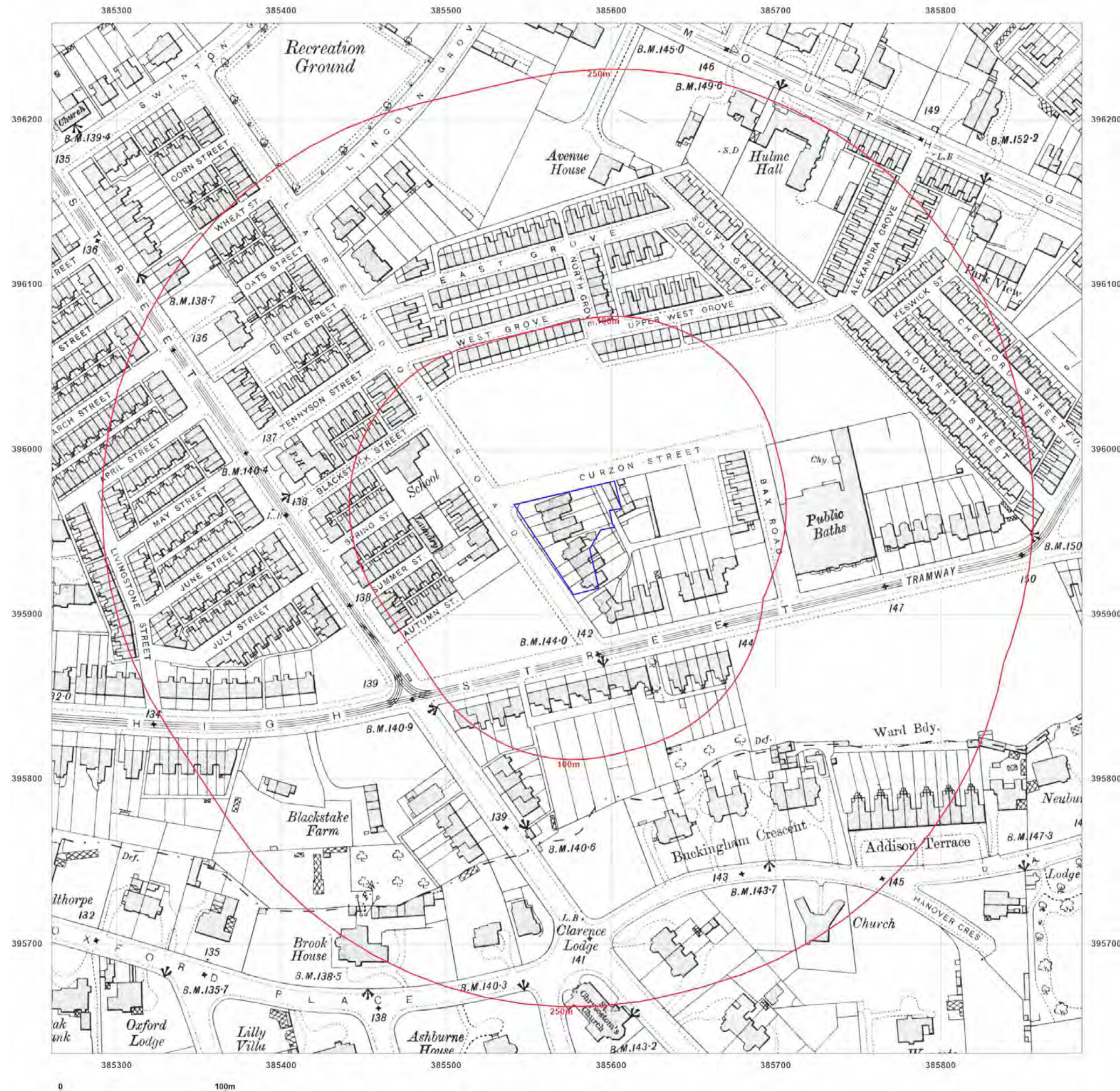


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Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1922

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1922
Revised 1916
Edition 1922
Copyright N/A
Levelled 1915



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Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Octagon Centre , Manchester,
M13 0FN

Client Ref: EMS_923550_1145236
Report Ref: EMS-923550_1176607
Grid Ref: 385573, 395946

Map Name: County Series

Map date: 1933

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1873
Revised 1933
Edition N/A
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