

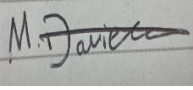
Manchester Airport Argosy Drive Development

Phase 1 Tier 1 Geo-environmental and Geotechnical
Assessment

Threadneedle Curtis Ltd

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The site reconnaissance consisted of a general external inspection of the site aimed at identifying any obvious signs of geotechnical hazards and potential sources of ground contamination affecting the site. An environmental compliance audit and/or detailed structural inspection of existing buildings were outside the project brief. Similarly, the site visit excluded detailed consideration of the ecological or archaeological aspects of the site, and if such are believed to be of potential significance then it is recommended that specialist advice is sought.

Any risks identified in this Report are perceived risks, based on the information reviewed during the desk study and therefore partially based on conjecture from available information. The study is limited by the non-intrusive nature of the work and actual risks can only be assessed following a physical investigation of the site.

The opinions expressed in this report and the comments and recommendations given are based on a desk assessment of readily available information and an initial site reconnaissance by an AECOM Engineer. At this stage intrusive investigations have yet to be undertaken at site to establish actual ground and groundwater conditions and to provide data for an assessment of the geo-environmental status of the site.

Reference to historical Ordnance Survey (OS) maps and/or data provides invaluable information regarding the land use history of a site. However, it should be noted that historical evidence will be incomplete for the period pre-dating the first edition and between the release of successive maps and/or data.

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1. Introduction

1.1 Terms of Appointment

On the instructions of Duncan Seward on behalf of Threadneedle Curtis Ltd (the Client), AECOM Limited (AECOM) has carried out a Phase 1 Geotechnical and Geo-environmental Desk Study of the site known as Argosy Drive Development.

The work has been carried out in accordance with the AECOM fee proposal dated January 2022, reference Argosy Drive Fee Proposal. The Client's instruction was confirmed under email of appointment from Samantha Hadland dated 2022.02.10, reference Argosy Drive, World Freight Terminal, Manchester Airport.

1.2 Background and Proposed Development

The report has been produced on the assumption that the site will be redeveloped to a commercial end use incorporating three warehouse units with first floor office spaces. The three warehouse units (Units 1,2 and 3) will cover c.5,985 sqm, c.4,266 sqm and c.3,066 sqm respectively which, is approximately half of the site area. The remainder of the site shall comprise associated infrastructure, including hardstanding lorry and car parking, access routes and loadings bays with landscaping between the site and Avro Way and the site and Viscount Drive. The proposed masterplan (Option 13) can be shown as drawing 020687-RPS-SI-XX-DR-A-9039 included within Appendix A.

The development of the site is anticipated to require the following stages:

- Demolition of the existing buildings B303, B304, B305 and B311;
- Site earthworks, including excavation levelling and landscaping for external areas;
- Installation of services and site drainage; and
- Construction of the new buildings and associated infrastructure.

1.3 Report Objectives

The primary objectives of this report are to:

- determine whether potentially contaminative uses have taken place within, or in close proximity to, the site which could have led to the contamination of underlying soils or groundwater; and
- to understand the effects of the geological conditions and site activities on the geotechnical properties for site redevelopment.

This Phase 1 Tier 1 Stage 1 as per UK Government guidance Land Contamination: Risk Management (LC:RM) (updated 2021) report is prepared to advise on site condition under the requirements of Town and Country Planning Act 1990 (as amended), the National Planning Policy Framework (2012) and considers the potential implications of Part 2A of the Environmental Protection Act 1990 (Part 2A) and the associated Contaminated Land (England) Regulations 2006 and Contaminated Land Statutory Guidance (2012).

This report has been prepared in general accordance with the technical guidance and procedures described in the UK Government guidance Land Contamination: Risk Management (2021) and its predecessor, Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11 (Department of Food and Rural Affairs (Defra)/Environment Agency, 2004), British Standard (BS) 5930:2015 (as amended) Code of Practice for Site Investigations (BSI), BS:EN 1997 Eurocode 7 – Geotechnical Design (BSI) and BS 10175:2011 (as amended) Investigation of Potentially Contaminated Sites – Code of Practice (BSI), to:

- Describe the geology, hydrogeology and shallow mining potential;
- Describe the environmental setting/ sensitivity and current/ historical land use of the site and surrounding area;
- Describe the findings of a site reconnaissance visit;
- Summarise the history of the site;
- Summarise the underlying geology and hydrogeology;

- Summarise the findings of any historical ground investigation work;
- Provide an initial Conceptual Site Model (iCSM) for the prevailing ground conditions;
- Using the source-pathway-receptor model present a preliminary qualitative risk assessment of potential land contamination risks to human (chronic), environmental, or controlled water receptors from contamination sources on or in the vicinity of the site, via transport pathways;
- Present a preliminary qualitative evaluation of potential geotechnical issues; and
- Identify the potential need for further intrusive investigation and potential need for remediation works. The purpose of such to substantiate the findings of the preliminary risk assessment and thereby refine the CSM.

1.4 Sources of Information

This report has been prepared using a combination of published records from publicly available sources (e.g. British Geological Survey (BGS), Environment Agency (EA), Defra). As part of this assessment a site-specific Groundsure Report has been acquired, including published environmental, geological and hydrogeological data and mapping and historical mapping for the area.

In addition, information provided by the client and from other sources such as the Local Authority Environmental Health/ Contaminated Land Officer, historical borehole records, and observations made during the site reconnaissance have also been reviewed where available.

Specific information sources are referenced throughout the document and a bibliography is included in Section 14 of the report.

2. Site Setting

2.1 Location

The site is located adjacent to both Avro Way and York Drive, with Argosy Drive running through the centre (M90 5TE) and is centred on National Grid Reference 380862 385150. The site is within a commercial/industrial setting (logistics park) immediately south west of the airside portion of Manchester Airport and is approximately 13km south of Manchester city centre.

2.2 Description and Setting

The site covers an area of approximately 2.716 hectares and is defined by the red line boundary shown in drawing 60663052-ACM-XX-XX-DR-C-0001 included within Appendix A.

The site is broadly rectangular in shape orientated north east to south west with ground elevation indicated to lie circa 67m Above Ordnance Datum (AOD). The site is generally level with the site reconnaissance determining a slight declining gradient running east to west.

The site is currently occupied by commercial premises and associated infrastructure. The site comprises 4 no. Buildings 311, 304, 303, 305, an access road (Argosy Drive), a large carpark and multiple loading bays. An area of grass land and various vegetation is present south west of the car park.

The buildings on site are currently being utilised by various firms for the commercial purposes of logistics and distribution. Specifically, Building 311 and 303 have associated HGV loading areas (loading bays), warehouse facilities and offices. Building 305 is unoccupied office space does not have loading areas, nor does it appear to have warehouse facilities. An area of trees and vegetation is present on site, immediately north west of Building 305 and north of the carpark occupying the west of the site. Building 304 houses a sewage pumping station control unit and two storage units for facilities maintenance companies.

Relevant features immediately surrounding the site are summarised in Table 2-1.

Table 2-1 Features Surrounding the Site

Direction	Summary
North East	Immediately adjacent to the site is York Drive. Beyond this road are loading bays and parking for Building 307 which is currently used for distribution and haulage, as well as airline services. Beyond this exists the Apron for parking and unloading/loading aircraft. Two large firewater tanks are located between Building 307 and Building 308.
South East	Again, York Drive is located adjacent to the site, here it is intersected by Viscount Drive at the south easterly corner of the site. Building 300 is positioned beyond this junction which is utilised in the same manner as Building 307. Beyond Building 300 is the Airport Apron. Building 302 and 301 are situated south of Viscount Drive with Building 308 alongside. A large hardstanding carpark is situated adjacent to Building 301, with Argosy Drive intersecting the two. The Manchester Airport Aviation Fuel (AVGAS) and tanker loading facility is located 300m to the east of the site with associated tank farm.
South West	Avro Way is immediately adjacent to the site, with the junction between Avro Way and Viscount Drive close to the south west corner of the site. Beyond Avro Way are three larger warehouses structures (Buildings 318, 317, 316). These are used for logistics and distribution. Beyond these loading areas are present, then further warehouse structures. South of Building 316, across an unnamed tarmac road, is Manchester Airport Coach Carpark. Further south west of the site is the A538.
North West	Runger Lane is immediately adjacent to the site. Beyond this a very large hardstanding area, presumed to be a carpark, is situated alongside three large hotels which serve the airport. The M56 is immediately north west of the hotels and carpark.

3. Geological and Environmental Setting

3.1 Introduction

The environmental setting including the topography, geology, hydrogeology and hydrology are the key factors that influence the way in which contaminants in the soil or groundwater can be transported on or off site, and also the way in which contamination can affect applicable receptors including controlled waters and users of the site.

The environmental setting of the Site has been assessed by making reference to the information sources detailed in Section 1.4.

3.2 Geology and Soils

3.2.1 Published Geology & Exploratory Hole Records

The published 1:50,000 scale geological maps of the area produced by the BGS (Sheet 98, Stockport, Drift, 1971 and Sheet 98, Stockport, Solid, 1977) and the published 1:10,000 scale maps produced by the BGS (accessed via the Groundsure Report) indicates the site is underlain by the geological succession summarised in Table 3-1. Extracts of the superficial deposit and bedrock maps are included in the Groundsure Geo-Insight Report (Appendix B).

Table 3-1 Geological Succession from Published Mapping

Age	Group	Geological Stratum	Stratum	Description
Quaternary-Devensian	N/A	Diamicton Till	Superficial Deposits	A wide range of deposits and geomorphologies associated with glacial and inter-glacial periods during the Quaternary.
Triassic	Sidmouth Mudstone Formation	Bollin Mudstone Member	Bedrock	Upper: Laminated reddish-brown and greenish-grey mudstone with siltstones. Lower: structureless and laminated, reddish-brown mudstone within the lower part of the member, a unit termed the 'Lower Keuper Sandstone' has been recognised in the Stockport area. This unit closely resembles the Tarporley Siltstone Formation of adjacent areas.

Source: bgs.ac.uk (BGS Lexicon of Named Rock Units)

Although anticipated due to the developed nature of the site, no artificial deposits (man-made such as Made Ground) are recorded on the geological mapping.

The BGS maintains an archive of historical exploratory hole records throughout the UK. AECOM has searched the database and those which are publicly available and the extract below (Plate 1) shows those boreholes recorded by the BGS in close proximity to the site.

Table 3-2 presents a summary of five available¹ borehole logs from the BGS archives, with two boreholes selected from each cluster of available borehole records to the south east and west of the site (Plate 1) which have been used to provide information on the possible ground profile at the site. Full copies of these exploratory holes are included as Appendix C. Relevant information from the records is considered as part of the Preliminary Ground Model in Section 8.

¹ The black boreholes, which are closest to the site, are not publicly available. the others are available, although not all of them have online records and are located a considerable distance away from the site.

Plate 1 Screenshot of relevant exploratory hole locations from BGS GeoIndex Viewer



Source: [GeoIndex - British Geological Survey \(bgs.ac.uk\)](https://geoindex.bgs.ac.uk) (Accessed December 2021)

Table 3-2 Summary of Historical BGS Borehole Logs

Borehole	Made Ground mbgl (Thickness m)	Description summary	Superficial Deposits mbgl (Thickness m)	Descriptive summary
SJ88SW235 (BH6)	0.60 (0.60)	Soft medium brown CLAY with stones and broken tarmac.	4.00 (3.40)	Very soft becoming stiff with depth, mottled brown and grey CLAY.
SJ88SW236 (BH7)	1.20 (1.20)	Loose concrete, brick, stone, tarmac and Clay over reinforced concrete between 0.6mbgl and 0.9mbgl below which is hardcore fill.	4.00 (2.80)	Firm to stiff, dark reddish brown, slightly marly CLAY.
SJ88SW267	1.00	Bands of tarmac hardcore and clay with hardcore fill.		Tarmacadam overlying bands of hardcore and clay which in turn overlies hardcore fill.
		Stiff to hard brown sandy CLAY with occasional fine to coarse gravel	2.00 (8.20)	Stiff to very stiff sandy CLAY with occasional fine to coarse gravel becoming hard at 6.20 transitioning to SILT as indicated below.
		Medium dense brown SILT and fine grained SAND	9.20 (>1.05)	Medium dense brown SILT and fine grained SAND
SJ88NW886 (BH15)	0.10 (0.10)	Clayey, sandy SILT with many rootlets (Topsoil).	2.90 (2.80)	Stiff to very stiff, brown mottled grey CLAY. Contains some sub rounded gravel of mudstone from 2.3m depth. From 2.5m depth becomes sandy and friable.

			4.80 (1.90)	Dense orange, brown SAND with occasional gravel. Gravel includes mudstone and sandstone.
			6.15 (1.35)	Stiff to very stiff red brown very sandy CLAY with a little gravel. Gravel includes mudstone, sandstone and green siltstone.
SJ88NW1398 (TP10/06)	0.40 (0.40)	Soft red brown sandy gravelly CLAY with rootlets. Gravel angular mixed lithologies and brick.	2.00 (1.60)	Stiff red brown mottled grey slightly sandy slightly gravelly CLAY.

Note that mbgl = metres below ground level.

3.2.2 Soils and Soil Chemistry

Information obtained from Soilsdapes online mapping tool (<http://www.landis.org.uk/soilsdapes/> Accessed 13/12/2021) describes the soils within the vicinity of the site as “slowly permeable, seasonally wet, slightly acid but base-rich, loamy and clayey soils” (Soilsdapes Classification 18). These soils have impeded drainage, draining typically to stream networks, and have moderate fertility.

Natural England reports the Agricultural Land Use Classification for land in England. Information obtained from Natural England website (<http://publications.naturalengland.org.uk/publication/144015> Accessed 13/12/21) reports the Agricultural Land Use Classification to be Good to Moderate agricultural land.

Soil Chemistry datasets included within the Groundsure Report (Appendix B) provide indicative information on regional concentrations of five potentially harmful elements (PHEs): arsenic (As), cadmium (Cd), chromium (Cr), nickel (Ni) and lead (Pb) in soil.

Elevated concentrations of these PHEs can exist because of natural geological conditions or possible anthropogenic contamination. The following BGS estimated soil chemistry levels are attributed to the vicinity of the site based on the geometric mean concentrations of available data (presented in **Error! Reference source not found.**).

Table 3.3 Estimated Soil Chemistry

Potentially Harmful Element	Estimated geometric mean concentration (mg/kg)
Arsenic	15
Cadmium	1.8
Chromium	60-90
Lead	100
Bio accessible Lead	60
Nickel	15-30

3.2.3 Ground Stability Records

Table 3-4 shows the variable risk of ground stability hazards across the site, taken from the Groundsure report:

Table 3-4 Ground Stability Records

Hazard Type	Hazard Potential	Details
Collapsible Ground Stability	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present
Compressible Ground Stability	Negligible	Compressible deposits are not thought to occur.
Ground Dissolution Stability	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.
Landslide Ground Stability	Very Low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Running Sand Ground Stability	Very Low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.
Shrinking or Swelling Clay Ground Stability	Very Low	Ground conditions predominantly low plasticity.

3.2.4 Mining and Mineral Extraction

3.2.4.1 Aggregate/Mineral Quarrying and Mining

The Groundsure report presents publicly available information on mining and quarrying operations, past and present that have taken place within 250m of the site.

The Groundsure report checks databases held by The British Geological Survey, The Coal Authority, Mining Searches UK, Kaolin and Ball Clay Association (UK), Stantec UK Ltd, Johnson Poole and Bloomer, Cheshire Brine Subsidence Compensation Board and British Gypsum; as well as records of surface and ground workings identified from Ordnance Survey and Groundsure mapping.

Of those databases and mapping only twelve entries are recorded within 250m of the site, all being surface ground working records. Table 3-5 provides a summary of these records.

Table 3-5 Surface Ground Workings Within 250m of the Site

Distance and Direction from Site	Land Use	Year of Mapping	Mapping Scale
On site (Northern corner of Building 311)	Ponds	1910	1:10,560
87m West	Pond	1995	1:10,000
104m Northwest	Ponds	1910	1:10,560
104m Northwest	Ponds	1954	1:10,560
104m Northwest	Ponds	1938	1:10,560

104m Northwest	Ponds	1899	1:10,560
109m Northwest	Pond	1989	1:10,000
112m Northwest	Ponds	1975	1:10,000
112m Northwest	Ponds	1967	1:10,560
237m East	Pond	1954	1:10560
239m East	Pond	1910	1:10560
241m East	Pond	1938	1:10560

Source: Groundsure Report Ref: GS-8391786

The Groundsure data does not identify any other features within 250m of the site.

Within 250m to 500m of the site, the only features recorded relate to 'other surface ground workings'.

3.2.4.2 Instability from Salt and Brine Extraction

The Project area is located within an area defined as the Cheshire Brine Compensation District. Potential ground instability as a result of historical brine pumping is considered unlikely at the site because:

- The site is not underlain by the Northwich Halite Member (the soluble strata from which brine was formerly extracted) located approximately 2.5km south of the site; and
- The site is not located within the consultation areas for where historical brine extraction is understood to have taken place as defined by the Cheshire Brine Subsidence Compensation Board Compensation District & Consultation Areas².

3.2.4.3 Coal Mining

The GroundSure report does not include any records of past, current or future coal mining on site.

Reference to the Coal Authority Interactive Map³ indicates the following in relation to the site:

- Areas of known probable past shallow coal mine workings are not identified at the site;
- The site is not within a Coal Mining Reporting Area;
- The site is not within a High-Risk Development Area;
- There are no mine entries identified on or within 1km of the site.
- The site is within an indicated Surface Coal Resource Area;

Surface Coal Resource Areas are defined as coal resource areas capable of being extracted by surface mining methods, often referred to as 'opencast'. This information is used by Local Planning Authorities as part of the duty to safeguard minerals from unnecessary sterilisation and is derived from Coal Authority and British Geological Survey data.

It should be noted that Surface Coal Resource Area is very broad, covering the Liverpool and Greater Manchester Area, and extending as far south as Birmingham. With no surface features recorded in the site

² Available at: <http://www.cheshirebrine.com/wp-content/uploads/2018/05/Cheshire-Brine-Subsidence-Compensation-Board-Compensation-District-and-Consultation-Areas.pdf>

³ Available at: [Interactive Map Viewer | Coal Authority \(bgs.ac.uk\)](http://www.bgs.ac.uk/interactive-map-viewer/)

vicinity relating to open cast coal mining and as the site is not within a 'High Risk Development Area' for coal mining, procurement of a CON29 Consultants Coal Mining Report is not necessary and a site-specific Coal Mining Risk Assessment is not recommended at this stage. However, this would be subject to review dependent upon any future ground investigation data.

3.2.5 Radon

The Groundsure report indicates that the site is not within a radon affected area. The site is identified as having less than 1% of properties above the UK 'Action Level'. This classification identifies no specific radon protective measures are likely to be considered necessary for the proposed development.

3.3 Hydrogeology

3.3.1 Aquifer Classification

The EA's Groundwater Protection Policy adopts aquifer designations that are consistent with the Water Framework Directive. Definitions of the various aquifer types can be found on the EA section of the gov.uk website. The following classifications are taken from this system:

3.3.1.1 Superficial Aquifers

The Devensian Glacial Till is classified as a Secondary Undifferentiated Aquifer. These designations are assigned in cases where it is not viable 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.

3.3.1.2 Bedrock Aquifers

The Bollin Mudstone Member is classified as a Secondary B Aquifer. These are described as predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures. Thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

3.3.2 Groundwater Vulnerability

The EA's Groundwater Vulnerability Mapping available from the online Defra Magic Mapping (magic.defra.gov.uk) identifies the groundwater vulnerability to pollution of an area. All associated terminology/definitions can be found on the EA section of the gov.uk website.

The Magic Mapping shows the site and surrounding area to have a 'medium to low' classification for groundwater vulnerability. Although, the Groundsure Report breaks this down by aquifer and identifies both the superficial and bedrock aquifers to be of low vulnerability.

3.3.3 Source Protection Zones

In terms of identifying the risk of contamination from potential activities in a given area to groundwater sources (e.g. Wells, boreholes, and springs) used for supplying public drinking water, the EA identifies Source Protection Zones (SPZ).

The show the extent of a groundwater source catchment and are divided into three zones, definitions of which can be found on the EA section of the gov.uk website.

The mapping produced by the EA and supplied both within the Groundsure Report and the EA mapping from Magic Maps, indicate that the site is not within a SPZ.

The nearest SPZ is c.7km south east of the site. The EA mapping from Magical Maps also identifies that the site is not within a Drinking Water Safeguard Zone for either surface water or groundwater.

3.3.4 Licensed Groundwater Abstractions

No Licensed Groundwater Abstractions have been identified within 2km of the site.

According to the Local Authority, no Private Water Supplies Regulations registered abstractions are located within 500m of the site (Correspondence included in Appendix D).

3.3.5 Risk of Flooding from Groundwater

The Groundsure report identifies that the risk of flooding from groundwater both onsite and within 50m are considered 'Low' based upon a 1 in 100-year return period and a 5m Digital Terrain Model (DTM).

The low risk identified is considered to present a limited potential for groundwater flooding to occur at the site.

3.4 Hydrology

3.4.1 Surface Water Courses and Drainage

There are no ponds, streams or drainage ditches on or adjacent to the site that are open at surface. The site is however understood to be included within Manchester Airports surface water drainage and fire management systems.

The site is located within a Water Framework Directive (WFD) surface body catchment area, specifically within the catchment of Timperley Brook. The WFD catchment area for River Bollin is further south.

Numerous surface water courses are noted in the vicinity of the site:

- The nearest WFD-relevant surface watercourse / feature listed within the Groundsure report to the site is Timperley Brook located approximately 1,917m north west of the site. It is important to note that Timperley Brook is noted as being present adjacent to Pinfold Lane on the EA's WFD Catchment Data Explorer approximately 250m south east of the site and is likely culverted and indicated to issue west of Junction 5 of the M56 Motorway.
- River Bollin is located some 500m south east of the site;

Cotteril Clough Brook lies c.700m south of the site, this is understood to drain into River Bollin;

Table 3-6 summarises the pertinent surface water quality information available within the Groundsure report associated with the site.

Table 3-6 Surface Water Quality

Surface Water Feature	Distance (m)	GQA (Overall)	GQA (Chemical)	GQA (Ecological)	Upstream / Downstream of Site
Timperley Brook	1917 NW	Moderate	Fail	Moderate	Downstream

Reference to the EA's catchment data explorer has determined that the River Bollin (River Dean to Ashely Mill) and Timperley Brook both possess Moderate Ecological and Physico-chemical quality but failed Chemical Quality in 2019;

3.4.2 Licensed Surface Water Abstractions

No Licensed Surface Water Abstractions have been identified within 1km of the site

Correspondence with the Local Authority has determined that there are no private water supplies which abstract from surface waters registered under the Water Supply Regulations within 500m of the site (Appendix D).

3.4.3 Risk of Flooding from Surface Water

The indicative floodplain map for the area, published by the EA, shows that the site does not lie within a Flood Zone with respect to Flood Risk under the NPPF. Therefore, the site is not considered likely to be susceptible to flooding. However, because the site is classified as a 'Critical Drainage Area' a Flood Risk Assessment (FRA) will be required.

The Groundsure Report presents surface water flood mapping which highlights the highest risk onsite as a 1 in 30-year risk of 0.3m-1.0m flooding. The area with this designation is focussed on the west corner of the site and is likely associated with the local topography.

4. Historical & Planned Development

4.1 Historical Ordnance Survey Mapping & Aerial Photographs

Historical Ordnance Survey (OS) maps of the Site and the wider environs dating between 1877 and 2021 are provided in the Groundsure Report (1:1,250, 1:2,500, 1:10,560 and 1:10,000 scale) and these are reviewed in this section. Copies of these maps are presented within the Groundsure report included in Appendix B. Reference has also been made to historical aerial imagery available via Google Earth Pro.

Table 4.1 presents a summary of the main features present on and within approximately 250m radius of the Site boundary. AECOM notes that only indicative map scales are provided. Where dates are stated, these refer to the dates of maps on which the features are present, have changed use or are no longer annotated, and do not necessarily refer to the exact dates of existence of a particular feature. Development that may have occurred between map editions is recorded as occurring on the latter published map, hence there are some limitations to the accuracy to the date of development unless supplementary evidence is available:

Table 4.1 Summary of Historical Mapping

Date	Key Features on-site	Key Features off site (250m)
1877 (1:2,500)	- Only part of the site mapped. - Presumed agricultural land. - Trees lining a track along the northeast perimeter of the site. - Field boundary intersecting site running northeast to southwest.	- Land use is predominantly agricultural with associated field boundaries and paths/tracks. - Tanyard Farm 100m east.
1881 (1:2,500)	- Only part of site mapped. - Presumed agricultural land. - Pond encroaching onto the northern corner of the site. - Track mapped cutting through the northern corner of the site, in a northwest to southeast direction.	- Land use is predominantly agricultural with associated field boundaries and paths/tracks. - Track extends off site in the northwest direction. - A pond c. 20m northwest. 3 Ponds c.110m northwest. - A pond c. 110m southwest. - Tanyard Farm renamed to Manor Farm. - Unspecified Farm 250m southwest.
1898 (1:2,500)	- No change from previous entry. - Expect that the trees have been removed from along the track along the northeast site perimeter.	- Little change from previous entry. - Expect that the 'unspecified' farm has been named as Oak Farm. - The pond 110m southwest no longer mapped.
1899 (1:10,560)	No significant changes.	No significant changes.
1909 (1:2,500)	No significant changes.	- No significant changes. - Except the Pond 110m southwest has reappeared.
1910 (1:10,560)	No significant changes.	No significant changes.
1935 (1:2,500)	- Only maps some of the site. - No significant changes.	- Only maps some of the area. - Only change is appearance of electricity pylon c.150m northwest of site.
1938 (1:10,560)	No significant changes	No significant change, except from missing electricity pylon c.150m northwest.
1954 (1:10,560)	No significant changes.	No significant changes.
1967 (1:10,560)	No significant changes except the track along the northeast perimeter appears to be a road and named 'Yewtree Lane'.	- Only the Northern off-site area mapped. - Only changes are the removal of one of the cluster of three ponds c.110m northwest of the site and the removal of the pond c. 20m northwest of the site.
1968 (1:1,250)	No significant changes.	- No significant changes except from the erection of a VHF Receiver Station c. 130m southwest of site. - The pond c. 110m southwest of site has disappeared. - Should be noted that this map only allows a c. 180m extent around the site to be viewed.
1969 (1:2,500)	No significant changes.	No significant changes.

Date	Key Features on-site	Key Features off site (250m)
		Except appearance of pond behind Manor Farm c. 200m east.
1974 (1:1,250)	No significant changes.	- A road has appeared named Runger Lane, c. 20m northwest of the site with associated earthworks creating an embankment north of the site. - A roundabout has also appeared c. 200m southwest of the site.
1981 (1:10,000)	No significant changes.	The A538 has appeared c. 250m southwest of the site.
1987 (1:1,250)	- Significant changes from the last map. - No longer agricultural land. - Part of Manchester Airport Cargo Centre. 4 no. large buildings presumed to be warehouses and offices confined to the southeast half of the site. - Associated hard standing areas, parking areas and access roads are observed.	- Significant changes. - New roads immediately adjacent to the southwest and the southeast of the site. - Erection of new buildings, all associated with the Manchester Airport Cargo Centre. 3 no. very large buildings have been erected to the southeast of the site. 2 no. of these contain many individual units. - The buildings are interpreted as offices/ warehouses for the purposes of logistics and distribution, along with airline services (cargo). - Parking areas, hard standing areas (loading bays) and access roads associated with the Cargo Centre are present southeast of the site. - The two ponds c.110m northwest of site have now merged into one and increased in size. - Two ponds have appeared c. 130m southwest of the site, close to the wireless Station (Formerly Receiver Station). - Should be noted, due to the scale of this map, only a range of about 200m from site can be observed. - Manor Farm is gone to make way for the Cargo Centre and Manchester Airport Terminal/ runway. - New tank (present day firewater tank) and electrical substation c. 80m southeast of site.
1990 (1:10,000)	No significant change.	- Manchester Airport apron is around 250m east of the site. - Otherwise, no changes.
1992 (1:1,250)	- Large structure assumed to be a warehouse added to the northern half of the site. - With the addition of this large structure, the pond which has been present in the north corner of the site for over century is no longer shown and has been infilled presumably. - Extension of a building in the southeast area of the site, unit added. - The road previously located along the perimeter of the site (Yewtree Lane) is no longer present.	- Large structure assumed to be a warehouse for distribution and haulage of cargo erected c.20m northeast of the site. 2 no. Tanks erected c. 20m north of the site (Present day firewater tanks). - Electrical substation c. 150m north of site. - Footpaths and cycle lanes added to Runger Lane.
1995 (1:1,250)	- Large warehouse in north of site split into many units, - Unit added to other large structure in the southeast area of site. - Hard standing carpark now appears to extend across majority of the west portion of the site. - Main access road appears to allow access to the above car park and the units in the east portion of the site.	New large structure c. 100m south of site, assumed to be a warehouse and associated features.
1995 (1:10,000)	No significant change, except the access road on site has been identified as Argosy Drive.	No significant change, except the roads around the site have been named; Avro Way (West), York Drive (East) and Viscount Drive (South).
2001 (1:10,000)	No significant change.	The wireless station and associated ponds have been removed southwest of the site.

Date	Key Features on-site	Key Features off site (250m)
		Development of the area where the wireless station used to be has begun. With five warehouse structure built here, to the southwest of the site.
2003 (1:1,250)	No significant change.	No significant change.
2010 (1:10,000)	No significant changes.	- Further development to the area southwest of the site - Buildings thought to be hotels associated with the Airport erected c. 150m west of the site.
2021 (1:10,000)	No significant changes.	- The land beyond the A538 has been developed and thus Oak Farm has been removed. - The large pond c.110m north from the site is no longer shown and has been presumed infilled and a large carpark has been built along with associated access road. - Another structure has been built to the northwest of the site, which is a hotel.
Ariel Photography 2000 to 2021	No notable difference from mapping.	No notable difference from mapping.

4.2 Records from Manchester Airport

AECOM reviewed Manchester Airport Group's history on 15th December 2021 via their 'Our History' page on their website (<https://www.manchesterairport.co.uk/about-us/manchester-airport-and-mag/history/>). A summary of findings that may relate to the Argosy Way site are summarised in Table 4-2 below.

Table 4-2 Manchester Airport "Our History" Records

Date	Details of Development
1935	Building of Ringway Airport, now known as Manchester Airport
1938	Ringway Airport opens
1939-1945	Ringway Airport becomes an engineering hub for military aircraft in WW2. Troops trained on the site.
1969	Runway extended to 2,745m.
1986	World Freight Terminal opens.

Source: <https://www.manchesterairport.co.uk/about-us/manchester-airport-and-mag/history/>

4.3 Unexploded Ordnance Risk

A UXO Pre-Desk Study Assessment has been obtained from Zetica Ltd. It is summarised as Table 4-3.

Table 4-3 Zetica Ltd UXO Pre-Desk Study Assessment

Category	Description
Pre-WWI Military Activity on or Affecting the Site	None identified.
WWI Military Activity on or Affecting the Site	None identified.
WWI Strategic Targets (within 5km of Site)	The following strategic targets were located in the vicinity of the Site: Transport infrastructure and public utilities.
WWI Bombing	None identified on the Site.
Interwar Military Activity on or Affecting the Site	None identified.
WWII Military Activity on or Affecting the Site	None identified on the Site. In 1939, Ringway Airfield, approximately 0.3km southeast of the Site, was requisitioned by the Royal Air Force (RAF). It operated as the base for No. 1 Parachute Training School RAF.

	Fairey Aviation undertook bomber aircraft assembly in hangars on the northwest of the airfield, approximately 0.6km southeast of the Site. No readily available records have been found to indicate that RAF Ringway or any associated activities extended onto the Site.
WWII Strategic Targets (within 5km of Site)	The following strategic targets were located in the vicinity of the Site: RAF Ringway. Transport infrastructure and public utilities. Industries important to the war effort, including aircraft assembly works. Military camps and training areas. Anti-Aircraft (AA) and anti-invasion defences.
WWII Bombing Decoys (within 5km of Site)	None.
WWII Bombing	During WWII the Site was located in the Rural District (RD) of Bucklow, which officially recorded 258 No. High Explosive (HE) bombs with a bombing density of 5.6 bombs per 405 hectares (ha). No readily available records have been found to indicate that the Site was bombed.
Post-WWII Military Activity on or Affecting the Site	None identified on the Site. Post-WWII RAF Ringway remained operational until 1957, when it reverted to civilian use as Manchester Airport. By 2000, facilities associated with Manchester Airport had been established on the Site.
Recommendation	A detailed desk study, whilst always prudent, is not considered essential in this instance.

5. Review of Historical Reports

5.1 Project Quantum Site Assessment (February 2019)

The overall objective of Project Quantum was to produce holistic executive summary reports for assets of the airport site. For each asset an asset fact file based upon a site walkover and workshop with MAG staff as well as publicly available data was produced.

Four Project Quantum reports have been found to be relevant to the Argosy Way Development site. These reports are written for the four buildings on the site; B311, B304, B303 and B305. These buildings are referred to in the Project Quantum Reports as; 'MAN-11', 'MAN-12', 'MAN-13' and 'MAN-14' respectively.

5.1.1 Project Quantum MAN-11

This report relates to Building 311 (Hereafter termed the 'Asset') in the northwest corner of the site. It should be noted that units 3 to 9 could not be accessed during the asset walkover, therefore, the contents and storage conditions were unknown.

The report reaffirms the assets current use as a warehouse and office space, noting that within a 500m buffer of the site commercial and industrial facilities associated with airport operation containing storage tanks and other hazardous storage is present.

At the time of this report (February 2019) the offices of units 3-9 were vacant and the associated warehouse facilities closed. According to information provided by the 'Site Workshop' at the time, the air freight warehouses act as a feeder unit to the main freight transfer building to the northeast, and the majority of storage relates to aircraft supplies e.g. pillows, headphones etc.

A viable risk identified in the report was the migration of gases through Made Ground (if present) and superficial deposits, both vertically and laterally. Although no basements were identified on site.

The report suggests that several issues with contamination and pollution are potentially present within a 500m buffer zone of the site, including a COMAH recorded site, pollution incidents and discharge consents. Although, these are not thought to impact the site.

Though no artificial ground has been mapped on the site, the report suggests it is probable associated with the development of the site. This could act as both a source and pathway for pollutants.

Air-conditioning units were found on site.

Manchester City Council was contacted for the purposes of this report in December 2018. They were unaware of any private water supplies within 1km of the asset at the time of replying. Additionally, the EA were contacted in January 2019 and replied with no records of surface water abstractions within 1km of the asset (abstracting >20 cubic metres a day).

The report includes a preliminary risk assessment chiefly comprising a tabulated preliminary conceptual model (CM) and risk assessment. The findings of this risk assessment identified the site to be of 'Low Risk'.

No geotechnical or environmental chemical data is included within the report. As such, no further comment can be made upon the chemical or geotechnical characteristics of the strata.

5.1.2 Project Quantum MAN-12

This report relates to Building 304 (Hereafter termed the 'Asset') in the east of the site. The Asset's current use at the time of writing the report was industrial, incorporating a sewage pumping station control unit. It should be noted that access to the building could not be gained during the site walkover.

Many of the 'off-site' risks mentioned in the MAN-11 for Building 311 will be the same for Building 304 due to the asset's proximity to each other.

The report includes a preliminary risk assessment chiefly comprising a tabulated preliminary conceptual model (CM) and risk assessment. The findings of this risk assessment identified the site to be of 'Low' Risk. Although, not having access to the building to check the sewage pumping system was a large limitation to this work.

No geotechnical or environmental chemical data is included within the report. As such, no further comment can be made upon the chemical or geotechnical characteristics of the strata.

5.1.3 Project Quantum MAN-13

This report relates to Building 303 in the southeast of the site. The report reaffirms the building's use as a warehouse and office facility.

Artificial Made Ground could be present on site and be a source of contamination, along with oil tanks 90m away from the asset.

Many of the 'off-site' risks mentioned in the MAN-11 for Building 311 will be the same for Building 303 due to the asset's proximity to each other.

As with the MAN-11 report, Manchester City Council is unaware of any private water supplies within 1km of the asset at the time of asking (05/12/18). Similarly, the EA reported no records of surface water abstractions (>20 cubic metres per day) within 1km of the asset, reporting this on 08/01/19.

The report includes a preliminary risk assessment chiefly comprising a tabulated preliminary conceptual model (CM) and risk assessment. The findings of this risk assessment identified the site to be of 'Low' Risk.

No geotechnical or environmental chemical data is included within the report. As such, no further comment can be made upon the chemical or geotechnical characteristics of the strata.

5.1.4 Project Quantum MAN-14

This report relates to Building 305 in the southwest of the site. Building 305 was being used as an office building at the time of the site walkover.

As with the other reports discussed previously, the features 'off-site' within the 500m buffer will broadly be the same in this report. Again, Made Ground is thought to be present, although not mapped.

At the time of the site walkover, the asset was disused. The site is slightly sunken with shallow slopes down to the building. A generator/ compressor was found on the eastern side of the building.

Manchester City Council were contacted again regarding this asset and a response dated 5th December 2018 found no private water supplies within 1km of the asset. The EA were also contacted, and a response received on 8th January 2019 did not provide any records of surface water abstraction within 1km of the asset.

The report includes a preliminary risk assessment chiefly comprising a tabulated preliminary conceptual model (CM) and risk assessment. The findings of this risk assessment identified the site to be of 'Low' Risk.

No geotechnical or environmental chemical data is included within the report. As such, no further comment can be made upon the chemical or geotechnical characteristics of the strata.

6. Regulated Activities and Statutory Consultation

6.1 Introduction

The key relevant features that characterise the site and surrounding area are summarised in this section, along with an indication of the risk to the land quality of the site.

Information on groundwater and surface water abstractions is detailed in Section 3.3.4 and 3.4.2 and is not repeated here.

Generally, any regulated activities within 250m of the site could, depending upon their nature, represent potential off-site sources of contamination. Whilst a 500m search area was generally adopted this section places emphasis on those activities present within 250m.

6.2 Regulated Processes

Table 6-1 summarises information on regulated processes contained in the Groundsure report (Appendix B). The report collates data from a variety of sources including the EA and the BGS. All data suppliers are referenced in the report.

The Groundsure Report also contained absence of records of the following items within 500m of the site: Contaminated Land Register Entries and Notices, Historical licensed industrial activities (IPC), Licensed Industrial activities (Part A(1)) Pollutant release to Surface Waters (Red List), Pollutant release to public sewer, Pollution incidents (EA / NWR), Pollution inventory substances, Pollution inventory waste transfers, Regulated Explosive Sites, Radioactive Substance Authorisations, Pollution inventory radioactive waste, List 1 Dangerous Substances and List 2 Dangerous Substances.

Table 6-1 Summary of Regulatory Information Within the Groundsure Report

Subject	Distance			Details
	On site	0-250m	250-500m	
Licensed discharge to controlled waters	0	2	6	4 No. of the 8 No. licences are potentially active. Of those potentially active: 2 No. relate to the Manchester Airport site drainage and containment system- Trade Discharge- site drainage to River Bollin. 2 No. relate to Man-TP, unit 307, York Drive, Manchester Airport – Trade Discharges – Process Effluent (Not water company) - discharge to Timperley Brook. Those revoked are mostly Manchester Airport drainage and aircraft stand drainage.
Licensed pollutant release (Part A(2)/B)	0	0	3	280m E and 450m N 370m SE 440m W 495m SE Fls Aerospace Ltd – Respraying of road vehicles. (Historic) Nnq, Hale Road – Other mineral processes. (Historic) Airline Services Ltd – Dry cleaning. (Historic)
Control of Major Accident Hazard Sites (COMAH)	0	0	1	345m SE Air BP Ltd, Manchester Airport, Pinfold Lane current COMAH site – COMAH Lower Tier Operator
Hazardous substance storage/ usage	0	0	3	356m SE 404m SE Shell UK Ltd – Hazardous Substance Consent for Storage of Aviation AVAGS 2 entries: Air BP Ltd – Storage of Jet fuel A1

Source: Groundsure Report

6.3 Licensed Waste Management Facilities

The Groundsure report provides details of waste facilities within 500m of the site based upon data from the EA, BGS, OS / Groundsure records and mapping, and Local Authority records.

With reference to the above data, the Groundsure report identified no recorded licensed waste management facilities or landfilling operations, past and present, within 500m of the site.

However, the report does identify 10 No. waste exemptions; 'Activities involving the storage, treatment, use or disposal of waste that are exempt from requiring a permit'. Table 6-2 below details these waste exemptions.

Table 6-2. Waste exemptions (<500m of Site)

Distance and Direction	Site	Category	Details
113m S	BAM Construction, Pinfold Lane	Using waste exemption	Use of waste in construction
321m SW	Hale Depot. M56, Junction 6, Wilmslow Road Roundabout	Treating waste exemption	Treatment of waste aerosol cans
321m SW	Hale Motorway Maintenance Compound, Wilmslow Road Roundabout	Storing waste exemption	Storage of waste in secure containers
321m SW	Hale Motorway Maintenance Compound, Wilmslow Road Roundabout	Storing waste exemption	Storage of waste in a secure place
355m W	Marriot Hotel, Hale Road,	Disposing of waste exemption	Deposit of waste from dredging of inland waters
379m SE	Hanger 3 Fuelling Farm Olympic House	Using waste exemption	Use of waste in construction
379m SE	Materials Innovation Factory, University of Liverpool	Treating waste exemption	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
379m SE	Materials Innovation Factory, University of Liverpool	Using waste exemption	Use of waste in construction
426m SE	Manchester Airport, Pinfold Lane	Using waste exemption	Use of waste in construction
452m SW	MAG DHL Warehouse Sunbank Lane	Using waste exemption	Use of waste in construction

6.4 Industrial Land Use

The Groundsure Report collates data on potentially contaminative active and inactive industrial land uses, tanks, fuel station entries, points of interest, gas pipelines and underground electrical cables within 500m of the site, that may have the potential to have caused contamination.

Various active and inactive entries for these land uses have been identified on or within the vicinity of the site. Table 6-3 summarises those entries that may have the potential to have caused contaminated within a search radius of 250m of the site.

Table 6-3 Potentially Contaminative Industrial Land Use on and Within 250 m of the Site

Subject	Location	Details
Historic Industrial Land Uses	On Site	Airport – 3no. entries: 1989,1995
	Off-Site	18m S Airport, 1989
		121m SW Wireless station, 1989
		222m E Airport, 1967
		222m E Airport, 1975
Historical Tanks	On Site	N/A
	Off-Site	11m NE Tanks, 1995
		12m NE Tanks, 1990
		12m NE Tanks, 1991
		70m SE Unspecified Tank, 1987
Recent Industrial Land Uses	On Site	Trilogy Freight – Distribution and Haulage
		S O S Air Cargo Ltd – Distribution and Haulage
		Blacksmith Freight Services – Distribution and Haulage
		A F I – Airline and Airline Services
		Fedex Trade Networks – Airlines and Airline Services
	Off-Site	Trilogy Freight – Distribution and Haulage
		Advantage Worldwide UK Ltd – Distribution and Haulage
		R J J Freight – Distribution and Haulage
		Airbridge International – Distribution and Haulage
		17m NE Tank – Tanks (Generic)
		29m SE Future Forwarding – Distribution and Haulage
		29m SE Puma Cargo – Distribution and Haulage
		29m SE A I T Worldwide Logistics Ltd – Airline and Airline Services
		29m SE C B I Global Freight Management – Distribution and Haulage
		29m SE Maurice Ward Group – Distribution and Haulage
		30m SE Evolution Logistics – Distribution and Haulage
		30m SE E M S Cargo Ltd – Distribution and Haulage
		30m SE Atlantic Pacific Global Logistics – Distribution and Haulage
		30m SE Air Sea Worldwide – Airlines and Airline Services
		30m SE R and M Developments Ltd – Civil Engineers
		30m SE A Z Freight Services – Airlines and Airlines Services
		37m SW Freightair Services – Airlines and Airlines Services
		37m SW Heritage International Freight – Distribution and Haulage
		55m SE Vantec World Transport Manchester – Distribution and Haulage
		63m NE Network Airline Services – Airlines and Airline Services
		63m NE Dnata – Distribution and Haulage
		69m SE Tank – Tanks (Generic)
		74m SE Electricity Substation – Electrical Features
		86m SE N N R Global Logistics – Distribution and Haulage
		87m SE Davies Turner Plc – Distribution and Haulage
		87m SE T Q Express – Airlines and Airline Services
		87m SE Warne Heating Ltd – Industrial Repairs and Servicing
		89m SE Select Euro Transport – Distribution and Haulage
		98m SE Air Canada – Distribution and Haulage
		102m SW Tranzfast Logistica UK Ltd – Airlines and Airline services
		102m SW Red Head International – Distribution and Haulage
		102m SW D B Schenker – Distribution and Haulage
		103m SW Alpha LSG – Aeroplanes

Subject	Location	Details
		104m S Alpha LSG – Aeroplanes 110m SW Tank – Tanks (Generic) 138m SW Manchester Airport – Airports and Landing Strips 174m SE Air Liaison – Airlines and Airline Services 174m SE Singapore Airlines Cargo – Distribution and Haulage 174m SE Omni Airline Services – Distribution and Haulage 174m SE Globe Air Cargo – Airline and Airlines Services 174m SE Dunwoody Airline – Distribution and Haulage 174m SE Airline Cargo Management Ltd – Airline and Airlines Services 174m SW Air Menzies International – Distribution and Haulage 174m SW Mapcargo – Distribution and Haulage 179m S Electricity Sub Station – Electrical Features 218m E Electricity Sub Station – Electrical Features
Historical Energy Features	On Site	N/A
	Off-Site	69m SE Electricity Substation, 1987-1991 70m SE Electricity Substation, 1995 130m NE Electricity Substation, 1990 202m S Electricity Substation, 1987 215m E Electricity Substation, 1987 216m E Electricity Substation, 1992
	On Site	N/A
	Off-Site	N/A
	On Site	N/A
	Off-Site	N/A
Gas Pipelines	On Site	N/A
	Off-Site	N/A
Underground Electrical Cables	On Site	N/A
	Off-Site	N/A

6.5 Sensitive Land Uses

The Groundsure Report and Defra Magic Mapping identify adjacent sensitive land uses based upon factors such as Sites of Special Scientific Interest (SSSI), Environmentally Sensitive Areas, Areas of Outstanding Natural Beauty, World Heritage sites, Nature Reserves, National Parks, Nitrate Sensitivity Areas/Vulnerability Zones, and Special Protection Areas.

The Groundsure Sensitive Land Use Map and Magic Maps indicate that the site is not within an area of sensitive land use. However, the site is located within the area of three SSSI impact risk zones.

The nearest SSSI for which the site is in the impact risk zone is Cotteril Clough 662m South of the site.

The impact risk zone is described in the GroundSure report as being 'Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts'. No specific impacts are ascribed to Cotteril Clough.

The impact risk zone is large and encompasses the wider airport area and beyond. Due to the developed nature of this area and as the site is located within the airport and captured within the regional surface water drainage system drainage system it is unlikely that there is notable potential for the proposed development to impact upon the SSSI of Cotteril Clough beyond that of the surrounding infrastructure.

No nitrate sensitive areas or nitrate vulnerable zones are located within 2km of the study site.

6.6 Regulatory Consultation

Correspondence has been sent to the EA and Local Authority (Manchester City Council) to obtain information related to Land Contamination for the site.

Manchester City Council's Environmental Protect Department responded that:

- There are no known contamination issues at or adjacent to the site;

- There are no sites determined to be statutory contaminated land within 250m of the site;
- There are no statutory notices in force within 100m of the site; and
- There are no Private Water Supplies Regulations registered abstractions within 500m of the site.

The EA Responded that:

- They do not hold any records of land contamination for the site;
- They have no information to provide under the Waste Management Regulations;
- They have no information with regards to the site and prosecutions under the control of Water Resources Act;
- They hold no information with regards to the site with respect to the Integrated Pollution Prevention Control directive or The Ionising Radiations Regulations;
- There is no record held of any EA licensed abstraction point within 1km radius of this site. They do not have a comprehensive record of Private Water Supplies, of the records the EA hold there are none are showing within 250m of this site;
- The site is not within 250m of another site classified as Contaminated Land under Part II of the Environmental Protection Act, nor is it classified as Contaminated Land;
- There are no known landfills within 250m of the site; and
- They have no information to provide with respect to enforcement notices with respect to nuisance issues.

Correspondence with regulators is included as Appendix D.

7. Site Reconnaissance

An external inspection of the site was completed by a suitably qualified and experienced AECOM Engineer on 22nd December 2021. The aim of the visit was to identify the range of activities carried out on the site and any obvious potential sources of ground contamination or geotechnical issues.

Figure 3 identifies the principal observations made during the visit and a summary is provided below.

- The site is predominantly level with a shallow dip in topography from east to west. A minor bund was located to the north of the site adjacent to Runger Lane. It is assumed that this material was likely deposited from the construction of Runger Lane although its exact origins are unknown;
- A monitoring well was noted within the grass located west of the site at the location marked on Figure 3;
- Hardstanding across the site generally appeared in good condition with little cracking or deterioration;
- Building B305 was vacant and possesses a small exterior plant compound to the north east of the building;
- Buildings B303, B304 and B311 are currently occupied. They all appeared to be used for commercial storage or logistics. B304 contains a sewage pumping station control panel. Associated sewer infrastructure is located east of the building adjacent to York Drive;
- Palletised storage of generic goods was noted east of buildings B303, B304 and B311. These appeared mostly non-hazardous in nature. 20 No. palletised drums of Fluronox® (a specialised grease) were noted as being present on hardstanding east of B311;
- A waste management area for general waste, recycling and storage of LPG canisters for forklifts was located north east of B311 and appeared generally well managed;
- The vicinity of the site was commercial and apparently dedicated to logistics. No major bulk chemical or fuel storage was noted in the immediate vicinity of the site; and
- Firewater tanks were noted as being adjacent to Building B309 north east of the site beyond York Drive.

A photographic record of the visit is included as Appendix F.

8. Preliminary Ground Model

Based on the review of published geological and hydrogeological information (provided in Section 3.2) and a selection of off-site historical borehole records, the ground conditions within the site are considered to comprise the following sequence presented in Table 8-1.

Table 8-1 Preliminary Ground Model

Geology			Groundwater	
8.1.1.1	Stratum	8.1.1.2 Typical Description	8.1.1.3 Anticipated Thickness (m)	
Made Ground		Typically, cohesive material (CLAY). Contains anthropogenic fragments of various types (Brick, Tarmac, concrete). Some lithic fragments found. Reinforced concrete underlain by hardcore fill found in one BH off-site.	c.0.0-1.5m outside site area. (Could be thicker where the pond has been infilled to the north of B311).	Potential for perched groundwater within more granular Made Ground.
Superficial Strata (Diamicton Till)		Typically, firm to stiff (locally very soft) red, brown, grey mottled CLAY. Increasing in stiffness with depth. Dense SAND and GRAVEL encountered at c.4m bgl.	Unproven. Although has been found as thick as 6.0m outside the site area.	Likely to contain a groundwater table, although no groundwater readings/ strikes have been reported on-site.
Bedrock (Bollin Mudstone Formation)		Mudstone.	Unproven.	No groundwater information obtained for the site.

It should be noted that no borehole records are available within the site area and only a few have records available within 250m of the site. Therefore, the anticipated geology in Table 8-1 should not be relied upon for design purposes and should be used only with caution. Table 8.1 should be used only as a guide to inform potential ground risks on site at this early stage. Ground investigation specific to the site will need to be undertaken prior to design.

No intrusive investigation or groundwater monitoring has been undertaken on-site and, therefore, no information on groundwater levels has been obtained. It is anticipated that perched water in the Made Ground is likely to be present, especially as perched water was encountered during historical investigations south of the site within the same strata.

8.2 Preliminary Gas Risk Assessment

Due to the sites history which includes potential infilling of ponds, import of materials, demolition and redevelopment, it is probable that Made Ground will be present on site of potentially significant thickness. No landfills have been identified within 250m.

Based on the ground conditions identified it is anticipated that the potential for significant gas generation is likely to be low although ground gas could still be encountered. See Section 14 for recommendations.

9. Initial Conceptual Site Model

9.1 Introduction

This section is aimed at identifying possible risks arising from substances used or deposited on-site, or from other sources of land contamination via production of an initial Conceptual Site Model. Both past and current potentially contaminative land uses have been considered. It is based on the proposed site redevelopment which will comprise commercial warehousing with associated hardstanding and soft landscaping as identified in Section 1.1.

9.2 Assessment Framework

The Site, in terms of potential land contamination, will be regulated by the Local Authority (Manchester City Council) under the Town and Country Planning Act 1990 (as amended), taking account of the National Planning Policy Framework 2019, with the EA, Natural England and English Heritage acting as potential statutory consultees.

Environmental liabilities can arise through provisions contained within statutory legislation including Part 2A of the EPA 1990, the Environmental Damage (Prevention and Remediation) Regulations 2009, the Water Resources Act 1991, the Groundwater Regulations 2009 and the Water Act 2003.

Current best practice recommends that the determination of health hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Statutory Guidance to Part 2A (2012) and Land Contamination: Risk Management (LCRM).

The “suitable for use” approach is adopted for the assessment of contaminated land where remedial measures are undertaken where unacceptable risks to human health or the environment are realised taking into account the use (or proposed use) of the land in question and the environmental setting.

The risk assessment process for environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- **Source:** hazardous substance that has the potential to cause adverse impacts; and
- **Pathway:** route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- **Receptor:** target that may be affected by contamination: examples include human occupants/ users of site, water resources (surface waters or groundwater), or structures.

For a risk to be present, there must be a relevant/ viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

The following sections details the iCSM which has been developed for the Site with a view to assessing the potential risks / liabilities and constraints associated with the Site in its current condition prior to any proposed redevelopment. Risks associated with the proposed redevelopment have also been assessed in Section 10 based on a “commercial/industrial” future land use scenario, including any potential sources of contamination, potential receptors and potential contaminant pathways identified during this desk based assessment.

9.3 Sources of Potential Contamination

9.3.1 ON-SITE

The Historical mapping and aerial photography show that the site was initially open farmland. By 1987 (between 1981 and 1987) the site was occupied by office/ warehouse buildings associated with the Manchester Airport Cargo Centre and associated hardstanding areas such as parking and access roads. By 1992 (between 1990 and 1992) a large structure presumed to be a warehouse was added to the northern half of the site, along with the assumed infilling of the pond in the north of the site with unknown material. By 1995 the current buildings and hardstanding area associated with the Manchester Airport Cargo Centre were erected. 4 No. buildings are now present on site, each with several individual units with different companies operating from them. The majority of buildings on site comprise offices and warehouse space with associated loading bays, used for logistics and distribution, and airline services.. It is understood that some buildings on site may be derelict and some have been found to contain air-conditioning units.

Based on the above the following potential sources of contamination could be encountered at the proposed development site:

- Previous agricultural land use may have incorporated the use of pesticides and insecticides.
- Contaminated Made Ground and shallow natural soils from previous demolition, construction and redevelopment of the site to its present day use;
- Made Ground / unknown fill material associated with infilled pond in northeast of site.
- Contamination from buildings as a result of operation of their associated plant, e.g. air conditioning, refrigeration, generators etc.
- Spillages or leaks of contaminants during the sites operation as a logistics unit from handled materials.
- HGVs associated with the loading bays of the site, and indeed other vehicles using hardstanding areas, could have spilled oil, petroleum or diesel.

9.3.2 OFF-SITE

A review of the site history notes the infilling of ponds associated with farmland to facilitate the development. Thereafter the site functioned as a logistics and distribution hub through various building configurations before becoming the present day site under the same broad use. There may have been leaks and spillages of materials being stored or transferred during its operation. There are also several electrical substations within the vicinity of the site which may be localised sources of PCBs which may have gone to ground during their operation. The airport originates from the 1930s and early infrastructure was located at a significant distance (750m southeast) so it is considered unlikely to interact with the site for the most part. Of note however is the presence of the present day airport's aviation fuel and distribution unit located approximately 300m east of the site.

Based on the above the following potential sources of contamination could be encountered at the proposed development site:

- Migration of contaminants within groundwater from leaks and spillages which may have occurred during the operation of the logistics park and associated infrastructure;
- Migration of aviation fuel from the aviation fuel storage facility 300m to the east of the site.
- Migration of ground gas from historical infilling in the vicinity of the site;

9.4 Summary of potential sources

With reference to the DoE Industry Profiles for Airports, Table 9-1 indicates the potential contaminants that could be associated with the current land use.

Table 9-1 Potential Sources of Contamination

Source Reference	Location	Potential Sources	Associated Contaminants of Potential Concern (CoPC)
S1	On Site	Made Ground & contaminated natural soils associated with historical development and operation as a logistics units with office buildings.	General: Heavy metals, Petroleum Hydrocarbons (TPH), Semi-volatile Organic Compounds (SVOCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), phenols, sulphate, ammoniacal nitrogen, asbestos, asbestos containing materials (ACMs). Refrigeration and air-con: Organics, solvents, hydrocarbons. Ground gases including carbon dioxide and methane.
S2	Off Site	Contaminated groundwater associated with spills/leaks from operation of the logistics park.	Heavy metals, PAH, TPH, SVOCs, VOCs
S3	Off Site	Contaminated groundwater associated with spills/leaks from	Heavy metals, PAH, TPH (including aviation kerosene and gasoline, gas oil and diesel) SVOCs, VOCs, acids, alkalis, glycols (e.g.

		operation of the airport aviation fuel storage and distribution facility	Antifreeze and de-icing agents), organic solvents, fire-fighting agents, washing agents, cleaners and lubricants, solvents (e.g. paints and thinners), Phosphoric acid, corrosion inhibitors, PCBs, and ACMs. Ground gases including carbon dioxide and methane.
S4	Off site	Ground gas associated with historical infilling and construction to support development in the vicinity of the site.	Ground gas

9.5 Potential Receptors

9.5.1 On-Site Receptors

Human Health

- Future construction and maintenance workers⁴
- Future site visitors
- Future site users (commercial);
- Existing site users and visitors (commercial)

Water Environment

- Shallow aquifer within the superficial Glacial Till deposits is classified as a Secondary Undifferentiated Aquifer.
- The deep aquifer within the Bollin Mudstone Member is classified as a Secondary B aquifer.

Buildings & Infrastructure

- Concrete foundations
- Building structures
- Underground services
- Gas / damp membranes

Ecosystems

Flora - Plants, trees and landscaping

9.5.2 Off-Site Receptors

Human Health

- Adjacent site users (commercial)

Water Environment

- The shallow aquifer within the superficial Glacial Till deposits is classified as a Secondary Undifferentiated aquifer.
- The deep aquifer within the Bollin Mudstone Member is classified as a Secondary B aquifer.
- The nearest surface water features to the site. /

⁴ This report and the preliminary risk assessment included does not consider acute linkages for construction and maintenance workers. AECOM anticipates that these acute linkages will be managed by appropriate health and safety measures.

9.5.3 Summary of Potential Receptors

Potential receptors associated with the potential development are shown in Table 9-2

Table 9-2 Potential Receptors

Receptor Reference	Receptor	Description
R1	Human Health: Chronic	Future site users - Workers at the site
R2	Human Health: Acute	Future site users - Site visitors
R3	Human Health: - Chronic	Adjacent site users – workers and footpath users (During construction phase)
R4	Water Environment: Superficial Aquifer	Secondary Undifferentiated Aquifer in the Superficial Glacial Till
R5	Water Environment: Bedrock Aquifer	Secondary B Aquifer in the Bollin Mudstone Member
R6	Water Environment: Surface waters	Timperly Brook (assumed culverted) c. 250m east of the site River Bollin c.500m south of the site Cotteril Clough c.700m south of the site.
R7	Ecosystems: Flora	Plants, trees and landscaping
R8	Buildings & Infrastructure: Concrete	Future proposed foundations and services at the site may be impacted by contamination in the ground. Concrete foundations can be corroded if perched groundwaters or leachates have high sulphate levels.
R9	Buildings & Infrastructure: Structures	Proposed structures may be impacted by accumulations of ground gases.
R10	Buildings & Infrastructure: Services	Potable water supply pipes and other service may be impacted by contamination in the ground. Toxic and corrosive contaminants can migrate through water supply pipes
R11	Buildings & Infrastructure: Gas / damp membranes	Potential for hydrocarbons in soils and groundwaters may deteriorate membranes.

9.6 Potential Pathways

9.6.1 On-Site Pathways

On-site pathways include direct contact, ingestion and dermal absorption of soil and inhalation of soil particles and soil vapour derived from soils, spillage / loss and run off from surface of site, leaching of chemicals and vertical migration via permeable unsaturated strata to shallow groundwater, lateral migration of impacted shallow groundwater to surface water features off-site, vertical migration of shallow impacted groundwater to deeper groundwater, direct contact of buried concrete, services and pipes with contaminated soils and the migration of hazardous gases and chemicals via permeable strata.

9.6.2 Off-Site Pathways

Off-site pathways include migration and leaching of hazardous gases and chemicals via permeable unsaturated strata, contact with shallow impacted groundwater travelling horizontally offsite, migration of CoPC via underground drainage/ sewers (including granular backfilling materials) and spillage/loss/runoff via on land rivers.

9.6.3 Summary of Potential Pathways

Potential pathways associated with the proposed development are shown in Table 9-3

Table 9-3 Potential Pathways

Pathway Reference	Receptor	Description
P1	Human Health	Direct Pathway: Direct contact, dermal absorption or ingestion of soil.
P2	Human Health	Indirect Pathway: Inhalation of soil particulates derived from soils.
P3	Human Health	Indirect Pathway: Inhalation of soil vapour derived from soils or groundwater
P4	Human Health	Indirect Pathway: Migration of hazardous gases / vapours via permeable strata into confined spaces (asphyxiation / explosion)
P5	Water Environment: Groundwater	Indirect Pathway: Leaching of chemicals and vertical / lateral migration via permeable unsaturated strata to shallow and/ or deep groundwater.
P6	Water Environment: Groundwater	Indirect Pathway: Vertical migration of impacted shallow groundwater to the deeper Secondary B aquifer.
P7	Water Environment: Groundwater/ surface water	Indirect Pathway: Lateral migration of impacted groundwater to off-site surface water.
P8	Water Environment: Surface water	Indirect pathway: Migration via underground drainage / sewers (including granular backfilling materials), spillage / loss / run-off from the surface direct to receiving water.
P9	Buildings & Infrastructure: Concrete	Direct Pathway: Direct contact of buried concrete with contaminated soils (i.e. hydrocarbons) and aggressive ground conditions (pH and sulphate).
P10	Buildings & Infrastructure: Supply pipes	Direct Pathway: Direct contact of services and supply pipes with contaminated soils.
P11	Buildings & Infrastructure: Structures	Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches
P12	Buildings & Infrastructure: Gas/ damp membranes	Indirect Pathway: Potential for hydrocarbons in soils and ground waters may deteriorate membranes.
P13	Ecosystems: Flora	Direct pathway: Direct contact with contaminated soils.

10. Preliminary Contaminated Land Risk Assessment

10.1 Risk Assessment Principles

Current best practice recommends that the determination of hazards due to contaminated land is based on the principle of risk assessment, as outlined in the EA guidance on LCRM.

For a risk to be present, there must be a viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

Assessments of risks associated with each of these contaminant linkages are discussed in the following sections.

Using criteria broadly based on those presented in the National House Building Council/Environment Agency / Chartered Institute of Environmental Health publication R&D 66 (NHBC/EA/CIEH, 2008), the magnitude of the risk associated with potential contamination at the Site has been assessed. To do this an estimate is made of:

- The magnitude of the potential consequence (i.e. severity);
- The magnitude of probability (i.e. likelihood).

The severity of the risk is classified according to the criteria in Table 10-1.

10.2 Risk Assessment Framework

Table 10-1 Description of Severity of Risk

Term	Description
Severe	– Highly elevated concentrations likely to result in significant harm to human health. – Catastrophic damage to human health, crops, buildings or property (e.g. by explosion / asphyxiation) for sites with high gassing potential. – Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects of water quality. – Major damage to aquatic or other ecosystems.
Medium	– Elevated concentrations which could result in significant harm to human health. – Significant damage to crops, buildings or property or human health (e.g. damage to building rendering it unsafe or explosion/asphyxiation on sites with low gassing potential). – Equivalent to EA Category 2 pollution incident including significant effect on water quality. – Significant damage to aquatic or other ecosystems.
Mild	– Exposure to human health unlikely to lead to significant harm. – Minor damage to crops, buildings or property (e.g. surface spalling to concrete). – Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water quality. – Minor or short-lived damage to aquatic or other ecosystems.
Minor	– No measurable effect on humans. – Repairable effects of damage to buildings, structures and services. – Equivalent to insubstantial pollution incident with no observed effect on water quality of ecosystems.

The probability of the risk occurring is classified according to the criteria in Table 10-2

Table 10-2 Likelihood of Risk Occurrence

Likelihood	Explanation
High	Contaminant linkage may be present that appears very likely in the short-term and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
Likely	Contaminant linkage may be present, and it is probable that the risk will occur over the long term.
Low	Contaminant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Contaminant linkage may be present but the circumstances under which harm would occur even in the long-term are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table 10-3

Table 10-3 Risk based on Comparison of Likelihood and Severity

		Severity			
Likelihood		SEVERE	MEDIUM	MILD	MINOR
	HIGH	Very High	High	Moderate	Low
	LIKELY	High	Moderate	Moderate/Low	Low
	LOW	Moderate	Moderate/Low	Low	Very Low
	UNLIKELY	Moderate/Low	Low	Very Low	Very Low

10.3 LCRM Assessment of Risk

In 2019, the UK government issued new guidance on the evaluation and management of contaminated land, LCRM. Current contaminated land guidance in LCRM (2021) categorises risk at Stage 1 Tier 1 (i.e. PRA) as follows:

- Acceptable;
- Unacceptable.

However, no framework for assessing the risk has been published to accompany the guidance, so the CIEH & NHBC R&D 66 assessment framework constitutes best practice in this regard. To align the risk rankings in Section 10.2 with the LCRM rankings and with the Part 2A definitions, the following matrix has been utilised. This conversion is demonstrated in Table 10-4 below:

Table 10-4 Conversion to LCRM Risk Categories

	Acceptable	Unacceptable
Very Low		
Low		
Moderate/Low		
Moderate*		
High		
Very High		

* This risk category spans both acceptable and unacceptable. This is intentional as it is this risk band that tends to have the greatest level of uncertainty associated with it. Acceptability will be dependent on site-specific circumstances and level of confidence in the available evidence

For a risk to be unacceptable, the contaminant linkage should be associated with at least a "medium" severity as defined in Table A4.3 in Annex 4 of R&D66 and the probability should (in the majority of cases) be at least "likely" as defined in Table A4.4 of R&D66

These risk categories represent the level of risk as it is currently understood from the information available at this time.

10.4 Preliminary Risk Assessment

An iCSM illustrating plausible contaminant linkages has been formulated for this site in Section 9. The qualitative preliminary risk assessment of the possible linkages of the above sources (S1 to S5), transport pathways (P1 to P11) and receptors (R1 to R13) is provided in Table 10-5

The level of risk is determined based on the current condition of the Site (i.e. the effects of mitigation measures are not included).

Table 10-5 Preliminary Risk Assessment and initial Conceptual Site Model

Source	Pathway	Receptor	Potential Severity	Likelihood of Occurrence	Potential Risk (R&D 66)	Potential Risk (LCRM)	Justification
Onsite Sources of CoPCs Made Ground and potential contaminants associated with historical development and operation as a logistics units with office buildings and (S1) including ACM associated with demolition materials Potential contaminants are likely limited to leaks from the operation of the buildings onsite and/or asbestos within Made Ground remanent from demolition of previous structures although this is by no means certain. Asbestos if present within existing structures would be managed appropriately and disposed of in accordance with the CDM and CAR regulations.	P1: Direct Pathway: Direct contact, dermal absorption or ingestion of soil.	R1: Future site users - Workers at the site (Chronic) R2: Future site users - Site visitors (acute)	Medium	Unlikely	Low	Acceptable	Potentially contaminative land uses have occurred onsite during the site's history including agriculture, redevelopment/demolition/construction, logistics operations, storage and the presence of a sewage pumping station control panel. As such there is potential for CoPCs to be present onsite. However it is considered that the likelihood of future site users coming in into contact with these contaminants would be low. This is because hardstanding is likely to cover the majority of the proposed development limiting the exposure pathway to areas of soft landscaping. In a commercial setting the likelihood of this occurring to a significant degree is also reduced as site users are also unlikely to spend extended duration within landscaped areas.
	P2: Indirect Pathway: Inhalation of soil particulates derived from soils.	R1: Future site users - Workers at the site (Chronic)	Medium	Unlikely	Low	Acceptable	
	P3: Indirect Pathway: Inhalation of soil vapour derived from soils or groundwater	R2: Future site users - Site visitors (acute)					
		R3: Adjacent site users – workers and road users (During construction phase)					
	P4: Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into confined spaces (asphyxiation/ explosion)	R1: Future site users - Workers at the site (Chronic) R2: Future site users - Site visitors (acute)	Medium	Unlikely	Low	Acceptable	A review of the site's history indicates that infilling of a former pond is likely to have been undertaken to facilitate development. The materials used as fill are unknown and may present a source of ground gas in addition to any Made Ground. No landfills have been identified within 250m. The overall potential for significant gas generation is likely to be low and the former pond is of limited extent. There may also have been leaks and spillages of volatile chemicals which could present a vapour risk. However, it is anticipated that the risk from ground gas / vapour to the proposed future development is likely to be low.
	P5: Indirect Pathway: Leaching of chemicals and vertical / lateral migration via permeable unsaturated strata to shallow and/ or deep groundwater.	R4: Secondary Undifferentiated Aquifer in the Superficial Glacial Till R5: Secondary B Aquifer in the Bollin Mudstone Member	Medium	Low	Moderate/Low	Acceptable	Potentially contaminative land uses have occurred onsite during the site's history including agriculture, redevelopment/demolition/construction, logistics operations, storage and the presence of a sewage pumping station control panel. As such there is potential for CoPCs to be present onsite. However, these are expected to be limited in extent and the anticipated low permeability of the Glacial Till is expected to limit the potential for vertical migration of contaminants.
	P6: Indirect Pathway: Vertical migration of impacted shallow groundwater to the deeper Secondary B aquifer.	R5: Secondary B Aquifer in the Bollin Mudstone Member	Medium	Low	Moderate/Low	Acceptable	
	P7: Indirect Pathway: Lateral migration of impacted groundwater to off-site surface water.	R6: Surface waters in the vicinity of the site.	Minor	Unlikely	Very Low	Acceptable	
							The anticipated low permeability of the Glacial Till and bedrock is expected to limit the potential for migration of contaminants to the surface water receptors within these strata. However, perched groundwater could be present within the made ground, although the closest identified surface water receptor is Timperly Brook which is located c.250m east of the site and is also culverted.
	P8: Indirect pathway: Migration via underground drainage / sewers (including granular backfilling materials), spillage / loss / run-off from the surface direct to receiving water.	R6: Surface waters in the vicinity of the site.	Minor	Low	Very Low	Acceptable	No information relating to the existing underground services and utilities and potential for connection to surface water has been obtained. However, it is unlikely that run-off would migrate directly to surface water based on the distances identified, although there is a potential that it could enter drainage during construction works without mitigation. However, due to the distance and generally limited potential for contamination it is considered that the

Source	Pathway	Receptor	Potential Severity	Likelihood of Occurrence	Potential Risk (R&D 66)	Potential Risk (LCRM)	Justification
							potential for impact would be low. It is also anticipated that existing site drainage would be replaced during construction.
	P9: Direct Pathway: Direct contact of buried concrete with contaminated soils (i.e. hydrocarbons) and aggressive ground conditions (pH and sulphate).	R8: Buildings & Infrastructure: Concrete R9: Buildings & Infrastructure: Structures	Minor	Low	Very Low	Acceptable	Made ground is likely to be present at the site and there is a potential this could contain contaminants which could be aggressive to concrete (e.g. extremes of pH / sulphates) or transmissible through water supply pipes (e.g. hydrocarbons). However, the information obtained to date indicates the potential for extensive aggressive ground conditions is likely to be low and these risks can be mitigated as part of the construction works.
	P10: Direct Pathway: Direct contact of services and supply pipes with contaminated soils.	R10: Buildings & Infrastructure: Services	Minor	Low	Very Low	Acceptable	
	P:11 Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches	R9: Buildings & Infrastructure: Structures	Medium	Unlikely	Low	Acceptable	A review of the site's history indicates that infilling of a former pond is likely to have been undertaken to facilitate development. The materials used as fill are unknown and may present a source of ground gas in addition to any Made Ground. No landfills have been identified within 250m. The overall potential for significant gas generation is likely to be low and the former pond is of limited extent. There may also have been leaks and spillages of volatile chemicals which could present a vapour risk. However, it is anticipated that the risk from ground gas / vapour to the proposed future development is likely to be low.
	P12: Indirect Pathway: Potential for hydrocarbons in soils and ground waters may deteriorate membranes.	R11: Buildings & Infrastructure: Gas/damp membranes	Minor	Low	Very Low	Acceptable	Leaks and spillages of hydrocarbons may have occurred during the site history. However, it is expected that these will be minimal and localised in nature if at all present. As such it is considered there is a very low risk that they will be present in sufficient quantities to cause significant irreparable damage to membranes. It would be prudent nonetheless to undertake a ground investigation to confirm these assumptions.
	P13: Direct pathway: Direct contact with contaminated soils.	R7: Plants, trees and landscaping	Minor	Low	Very Low	Acceptable	Contaminants could be present onsite associated with existing fill material with the potential to be toxic to plants in areas of soft landscaping. However, this could be mitigated through the use of a suitable thickness of clean cover if required.
Offsite Sources of CoPCs	Migration onsite via lateral movement of groundwater within permeable strata and then:	R1: Future site users - Workers at the site (Chronic)	Medium	Unlikely	Low	Acceptable	There may be impacted groundwater in the vicinity of the site resultant of the operations of the adjacent business park and fuel storage compound beyond (although this is located c.300m distance).
S2 - Contaminated groundwater associated with spills/leaks from operation of the logistics park.	P3: Indirect Pathway: Inhalation of soil vapour derived from soils or groundwater						Additionally, the nature of materials used to backfill the pond identified within the historical maps as well as create development platforms is unknown. These could represent sources of ground gas.
S3 -Contaminated groundwater associated with spills/leaks from operation of the airport aviation fuel storage and distribution facility	P4: Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into confined spaces (asphyxiation/ explosion)	R2: Future site users - Site visitors (acute)	Medium	Unlikely	Low	Acceptable	The anticipated low permeability of the Glacial Till and bedrock is expected to limit the potential for migration of contaminants off-site within these strata. However, there is a potential that made ground on-site or within the wider area could provide a pathway for contaminant migration if this is laterally extensive.
	Migration onsite via lateral movement of groundwater within permeable strata and then:	R8: Buildings & Infrastructure: Concrete R9: Buildings & Infrastructure: Structures R10: Buildings & Infrastructure: Services	Minor	Unlikely	Very Low	Acceptable	
	P9: Direct Pathway: Direct contact of buried concrete with contaminated soils (i.e. hydrocarbons) and aggressive ground conditions (pH and sulphate).						
	Migration onsite via lateral movement of groundwater within permeable strata and then:	R10: Buildings & Infrastructure: Services	Minor	Unlikely	Very Low	Acceptable	
	P10: Direct Pathway: Direct contact of services and supply pipes						
	P:11 Indirect Pathway: Migration of hazardous gases/vapours via	R9: Buildings & Infrastructure: Structures	Medium	Unlikely	Low	Acceptable	

Source	Pathway	Receptor	Potential Severity	Likelihood of Occurrence	Potential Risk (R&D 66)	Potential Risk (LCRM)	Justification
Offsite Sources of CoPCs Ground gas associated with historical infilling and construction to support development in the vicinity of the site. (S4)	permeable strata into enclosed spaces and service/utility trenches	R10: Buildings & Infrastructure: Services					
	P4: Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into confined spaces (asphyxiation/ explosion)	1: Future site users - Workers at the site (Chronic)	Medium	Unlikely	Low	Acceptable	
	P:11 Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches	R9: Buildings & Infrastructure: Structures R10: Buildings & Infrastructure: Services	Minor	Unlikely	Very Low	Acceptable	

10.5 Discussion of Acute Risk to Future Construction Workers & Off-Site Receptors.

AECOM understands that the proposed development works will be undertaken in compliance with Construction Design and Management (CDM) 2015 regulations.

Prior to work commencing, a health and safety risk assessment should be carried out by the appointed Principal Contractor / developed in accordance with current health and safety regulations. This assessment should cover potential risks to construction staff, permanent site staff and the local population. Based on the findings of this risk assessment, appropriate mitigation measures should be implemented during the construction period.

The greatest potential for generation of dust will be during the Site works and therefore dust generation should be kept to a minimum in accordance with general best practice, as outlined in, for example, 'Environmental Good Practice on Site', CIRIA Publication C692 to reduce this risk.

The risk to construction workers during the excavation and construction phases in terms of potential exposure to high concentrations of contaminants is considered to be low given the historic and current land uses identified at the Site. Should gross contamination be identified during the construction phase, then this may pose a potential acute risk to construction works. It is likely to be able to be effectively managed through good health and safety practices and protocols. Adoption of appropriate dust suppression techniques would also mitigate the degree of potential particulate migration off-site

11. Waste Management & Potential Reuse of Site-Won Material

11.1 Initial Assessment of Probable Waste Generation

No specific design plans are currently available at the time of writing this report. Based upon the proposed redevelopment, there is a potential that general construction and soil waste will be generated for the site as part of the redevelopment.

11.2 Initial Assessment of Probable Material Available for Reuse

Based on the proposed redevelopment, the earthworks design would likely include cut and fill works, cut / fill balance, and an investigation of the potential to include for the re-use of site won materials during the earthworks.

11.3 Outline Recommendations

It would be prudent to undertake a hazardous waste assessment on samples collected during any future ground investigations, to determine the classification of soils for any off-site disposal and to determine the chemical suitability of soils for consideration for re-use as site won materials. This initial assessment could support the determination of costings for disposal of site generated soils if they are unsuitable for reuse.

12. Review of Geotechnical Risk and Preliminary Engineering Assessment

12.1 Geotechnical Risk

A preliminary geotechnical risk register is given in Appendix C which describes the main ground related hazards on the site (excluding ground contamination) and mitigation measures which may be implemented to eliminate or reduce the risk by means for further investigation or during the design.

The most significant risks are:

- Unknown / unrecorded buried structures may be present on site. The nature of the foundations of the buildings on site are currently unknown, although basements are not thought to be present on site. It is likely that a number of underground services are present on site, including a drainage system underneath Building 303. Underground tanks and pipework may be present underneath Building 304 associated with the sewage pumping system control panel. There may implications for construction, surface / foundation stability and settlement, especially under increased loading from structures or earthworks.
- Made Ground is likely to be present on-site. This stratum is prone to undue differential settlement under load and will be heterogenous in both consistency (strength) and thickness. Therefore, the Made Ground will likely not provide a suitable bearing stratum for the structural foundations of the proposed structures on site and potentially will be unsuitable for pavements. Site specific ground investigation is required to confirm the presence of Made Ground on site, along with its thickness, extent and characteristics. This should be investigated most notably beneath the current structures and where the historical pond has been infilled towards the north corner of the site.
- The ground investigation data within 250m of the site described the natural superficial deposits as 'firm to stiff', although these have been found locally soft. Additionally, the GroundSure report suggests a negligible compressibility of this underlying strata. However, should the present weak and compressible soils be identified onsite these may pose a risk of excessive total or differential settlement of foundations and proposed structures.
- Where ground may be required to be re-graded, the material will require classification for re-use. Glacial Till is a highly variable material and will need classification for re-use.
- The site is broadly level. However it is important to note the approximate 1m level difference between the south west (Viscount Drive) and north west side of the site. In addition there is a retaining wall and embankment between Buildings 303 and 304 on York Drive. If retained or altered slope stability of embankments and cuttings should be assessed. Structural and geotechnical suitability for retention of retaining walls in the end proposed development should also be considered. The long-term settlement of raised areas should be assessed, if excessive total and differential settlement are a concern for the proposed development area.
- High, perched or variable groundwater levels is a concern. Due to the lack of intrusive investigation and groundwater monitoring it is difficult to give a reliable groundwater level on site. However, taking into consideration intrusive investigations which have taken place off-site, it can be assumed that shallow perched groundwater exists in the Made Ground and Glacial Till. A shallow water table may be appropriate to assume at this stage.
- Potential obstructions may be present to drilling or piling on site from boulders in the Glacial Till, reinforced concrete in the Made Ground, previous underground structures/ foundations or variable rock head level.
- Striking underground services and utilities during intrusive investigation or construction.
- Chemically aggressive ground conditions specifically affecting subsurface concrete structures.
- Felling of trees on or close to the site may cause volume change in cohesive soils.

12.2 Preliminary Engineering Assessment

12.2.1 Foundations

Subject to the findings of a ground investigation and detailed design, for lightly loaded structures with little concern for excessive total and differential settlement, the underlying firm to stiff Glacial deposits may be suitable for the use of shallow spread foundations founded within this formation. Although, some softer more compressible Glacial Till may be present at shallower depths. Therefore, if this is encountered shallow foundations could still be an option, following the excavation of such 'soft spots' and replacement with suitable compacted engineered fill, providing a suitable founding material. However, if extensive 'soft spot' treatment is required, this may not be viable, and consideration may have to be given to alternative solutions.

The bearing resistance of foundation stratum and indeed engineered fill, and the settlement tolerance of the proposed structures will need to be considered at detailed design for the suitability of any shallow spread foundations. In general, foundations should be located within natural ground beneath any fill, Made Ground, highly compressible soil, and below the depth of effect of variations due to vegetation, seasonal and climatic change. As mentioned earlier, depending on the depth to suitable bearing strata and the viability of excavation and replacement with engineered fill, piled foundations may be considered based on economical and construction reasons.

Piled foundations may need consideration for more heavily loaded structures and for economical and construction reasons as mentioned above, along with practicality. Although, piles may encounter boulders with the Glacial Till, obstruction from underground structures/ foundations, obstructions included in the Made Ground such as reinforced concrete and variable rock head level, these should be taken into consideration.

For light to moderate loads, the ground conditions are expected to be suitable for the use of traditional shallow spread foundations founded within the formation. Piled foundations may be considered for structures located in close proximity to existing trees or for more heavily loaded structures. Piled foundations should not introduce pathways for contaminants to migrate to receptors such as from perched groundwater to aquifers.

Where structures are located within influencing distance of any existing or future trees, reference should be made to Chapter 4.2 of NHBC's Standards.

12.2.2 Ground Floor Slabs

It is possible that for lightly loaded structures ground bearing floor slabs would be suitable provided that any footings are at least 0.1m below any Made Ground and into competent superficial strata. The potential use of ground bearing floor slabs would be determined following a ground investigation which would suitability and mitigate potential differential or total settlement via design.

12.2.3 Excavations

Where excavations for foundations, earthworks, and drainage and are required, stability of excavated areas should be considered. Close or continuous support will be required for any manned entry to excavations.

Shallow groundwater may be encountered and may require groundwater control during excavation. Detailed information regarding the groundwater regime will need to be obtained from a ground investigation and subsequent monitoring.

It should be noted that the potential presence of granular Made Ground, along with shallow groundwater could significantly undermine the stability of excavations in the short term.

12.2.4 Soakaways

The ground conditions are unlikely to be suitable for the use of soakaways, where cohesive Glacial Till or cohesive materials are present, due to their low permeability. Therefore, surface water run-off is likely to need to be directed to main drainage subject to appropriate consent to discharge.

13. Conclusions

The following is a summary of the review of the information within this report:

The site is located adjacent to both Avro Way and York Drive, with Argosy Drive running through the centre (M90 5TE) and is centred on National Grid Reference 380862 385150. The site is within a commercial/industrial setting (logistics park) immediately south west of the airside portion of Manchester Airport and is approximately 13km south of Manchester city centre.

The site covers an area of approximately 2.716 hectares. The site is broadly rectangular in shape orientated North East to South West with ground elevation indicated to lie circa 67m Above Ordnance Datum (AOD). The site is generally level with the site reconnaissance determining a slight declining gradient running east to west.

The site is currently occupied by commercial premises and associated infrastructure. The site comprises 4 No. buildings: MAG 311, 304, 303, 305, an access road (Argosy Drive), a large carpark and multiple loading bays. An area of Grass land and various vegetation is present south west of the car park.

The buildings on site are currently being utilised by various firms for the commercial purposes of logistics and distribution. Specifically, Buildings 311 and 303 have associated HGV loading areas (loading bays), warehouse facilities and offices. Building 305 is unoccupied office space does not have loading areas, nor does it appear to have warehouse facilities. An area of trees and vegetation is present on site, immediately north west of building 305 and north of the carpark occupying the west of the site. Building 304 houses a sewage pumping station control panel and two storage units for facilities maintenance companies.

Geology at the site is anticipated to comprise Made Ground up to an estimated thickness of circa 1.5m. This is expected to overlie Glacial Till comprising typically, firm to stiff (locally very soft) red, brown, grey mottled clays. Sands and gravels have been encountered in the vicinity of the site however. Thickness of the Glacial Till is unknown although the nearest historical BGS boreholes records indicate that it could be at least 6m thick. The Glacial Till is expected to in turn overlie mudstone bedrock of the Bollin Mudstone Formation.

Potential controlled waters receptors identified comprise the Glacial Till (Secondary Undifferentiated Aquifer) and Bollin Mudstone Member (Secondary B Aquifer) which underlie the site, the nearest identified surface water course is Timperly Brook (assumed culverted) 250m east of the site.

A review of the site history notes the infilling of ponds associated with farmland to facilitate the development. Thereafter the site functioned as a logistics and distribution hub through various building configurations before becoming the present day site under the same broad use. There may have been leaks and spillages of materials being stored or transferred during its operation. There are also several electrical substations within the vicinity of the site which may be localised sources of PCBs which may have gone to ground during their operation. The airport originates from the 1930s and early infrastructure was located at significant distance (750m south east) so it is considered unlikely to interact with the site for the most part. The existing airport's aviation fuel and distribution unit is located approximately 300m east of the site. It is considered there is a low risk of encountering significant, gross extensive contamination at the site.

Due to the site history which includes potential infilling of ponds, import of materials demolition and redevelopment, it is probable that Made Ground will be present on site. No landfills have been identified within 250m of the site. Based on the ground conditions identified it is anticipated that the potential for significant gas generation is likely to be low although ground gas could still be encountered.

A preliminary Conceptual Site Model and Contaminated Land Risk Assessment have been carried out with geo-environmental risks (which includes risks to Human Health, Controlled Waters and Property) classified as Very Low to Moderate/Low risk with the majority being Low to Very Low Risk. As such geo-environmental risks for the proposed development are considered to be "Acceptable" in the context of LC:RM.

The key potential geotechnical hazards identified include:

- Constraints posed by legacy in ground structures such as foundations and structures;
- Variable strength and compressibility of site soils and Made Ground that are unsuitable as founding stratum or liable to cause differential settlement;
- High, perched or variable groundwater tables;
- Piling obstructions posed by boulders within Glacial Till and or by relic foundations and legacy structures and services.
- Striking underground buried services during construction/maintenance and investigations;

- Chemically aggressive ground conditions to structures and concrete.
- Shrink or heave of clay soils caused by removal of trees or presences of trees close to proposed structures.

The potential risks that have been identified have been assessed by the preliminary geotechnical risk assessment include substantial and intolerable risks.

The risks may be mitigated by potential solutions identified within the geotechnical risk assessment and further assessment through intrusive ground investigation and risk assessment at the detailed design stage with routine engineering solutions. Therefore, the potential risks identified are unlikely to represent a significant risk to the proposed development following mitigation.

14. Recommendations

Further work should be done to understand the operations of the sewage pumping station control panel understood to reside in B304. It is unknown if any pipes, tanks or infrastructure are associated with this building.

An intrusive ground investigation is recommended in order to confirm the preliminary assessments provided within this report. In summary, key objectives to be addressed by the investigation include:

- Confirmation of the ground (and groundwater) conditions and validation of the CSM;
- Chemical status of Made Ground and natural soils for the purpose of risk assessment to human health, groundwater and for preliminary waste classification (if material needs to be removed off-site);
- Chemical status of groundwater in order to determine the risks to controlled waters;
- Ground gas monitoring to determine the potential risks to the proposed development and surrounding properties;
- Identification of geotechnical design parameters for earthworks and preliminary foundation design; and
- Confirmation of infiltration characteristics.

The geo-environmental investigation should be designed with due consideration of the requirements of BS 10175:2011. The geotechnical elements of the investigation should be designed with consideration of BS EN 1997-1:2004, BS EN 1997-2:2007 (Eurocode 7: Geotechnical Design – Parts 1 and 2) and BS 5930:1999.

It is recommended that the ground investigation be designed in accordance with the UK Specification for Ground Investigation (version 2). In brief, the outline scope of works is anticipated to include:

- Boreholes constructed using cable percussive / rotary / dynamic sampling drilling techniques, focussing on areas of previous development undertaken post demolition
- Machine excavated trial pits;
- Testing of site-won materials for potential reuse;
- Chemical testing of soil to BRE requirements to support selection of underground materials.
- Soakaway tests carried out to BRE365;
- Installation of ground gas / groundwater monitoring wells followed by a programme of gas / groundwater monitoring; and
- Geotechnical and geo-environmental laboratory testing.

The intrusive investigations should aim primarily to confirm the extent, thickness and characteristics of Made Ground and any soft, compressible deposits on site.

The programme of gas monitoring should precede a subsequent risk assessment. The investigation and assessments should be carried out in accordance with BS 8485:2015+A1:2019 (The Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings) and BS 10175:2011+A2:2017 (Investigation of potentially contaminated sites. Code of practice).

The intrusive ground investigation will allow an assessment of the ground and groundwater profiles to be carried out along with further consideration of the geotechnical and geo-environmental risks associated with the site,

including the CSM and risk assessment to be developed in accordance with LCRM methodology, to confirm whether the potential risks identified in this study are present and are of material concern to the development.

The findings from the ground investigation should be interpreted within a dedicated Ground Investigation Report. This would also inform successive geotechnical design reports as the design progresses. AECOM are able to provide consultancy services for ground investigation design, interpretation as well as subsequent design on the proposed development.

Site procedures should be established, to be undertaken in the event underground services are encountered, including risk assessment and method statement. Ensure any existing services are identified and fully traced prior to commencement of ground investigation and construction works.

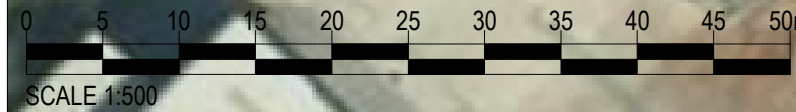
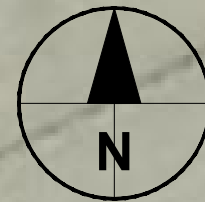
PAS128 surveys should be undertaken, and cable avoidance tools used prior to breaking ground. Then a hand dug inspection pit should be dug to 1.2m bgl using insulated hand tools, while CAT scanning periodically. Only after this process should mechanical intrusive investigation commence.

Due to the site being within an area of Cheshire Salt Compensation, it may be prudent however to procure a Cheshire Salt Search report for additional assurance.

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- the Environmental Protection Act 1990 (Part 2A)
- the National Planning Policy Framework (2012)
- Town and Country Planning Act 1990 (as amended)

Appendix A Figures



AECOM

PROJECT

ARGOSY DRIVE
DEVELOPMENT -
MANCHESTER
AIRPORT

CLIENT



CONSULTANT

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KEY

— SITE BOUNDARY

ISSUE/REVISION

P1	11.01.2022	FOR ISSUE
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60663052

SHEET TITLE

SITE BOUNDARY FOR
TOPOGRAPHICAL SURVEY

SHEET NUMBER

60663052-ACM-XX-XX-DR-C-0001

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Key

—	Overall Site	6.021Ha	14.88acres
—	Site	2.716Ha	6.71acres

Building 311 Footprint	: 2,787 sqm	29,999 sqft
Building 304 Footprint	: 527 sqm	5,673 sqft
Building 305 Footprint	: 1,014 sqm	10,915 sqft

Schedule of Accommodation

Unit 1a	c.9k
Unit 1b	c.6k
Unit 1c	c.8k
Unit 1d	c.8k
Unit 1e	c.6k
Unit 1f	c.9k
Unit 1g	c.6k
Unit 1h	c.9k

Unit 1 Total	5,985 sqm	64,422 sqft
All areas include 15% offices at 1st floor		

Unit 2a	c.14k
Unit 2b	c.11k
Unit 2c	c.18k
Unit 2d	c.11k

Unit 2 Total	4,266 sqm	45,919 sqft
All areas include 10% offices at 1st floor		

Unit 3a	c.10k
Unit 3b	c.8k
Unit 3c	c.14k

Unit 3 Total	3,066 sqm	33,002 sqft
All areas include 10% offices at 1st floor		

Overall Total	13,317 sqm	143,343sqft
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P01	First Issue	LL	MJH	11/02/22
Rev	Description	By	Ckd	Date



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Project

MAG - Argosy Drive,
Manchester Airport

Title

Masterplan Option 13

RPS Project Number NK020687	Scale @ A1 1:500	Date Created 11/02/22
Task Team Manager KRP	Information Author LL	Task Information Manager MJH

Status

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Document Number 020687-RPS-SI-XX-DR-A-9039	Revision P01
Project Code - Originator - Zone - Level - Type - Role - Drawing Number	

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Appendix B Groundsure Report

Site Details:

BUILDING 311 UNIT 3,
MANCHESTER AIRPORT,
RINGWAY ROAD,
MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: County Series

Map date: 1872-1877

Scale: 1:2,500

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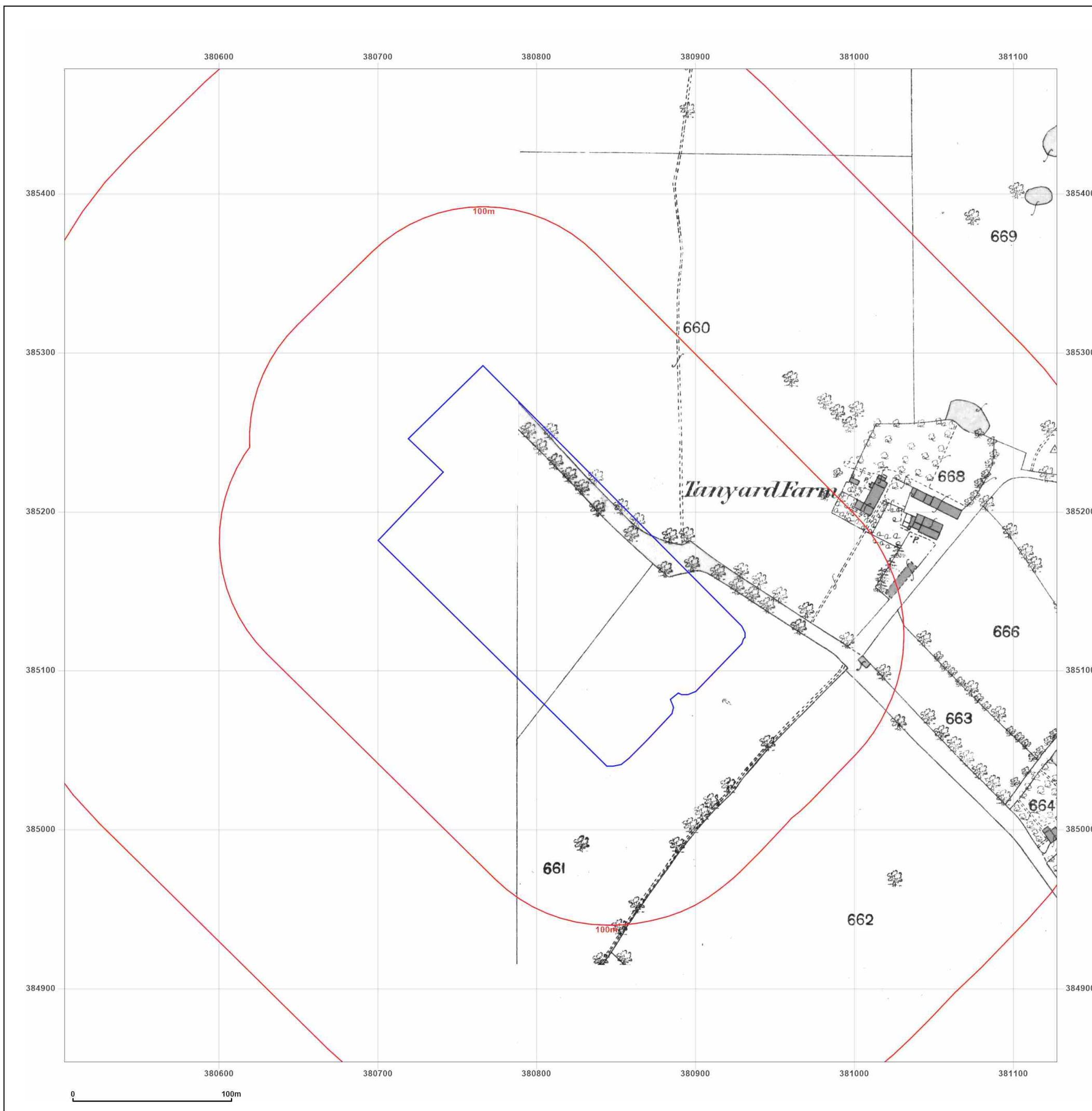


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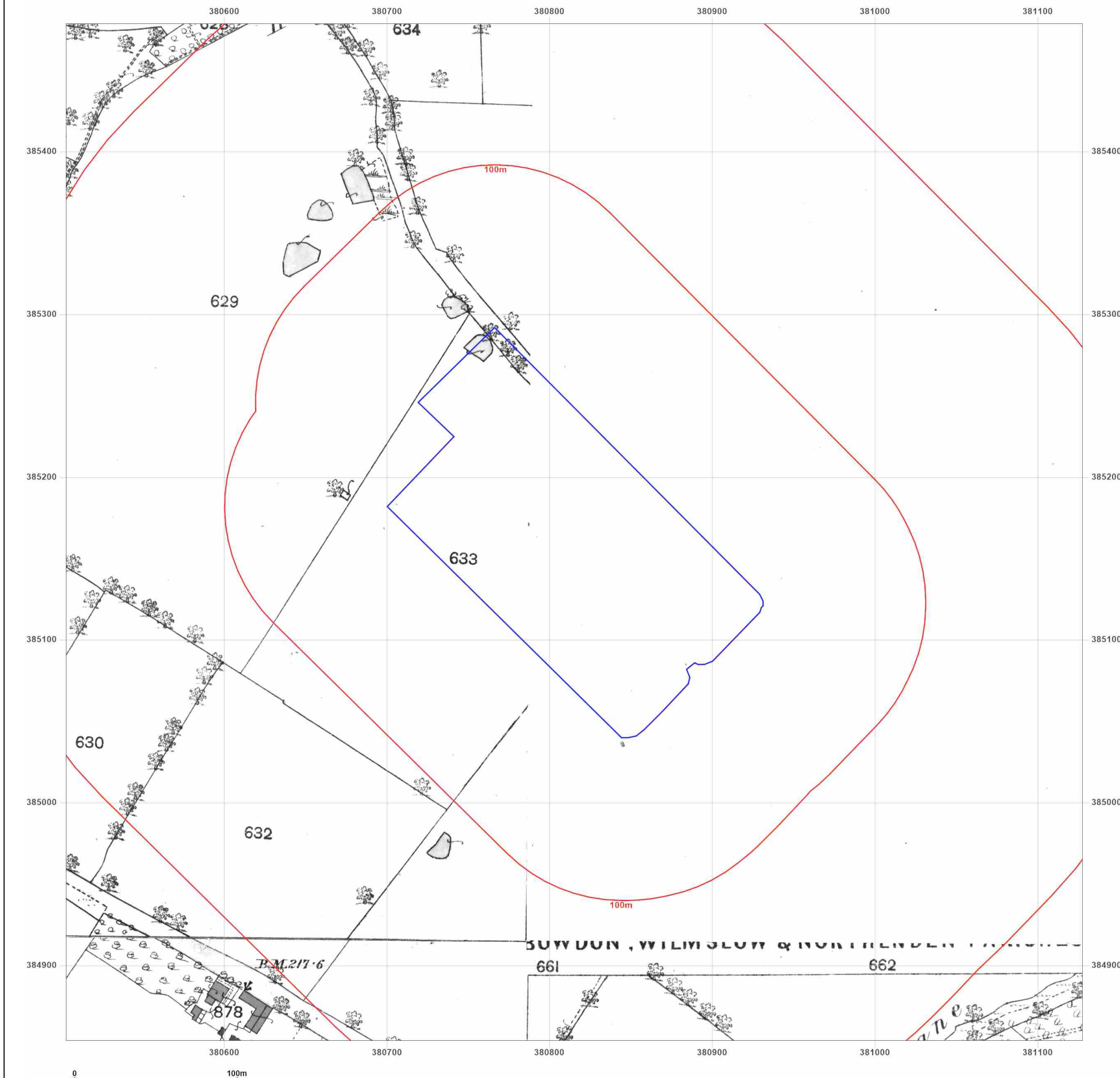


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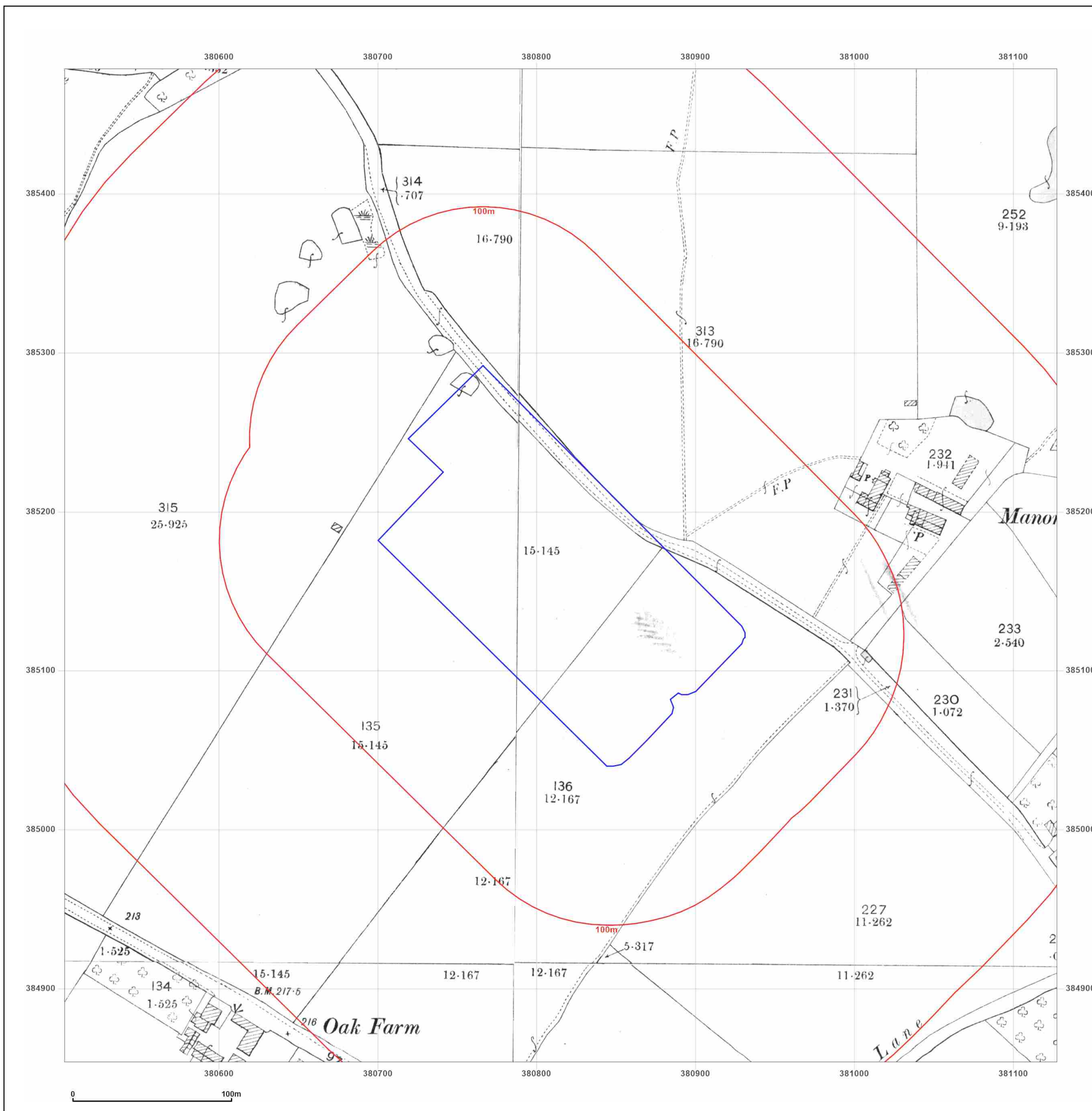


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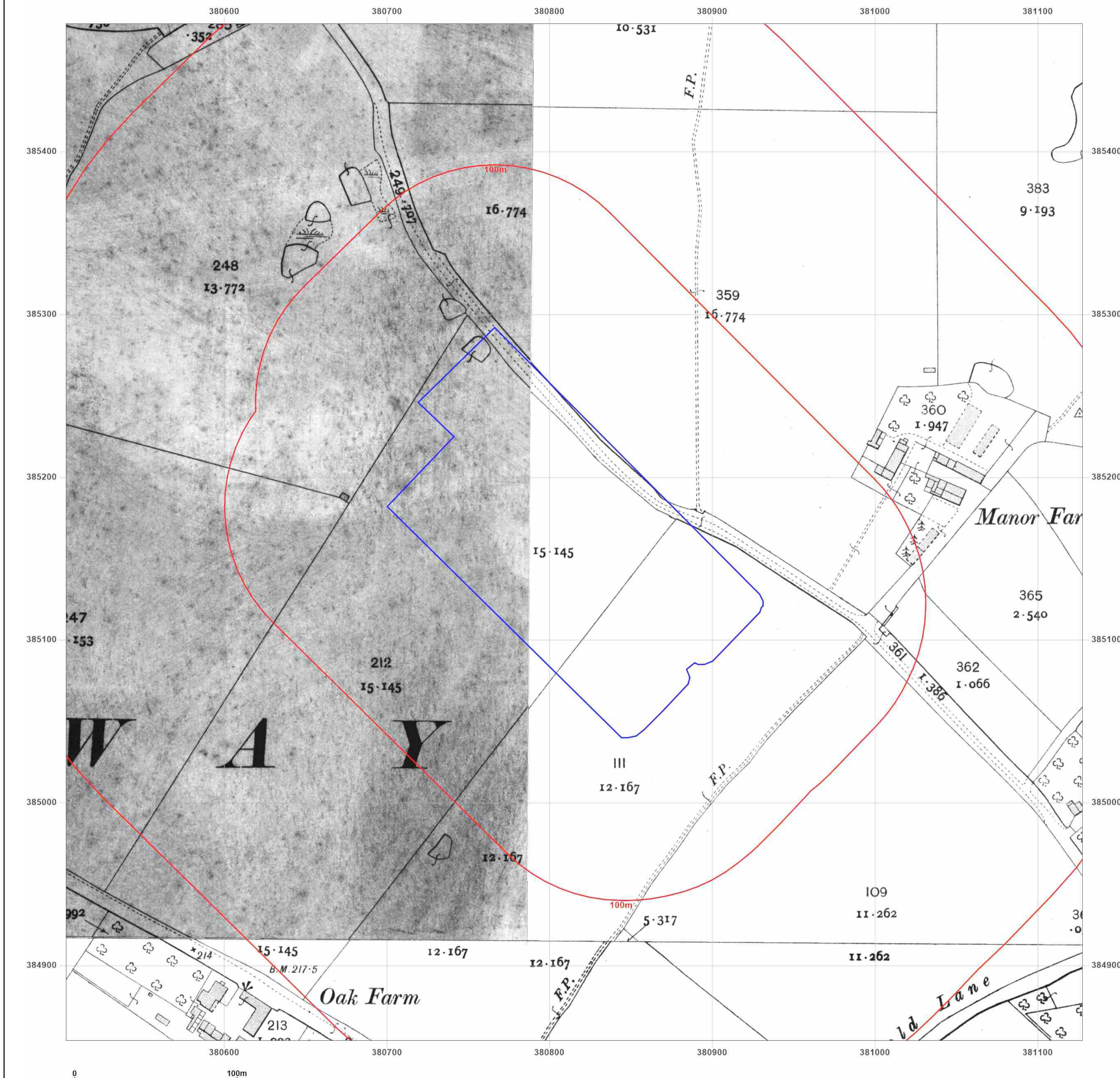


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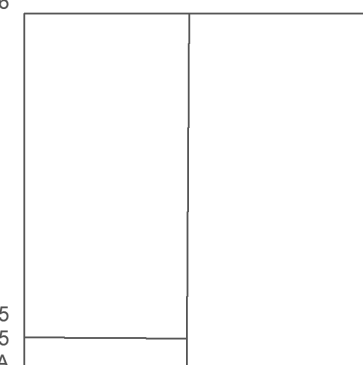
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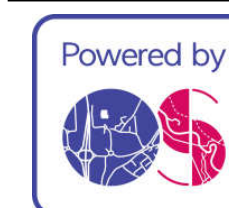
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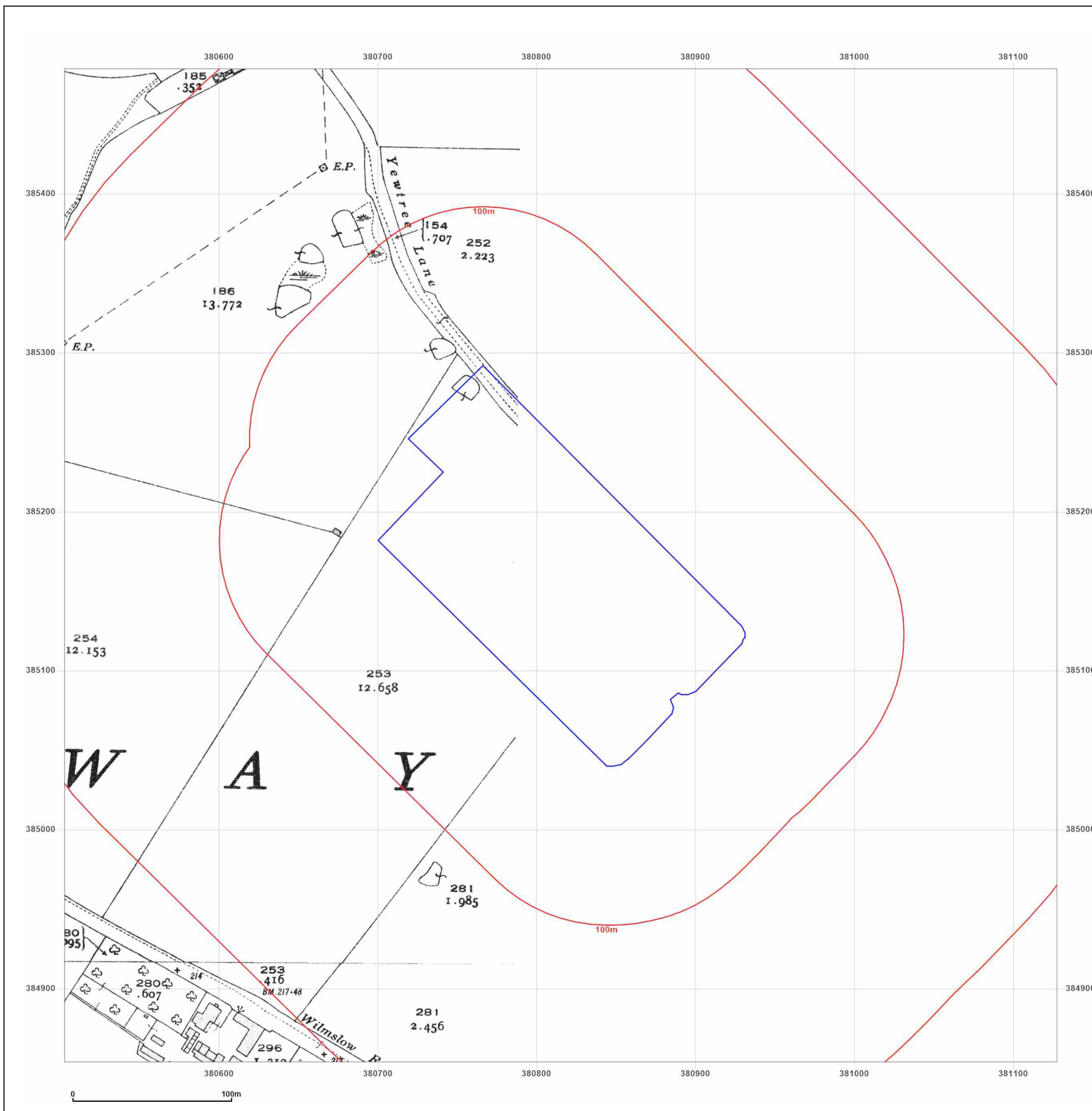


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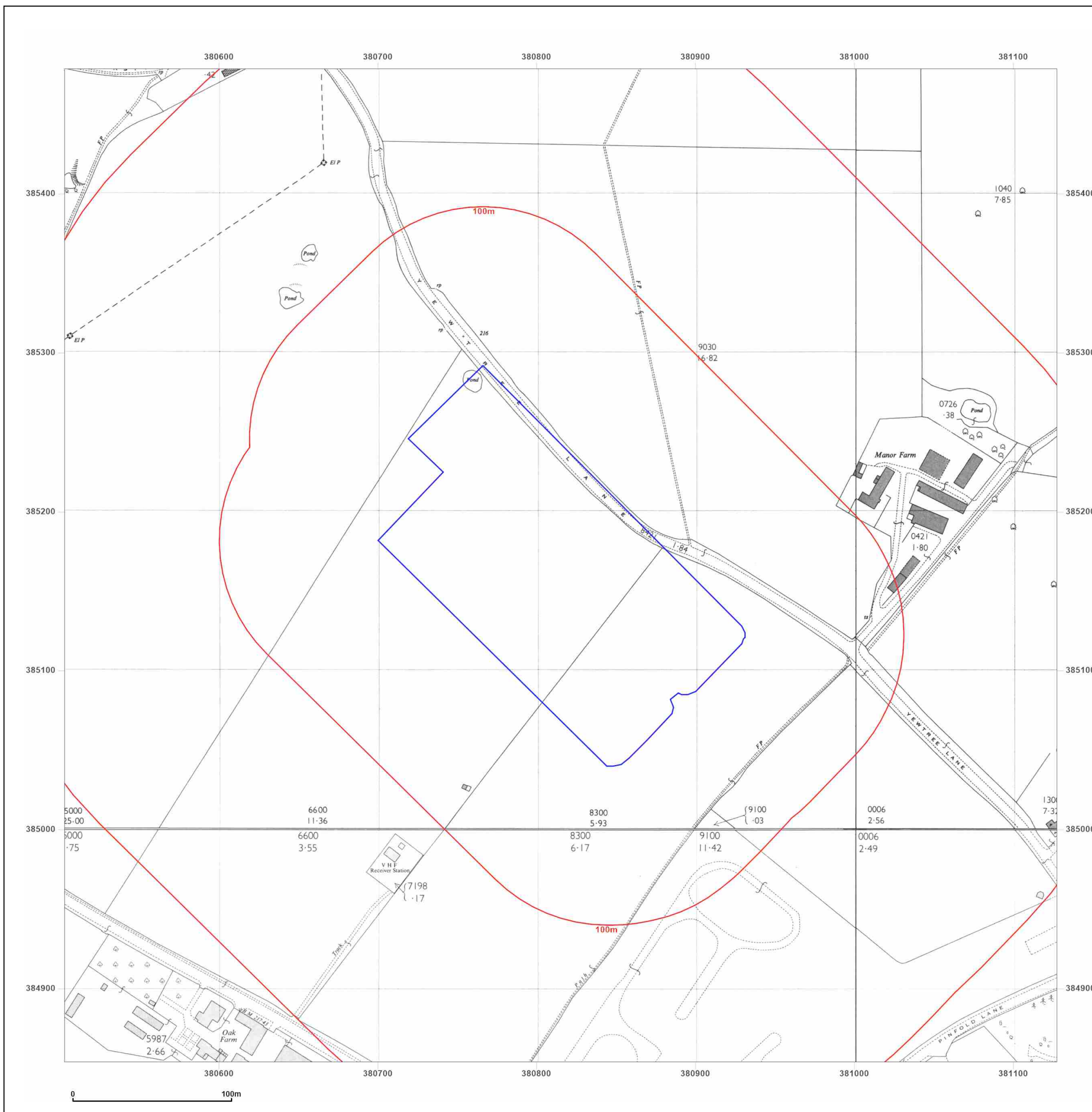


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MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: National Grid

Map date: 1973-1974

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1962
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Edition N/A
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Surveyed 1968
Revised 1973
Edition N/A
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Site Details:

BUILDING 311 UNIT 3,
MANCHESTER AIRPORT,
RINGWAY ROAD,
MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: National Grid

Map date: 1987

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

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MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: National Grid

Map date: 1990-1992

Scale: 1:1,250

Printed at: 1:2,000



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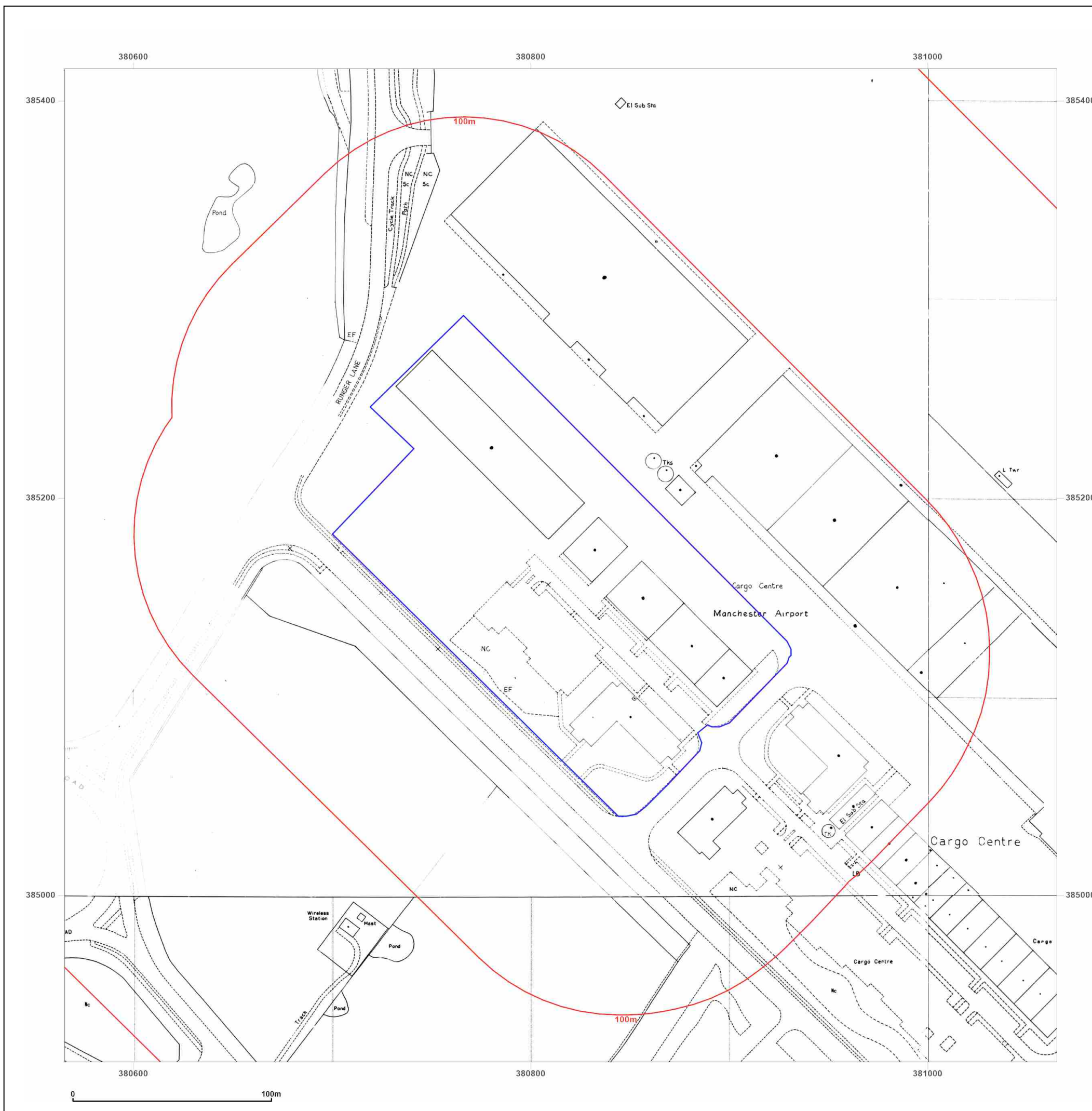


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MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: National Grid

Map date: 1991-1995

Scale: 1:1,250

Printed at: 1:2,000



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Revised 1995
Edition N/A
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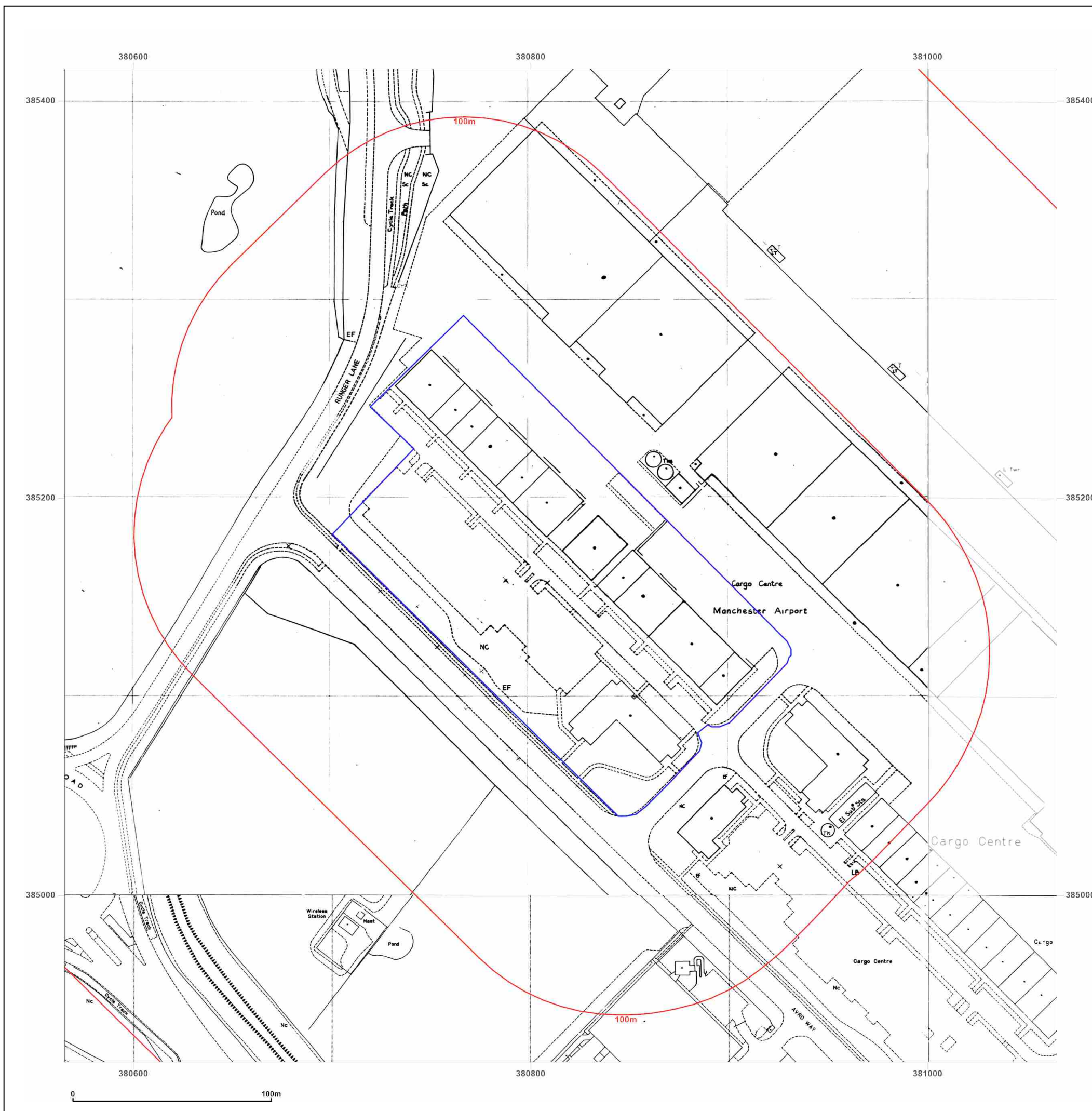


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RINGWAY ROAD,
MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: National Grid

Map date: 1992-1995

Scale: 1:1,250

Printed at: 1:2,000



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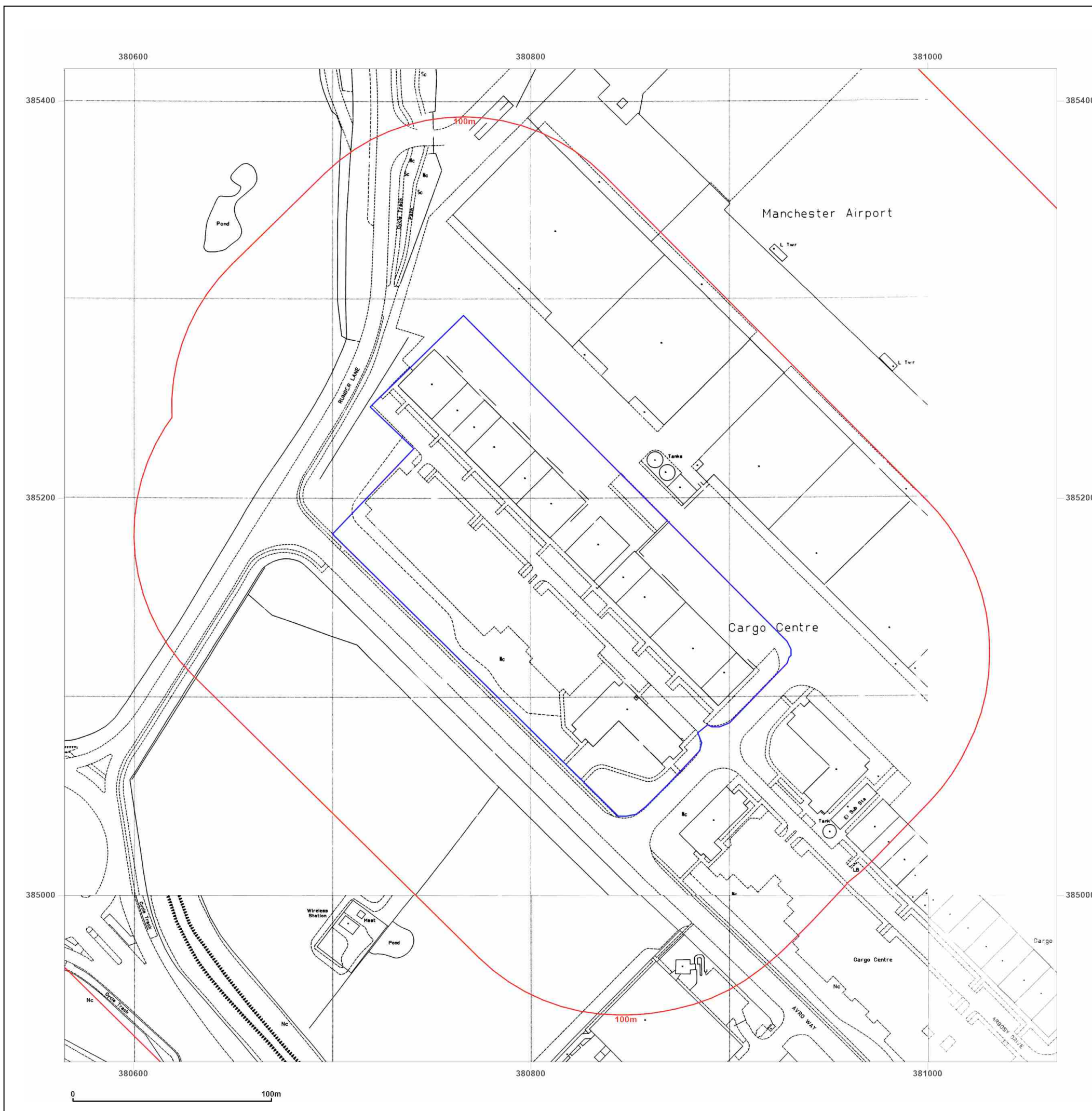


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RINGWAY ROAD,
MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: National Grid

Map date: 1995

Scale: 1:1,250

Printed at: 1:2,000



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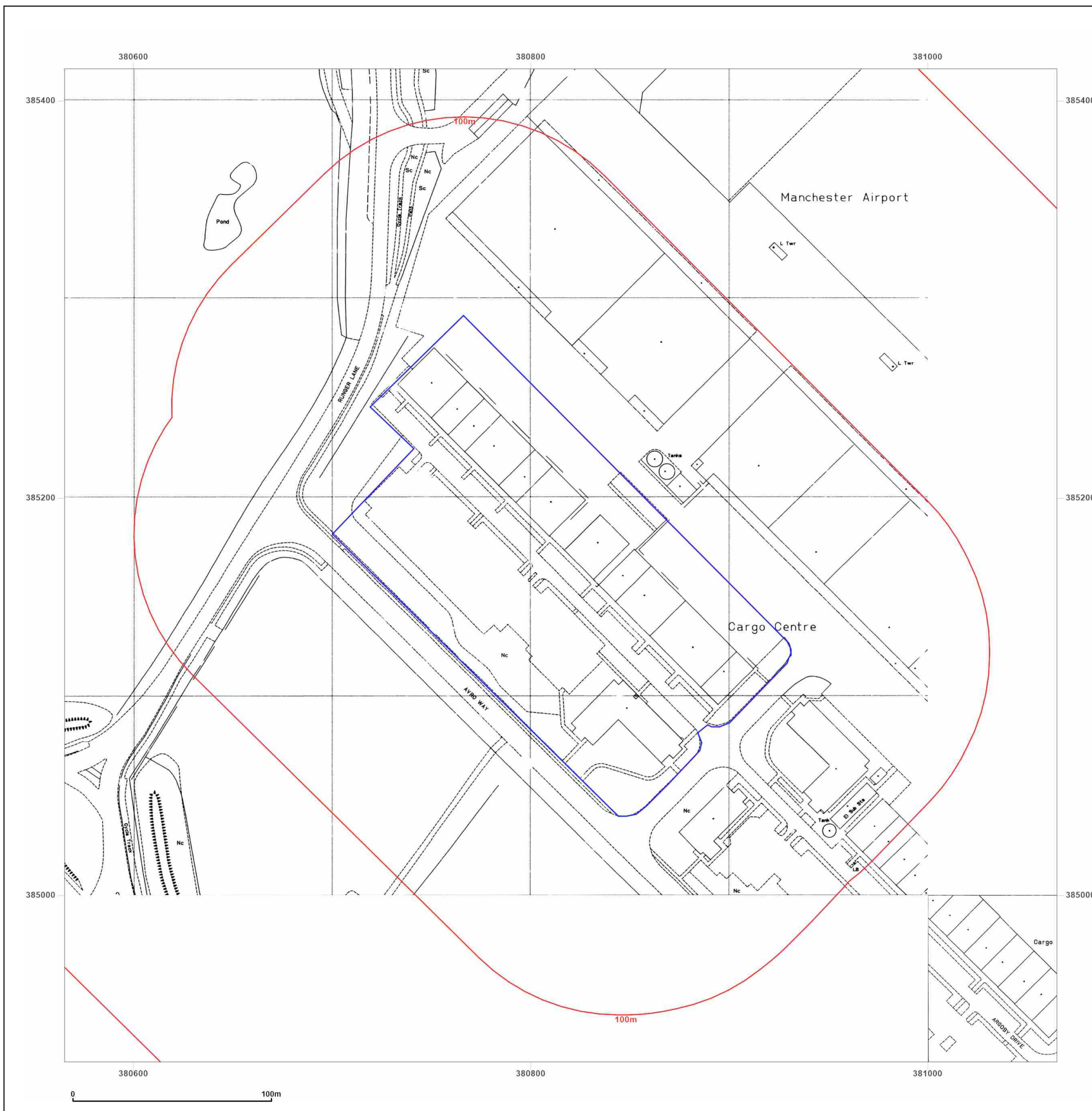


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MANCHESTER, M90 5TE

Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: National Grid

Map date: 1995

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1995
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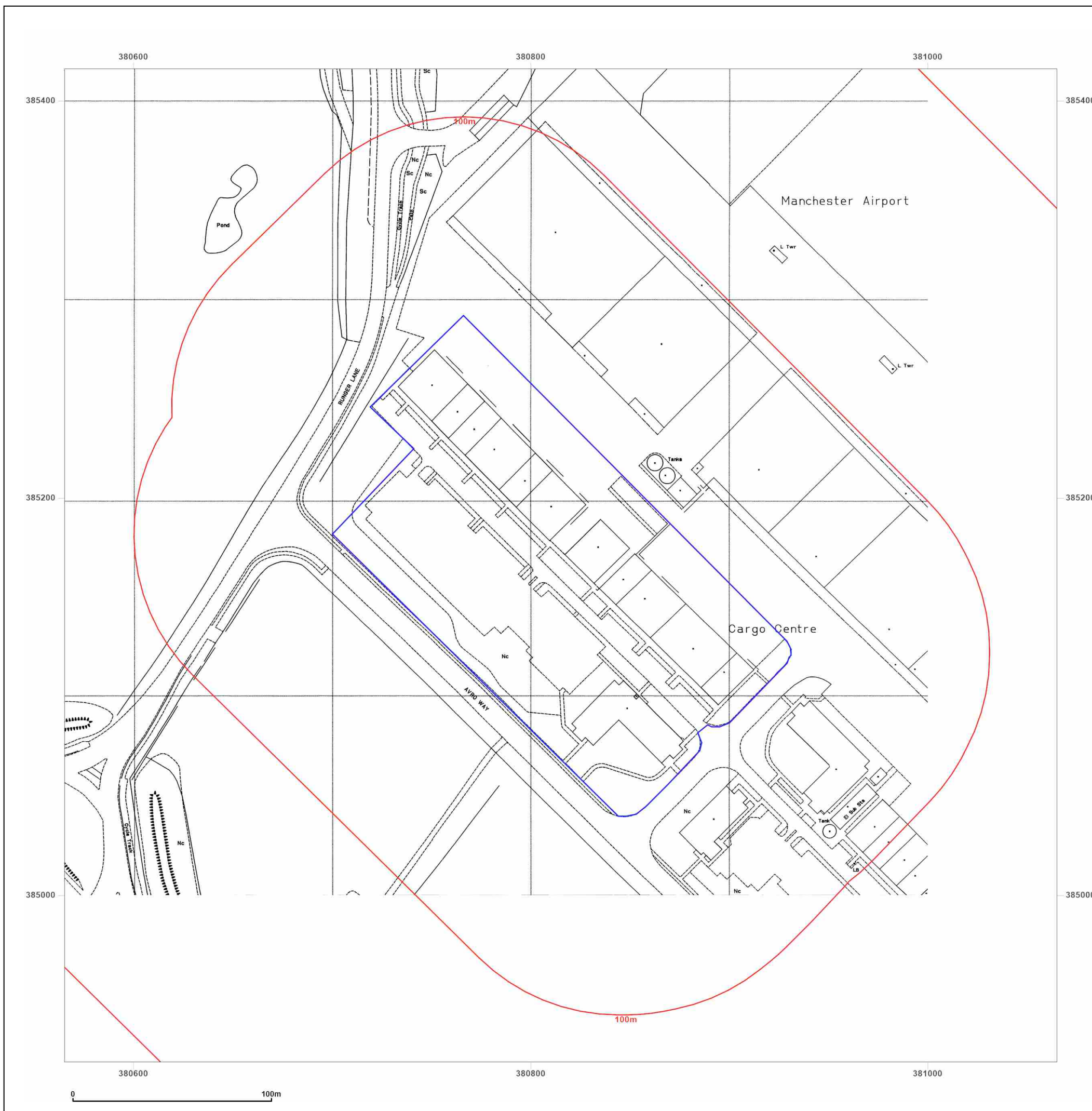


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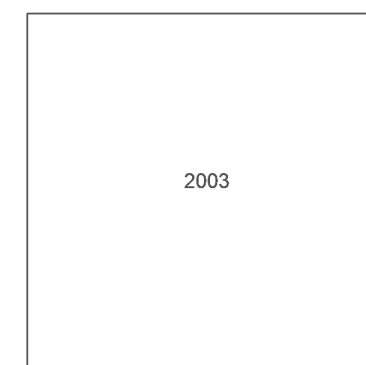
Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: County Series

Map date: 1899

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1874
Revised 1897
Edition 1899
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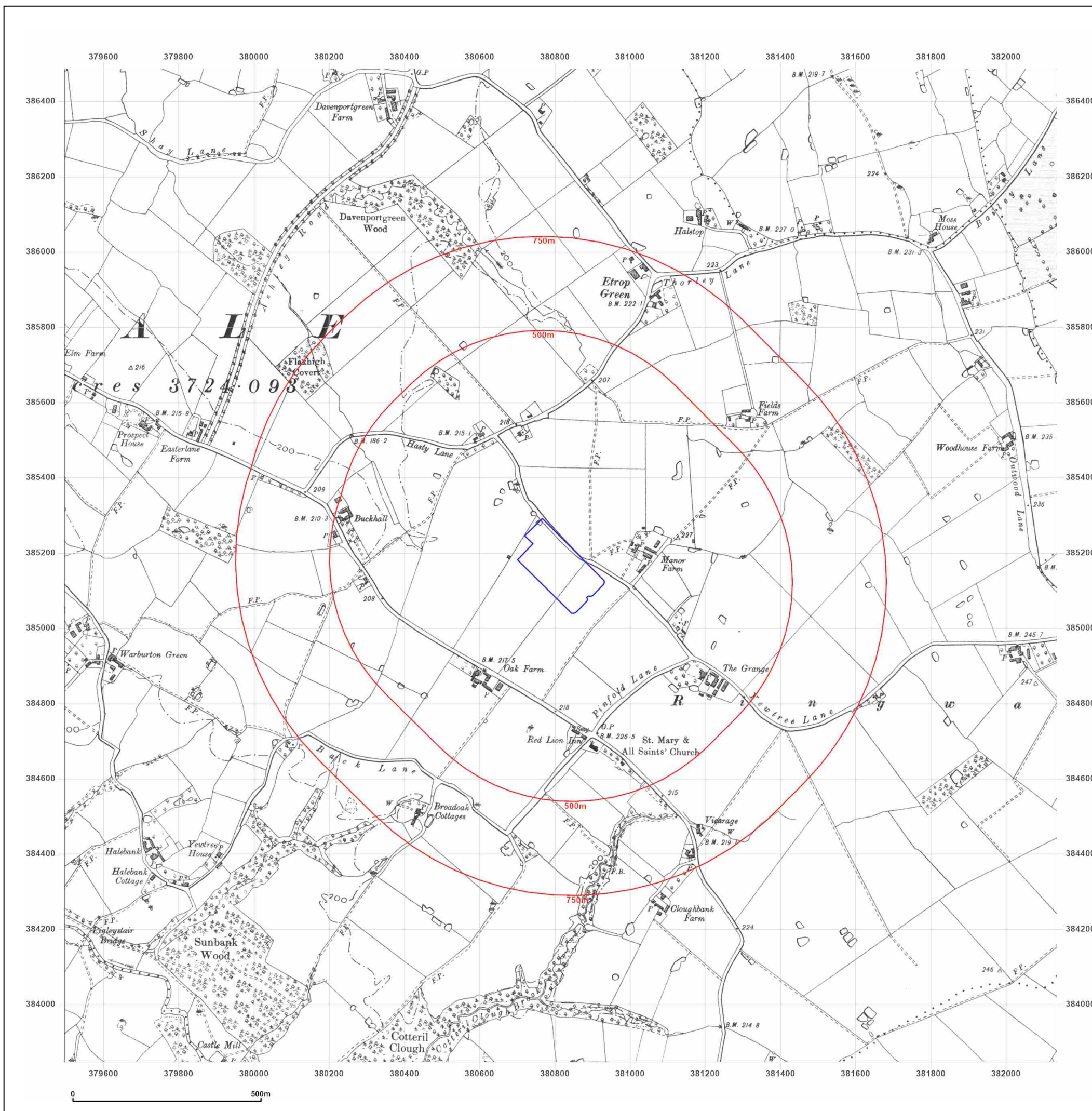


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Client Ref: MAG-Argosy_Development_60663052_R2
Report Ref: GS-8391785
Grid Ref: 380815, 385166

Map Name: County Series

Map date: 1910

Scale: 1:10,560

Printed at: 1:10,560



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