e3p

Phase I Geoenvironmental Site Assessment
Manchester Life Phase 3

Reference:13-729-R1
Date: February 2020

PHASE I GEOENVIRONMENTAL SITE ASSESSMENT

Manchester Life Phase 3
Land to the north and south of Jersey Street,
Manchester,
M4 6JW

Prepared for:
Manchester Life

Report Ref: 13-729-R1
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EXECUTIVE SUMMARY

Site Address	Land to the north and south of Jersey Street, Manchester, M4 6JW	
Grid Reference	E 385200, N 398770	
Site Area	1.54 Hectares	
Current Site Use	The site comprises three parcels of land referred to as Parcel A, B and C. **Parcel A** Parcel A comprises several structures with multiple uses. A textile Waste Merchant is present in the north west occupied by Frank Hitchen and is referred to as Unit 1. The north east of the site is occupied by two adjacent secured car parks and works buildings are present directly behind the car parks. The south of the site is currently a construction site occupied by Eric Wright containing site cabins, offices and building materials such as bricks. A dance bar, fashion clothing offices occupied by Daisy Street and a depot are located to the far south west. **Parcel B** Parcel B is currently surfaced by hardstanding and is used as a car park operated by Manchester Life. The parcel currently contains no structures with the exception of ticket machines, secured by metal fencing to the south, north and west and a brick wall to the west **Parcel C** The west of Parcel C comprises a warehouse occupied by Easy Equipment who are a catering supplier. The central sector is utilised as a car park and the far east is used to store building equipment including timber, boards and brick. There are also a number of waste rubble stockpiles comprising brick and concrete.	
Proposed Development	E3P understands that three adjacent sites referred to as Parcel A, Parcel B and Parcel C will be developed into residential high rise buildings with some commercial use to the ground floor.	
Environmental Setting	**Drift Geology**	Glacial Till (Devensian) – Diamicton (Clay, Sand and Gravel)
	Bedrock Geology	Manchester Marls Formation – Mudstone
	Faults	The Bradford Fault intersects the west of parcel B and downthrows to the south west.
	Hydrogeology	Secondary Undifferentiated aquifer strata overlying a Principal Aquifer to the east Parcel C and west of Parcel A and Secondary B Aquifer for the remainder of the site (Bedrock Geology).
	Hydrology	Historically mapping dated 1948 shows that Parcel A was formerly Intersected through the center by Bengal Arm canal. The Rochdale Canal is located immediately south of Parcel C and a canal basin is located 95 m south west of the site.

Environmental Setting	**Hydrology Continued**	There are no groundwater abstraction points located within 1 km of the site
	Flood Risk	The site is located within Flood Risk Zone 1 and is considered unaffected by river flooding.
	Ecology	A number of semi mature trees are present throughout Parcel C and the northern periphery of Parcel B which may provide a potential habitat.
	Subsidence Hazards	No hazard identified in data searches.
Site History	Historical mapping suggests that the Parcel A was occupied by the Phoenix works (south) with a canal (Bengal Arm) running east west though the centre of the site. The Phoenix works later became an Iron Works with an engineering works to the north of the canal (formally a canal wharf). The canal appears to have been infilled in the late 1950's. The site appears to have remained as various industrial works. Parcel B formally had the same canal branch running east west along the northern sector, again this appears to have been infilled in the mid / late 1950's. Parcel B was largely undeveloped with the exception of the canal and small buildings in the western sector. By the early 20th century it was listed as a corporation yard in the western sector. In the mid to late 20th century Parcel B was developed with industrial type buildings which remained in varying configurations. The former canal arm ran north south through the centre of Parcel C, again this is thought to have been infilled in the mid 20th century. The western sector was occupied by the Jersey Street Cotton Mills in the 19th century with various small structures in the east. In the early 20th century industrial works were constructed either side of the canal arm which remained until the latter 20th / early 21st century.	
Utility Locations	A formal GPR survey has been completed and combined with a review of online service plans and a detailed GPR survey have identified the following services within the site boundary: • 2W fibre optic cable intersects the centre of Parcel A • Low voltage electivity cables intersect Parcel A and C • BT intersecting Parcel A • Drainage in Parcel A and B • Medium power gas main in all sectors	

Landfill Sites and Ground Gases	There are no current or historic landfill sites within 250 m of the site. However, there are two areas of potentially infilled land (Two canal arms) within the site boundary and nine areas within 250 m of the site. There are likely varying depths of Made Ground generated from historical development, demolition works, infilling of canal and areas of potentially infilled land. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users.
Invasive Plant Species	No invasive plant species were identified during the site walkover.
Radon	Unaffected – No special precaution required.
Coal Mining/Land Stability	Geological mapping for the area notes that four seams are located to the north east of the site including Openshaw Coal Seam (875 m), Charlotte Coal (980 m), Bradford Threequarters Coal (1020 m) and Bradford Four Foot Coal (1030 m). All seams are dipping towards the site in a south westward direction. The closest seam to site is the Openshaw Coal Seam which would be circa 75 m beneath the east of the site and is therefore deemed to be of low risk. Geological mapping also shows that the Bradford Fault intersects the west of Parcel B and downthrows to the south west. There are no mine entries within 100 m of the site boundary. Based on the above the site has been deemed to be in an area of low risk and further assessment is therefore not required.

Geotechnical Assessment

The site is located within a coal mining reporting area, however is thought to be at low risk and further assessment is therefore not required.;

The underlying superficial geology will likely comprise a cohesive soil matrix and, as such, is not likely to offer the required degree of permeability to make soak-away drainage viable in this instance;

Footings will require deepening in accordance with NHBC guidance 2016 Chapter 4.2 if the development incorporates any existing and proposed trees within any cohesive drift deposits;

The site is generally topographically level due to historic levelling with the exception of Jersey street through the center that is elevated to accommodate the canal bridge. To construct the proposed development limited earthworks will be required to create a level developable platform;

Services have been identified within the site boundary. VSC would not be possible within close proximity to any sensitive infrastructure;

There is a retaining wall to the south of Parcel B which retains the elevated Jersey street section over the former canal to the south;

The Rochdale Canal is located immediately south of Parcel C;

Intrusive investigation will be required to assess the ground conditions and undertake in-situ geotechnical testing to determine possible foundation solutions; and

Any underground obstructions will require grubbing out in their entirety, prior to the construction of the proposed development.

Contaminated Land Risk Assessment

Human Health	Based on the information available to review, it is considered that there will be a moderate risk to human health as a number of sources of contamination have been identified in relation to historic land uses on all three parcels of the site. Hydrocarbon compounds and chlorinated solvents may be present due to historic iron works, chimney, factories, garage and builders yard in addition to underlying Made Ground and the infilled canal which formerly intersected all three parcels. A number of storage drums containing diesel and hydraulic oil were present throughout Parcel A during a site walkover. Material deemed to have a potential vapour risk may require delineation and a hotspot removal. The historic iron works is thought to be a source of heavy metals, in particular iron. The presence of deep Made Ground may also be a potential source of heavy metals, sulphates, asbestos and Polycyclic aromatic hydrocarbons (PAHs), however can be mitigated with the use of a 300 mm cover system to all landscaped areas

Controlled Waters	Historical industrial land uses on the site, including works, garage, factories and builders yard, as well as Made Ground represent potential sources of mobile hydrocarbon contamination. Glacial Till reduces the potential for migration of contaminants, if present, however, considering the underlying Secondary B Aquifer and Principal aquifer in addition to the Rochdale Canal located immediately south of Parcel C, there is considered to be a moderate risk to controlled waters. Intrusive investigation with chemical analysis of soil and groundwater samples is recommended to assess the presence of mobile contaminants and facilitate further risk assessment.
Ground Gas	There are likely varying depths of Made Ground generated from historical development, demolition works and infilling of canal. The Envirocheck report has also recorded two areas of potentially infilled land (water- Pond, marsh, river, stream, dock etc) within the site boundary and nine areas within 250 m of the site. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users. Carbon dioxide and methane have associated asphyxiation and explosive risks, respectively. Should a ground gas risk be identified to end users, the risks can be mitigated through the adoption of suitable control measures within the building construction using guidance presented within CIRIA 665 (Assessing Risk Posed by Hazardous Ground Gases to Buildings) and BS8485 (Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments).

RECOMMENDATIONS

A detailed Phase II intrusive Geo-Environmental Ground Investigation is currently being undertaken in order to confirm the findings of the initial conceptual site model and value engineer a development solution.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 4

1. INTRODUCTION 11
1.1. Background 11
1.2. Proposed Development 11
1.3. Objectives 11
1.4. Limitations 11
1.5. Sources of Information 12
1.6. Confidentiality 12

2. SITE SETTING 13
2.1. Site Details 13
2.2. Current Site Use 13
2.3. Surrounding Area 15

3. SITE HISTORY 16
3.1. On-Site Historical Development 16
3.2. Off-Site Historical Development 19
3.3. Planning History 20

4. ENVIRONMENTAL SETTING 22
4.1. Geology and Hydrogeology 22
4.2. Geotechnical Data 22
4.3. Coal Mining 23
4.3.1. Coal Mining Information 23
4.3.2. Coal Mining Geology 25
4.3.3. Recorded Coal Authority Workings 25
4.3.4. Coal Mining Risk Assessment 25
4.4. Hydrology 26
4.5. Radon Risk Potential 27
4.6. Industrial Land Uses 27
4.7. Hazardous Substance Consents 27
4.8. Sensitive Land Uses 28
4.9. Site Sensitivity Assessment 29
4.10. Preliminary Geotechnical Assessment 29
4.11. Unexploded Ordnance 32

5. CONSULTATIONS 33
5.1. Contaminated Land Officer 33
5.2. Landfill Sites and Waste Treatment Sites 33
5.3. Regulatory Database 33

6. INITIAL CONCEPTUAL SITE MODEL 35

7. CONCLUSIONS AND RECOMMENDATIONS 40
7.1. Site Summary 40
7.2. Contamination Issues 41
7.3. Geotechnical Issues 42

APPENDIX I LIMITATIONS 43

APPENDIX II GLOSSARY 45

APPENDIX III DRAWINGS 48

APPENDIX IV PHOTOGRAPHS 50

APPENDIX V HISTORICAL MAPS 55

LIST OF DRAWINGS

Drawing No 13-729-001 – Site Location Plan
Drawing No 13-377-002 – Site Features Plan
Drawing No 13-377-003 – Historical Features Plan

1. INTRODUCTION

1.1. BACKGROUND

E3P Ltd has been commissioned by Scott Hughes on behalf of their client Manchester Life to undertake a Phase I Geoenvironmental Site Assessment at a Manchester Life owned site known as Phase 3 at the back of Ancoats, located along Jersey Street, Manchester.

1.2. PROPOSED DEVELOPMENT

E3P understands that three adjacent sites referred to as Parcel A, B and C will be developed into residential high rise buildings with some commercial use to the lower floors. There is currently no proposed development plan made available to E3P for the subject site.

1.3. OBJECTIVES

The objectives of the geoenvironmental investigation are as follows:

- Review historical plans, geology, hydrogeology, site sensitivity, floodplain issues, mining records and any local authority information available in order to complete a desk study in line with Environment Agency (EA) document Model Procedures for the Management of Contaminated Land (Contaminated Land Report 11 (CLR11)).
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors.
- Assess the desk-study information and, where possible, provide preliminary recommendations in relation to foundations, pavement construction and floor slabs.
- Provide recommendations regarding future works required and undertake a preliminary pre-construction cost appraisal.

1.4. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.5. Sources of Information

Background information was sought from the following sources:

- Envirocheck Search;
- Historical mapping dated 1849 to 2019. A selection of historical maps are reproduced in Appendix V;
- On-line planning records held by Manchester City Council;
- Consultations with representatives of Manchester City Council;
- Magic Map Groundwater Vulnerability Map;
- Radon: Guidance on protective measures for new buildings (BRE Document BR 211, 2007);
- British Geological Survey Map;
- https://zeticauxo.com/downloads-and-resources/risk-maps/; and,
- https://flood-map-for-planning.service.gov.uk.

1.6. Confidentiality

E3P has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.

2. SITE SETTING

2.1. SITE DETAILS

TABLE 2.1 SITE DETAILS

Site Address	Land to the north and south of Jersey Street, Manchester, M4 6JW
National Grid Reference	E 385200, N 398770
Site Area	1.54 Hectares

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan is presented in Appendix III as Drawing 13-729-001.

2.2. CURRENT SITE USE

E3P has undertaken a site walkover of the entire site and a description of the key findings is summarised in Table 2.2.

TABLE 2.2 SITE DESCRIPTION

Occupancy/Use	The site comprises three parcels of land referred to as Parcel A, B and C. **Parcel A** Parcel A comprises several structures with multiple uses. A textile Waste Merchant is present in the north west occupied by Frank Hitchen and is referred to as Unit 1. The north east of the site is occupied by two adjacent secured car parks and works buildings are present directly behind the car parks. The south of the site is currently a construction site containing site cabins and offices. A dance bar, fashion clothing offices occupied by Daisy Street and a depot are located to the far south west. **Parcel B** Parcel B is currently surfaced by hardstanding and is used as a car park operated by Manchester Life. **Parcel C** The west of Parcel C comprises a warehouse occupied by Easy Equipment who are a catering supplier. The central sector is utilised as a car park and the far east is used to store building equipment including timber, boards and brick. There are also a number of waste rubble stockpiles comprising brick and concrete.

Structures	**Parcel A** A number of industrial units are present throughout Parcel A. A large brick walled warehouse is present to the north east which is occupied by A textile Waste Merchant known as Frank Hitchen and is referred to as Unit 1. The unit can be accessed by metal roller shutters to the north. There are four additional industrial works buildings located to the north east. Temporary construction site cabins and offices are located to the south east. A large brick walled depot is located to the far south west adjoined by a two storied a brick walled dance bar. A three storied building is also located to the north east utilised as a fashion clothing office with an adjacent garage. The south and eastern boundary is also secured by a large brick wall circa 6 m high and the north is secured by metal, brick and wooden fencing. **Parcel B** Parcel B is currently surfaced by hardstanding and contains no structures with the exception of a ticket machines, secured by metal fencing to the south, north and west and a brick wall to the west **Parcel C** A large brick walled warehouse is present in the west which can be accessed by metal roller shutters and is occupied by Easy Equipment catering suppliers. The Parcel is also secured by metal fencing around the periphery.	
Access	**Parcel A** Parcel A can be accessed along the southern boundary via Jersey Street. **Parcel B** Parcel B can be accessed via Jersey Street along the southern boundary. **Parcel C** Parcel C can be accessed via Jersey Street along the northern boundary.	
Slope	Due to previous historic development the site has been levelled and there are no major topographical features present. However, Parcel A falls in elevation from north to south from Naval Street to Jersey Street.	
Retaining Structures	There is a retaining wall to the south of Parcel B which retains Jersey street that is raised over the historic canal bridge. There is also a small brick retaining wall to the south of Parcel A integral to the former factory wall retaining the land to the south on Jersey Street and land to the east on Poland Street. This will need to be assessed by a structural engineer prior to demolition and redevelopment.	
Surface Cover (%)	Buildings:	20%
	Hardstand:	70%
	Soft cover:	10%
Vegetation/Ecology	The site is predominantly surfaced by hardstanding, however a number of semi mature trees are present in throughout Parcel C and the northern periphery of Parcel B.	

Hazardous Material Storage	All three parcels have undergone significant historic development and former uses include engineering and iron works, factories, garage and builders yard. It is therefore deemed likely that hazardous substances will have been stored within the site boundary including storage tanks. Several drums containing diesel and hydraulic oil were present throughout Parcel A during a site walkover.
Asbestos-Containing Material (ACM)	No evidence of ACM was noted across the site during the site walkover. However, due to the age of the buildings and Made Ground it is likely that ACM may be present within existing buildings and a pre-demolition asbestos survey may be required.
Polychlorinated Biphenyls (PCBs)	There is no equipment identified which may contain PCBs within the site boundary.
Waste Storage	Potentially hazardous waste streams may have been previously generated at the site due to historical land uses including several works buildings; however none were observed during the preliminary site inspection. Several drums containing diesel and hydraulic oil were present throughout Parcel A.
Drainage	A GPR survey and a review of online services shows utility services are present within all three parcels and along Jersey Street to the south.

2.3. Surrounding Area

The surrounding area land uses are summarised in Table 2.3.

TABLE 2.3 SURROUNDING LAND

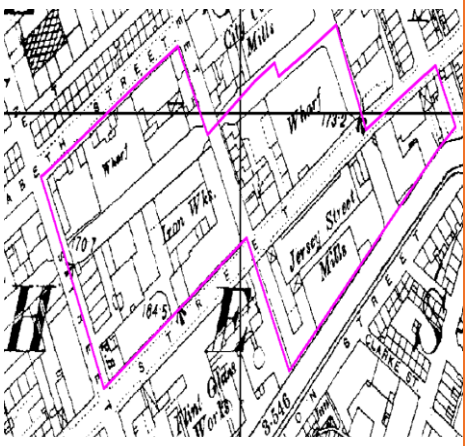
DIRECTION	LAND USE
North	Industrial units, R K Ross & Co (manufacturer), DM Miller (flooring shop), Wholesale Budget Flooring (flooring shop), Rylands of Manchester (removal company), car park and House of Ethnic Foods (food products supplier).
East	Car Park and Residential housing.
South	Rochdale Canal, Residential housing and vacant grassland.
West	Ancoats Car Park, apartments, SMC Coach Hire and charity shop.

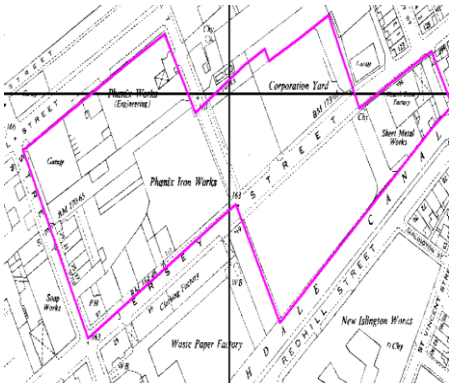
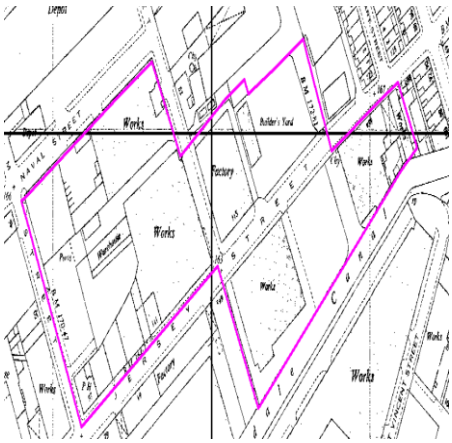
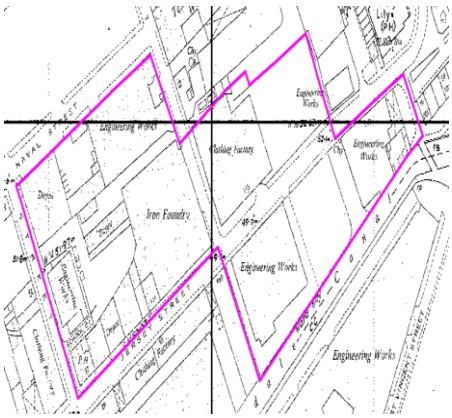
3. SITE HISTORY

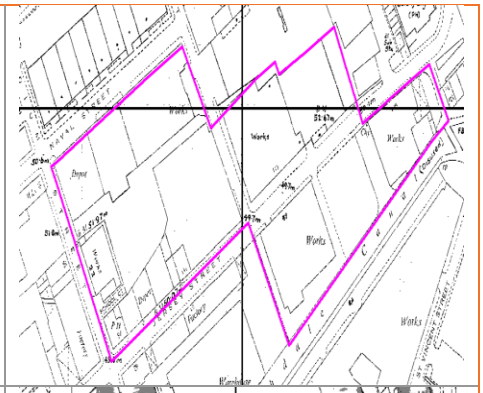
3.1. ON-SITE HISTORICAL DEVELOPMENT

A review of historical mapping pertinent to the site is summarised in Table 3.1 below.

TABLE 3.1 SITE HISTORICAL DEVELOPMENT

MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1893 **1:2500**	**Parcel A** Parcel A is entirely surfaced by buildings and intersected by a canal in the center. An Iron Works is present in the south east and a canal Wharf is located in the north off Bengal Arm. **Parcel B** The Parcel comprises a large Wharf in the eastern portion and numerous smaller buildings located to the east. The canal branch runs along the north and east. **Parcel C** The parcel comprises a number of large structures referred to as Jersey Street Mills.	
1908 **1:2500**	**Parcel A** The canal intersecting parcel A is referred to as Bengal Arm. The Wharf in the north of the site has been infilled and divided into a number of smaller buildings referred to as Iron Works. The buildings in the south west of the site are now referred to as a Glass Works. **Parcel B** The Wharf in this parcel has also been infilled and is now referred to as a Corporation Yard. **Parcel C** The Jersey Street Mill building to the west is now referred to as Jersey Street Dwellings and the north of the structure has been sub divided into a number of smaller structures.	

1952-1955 **1:2500**	**Parcel A** The Iron Works located to the south east is now referred to as Phoenix Iron Works. The structures located in north east is also referred to as Phoenix Works (engineering). A garage is now present in the north west. The canal is no longer present. **Parcel B** The structures previously noted in the west are no longer present. The canal is no longer present. **Parcel C** All buildings in the west have been demolished. A chimney is present in the north east. A sheet metal works is present in the east in addition to a factory.	
1958-1982 **1:1250**	**Parcel A** The rectangular building present in the center is now referred to as a warehouse and the parcel no longer appears to be intersected by a canal. **Parcel B** The Corporation Yard present in the east is referred to as a builders yard. A structure has been developed to the west referred to as a factory. The canal is no longer present. **Parcel C** A works building has now been developed in the east of the site. The canal is no longer present.	
1958-1985 **1:1250**	**Parcel A** The garage located to the north west and the warehouse located in the center are now referred to as depots. There is also an additional depot located to the south. An engineering works building is now present in the central western sector. **Parcel B** The factory located to the west is now specified as a clothing factory. **Parcel C** There have been no significant changes in parcel C.	

1979-1990 **1:1250**	**Parcel A** The depot located in the center of the site has been demolished. **Parcel B and C** There have been no significant changes in parcel B and C**.**	
1988-1989 **1:1250**	**Parcel A** The structure in the south east is now referred to as a warehouse. **Parcel B** There have been no significant changes in parcel B**.** **Parcel C** The structure in the west is now referred to as a warehouse.	
Envirocheck satellite image **2000**	**Parcel A** There have been no significant changes. **Parcel B** The works building to the east has been demolished. The parcel appears to be vacant and surfaced by hardstanding. **Parcel C** The works building located to the east has been demolished.	

3.2. Off-Site Historical Development

Given the highly industrialised nature of the surrounding area a review of potentially contaminative uses identified on historical Ordnance Survey maps within a 100 m radius of the site is summarised in Table 3.2.

TABLE 3.2 SURROUNDING POTENTIALLY CONTAMINATIVE LAND USES

SURROUNDING FEATURE	DISTANCE	DATES	DIRECTION
Rochdale Canal	1m	Pre1893 - Present	South
Flint Glass Works	7m	Pre1893 - Present	South
Corn Mill …Then City Flour Mill …Then Soap Works …Then Works …Then Factory	10m	1908-1922 1922-1948 1948-1958 1958-1988 1988-Present	West
City Corn Mills …Then Glass Works …Then Calico Printing Works …Then unlabelled	10m	Pre1893 – 1908 1908-Pre1948 Pre1948-1989 1989-Present	North
Soap Works …Then Clothing Factory …Then Factory	10m	1948 – Pre1958 1958 – Pre1988 1988 - Present	West
Chimney	10m	1908 – Post 1991	North
Chimney	15m	1908 – Pre1948	East
New Islington Works	20m	Post 1922-Present	South
Street Mains Department (Gas) …Then Corporation Yard …Then Portland Street Industrial Estate	30m	Pre1983-Post1948 1948-Pre1979 1979-Present	North
Cotton Mills …Then Warehouse …Then no longer marked	40m	Pre1893 – 1967 1967-Pre1988	South West
Depository …then industrial units	50m	1948-1979 1979-Present	North
Wharf …Then no longer marked	50m	Pre1893-Pre1922	North East
Garages …Then no longer marked	60m	1948-1953	West
Steel Works …Then St Vincents Home …Then Vincents Electrical Works …Then no longer marked	80m	Pre1893 – Pre1908 1908-Pre1948 1948 – Pre1979	South East
Electricity Sub Station	90m	1908-Present	North West
Paint Works …Then Warehouse	90m	1948-1952 1952-Present	North
Chimney	95m	1908 – Post 1992	South

3.3. PLANNING HISTORY

E3P has undertaken a detailed search of on-line planning records held by Manchester City Council which has identified that there have been some previous planning applications relating to the site. These have been detailed in Table 3.3, 3.4 and 3.5.

TABLE 3.3 PREVIOUS PLANNING APPLICATIONS PARCEL A

PLANNING APPLICATION	DETAILS	DATE	OUTCOME
070653/FU/2004/N1	Change of use from estate agents and fabric suppliers [Class A2/Class B8] to design and photography studio [class B1]	Fri 26 Mar 2004	Approved
080131/FO/2006/N1	Siting of a mobile catering unit within car park for a period of two years	Mon 09 Oct 2006	Approved
093163/CC/2010/N1	Demolition of warehouse premises and part demolition of boundary walls along Jersey Street and Poland Street	Tue 11 May 2010	Approved
042930/FU/NORTH2/93	Retrospective application for change of use of part of metal works to aluminum melting works and erection of 24m high chimney	Wed 14 Apr 1993	Approved
8 of 8 Application 046041/FO/NORTH2/94	Extension to single story factory	Mon 24 Oct 1994	Approved
099861/FO/2012/N1	Elevational alterations including replacement windows and bricking-up of ground floor window opening on rear elevation, in conjunction with use of premises as 2 no. shop units (Use Class A1) at ground floor level and 1 no. 3-bed flat above	Mon 10 Sep 2012	Approved

TABLE 3.4 PREVIOUS PLANNING APPLICATIONS PARCEL B

PLANNING APPLICATION	DETAILS	DATE	OUTCOME
059269/FO/NORTH2/00	Construction of 2.40m high steel rolled paladin fencing and double leaf access gate	Thu 06 Jul 2000	Approved
078411/FO/2006/N1	Use of land as a 102 space surface car park for a temporary period of two years	Mon 06 Feb 2006	Temporarily Approved

TABLE 3.5 PREVIOUS PLANNING APPLICATIONS PARCEL C

PLANNING APPLICATION	DETAILS	DATE	OUTCOME
078193/FO/2006/N1	Erection of part four/five/six/seven/eight storey buildings comprising 110 residential units and six A1, A2, A3 and B1 units (462 square metres in total) with associated car parking, landscaping and works to canal arm (AMENDED TITLE)	Tue 28 Feb 2006	Application withdrawn
084773/FO/2007/N1	Erection of 7 storey building with commercial units at ground floor and 103 apartments on the remaining 6 floors with associated basement car parking and landscaping	Fri 16 Jan 2009	Withdrawn
084774/CC/2007/N1	Demolition of the existing building followed by the redevelopment of the site for 103 apartments and 7 commercial units in a seven storey building	Fri 16 Jan 2009	Withdrawn
121669/FO/2018	Continued use of land as a temporary contractors compound including the siting of 3 silos in association with nearby construction works for a period of 24 months until 23 October 2020	Thu 25 Oct 2018	Temporarily Approved

4. ENVIRONMENTAL SETTING

4.1. GEOLOGY AND HYDROGEOLOGY

The British Geological Survey (BGS) map for the site, (1:50,000, Solid and Drift edition) and online records indicate that the site is underlain by the geological sequence presented in Table 4.1.

TABLE 4.1 SUMMARY OF UNDERLYING GEOLOGY

GEOLOGICAL UNIT	CLASSIFICATION	DESCRIPTION	AQUIFER CLASSIFICATION
Drift	Glacial Till (Devensian)	Diamicton (Clay, Sand, Gravel)	Secondary Undifferentiated
Solid	Manchester Marls Formation	Mudstone	Principal Aquifer (East Parcel C and west of Parcel A) Secondary B Aquifer (remainder of the site)

TABLE 4.2 SUMMARY OF BGS BOREHOLE RECORDS

LOCATION	DEPTH	MADE GROUND	DRIFT	SOLID
161 m north west **(Sj89ne652)**	12.00 m	Ash and reworked clay .4.27 m	CLAY 12.00 m	N/A
179 m north **(Sj89ne651)**	12.00 m	Ash 2.00 m	CLAY and SAND 12.00 m	N/A
202 m West **(Sj89nw205)**	122.99 m	N/A	CLAY, SAND and GRAVEL 22.86 m	SANDSTONE and MUDSTONE 122.99 m
266 m east **(Sj89ne1)**	7.32 m	Type not specified 0.20 m	CLAY 7.32 m	N/A

4.2. GEOTECHNICAL DATA

Geotechnical data presented within a commercially available environmental database is summarised within Table 4.3.

TABLE 4.3 SUMMARY OF GEOTECHNICAL DATA

HAZARD	DESIGNATION
Shrink-Swell Clay	Very Low Risk
Landslides	Low Risk
Ground Dissolution	No Hazard
Compressible Ground	No Hazard
Collapsible Deposits	Very Low Risk
Running Sand	Very Low Risk
Natural Cavities	None recorded within 2000m
Manmade Cavities	None recorded within 2000m

4.3. Coal Mining

The Envirocheck Report states the site is in an area that may be affected by coal mining.

A Coal Authority Mining Report was obtained (Ref: 51002189613001) dated 14th November 2019.

The Coal Authority operates a risk-based approach to the assessment of potential instability issues associated with future development of land located within the predefined Coal Authority Consultation Areas. This risk-based approach subdivides the potential risk into "Low" and "High" risk categories.

The risk categories can be defined as:

Low-Risk Sites – Deemed to be land where coal mining has taken place, however it was at such depth not to pose a risk to new development and it therefore contains no known recorded risks and as such no further assessment is required.

For low-risk sites, the CA categorically states:

> *If your proposed development is within the Development Low Risk Area there is no need for you to submit any coal mining information with your planning application and The Coal Authority will not be consulted by the LPA. The LPA will include our Standing Advice as an informative note within the decision notice.*

High-Risk Sites – Deemed to be landholdings located within an area known to contain legacy risks that include:

- Mine entries (shaft or adit);
- Shallow coal workings (recorded and probable);
- Workable coal seam outcrops;
- Mine gas sites and areas;
- Recorded coal-mining-related hazards;
- Geological features (fissures and break lines); and
- Former surface mining sites (sometimes using historic opencast extraction methods).

4.3.1. Coal Mining Information

Prior to the enactment of the Coal Mines Regulation Act (1872), which came into force on the 1st January 1883, there was no statutory requirement to record the extent of abandoned mine workings and as such the Coal Authority has no knowledge of extensive workings throughout the UK Coal Fields where shallow workings are present at a depth which could result in a subsidence event in the future (through successive cavitation) associated with failure of support mechanism.

To determine if a site may have unrecorded or recorded coal mine workings requires a consideration of a wide range of information and E3P has completed a review of relevant information in relation to potential coal mining activities. Table 4.4 provides a summary of pertinent coal mining information.

TABLE 4.4 COAL MINING INFORMATION

SOURCES OF INFORMATION	SUMMARY
Coal Authority Mining Report	The Coal Authority Mining Report (Ref: 51002189613001) dated 14th November 2019 has been obtained for the subject site by E3P. This report confirmed that: • The property is within a surface area that could be affected by past underground mining from a number of seams; • The site is not within an area affected by probably unrecorded shallow workings; • There are no known coal mine entries within, or within 100 metres of, the site boundary; • There may, however, be mine entries in the local area for which the Coal Authority has no knowledge; • There are no faults, fissures or breaklines recorded; • There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property; • The Coal Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining; and • The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.
Coal Authority Interactive Map	The site is not located in a high risk area and there are no mine entries within 100 m of the site. There are several coal seams to the north east of the site, the closest of which is circa 875 m away from the site boundary. All coal seams dip towards the site in a south westward direction.
British Geological Survey Mapping	The 1:10,000 geological mapping for the area notes area notes that four seams are located to the north east of the site including Openshaw Coal Seam (875 m), Charlotte Coal (980 m), Bradford Threequarters Coal (1020 m) and Bradford Four Foot Coal (1030 m). All seams are dipping towards the site in a south westward direction. The closest seam to site is the Openshaw Coal Seam which would be circa 76 m beneath the east of the site and is therefore deemed to be of low risk. There are no mine entries within 100 m of the site boundary.
Review of Coal Authority Archive	No Coal Authority archives/mine abandonment plans are made available.
Historical Ordnance Survey Mapping	A review of the 1:10,000 Ordnance Survey mapping from circa 1848 records a number of collieries at the 1km buffer to the north east of the site including St Georges Colliery.
Historical Site Investigations	E3P has not been provided with any historic site investigation reports.

4.3.2. Coal Mining Geology

Geological mapping for the area notes area notes that four seams are located to the north east of the site including Openshaw Coal Seam (875 m), Charlotte Coal (980 m), Bradford Threequarters Coal (1020 m) and Bradfort Four Foot Coal (1030 m). All seams are dipping towards the site in a south westward direction. The closest seam to site is the Openshaw Coal Seam which would be circa 75 m beneath the east of the site and is therefore deemed to be of low risk. Geological mapping also shows that the Bradford Fault intersects the west of parcel B and downthrows to the south west.

There are no mine entries within 100 m of the site boundary.

The data is summarised in Table 4.5.

TABLE 4.5 SUMMARY OF COAL MINING GEOLOGY

COAL SEAM	THICKNESS	OUTCROP	DEPTH
Openshaw Coal Seam	TBC	Outside site boundary (875 m north east)	75 m
Charlotte Coal	TBC	Outside site boundary (980 m north east)	85 m
Bradford Threequarters Coal	TBC	Outside site boundary (1020 m north east)	89 m
Bradfort Four Foot Coal	122 cm	Outside site boundary (1030 m north east)	90 m

4.3.3. Recorded Coal Authority Workings

There have been no recorded workings within the site boundary.

4.3.4. Coal Mining Risk Assessment

This risk assessment comprises a desk-based review of all available information on the coal mining issues that are relevant to the application site, deemed to be located within a “High Risk” area. This includes:

- Interpretation of information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of issues;
- Setting out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development; and
- Demonstrating to the local planning authority that the application site is, or can be made, safe and stable to meet the requirements of national planning policy with regard to development on unstable land.

The coal mining risk assessment is summarised in Table 4.6.

TABLE 4.6 SUMMARY OF COAL MINING RISK ASSESSMENT

COAL MINING RISK ASSESSMENT	YES/NO	RISK ASSESSMENT
Recorded Underground Coal Mining at Shallow Depth (< 30 m)	No	Low
Recorded Underground Coal Mining at Shallow Depth (> 30 m)	Yes	Moderate
Unrecorded Underground Coal Mining at Shallow Depth (< 30 m)	No	Low
Mine Entries (Shaft/Adits)	No	Low
Coal Mining Geology – Fractures/Fissures	No	Low
Recorded Gas Emissions	No	Low
Recorded Mining Surface Hazard	No	Low
Surface Mining (Opencast)	No	Low

Based on the above the site has been deemed to be in an area of low risk and further assessment is therefore not required.

4.4. HYDROLOGY

Historically mapping dated 1948 shows that parcel A and b have been formerly interested through the center by Bengal Arm canal. The Bengal and nearby Prussia Street Arms of the Rochdale canal in the south lead to former Wharfs that previously underly parts of the site.

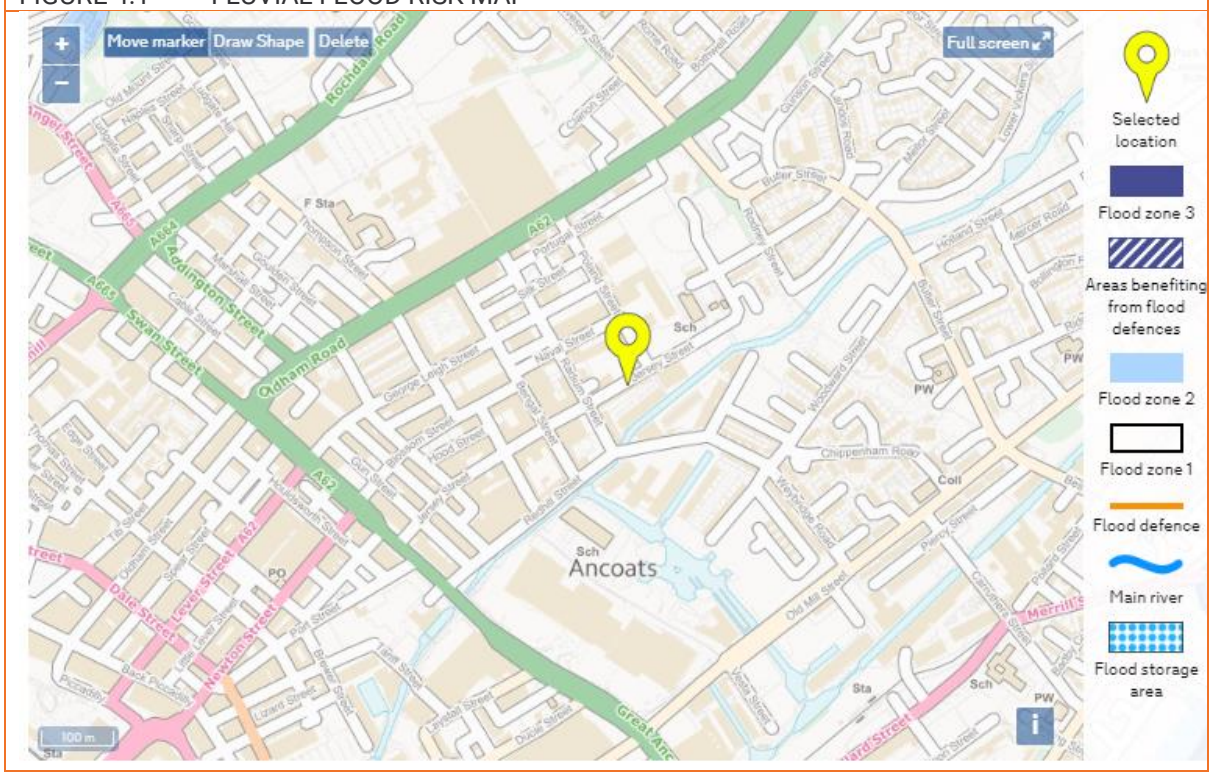
The Rochdale Canal is located immediately south of parcel C and a canal basin is located 95 m south west of the site.

There are no groundwater abstraction points located within 1 km of the site.

The site is located within a currently defined Flood Risk Zone 1; defined as land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (<0.1%), and as such is considered to be unaffected by river flooding. In addition, the Envirocheck Report states there is a limited potential for groundwater flooding to occur at the site.

The Fluvial Flood Risk Map is presented in Figure 4.1.

FIGURE 4.1 FLUVIAL FLOOD RISK MAP



Source - https://flood-map-for-planning.service.gov.uk/

4.5. RADON RISK POTENTIAL

The Envirocheck Report indicates the site is situated in an area where less than 1% of homes are above the Action Level and that the BGS reports that full radon protective measures are not necessary in the construction of new dwellings or extensions.

4.6. INDUSTRIAL LAND USES

There are three contemporary trade directory entries located within the site boundary. Easy Equipment is located within the east of parcel C. Freeflow Production manufacturers are located to the south of parcel A and Made In Manchester Ltd, classified as a clothing and fabric manufacturers are located to the north of parcel A.

There are 33 additional contemporary trade directory entries located within 250 m of the site, the closest of which relates to D M Miller Ltd (25 m north west), classified as a flooring manufacturers and Altimo Clothing Co (25 m north west), classified as a clothing and fabric manufacturers.

There are four fuel station entries located within 1km of the site which relate to Blossom Motor Company (420 m west), Rochdale Road Service Station (485 m north west), Smithfield Service Station (526 m west) and Impact Services Ltd (800 m north east).

4.7. HAZARDOUS SUBSTANCE CONSENTS

The Envirocheck Report confirms the absence of the following Hazardous Installations within 500m of the site:

- Control of Major Accident Hazard (COMAH) Sites;
- Explosive Sites;
- Notification of Installation Handling Hazardous Substances (NIHHS);
- Planning Hazardous Substance Consents; and
- Planning Hazardous Substance Enforcements.

4.8. Sensitive Land Uses

The site has been deemed to be located within a high sensitivity setting.

There is a nitrate vulnerable zone located 37 m north west of the site. There are also residential houses located 30 m south of parcel C.

The aquifer classification in the bedrock is a Principal Aquifer (East parcel C and west of parcel A)

The Rochdale Canal is located immediately south of parcel B and a canal basin is located 95 m south west of the site.

No other environmentally sensitive land uses have been identified within close proximity to the site.

4.9. SITE SENSITIVITY ASSESSMENT

The site is assessed to be located within a **high** sensitivity setting as discussed within Table 4.17.

TABLE 4.7 SITE SENSITIVITY ASSESSMENT

SENSITIVITY PROFILE	DISCUSSION	RATING
Sensitive Land Uses Within Close Proximity (e.g. Residential, School, Nursery, Local Nature Reserves)	There is a nitrate vulnerable zone located 37 m north west of the site. There are also residential houses located 30 m south of parcel C.	**Moderate**
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site is not located within a Groundwater Source Protection Zone or Drinking Water Safeguard Zone	**Low**
Distance to the Closest Groundwater Abstraction Point	There are no groundwater abstraction points located within 1km of the site.	**Low**
Aquifer Classification in Superficial Drift Deposits	The underlying superficial deposits located within the Secondary undifferentiated aquifer are likely to comprise gravelly sands interbedded with low-permeability clay soils to depths in excess of 5 m, which may reduce the potential for mobile phase contaminants to migrate towards the bedrock aquifer.	**Low**
Aquifer Classification in Bedrock	Principal Aquifer (east parcel C and west of parcel A) Secondary B Aquifer (remainder of the site)	**Moderate**
Is the Site Underlain by Low-Permeability Drift to Depths in Excess of 10 m?	Nearby BGS boreholes records confirm the presence of granular deposits interbedded with CLAY to 5.0 m bgl.	**Low**
Is the Site Located Within 50 m of a Surface Watercourse?	The Rochdale Canal is located immediately south of parcel B and a canal basin is located 95 m south west of the site, not considered in hydraulic continuity given the managed nature of the watercourse. No natural streams or rivers are present within 50m of the site.	**Low**
OVERALL SITE ENVIRONMENTAL SENSITIVITY		**Low**

4.10. PRELIMINARY GEOTECHNICAL ASSESSMENT

E3P has completed an assessment of potential geotechnical constraints based on the available desk-study information within the context of the proposed residential/commercial development. This assessment is summarised in Table 4.8.

TABLE 4.8 SUMMARY OF POTENTIAL GEOTECHNICAL CONSTRAINTS

POTENTIAL ABNORMAL CONSTRAINT	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Remediation of Contaminated Soils	On site	TBC	Hydrocarbon compounds may also be present due to historic land uses including the former garage, works and factories. Material deemed to have a potential vapour risk may require hotspot removal, resulting the requirement to backfill the resulting void. Should significant backfill be needed deeper or specialist foundations may be required in those areas.
Obstructions	All	100	Site has been subject to significant historical development and, while above-ground structures have been removed, potential subsurface obstruction from relict foundations, chimney and slabs remain.
Artificially Levelled and Filled Platforms	N/A	N/A	The site appears to have been levelled and artificially backfilled.
Retaining Walls	South and south west parcel B and south parcel B	10	There is a retaining wall to the south of parcel B which retains Jersey street to the south. This feature elevates to a point in the south eastern corner of parcel b where the former canal bridge is evident that supports jersey street over the former canal. There is also a brick retaining wall to the south of parcel A retaining the land to the south on Jersey Street and land to the east on Poland Street. This will need to be assessed by a structural engineer prior to development as it is integral to the former factory wall.
Trench Collapse	All	100	Made Ground present beneath the site is likely to be loosely compacted and possibly prone to collapse.
Infilled canal	North parcel B, center parcel a, west parcel c	5	The Bengal Arm Canal historically intersected the center of parcel a, north of parcel b and west of parcel c which has now been infilled. The former infilled canal will need to be clearly identified and investigated to assess the nature of materials and extent of any organic or deleterious elements.
Mature Trees	Periphery parcel B and C	35	Arboriculture survey required to determine areas of potential tree influence. The site is predominantly surfaced by hardstanding, however a number of semi mature trees are present in throughout parcel C and the northern periphery of parcel B.

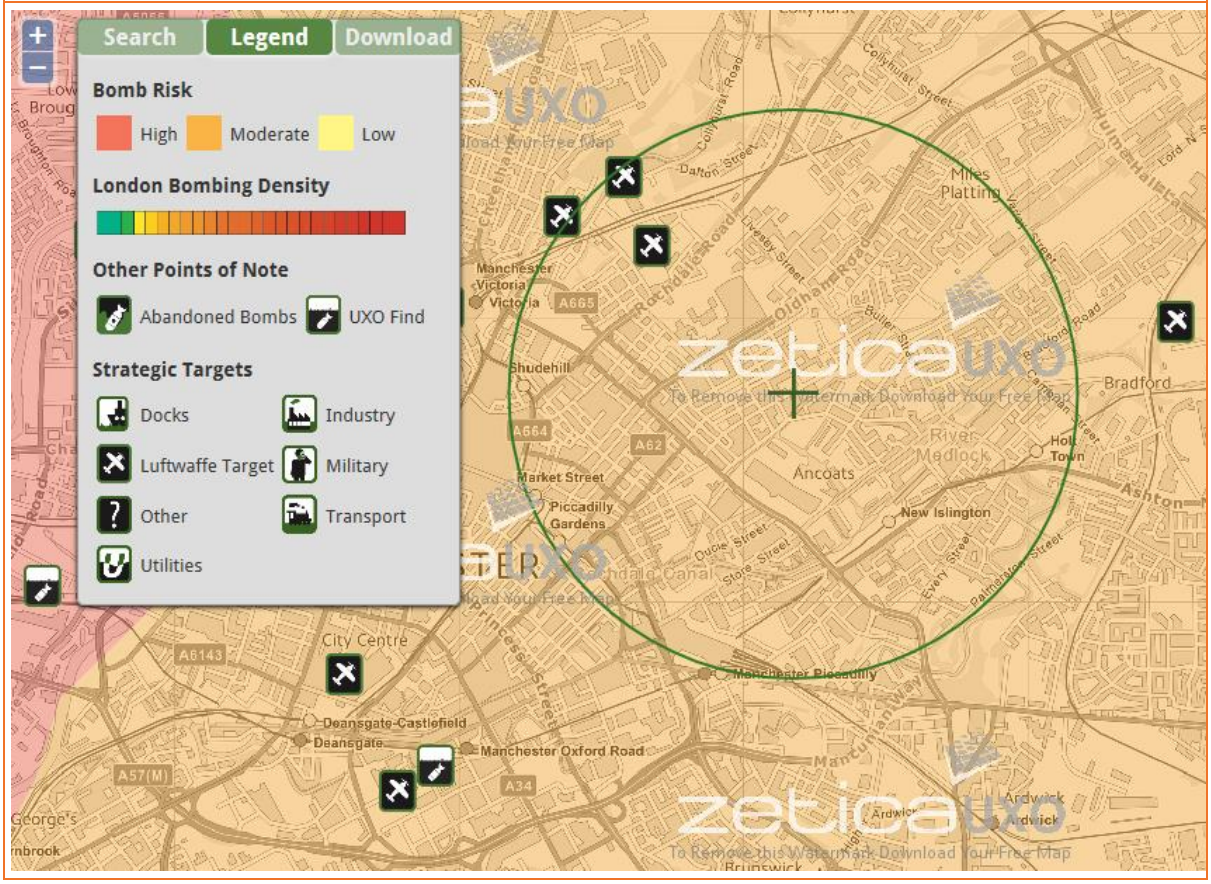
POTENTIAL ABNORMAL CONSTRAINT	LOCATION ON SITE	ESTIMATED AREA OF SITE AT RISK (%)	ASSESSMENT AND MITIGATION
Volume Change Potential Clay	On site	80	The site is likely to be underlain by cohesive and granular soils. Should cohesive soils be present, an assessment of the volume change potential will be required, and therefore heave precautions may be required at the site. The full extent of precautions will only be determined after site investigation.
Running Sands	N/A	N/A	Data searches indicate low risk.
Ground Dissolution	N/A	N/A	Data searches indicate no hazard.
Concrete Design	TBC	-	The full extent of concrete design will be determined after site investigation.
Low-Permeability Ground	On site	70	Soakaways unlikely to be effective in areas where low permeability cohesive deposits are present or where areas of potentially contaminated soil and groundwater are present.
Services/Sensitive Structures	-	-	A review of online services has identified a number of services within the site boundary as well as the canal which should be considered sensitive in this case. Piling may not be possible within close proximity to any sensitive infrastructure.
Abnormal Foundation Solutions	TBC	TBC	Should significant Made Ground and soft clays be identified on site, that will be subject to volume change an abnormal foundation solution (MTF, VSC, Pile) may be required. Intrusive site investigation will be required to determine the required foundation solution however it is assumed that a piled foundation will be required due to the high rise development load.

4.11. UNEXPLODED ORDNANCE

The regional unexploded bomb risk map from Zetica indicates that the site is in an area at low risk from possible Unexploded Ordnance (UXO) resulting from the Second World War. (Zetica, 2014). The Zetica UXO Risks Map is presented in Figure 4.4 (below).

As the site is within the high-risk area, it is recommended that further detailed assessments are carried out to establish the level of risk and the potential need for mitigation.

FIGURE 4.2 ZETICA UXO RISKS MAP



Source: https://zeticauxo.com/downloads-and-resources/risk-maps/

5. CONSULTATIONS

5.1. CONTAMINATED LAND OFFICER

E3P has submitted an enquiry on with the Contaminated Land Officer at Manchester City Council regarding potential contaminated land issues and/or development constraints.

E3P received a response from Robert Willcock – Neighbourhood Officer Environmental Protection who provided the below response:

Further to your request for information relating to the above property, I can confirm the following:

- *Manchester City Council are aware of past land uses on the site and surrounding area.*
- *The council have not identified the site or surrounding area as being contaminated land as defined under the Environmental Protection Act 1990, Part 2A.*
- *The council have not assigned a risk rating to the site, and have no current proposals to investigate the site or surrounding area under the Environmental Protection Act 1990, Part 2A.*

5.2. LANDFILL SITES AND WASTE TREATMENT SITES

There are no current or historic landfill sites within 250 m of the site. However, there are two areas of potentially infilled land (wharfs and canal arms) within the site boundary and nine areas within 250 m of the site.

However, there are likely varying depths of Made Ground generated from historical development, demolition works, infilling of canal (centre of parcel A) and areas of potentially infilled land. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users.

5.3. REGULATORY DATABASE

The information summarised in Table 5.1 has been obtained from a commercially available environmental database. The summary table only includes records from within 250 m of the subject site and not otherwise detailed in the report.

TABLE 5.1 SUMMARY OF ENVIRONMENTAL DATA

RECORD	ENTRIES WITHIN 250 m	DETAILS
Contaminated Land Register Entries and Notices	0	None Identified (N/A).
Authorised Industrial Processes (IPC/IPPC/LAPPC)	3	There are two LAPPC within the site boundary relating to Bill Howarth Metals and An onsite Air Pollution Control Enforcement Notice in the west of the site. Additionally, there is one LAPPC 14 m south west of the site relating to Presbar Diecastings Ltd.
Fuel Stations Entries	0	N/A
Licensed Radioactive Substances	1	Named Umist with a permit reference AC8886 authorisation by the Environment Agency under S7 RSA for use and keeping of radioactive materials.
Enforcements, Prohibitions or Prosecutions	0	N/A
Discharge Consents	0	N/A
Pollution Incidents	0	N/A
Consents Issued Under the Planning (Hazardous Substances) Act 1990	0	N/A
Control of Major Accident Hazard (COMAH) Sites	0	N/A

6. INITIAL CONCEPTUAL SITE MODEL

In accordance with Environment Agency, LCRM (2019) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), E3P Ltd has developed an initial CSM to identify potential contamination sources, migration pathways and receptors within the study area. This is summarised within Table 6.1

TABLE 6.1 INITIAL CONCEPTUAL SITE MODEL

CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK
Human Health				
Heavy metals, petroleum hydrocarbons and PAH associated within (Made Ground, works, garage, factories, builders yard, corporation yard)	**Dermal contact. Dermal contact and ingestion.**	**Future site users**	**Likely**	**High**
Assessment Historical industrial land uses on and in the vicinity of the site including engineering and iron works, factories, garage and builders yard. Such uses are potential sources of heavy metals, total petroleum hydrocarbons and Polycyclic Aromatic Hydrocarbons (PAHs). Made Ground associated with historical infilling and demolition activities, may contain ash deposits, a source of heavy metals and PAHs. If present heavy metals and non-volatile PAH may pose a short-term risk to construction workers who may come into contact with impacted soils during earthworks. However, this risk can be mitigated through the use of appropriate Personal Protective Equipment (PPE) and the provision of adequate welfare facilities. Future residential users may come into contact with impacted soils within any garden and landscaped areas. If impacted soils are identified then localised remediation or an appropriate cover system, designed in accordance with BRE465 (Cover Systems for Land Regeneration), will mitigate the risk. Due to the historic nature of the site as a works and extensive railway sidings, it is likely the proposed development will require the installation of a cover system within proposed soft standing areas.				
Volatile Contaminants such as hydrocarbons, chlorinated solvents (Garage, works and factory)	**Inhalation of vapours. Migration through permeable strata and preferential pathways.**	**Future site users. Off-site receptors.**	**Likely**	**Moderate**
Assessment Made Ground across the site resulting from historic development (works and infilling) may be a potential source of hydrocarbon compounds, volatile TPHs, chlorinated solvents and volatile PAHs, such as Naphthalene. Testing for the above including SVOCs and VOCs and TPHs in particular will be necessary.				

CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK
Hydrocarbon compounds, chlorinated solvents and volatile PAHs pose a risk to construction workers during earthworks. Construction works should be undertaken using the appropriate Personal Protective Equipment (PPE) to ensure they are at no unacceptable risk. Future residential end users may come into contact with impacted soils in garden and landscaped areas, though the main pathway of volatile compounds is considered to be vapour inhalation indoors. If identified it is likely that additional remediation of impacted soils and/or perched groundwater will be required to mitigate the risk to future residential end users.				
Asbestos Containing Materials (ACM) within Made Ground	**Inhalation of dust.**	**Future site users.** **Buildings.** **Off-site land users.**	**Likely**	**Moderate**
Assessment Due to the age of the former buildings, it is anticipated that asbestos is present within the Made Ground. ACM poses a risk through fibre and dust inhalation and if present may pose a risk to construction workers during any future earthworks / demolition and to adjacent third-party property should dust be generated during those works. Made Ground deposits associated with the site's former industrial use are likely to be encountered. Where Made Ground is located it may contain traces of ACM which if exposed at the surface poses a risk through inhalation of fibres. In addition, the age of the current building in the north western sector, the use of ACM within the building fabric cannot be discounted and the presence of ACM within demolition arisings generated during the residential development must be considered a potential risk. If present ACM could be released during future earthworks and then subsequently inhaled by construction workers and possibly third-party property. However, with appropriate construction phase health and safety controls in accordance with CIRIA 733 guidance (Asbestos in soil and Made Ground: a guide to understanding and managing risks),				

CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK
Methane, carbon dioxide (Made Ground, infilled canal, infilled ground)	**Inhalation of gas.** **Migration through permeable strata and preferential pathways.** **Explosion in confined spaces.**	**Future site users.** **Buildings.** **Off-site land users.**	**Low likelihood**	**Moderate**
Assessment There are likely varying depths of Made Ground generated from historical development, demolition works, infilling of canal (centre of parcel A) and areas of potentially infilled land. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users. Carbon dioxide and methane have associated asphyxiation and explosive risks, respectively. Should a ground gas risk be identified to end users, the risks can be mitigated through the adoption of suitable control measures within the building construction using guidance presented within CIRIA 665 (Assessing Risk Posed by Hazardous Ground Gases to Buildings) and BS8485 (Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments).				
Controlled Waters				
Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds (Works, garage, factories and builders yard)	**Surface runoff.** **Migration through permeable strata and preferential pathways.** **Perched waters migration.**	**Groundwater (Secondary B Aquifer and Principal aquifer)** **Surface water (Rochdale Canal)**	**Likely**	**Moderate**
Assessment Historical industrial land uses on the site, including works, garage, factories and builders yard, as well as Made Ground represent potential sources of mobile hydrocarbon contamination. Glacial Till reduces the potential for migration of contaminants, if present, however, considering the underlying Secondary B Aquifer and Principal aquifer in addition to the Rochdale Canal located immediately south of parcel C, there is considered to be a moderate risk to controlled waters. Intrusive investigation with chemical analysis of soil and groundwater samples is recommended to assess the presence of mobile contaminants and facilitate further risk assessment.				

Buildings and Infrastructure				
Sulphate (potential ash within Made Ground)	**Sulphate attack on concrete.**	**Building structure.**	**Likely**	**Moderate/Low**
Assessment Presence of pH and sulphate within Made Ground deposits may result in corrosion of buried concrete within the proposed development. Intrusive investigation with chemical analysis of soil samples is recommended to confirm the levels of pH and sulphate within Made Ground deposits and thus determine the concrete classification.				
Ecology				
Phytotoxic contaminants (Made Ground)	**Direct Contact (plant uptake).**	**Flora**	**Likely**	**Low**
Assessment A number of semi mature trees are present in throughout Area C and the northern periphery of parcel B which may provide a potential habitat.				

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. SITE SUMMARY

Current site use	The site comprises three parcels of land referred to as parcel A, B and C. **Parcel A** Parcel A comprises several structures with multiple uses. A textile Waste Merchant is present in the north west occupied by Frank Hitchen and is referred to as Unit 1. The north east of the site is occupied by two adjacent secured car parks and works buildings are present directly behind the car parks. The south of the site is currently a construction site containing site cabins and offices. A dance bar, fashion clothing offices occupied by Daisy Street and a depot are located to the far south west. **Parcel B** Parcel B is currently surfaced by hardstanding and is used as a car park operated by Manchester Life. **Parcel C** The west of parcel C comprises a warehouse occupied by Easy Equipment who are a catering supplier. The central sector is utilised as a car park and the far east is used to store building equipment including timber, boards and brick. There are also a number of waste rubble stockpiles comprising brick and concrete.
Historical Site Use	Historical mapping suggests that the parcel A was occupied by the Phoenix works (south) with a canal running east west though the centre of the site. The Phoenix works later became an Iron Works with an engineering works to the north of the canal (formally a canal wharf). The canal appears to have been infilled in the late 1950's. The site appears to have remained as various industrial works. Parcel B formally had the same canal branch running east west along the northern sector, again this appears to have been infilled in the mid / late 1950's. in the 19th century, parcel B was largely undeveloped with the exception of the canal and small buildings in the western sector, by the early 20th century it was listed as a corporation yard in the western sector. In the mid to late 20th century parcel B was developed with industrial type buildings which remained in varying configurations. The former canal arm ran north south through the centre of parcel C, again this is thought to have been infilled in the mid 20th century. The western sector was occupied by the Jersey Street Cotton Mills in the 19th century with various small structures in the east. In the early 20th century industrial works were constructed either side of the canal arm which remained until the latter 20th / early 21st century.

SITE SENSITIVITY	The site has been deemed to be located within a high sensitivity setting. There is a nitrate vulnerable zone located 37 m north west of the site. there are also residential houses located 30 m south of parcel c. The aquifer classification in the bedrock is a principal aquifer (east parcel c and west of parcel a) The Rochdale canal is located immediately south of parcel b and a canal basin is located 95 m south west of the site.

7.2. CONTAMINATION ISSUES

Human Health	Based on the information available to review, it is considered that there will be a moderate risk to human health as a number of sources of contamination have been identified in relation to historic land uses on all three parcels of the site. Hydrocarbon compounds and chlorinated solvents may be present due to historic iron works, chimney, factories, garage and builders yard in addition to underlying Made Ground. Material deemed to have a potential vapour risk may require delineation and a hotspot removal. The historic iron works is also thought to be a source of heavy metals, in particular iron. The presence of deep Made Ground may be a potential source of heavy metals, sulphates, asbestos and Polycyclic aromatic hydrocarbons (PAHs), however can be mitigated with the use of a 300 mm cover system to all landscaped areas.
Controlled Waters	Historical industrial land uses on the site, including works, garage, factories and builders yard, as well as Made Ground represent potential sources of mobile hydrocarbon contamination. Glacial Till reduces the potential for migration of contaminants, if present, however, considering the underlying Secondary B Aquifer and Principal aquifer in addition to the Rochdale Canal located immediately south of parcel C, there is considered to be a moderate risk to controlled waters. Intrusive investigation with chemical analysis of soil and groundwater samples is recommended to assess the presence of mobile contaminants and facilitate further risk assessment.
Ground Gas	There are likely varying depths of Made Ground generated from historical development, demolition works, infilling of canal (centre of parcel A) and areas of potentially infilled land. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users. Carbon dioxide and methane have associated asphyxiation and explosive risks, respectively. Should a ground gas risk be identified to end users, the risks can be mitigated through the adoption of suitable control measures within the building construction using guidance presented within CIRIA 665 (Assessing Risk Posed by Hazardous Ground Gases to Buildings) and BS8485 (Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments).
Potable Waters	A UKWIR risk assessment will be required. Based on the potential for contamination and significant Made Ground at the site an allowance for barrier pipeline should be retained.

7.3. GEOTECHNICAL ISSUES

Geological	• The site is located within a coal mining reporting area, however is thought to be low risk; • The underlying superficial geology will likely comprise a cohesive soil matrix and, as such, is not likely to offer the required degree of permeability to make soak-away drainage viable in this instance; • Footings will require deepening in accordance with NHBC guidance 2016 Chapter 4.2 if the development incorporates any existing and proposed trees within any cohesive drift deposits;
Civil and Structural	• The site is generally homogenous topographically due to historic levelling. To construct the proposed factory limited earthworks will be required to create a level developable platform; • Services have been identified within the site boundary. As such some foundation options will not be possible within close proximity to any sensitive infrastructure; • There is a retaining wall to the south of parcel B which retains the elevated land to the south referred to as Jersey Street and adjacent car park to the east. There is also a brick retaining wall to the south of parcel A retaining the land to the south on Jersey Street and land to the east on Poland Street. This will need to be assessed by a structural engineer prior to development. The Rochdale Canal is located immediately south of parcel C; • Intrusive investigation will be required to assess the ground conditions and undertake in-situ geotechnical testing to determine possible foundation solutions; and • Any underground obstructions will require grubbing out in their entirety, prior to the construction of the proposed development.
Abnormal Foundations	Should significant Made Ground and soft clays be identified on site, that will be subject to volume change an abnormal foundation solution (MTF, VCC, Pile) may be required. Intrusive site investigation will be required to determine the required foundation solution however it is assumed that a piled foundation will be required due to the high rise development load.

END OF REPORT

APPENDIX I
LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the Client as indicated in Section 1.3.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.

10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II
GLOSSARY

TERMS

ACM	Asbestos-containing material	**MMP**	Materials management plan
ADS	Acoustic design statement	**ND**	Not detected
AST	Above-ground storage tank	**NDP**	Nuclear density probe
BGS	British Geological Survey	**NMP**	Noise management plan
BSI	British Standards Institute	**NPSE**	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	**NR**	Not recorded
CA	Coal Authority	**PAH**	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	**PCB**	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	**PI**	Plasticity index
CIRIA	Construction Industry Research Association	**PID**	Photo ionisation detector
CLEA	Contaminated land exposure assessment	**POS**	Public open space
CML	Council of Mortgage Lenders	**PPE**	Personnel protective equipment
CoC	Contaminants of concern	**ProPG**	Professional practice guidance
CSM	Conceptual site model	**QA**	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	**SGV**	Soil guideline value
DWS	Drinking water standard	**SPH**	Separate-phase hydrocarbon
EA	Environment Agency	**SPT**	Standard penetration test
EQS	Environmental quality standard	**SVOC**	Semi-volatile organic compound
FFL	Finished floor level	**TPH**	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	**TPH CWG**	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	**UKWIR**	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	**UST**	Underground storage tank
HCV	Health criteria value	**VCC**	Vibro-concrete column
ICSM	Initial conceptual site model	**VOC**	Volatile organic compound
LEL	Lower explosive limit	**VRSC**	Vibro-replacement stone columns
LMRL	Lower method reporting limit	**VSC**	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	**WHO**	World Health Organisation
MCV	Moisture condition value	**WRAP**	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	**WTE**	Water table elevation

m	Metres	**ppm**	Parts per million
km	Kilometres	**mg/m^3**	Milligram per metre cubed
% v/v	Percent volume in air	**m bgl bgl**	Metres below ground level
mb	Millibars (atmospheric pressure)	**m bcl**	Metre below cover level
l/hr	Litres per hour	**mAOD**	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	**kN/m^2**	Kilonewtons per metre squared
ppb	Parts per billion	**µm**	Micrometre
mg/kg	Milligrams per kilogram (parts per million)		

APPENDIX III
DRAWINGS

DRAWING 13-729-001 – SITE LOCATION PLAN

N

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City Court
Trading Estate

GH STREET

Car Park
Fence
Works Building
Eric Wright
Site Cabins
Graham Site
Cabins
Works Building
Textile
Merchant
Bushes
Brick Wall
Daisy Street
Drums
Dance Bar
Beehive Mill
RADIUM STREET
46
62
Skips
Building Materials
JERSEY STREET
64
Flint Glass Works
Flint Glass Wharf
Semi Mature Tree
Brick Wall
Fence
10
Retaining Wall
Semi
Mature
Trees
Mature
Tree
Gas Box
Fence
89
Skip
Building Materials
Car Park
Pay and Display Machine
Camera
Easy Equipment Warehouse
Rochdale Canal
ST VINCENT STREET
25
N

Current Site Features

- Skips
- Existing Commercial Buildings
- Trees/Bushes
- Site Cabins
- Gas Box
- Building Materials
- Retaining Wall
- Car Park
- Drums
- Brick Wall
- Fence
- Camera/Pay and Display Machine

Notes:

Phase	Revision	Date	Issue	Drawn	Checked
P1	-	02.12.2019	DRAFT	CB	RJW

Client: Manchester Life

Job No: 13-729

Date: 02.12.2019

Drawing No: 002

Scale: NTS

Job Title: Jersey Street

Drawing Title: Site Features Plan

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Historical Features

- Former Canal
- Former Chimney
- Former Works Building
- Former Works Building
- Former Works Building

Notes:

Phase	Revision	Date	Issue	Drawn	Checked
P1	-	01.11.2019	DRAFT	HM	RJW

Client: Manchester Life

Job No: 13-729

Date: 01.11.2019

Drawing No: 003

Scale: NTS

Job Title: Jersey Street

Drawing Title: Historical Features Plan

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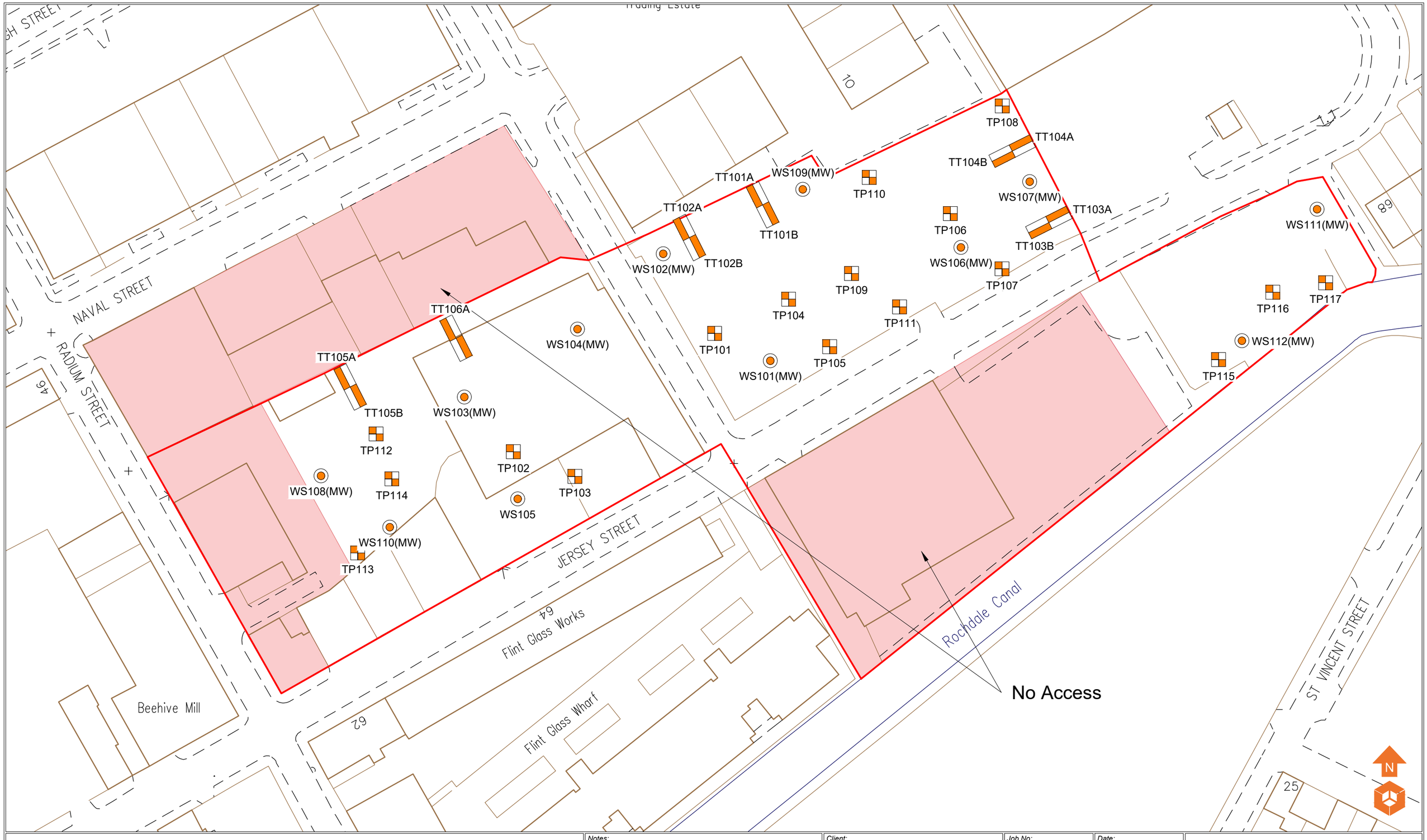

Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Trial Pit Location
- Approximate Slit Trench Location
- No Access

Notes:

Phase	Revision	Date	Issue	Drawn	Checked
P1	-	22.11.2019	DRAFT	CB	RJW

Client: Manchester Life

Job No: 13-729

Date: 22.11.2019

Drawing No: 004

Scale: NTS

Job Title: Jersey Street

Drawing Title: Exploratory Hole Location Plan

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APPENDIX IV
PHOTOGRAPHS

PLATE 1 PARCEL A

PLATE 2 PARCEL A

PLATE 3 PARCEL B LEVEL DIFFERENCE OVER CANAL BRIDGE

PLATE 4 PARCEL B

PLATE 5 PARCEL B

PLATE 6 EVIDENCE OF FORMER CANAL BRIDGE.

PLATE 7 PARCEL C

APPENDIX V
HISTORICAL MAPS

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

Quarry
Gravel Pit
Sand Pit
Clay Pit
Shingle
Refuse Heap
Sloping Masonry
Flat Rock
Marsh
Reeds
Osiers
Rough Pasture
Furze
Wood
Mixed Wood
Brushwood
Orchard
Fir
Ford
Stepping Stones
Ferry
Waterfall
Lock

Trig. Station
507 Altitude at Trig. Station
B.M.325·9 Bench Mark
342 Surface Level
Arrow denotes flow of water
Antiquities (site of)

Cutting
Embankment
Railway crossing Road
Level Crossing
Road crossing Railway
Railway crossing River or Canal
Road over single stream
Road over River or Canal

County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

Inactive Quarry, Chalk Pit or Clay Pit
Active Quarry, Chalk Pit or Clay Pit
Rock
Boulders
Cliff
Slopes
Top
Roofed Building
Glazed Roof Building
Sloping Masonry
Archway
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Bench Mark
Antiquity (site of)
Cave Entrance
Triangulation Station
Electricity Pylon
Electricity Transmission Line

County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
L B Bdy London Borough Boundary
Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250

Cliff
Slopes
Top
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Positioned Boulder
Scree
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Triangulation Station
Antiquity (site of)
Electricity Transmission Line
Electricity Pylon
BM 231.60m Bench Mark
Buildings with Building Seed
Roofed Building
Glazed Roof Building

Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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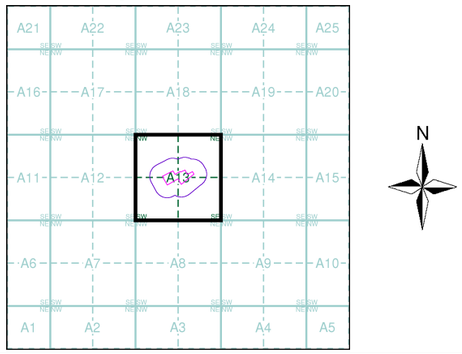
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	1:2,500	1893	2
Lancashire And Furness	1:2,500	1908	3
Lancashire And Furness	1:2,500	1922	4
Ordnance Survey Plan	1:1,250	1948 - 1949	5
Ordnance Survey Plan	1:2,500	1951	6
Ordnance Survey Plan	1:1,250	1952 - 1955	7
Ordnance Survey Plan	1:2,500	1953 - 1955	8
Ordnance Survey Plan	1:1,250	1958 - 1981	9
Additional SIMs	1:1,250	1958 - 1985	10
Ordnance Survey Plan	1:2,500	1959 - 1966	11
Ordnance Survey Plan	1:2,500	1966 - 1969	12
Ordnance Survey Plan	1:1,250	1968 - 1991	13
Supply of Unpublished Survey Information	1:1,250	1973 - 1974	14
Additional SIMs	1:1,250	1979 - 1990	15
Additional SIMs	1:1,250	1985 - 1991	16
Ordnance Survey Plan	1:1,250	1988 - 1989	17
Additional SIMs	1:1,250	1989 - 1992	18
Additional SIMs	1:1,250	1990	19
Additional SIMs	1:1,250	1990	20
Large-Scale National Grid Data	1:1,250	1992	21
Large-Scale National Grid Data	1:1,250	1993 - 1995	22
Large-Scale National Grid Data	1:1,250	1994	23
Large-Scale National Grid Data	1:1,250	1996	24
Large-Scale National Grid Data	1:1,250	1996	25
Historical Aerial Photography	1:2,500	2000	26

Historical Map - Segment A13



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Customer Ref: 13742
National Grid Reference: 385200, 398770
Slice: A
Site Area (Ha): 1.54
Search Buffer (m): 100

Site Details

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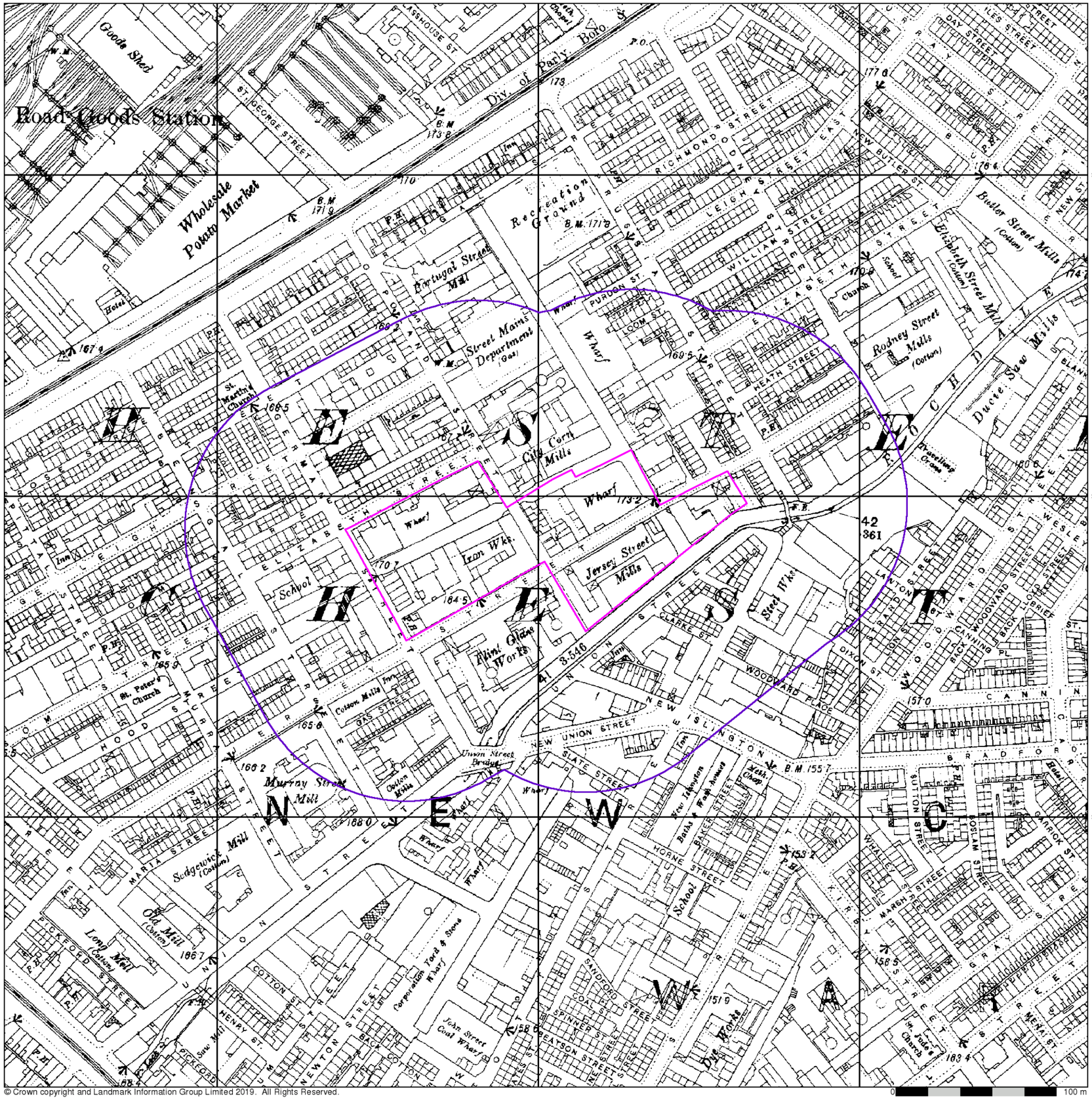

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Published 1893

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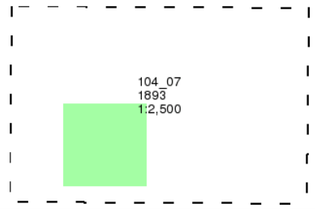
Map Name(s) and Date(s)



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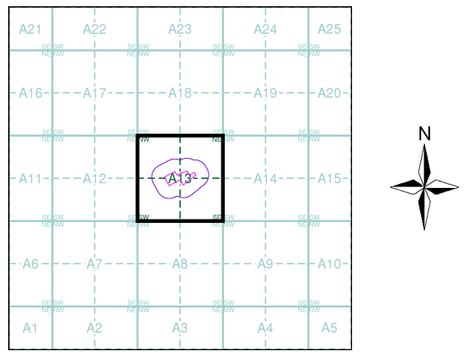

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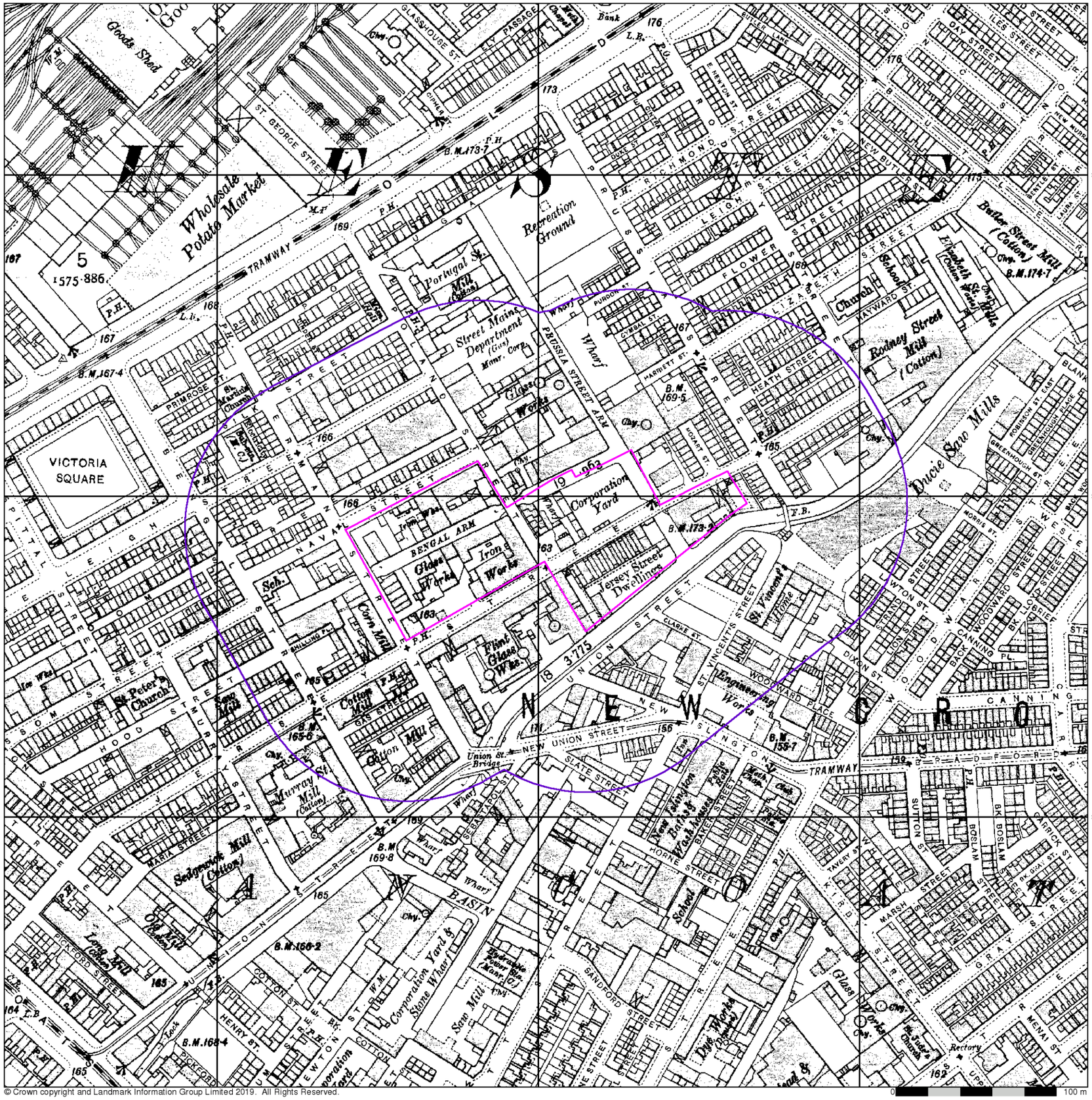

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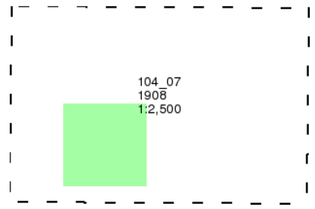

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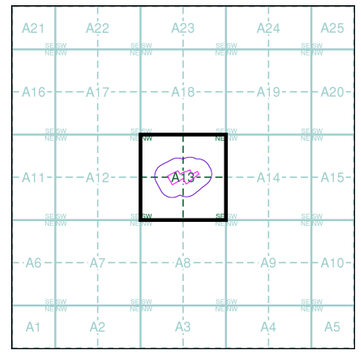

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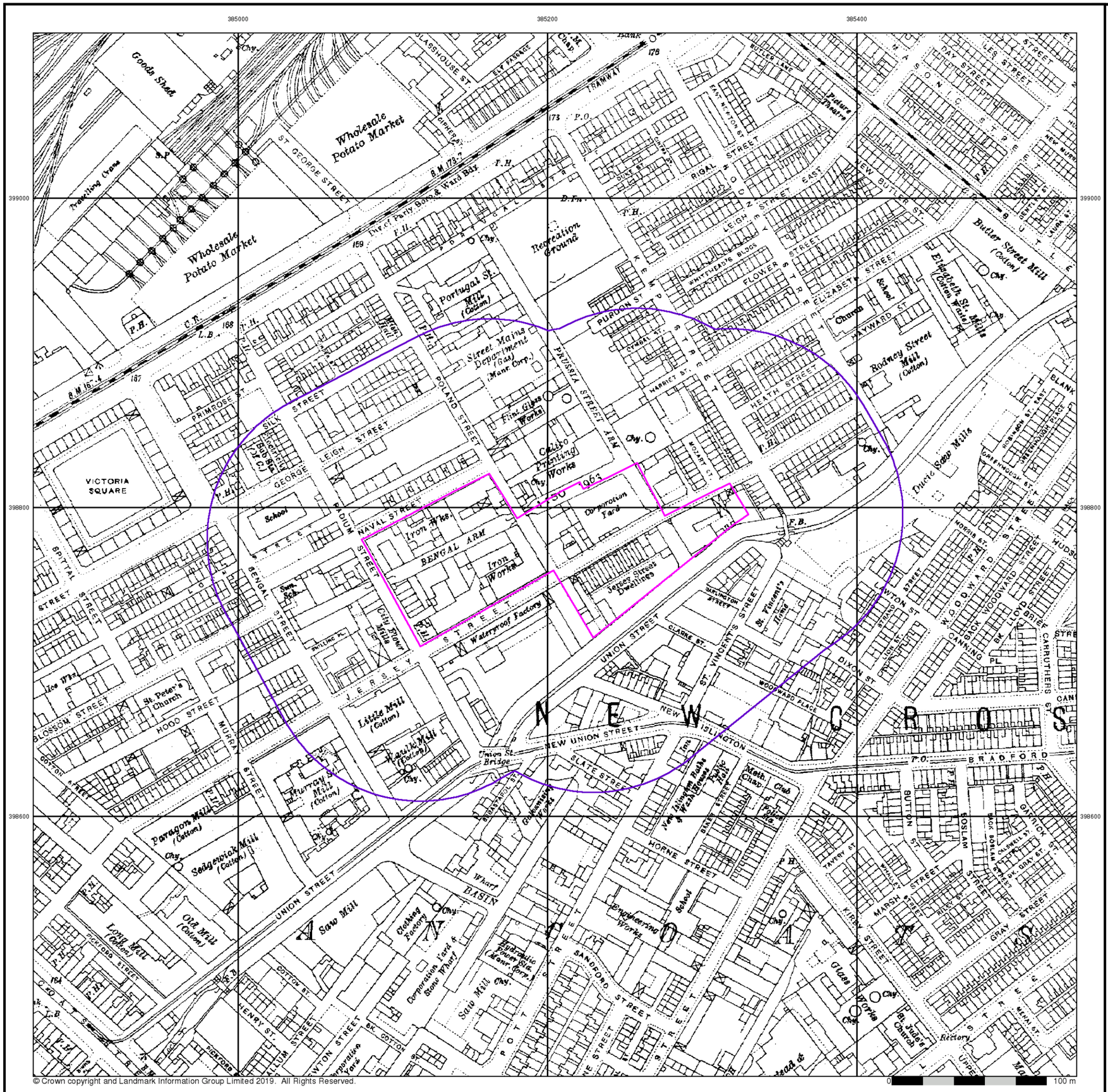

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Lancashire And Furness

Published 1922

Source map scale - 1:2,500

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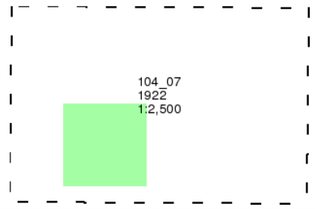
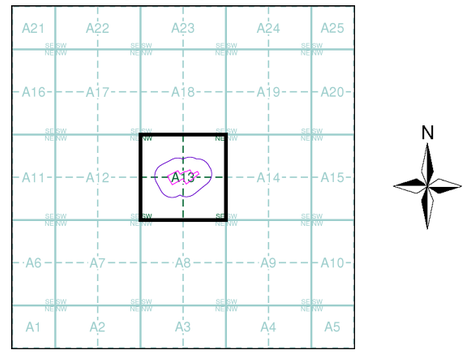
Map Name(s) and Date(s)



Historical Map - Segment A13



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Ordnance Survey Plan

Published 1948 - 1949

Source map scale - 1:1,250

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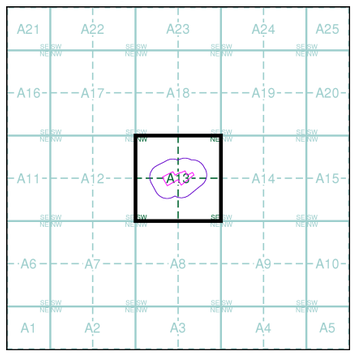
Map Name(s) and Date(s)

SJ8499SE 1949 1:1,250	SJ8599SW 1949 1:1,250	SJ8599SE 1949 1:1,250
SJ8498NE 1948 1:1,250	SJ8598NW 1948 1:1,250	SJ8598NE 1949 1:1,250
SJ8498SE 1948 1:1,250		SJ8598SE 1948 1:1,250

Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

Site Details

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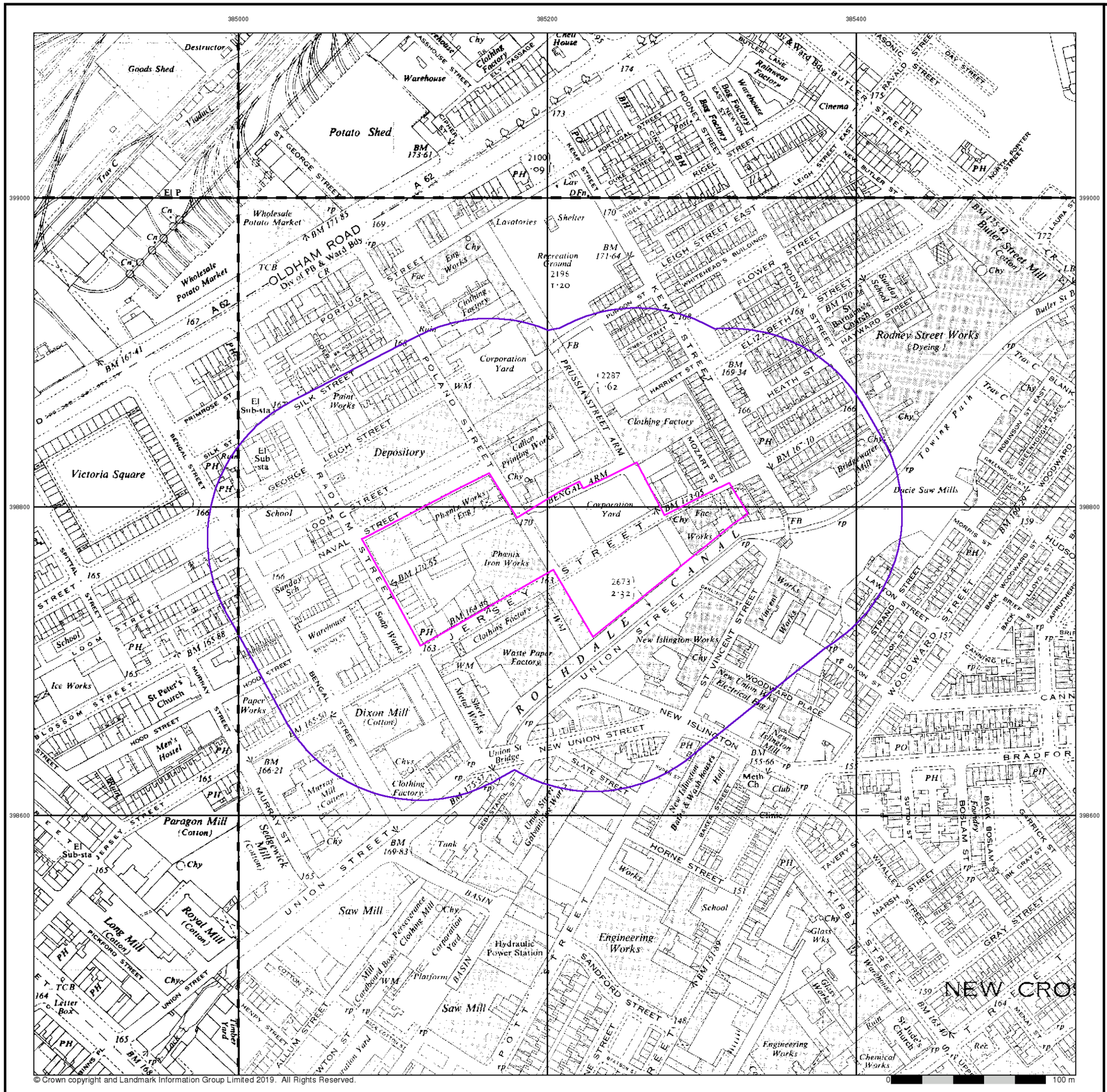


e3p

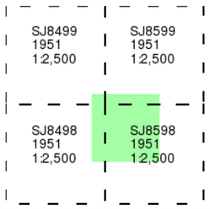
Ordnance Survey Plan

Published 1951

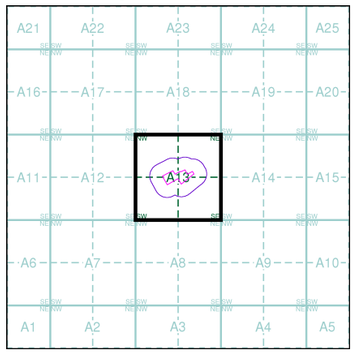
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

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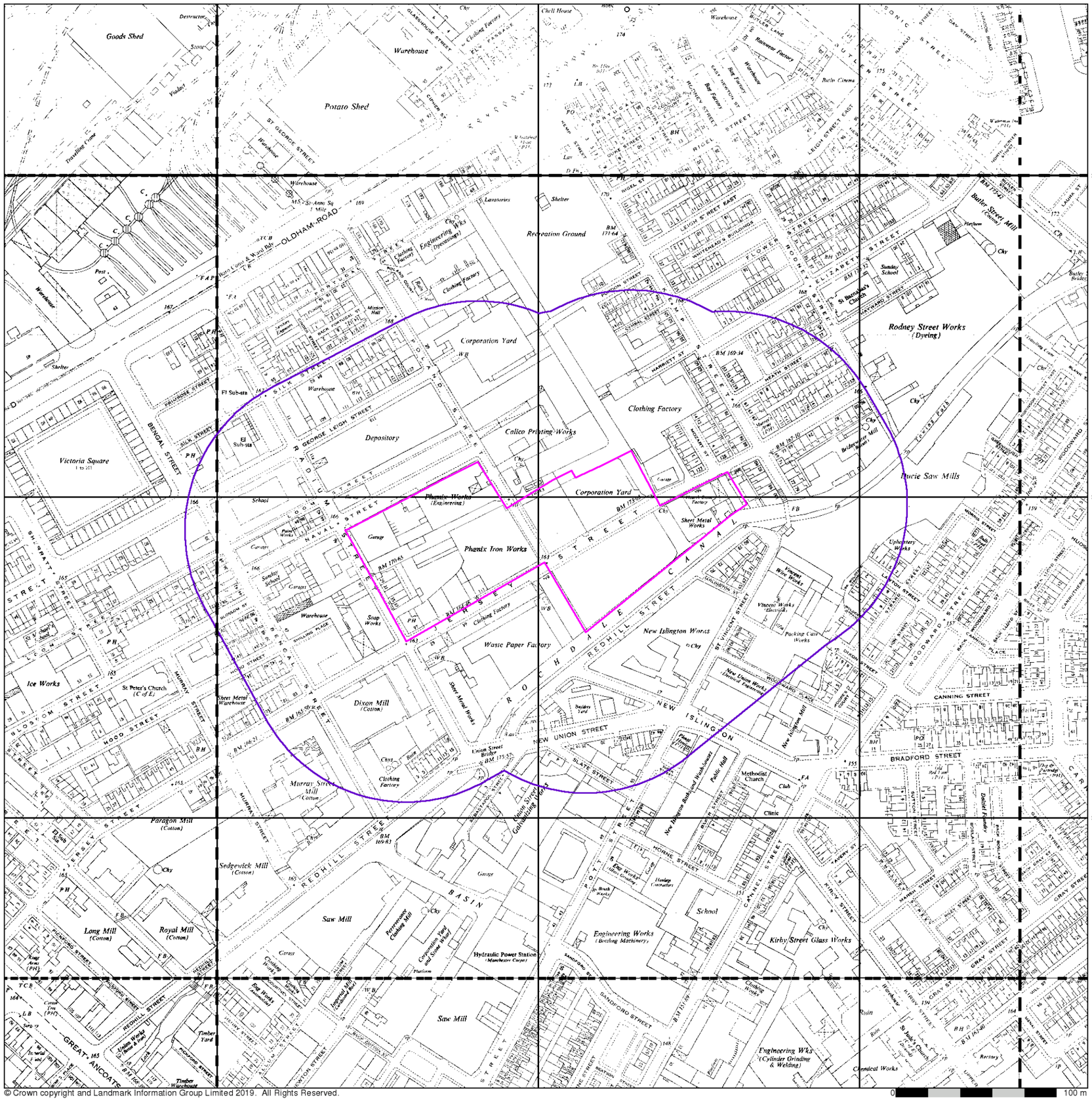

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Ordnance Survey Plan

Published 1952 - 1955

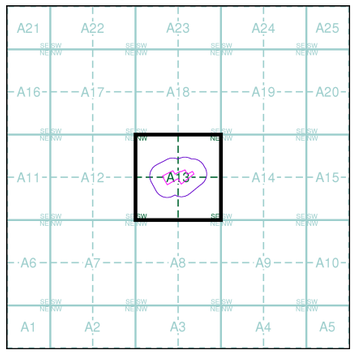
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8499SE 1952 1:1,250	SJ8599SW 1952 1:1,250	SJ8599SE 1953 1:1,250
SJ8498NE 1953 1:1,250	SJ8598NW 1952 1:1,250	SJ8598NE 1955 1:1,250
SJ8498SE 1954 1:1,250	SJ8598SW 1955 1:1,250	SJ8598SE 1952 1:1,250

Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

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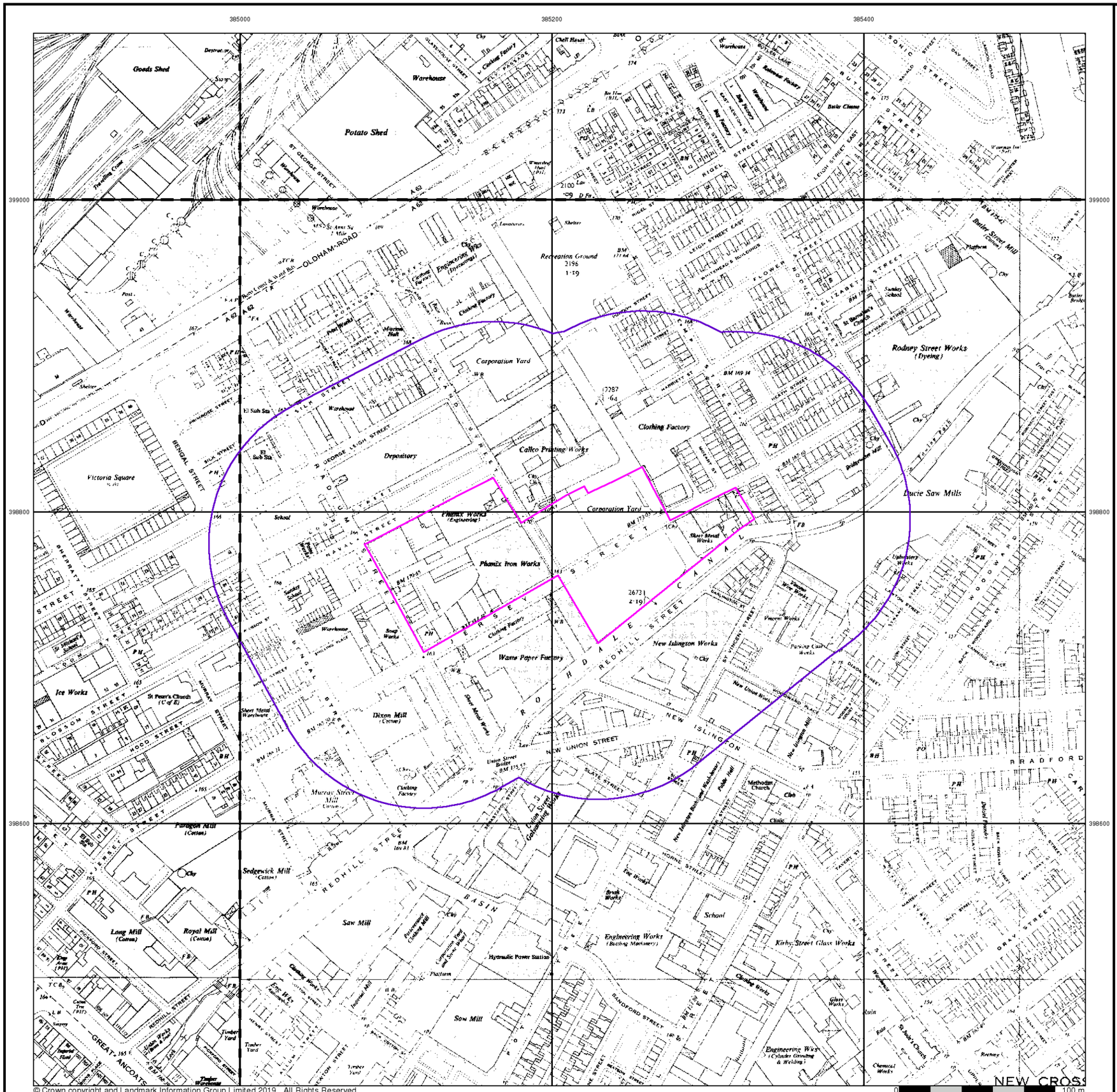

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Ordnance Survey Plan

Published 1953 - 1955

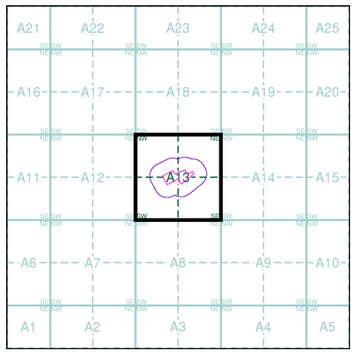
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8499 1953 1:2,500	SJ8599 1954 1:2,500
SJ8498 1955 1:2,500	SJ8598 1953 1:2,500

Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

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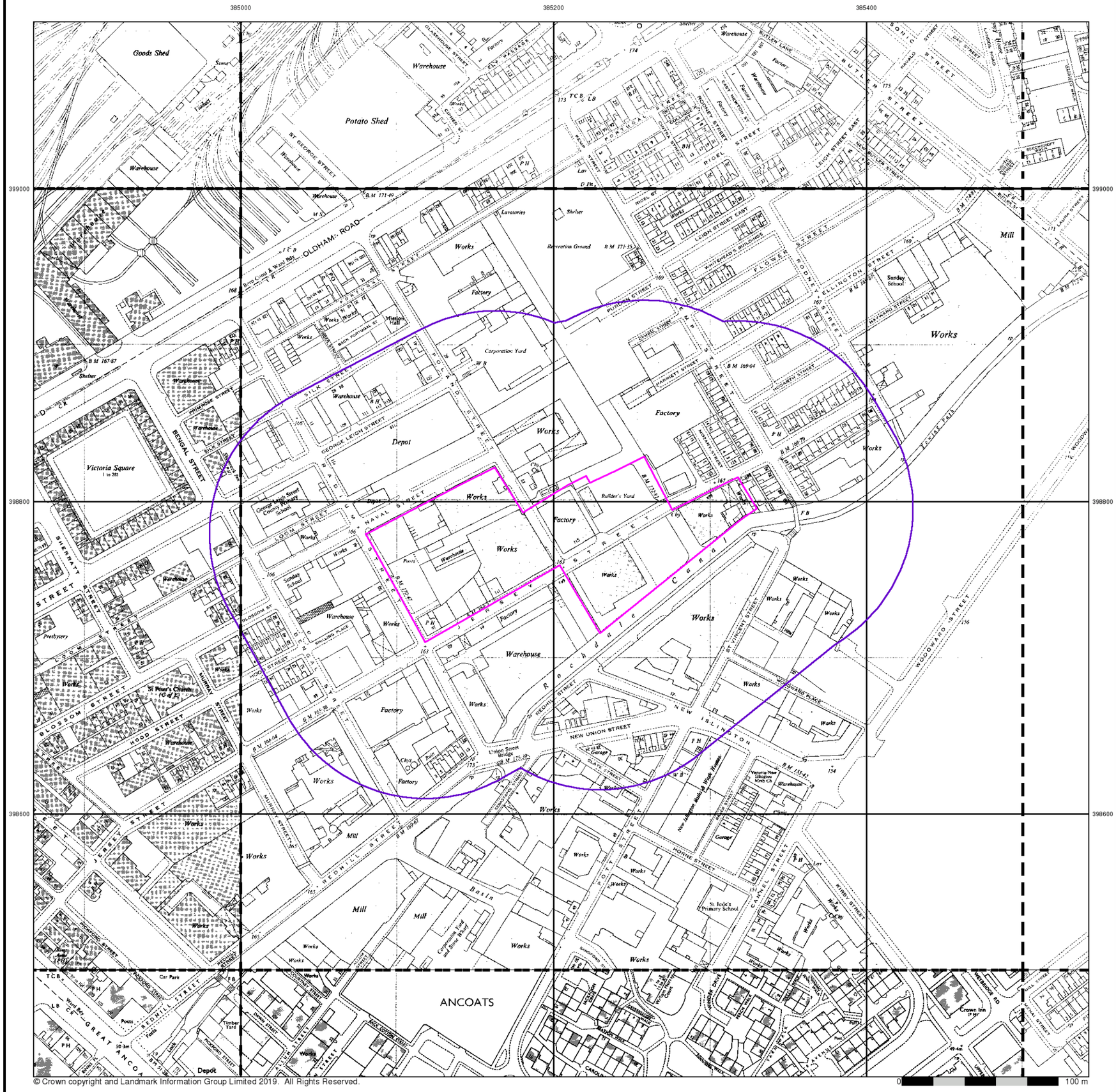

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Ordnance Survey Plan

Published 1958 - 1981

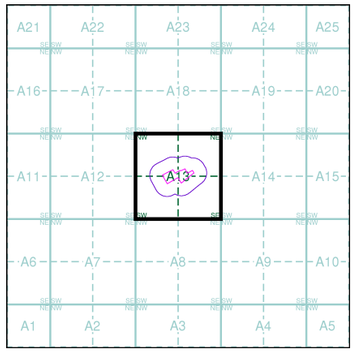
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8499SE 1958 1:1,250	SJ8599SW 1960 1:1,250	SJ8599SE 1965 1:1,250
SJ8498NE 1963 1:1,250	SJ8598NW 1963 1:1,250	SJ8598NE 1963 1:1,250
SJ8498SE 1971 1:1,250	SJ8598SW 1981 1:1,250	SJ8598SE 1958 1:1,250

Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

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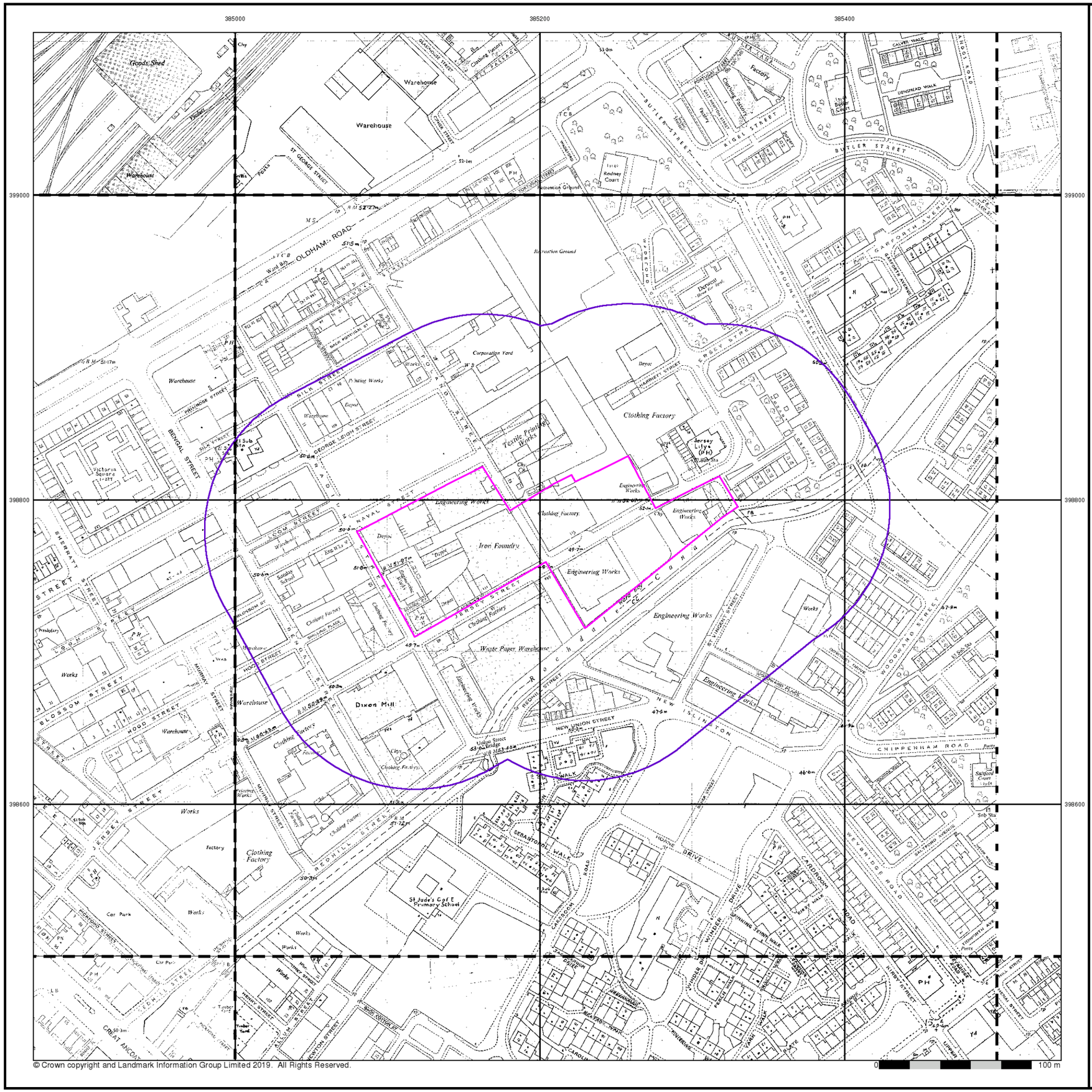

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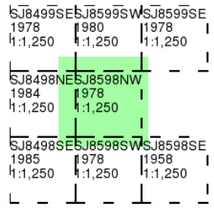
Additional SIMs

Published 1958 - 1985

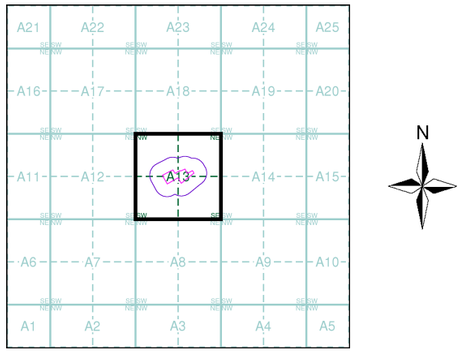
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

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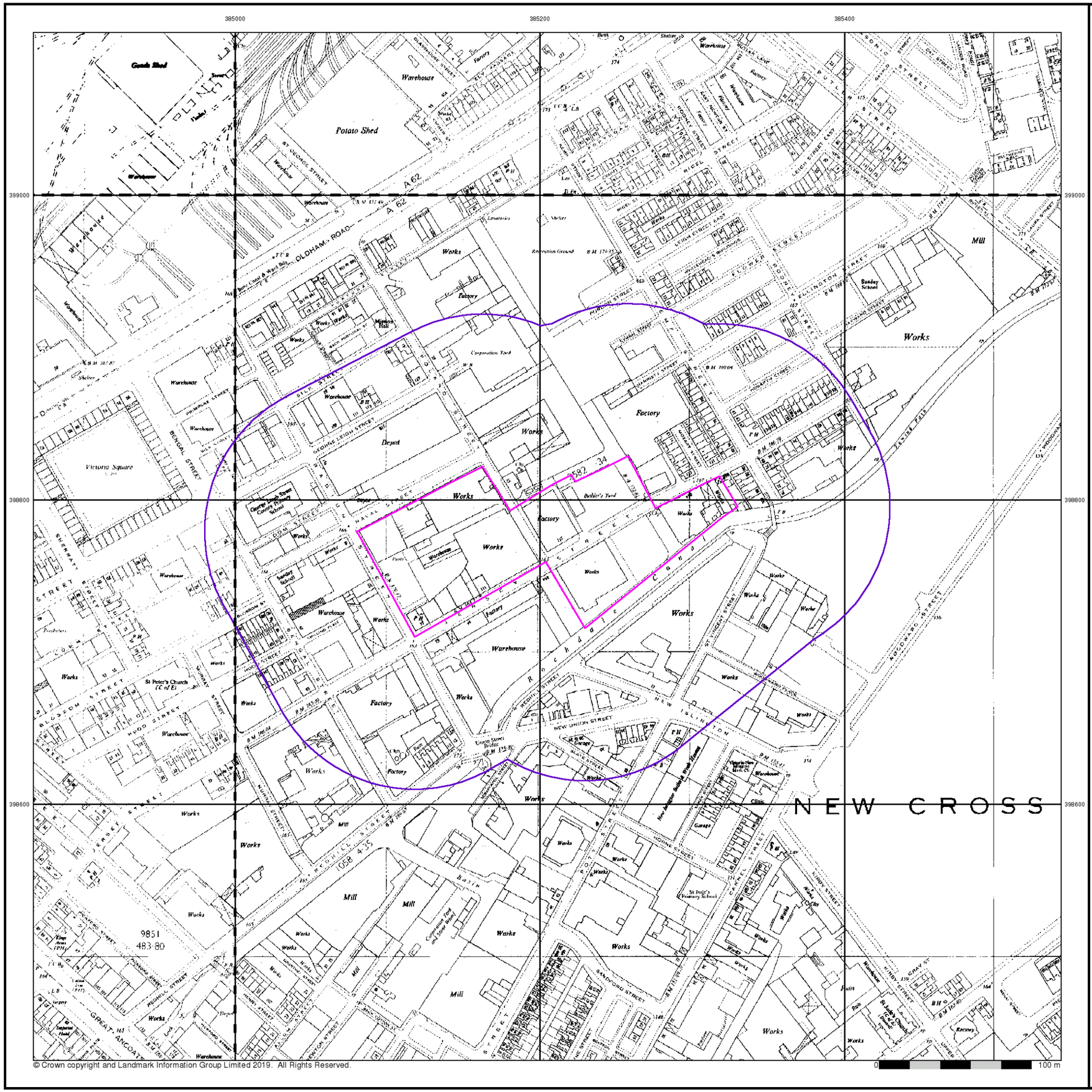

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Ordnance Survey Plan

Published 1959 - 1966

Source map scale - 1:2,500

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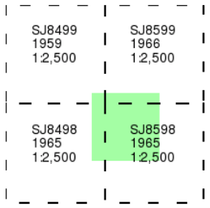
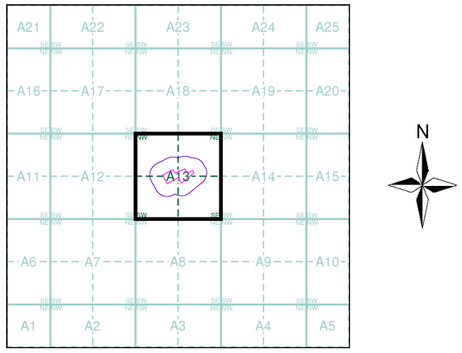
Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

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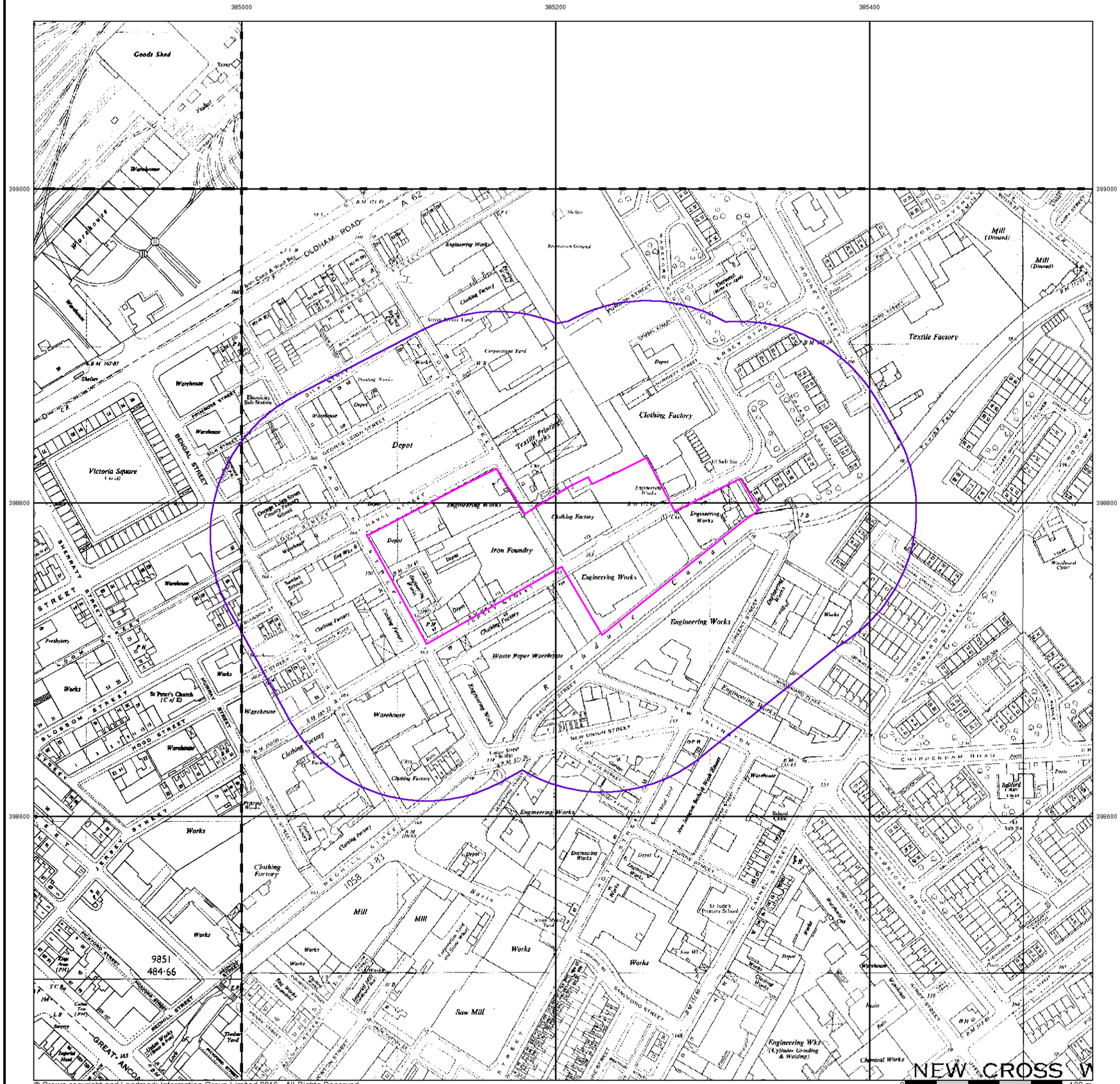

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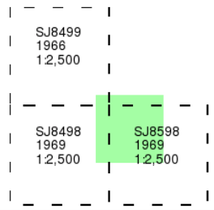
Ordnance Survey Plan

Published 1966 - 1969

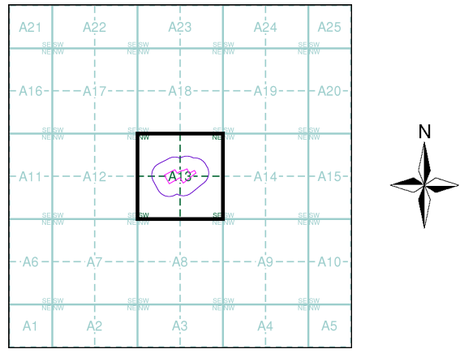
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

Site Details

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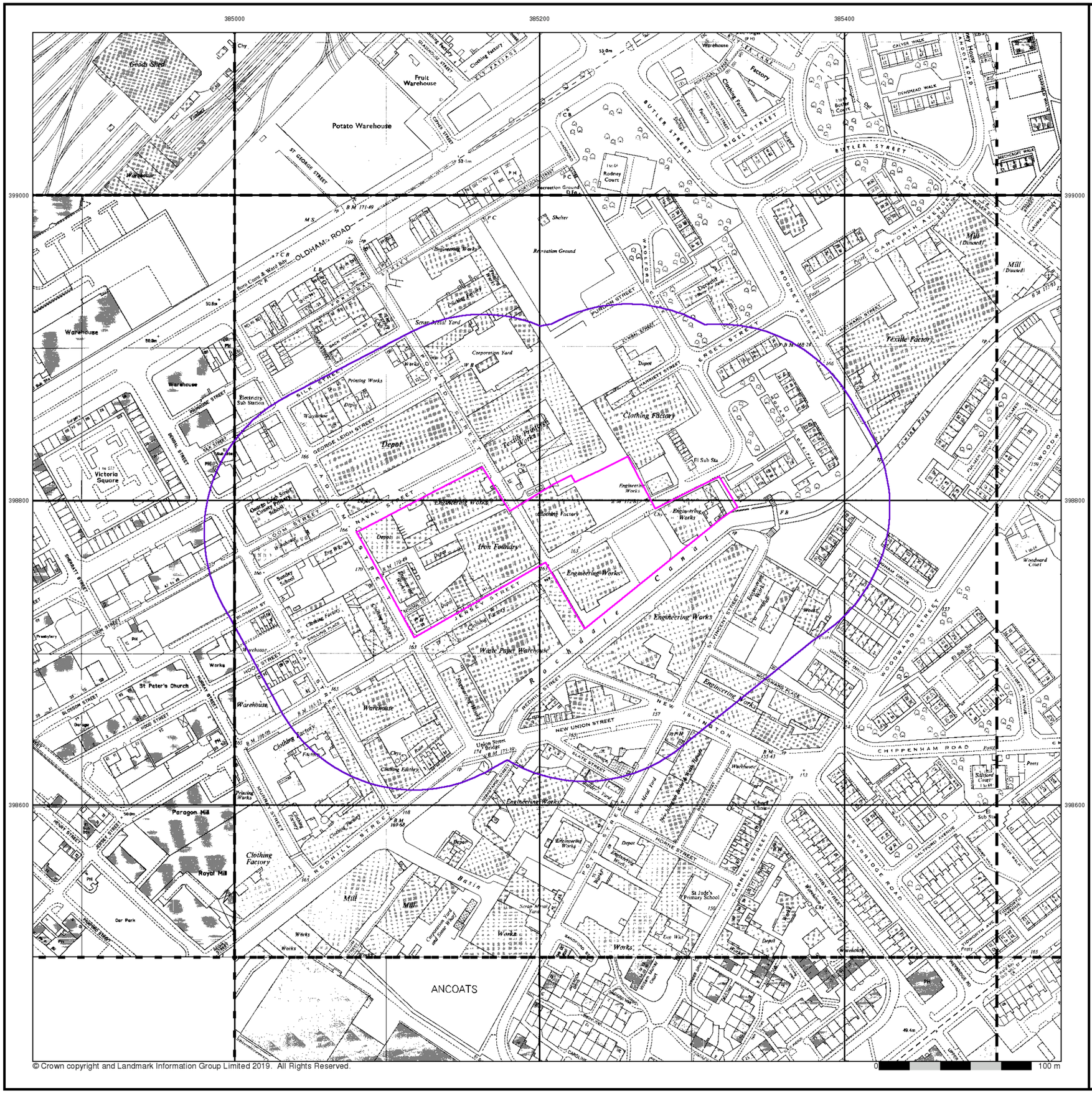


Ordnance Survey Plan

Published 1968 - 1991

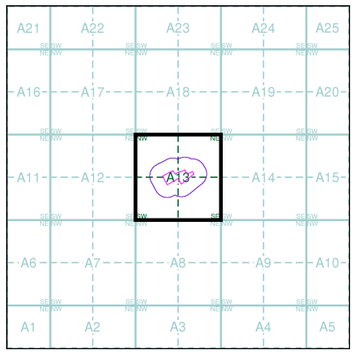
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8499SE 1970 1:1,250	SJ8599SW 1970 1:1,250	SJ8599SE 1981 1:1,250
SJ8498NE 1986 1:1,250	SJ8598NW 1968 1:1,250	SJ8598NE 1968 1:1,250
	SJ8598SW 1989 1:1,250	SJ8598SE 1991 1:1,250

Historical Map - Segment A13



N

Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

Site Details

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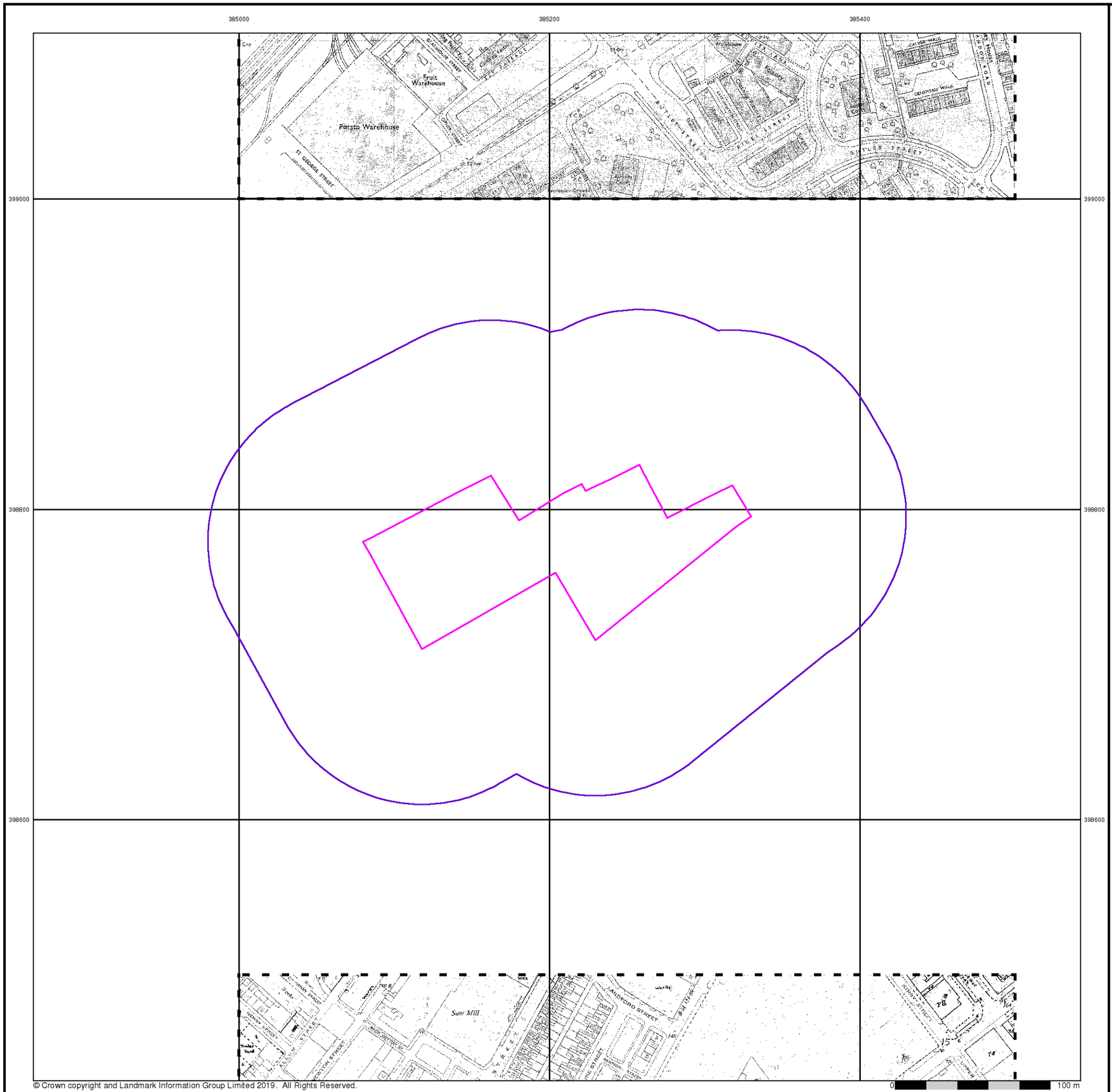

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Supply of Unpublished Survey Information

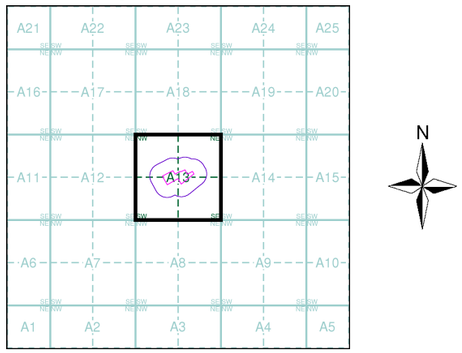
Published 1973 - 1974

Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
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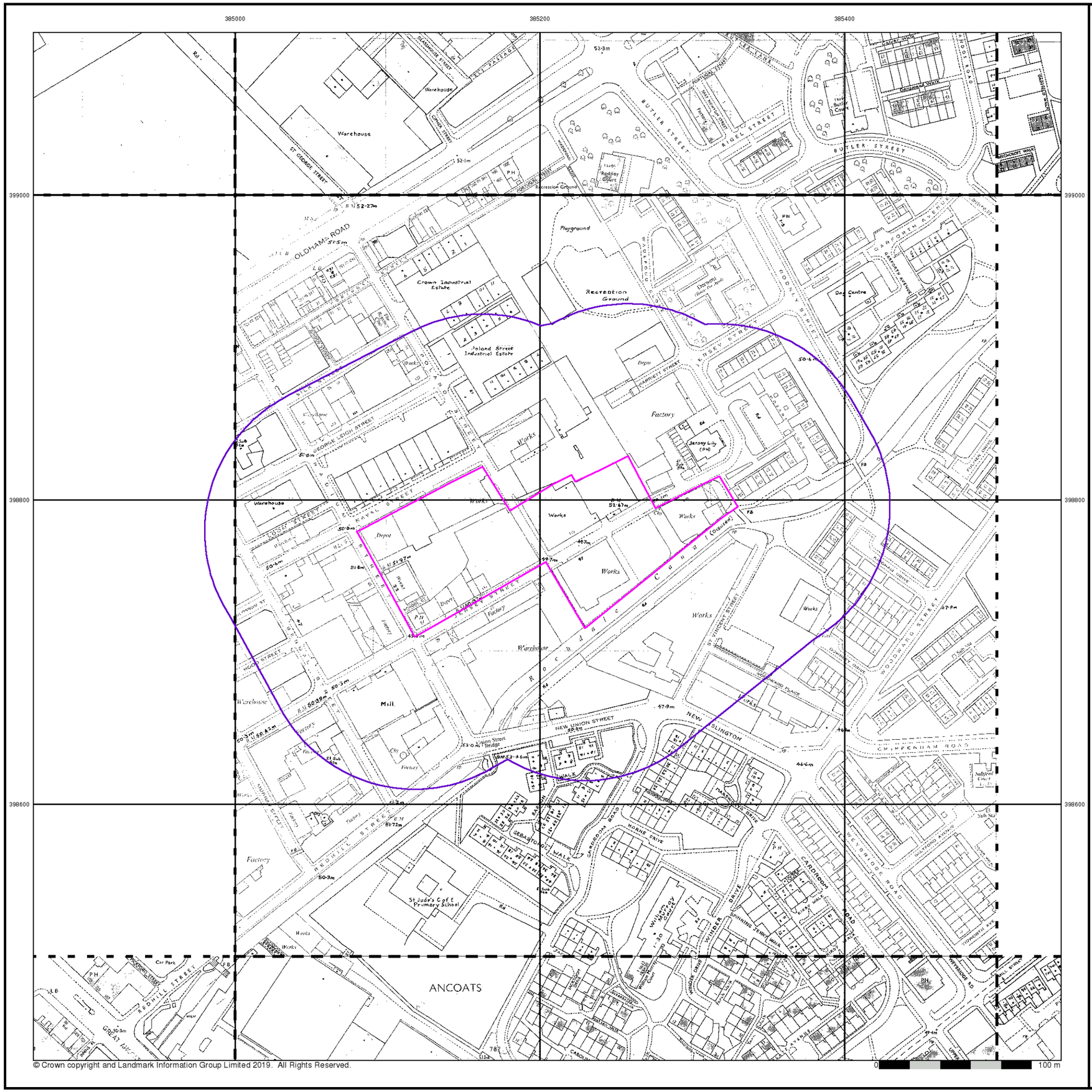


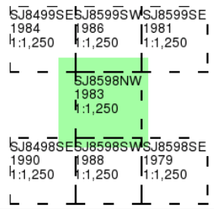
Additional SIMs

Published 1979 - 1990

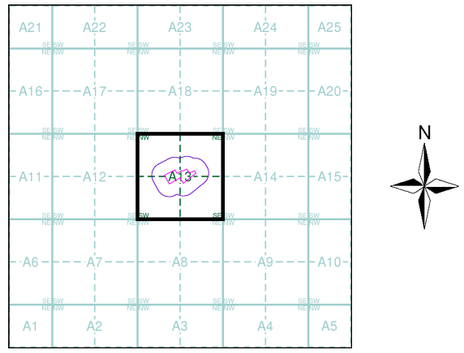
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
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Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

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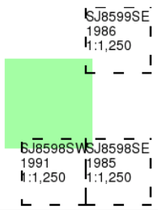
Additional SIMs

Published 1985 - 1991

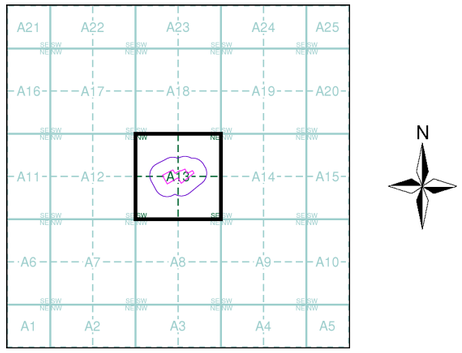
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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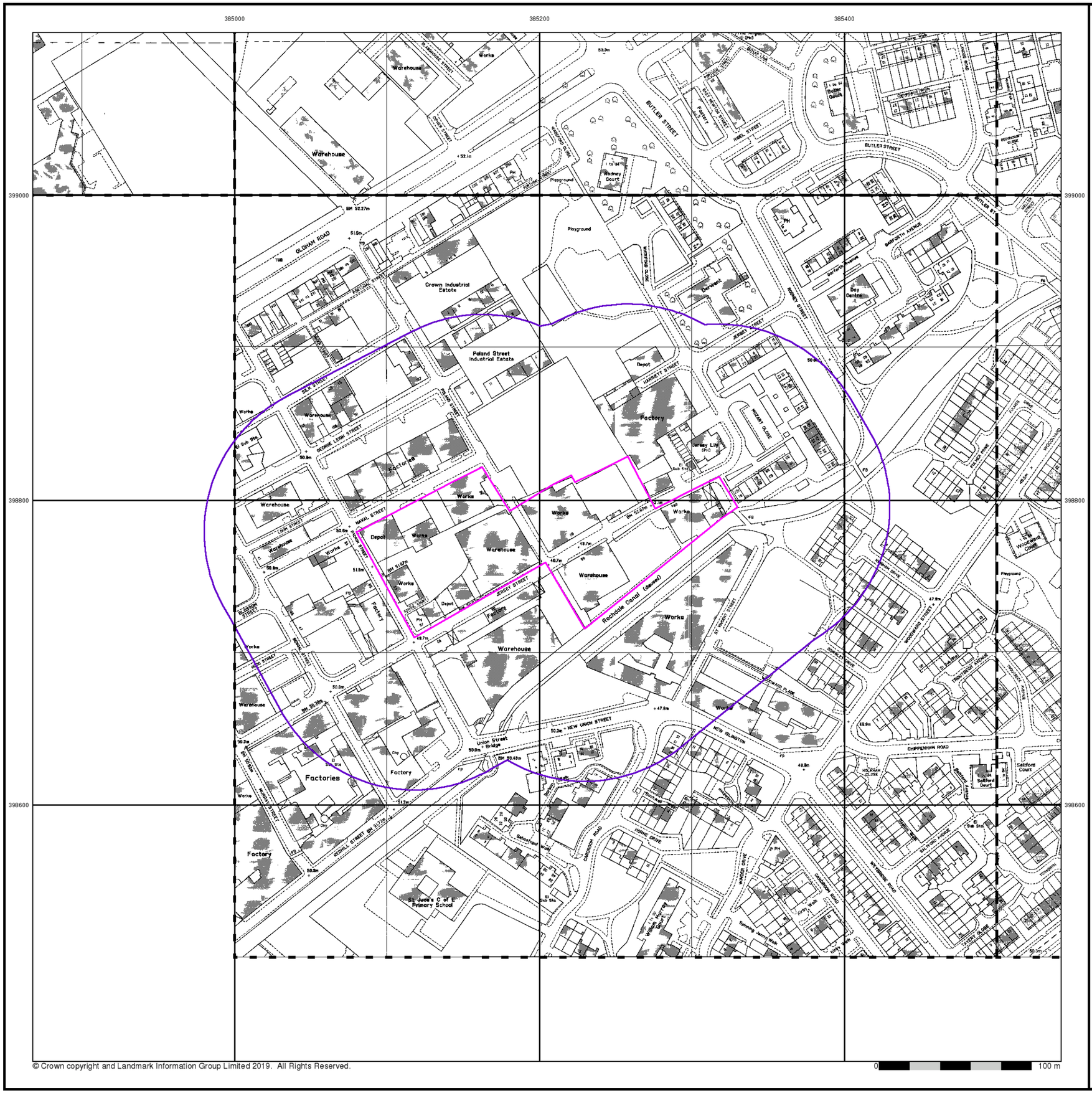

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Ordnance Survey Plan

Published 1988 - 1989

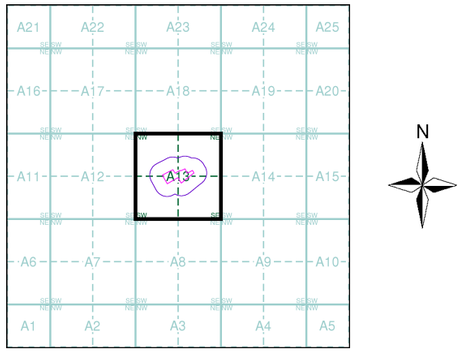
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8499SE 1989 1:1,250	SJ8599SW 1988 1:1,250	SJ8599SE 1988 1:1,250
	SJ8598NW 1988 1:1,250	SJ8598NE 1989 1:1,250

Historical Map - Segment A13



Order Details

Order Number:	223310816_1_1
Customer Ref:	13742
National Grid Reference:	385200, 398770
Slice:	A
Site Area (Ha):	1.54
Search Buffer (m):	100

Site Details

First Floor and Second Floor, 62, Jersey Street, MANCHESTER, M4 6JW

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
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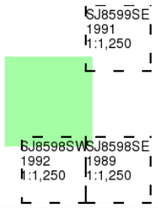
Additional SIMs

Published 1989 - 1992

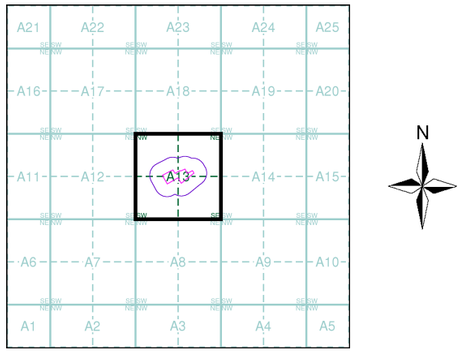
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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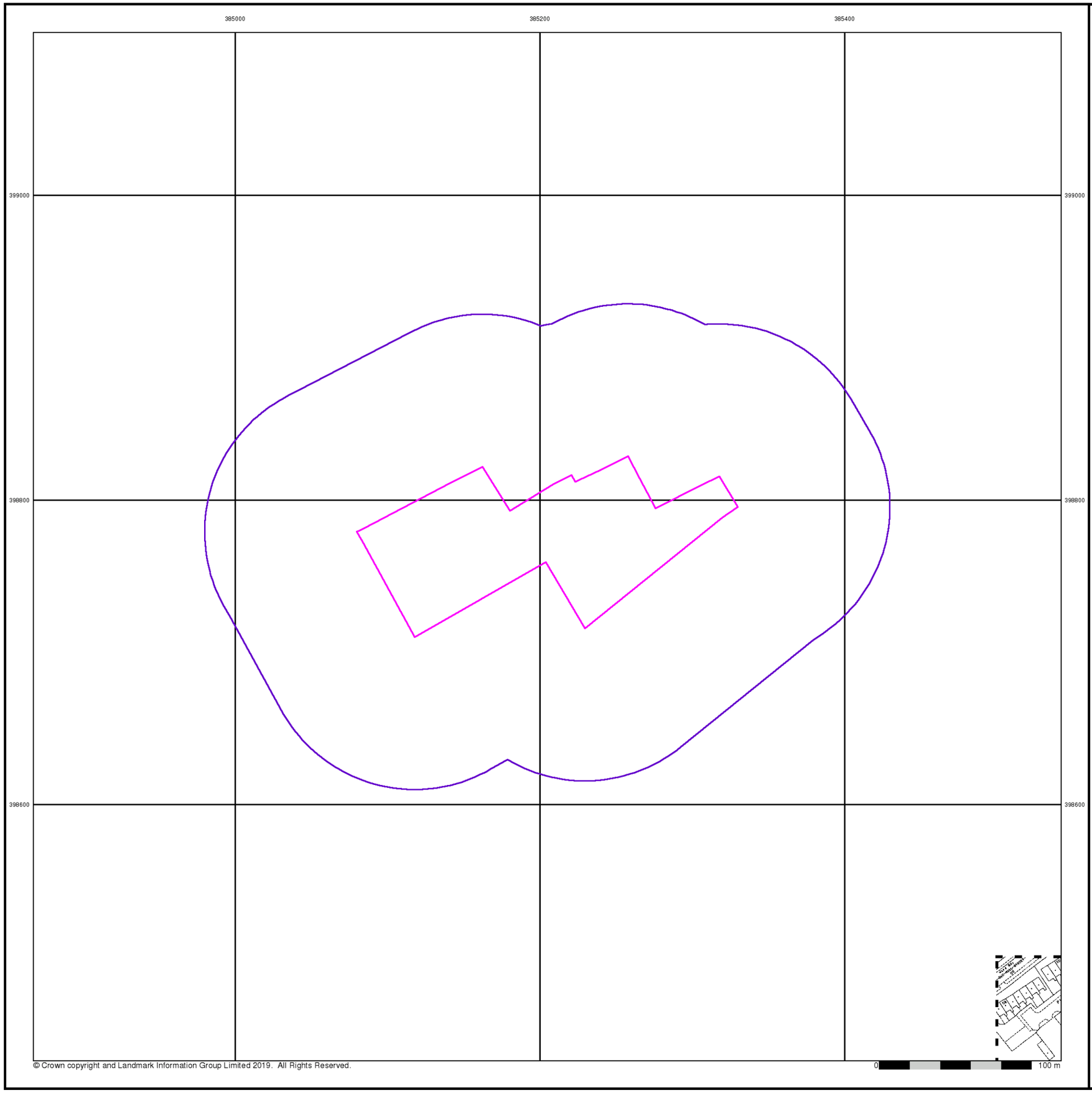

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Additional SIMs

Published 1990

Source map scale - 1:1,250

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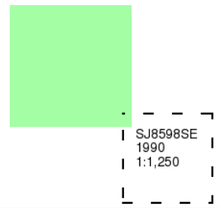
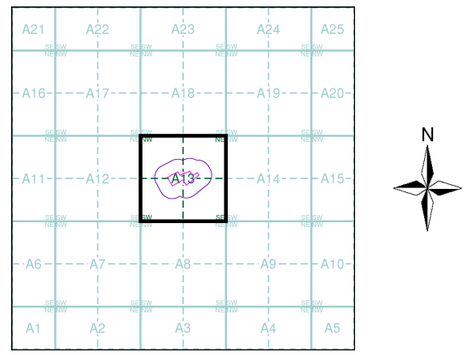
Map Name(s) and Date(s)



Historical Map - Segment A13



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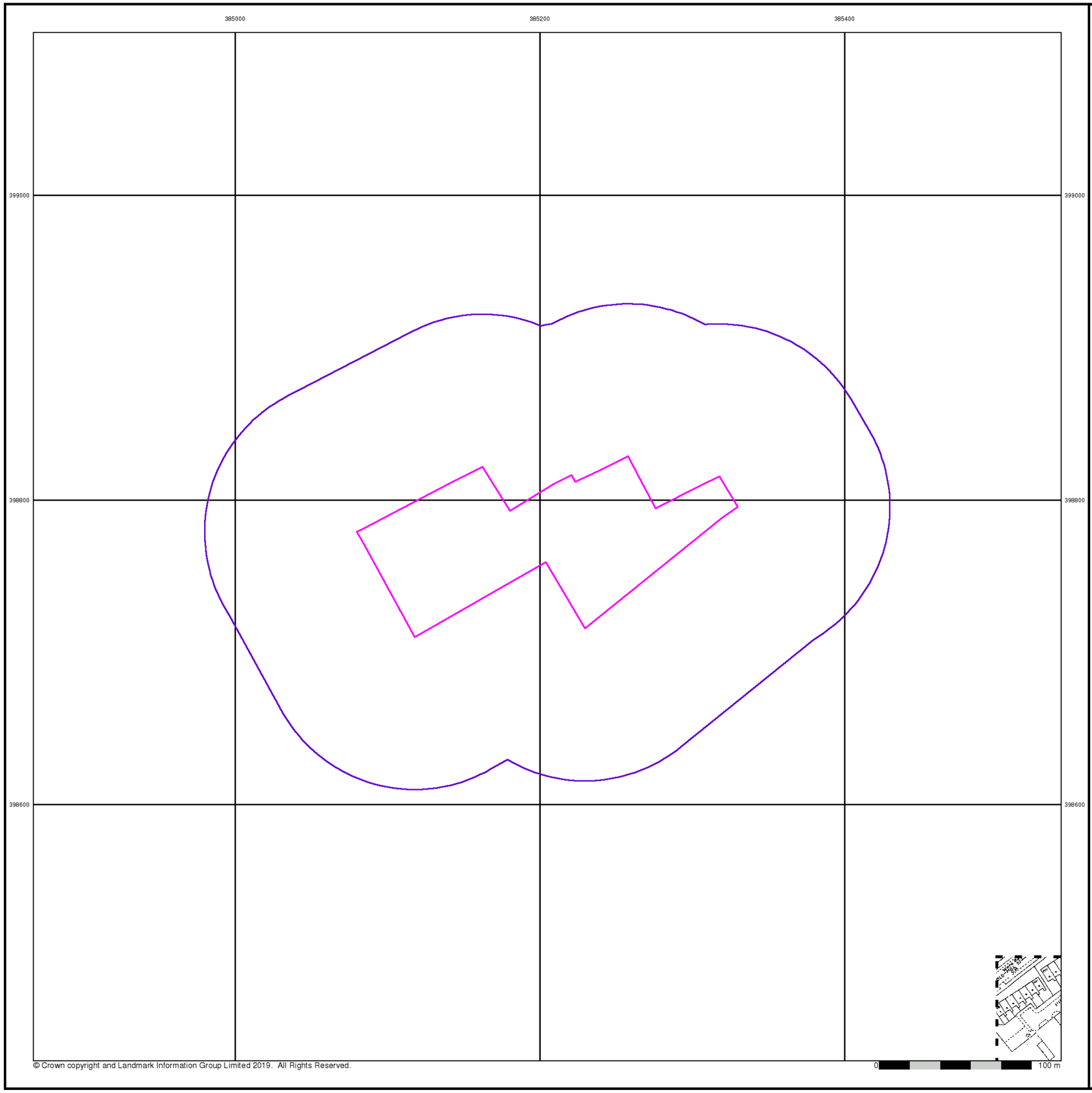

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Additional SIMs

Published 1990

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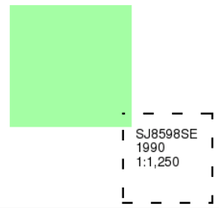
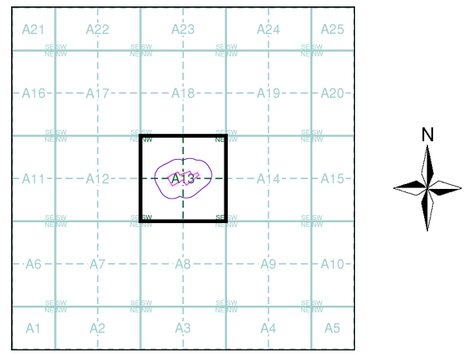


Historical Map - Segment A13



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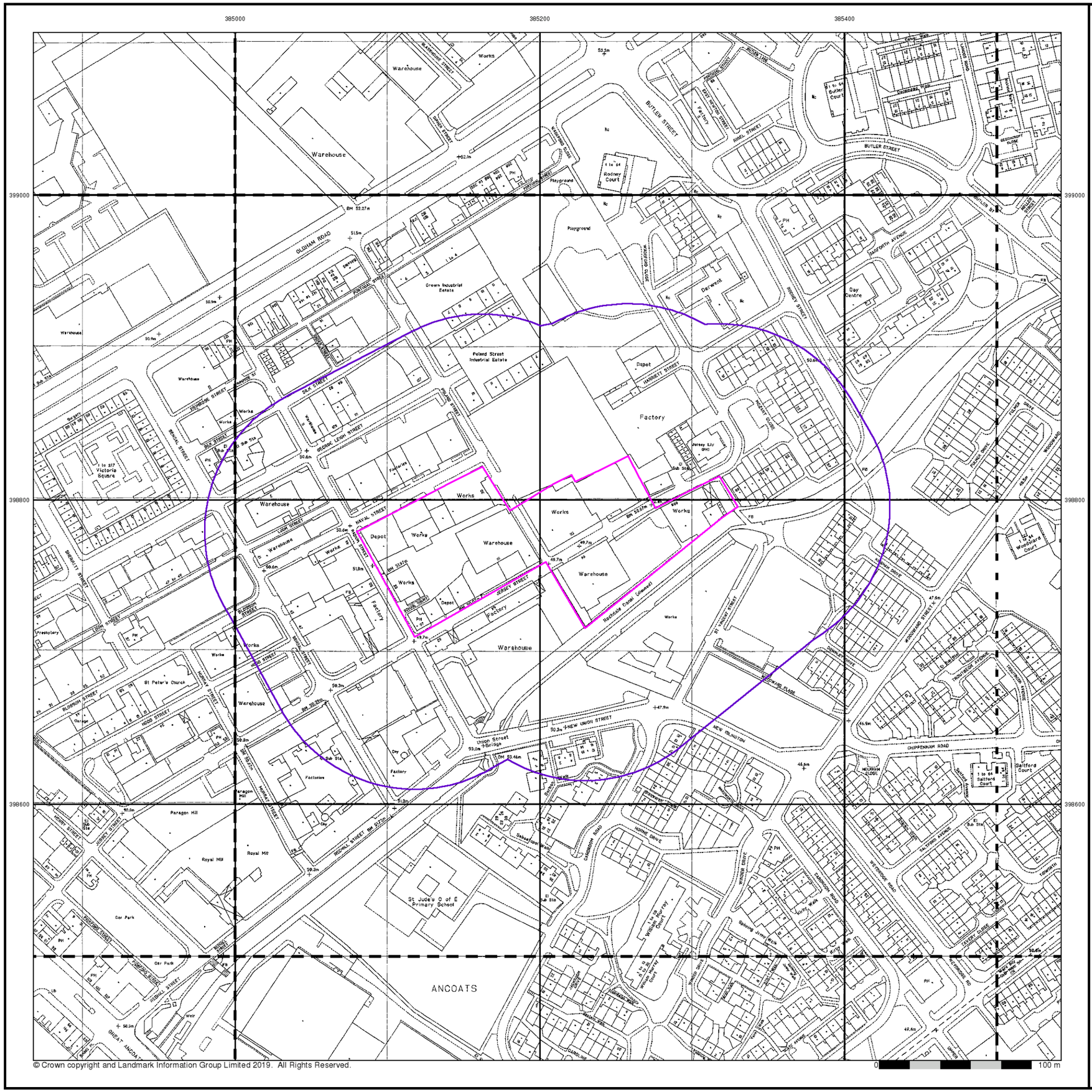

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Large-Scale National Grid Data

Published 1992

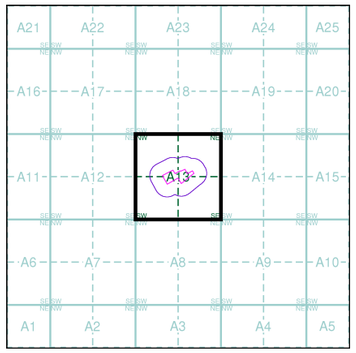
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SJ8499SE 1992 1:1,250	SJ8599SW 1992 1:1,250	SJ8599SE 1992 1:1,250
SJ8498NE 1992 1:1,250	SJ8598NW 1992 1:1,250	SJ8598NE 1992 1:1,250
SJ8498SE 1992 1:1,250	SJ8598SW 1992 1:1,250	SJ8598SE 1992 1:1,250

Historical Map - Segment A13



Order Details

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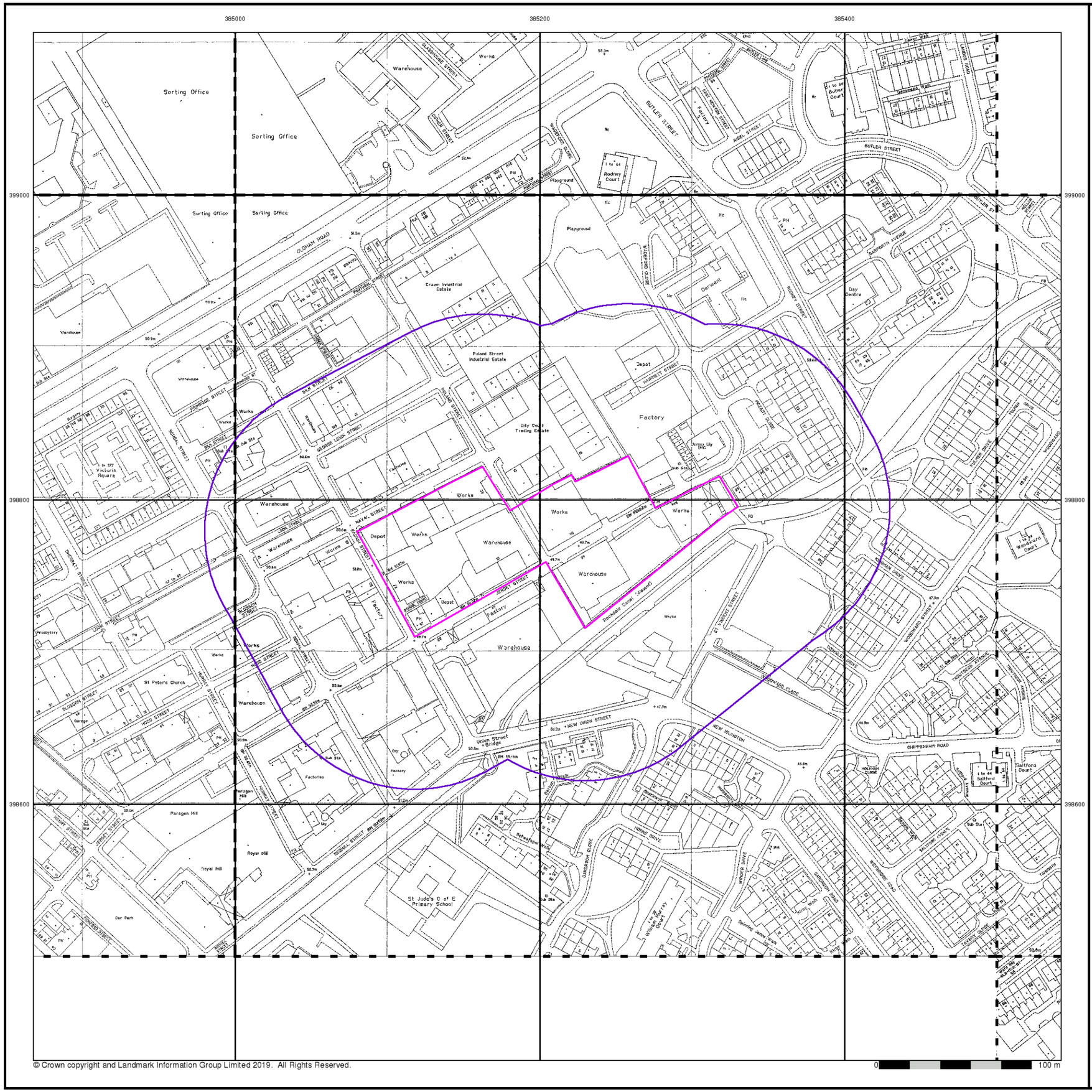

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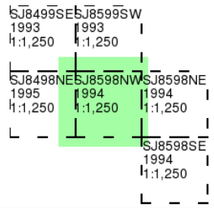
Large-Scale National Grid Data

Published 1993 - 1995

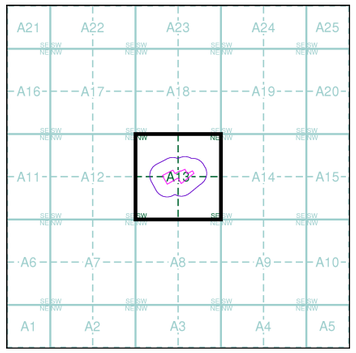
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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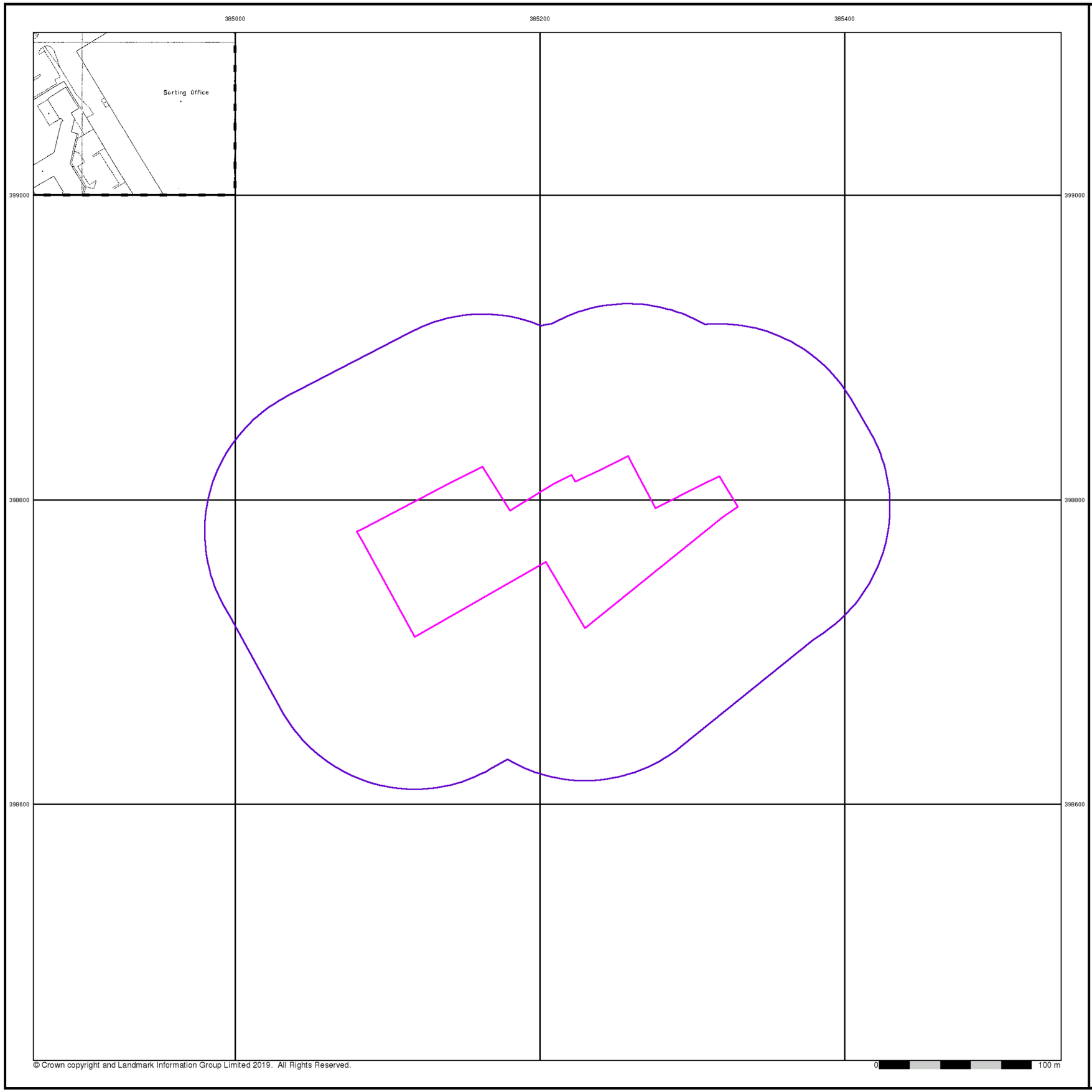

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Large-Scale National Grid Data

Published 1994

Source map scale - 1:1,250

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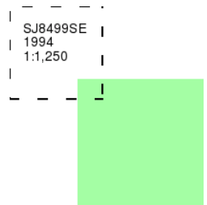
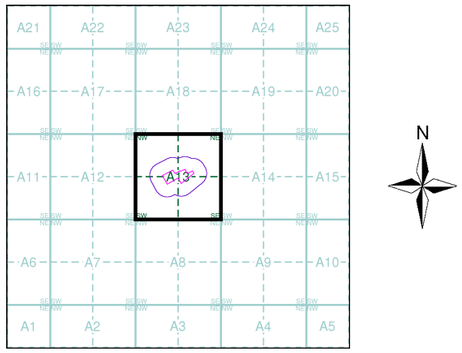
Map Name(s) and Date(s)



Historical Map - Segment A13



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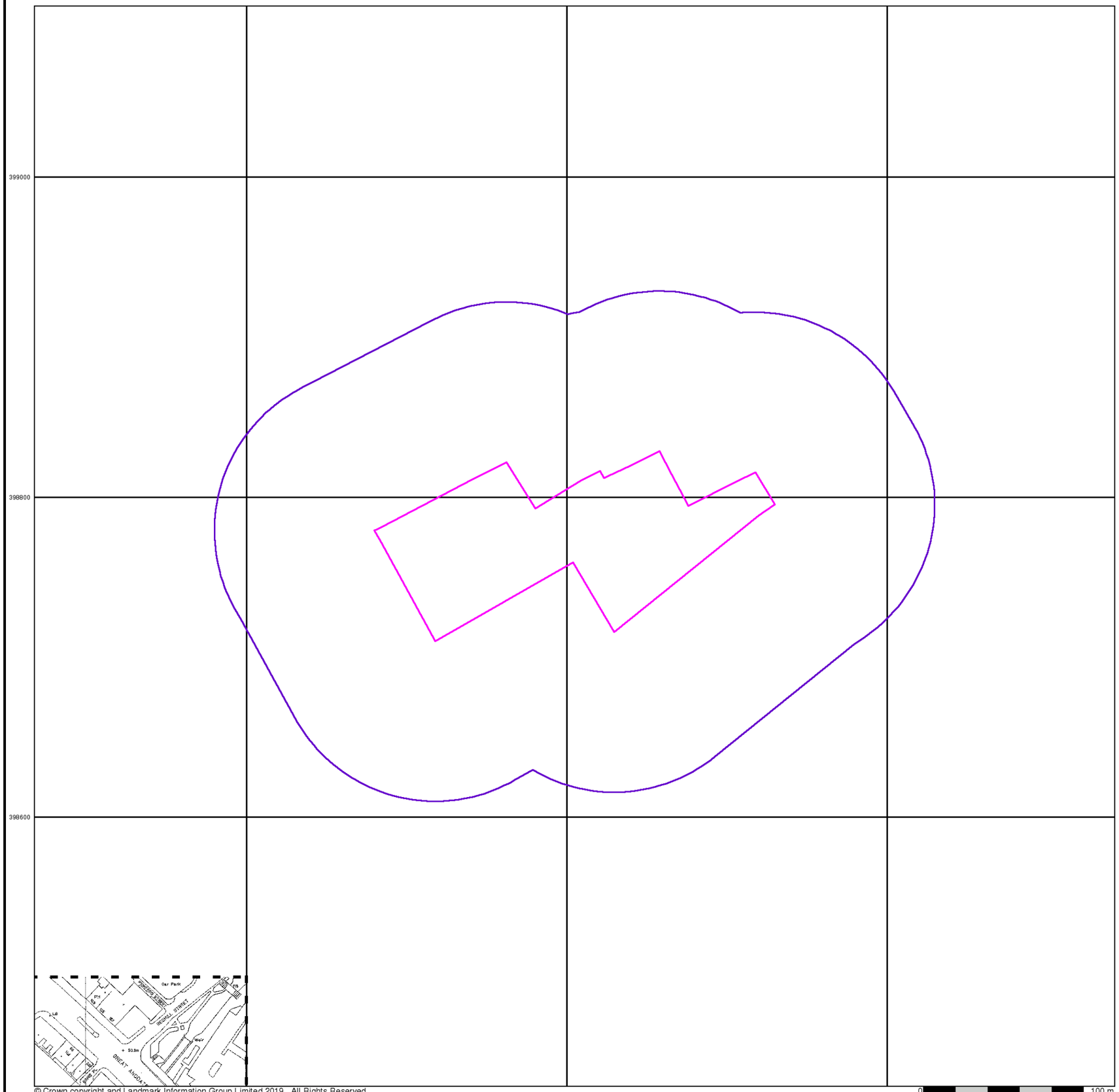

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Large-Scale National Grid Data

Published 1996

Source map scale - 1:1,250

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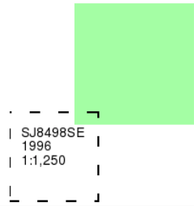
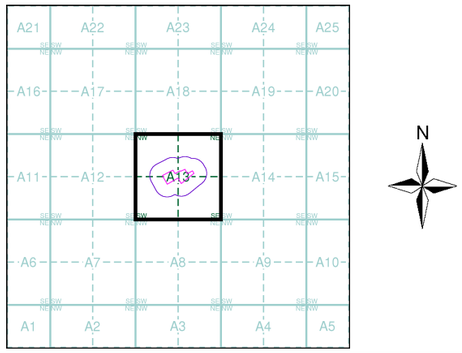
Map Name(s) and Date(s)



Historical Map - Segment A13



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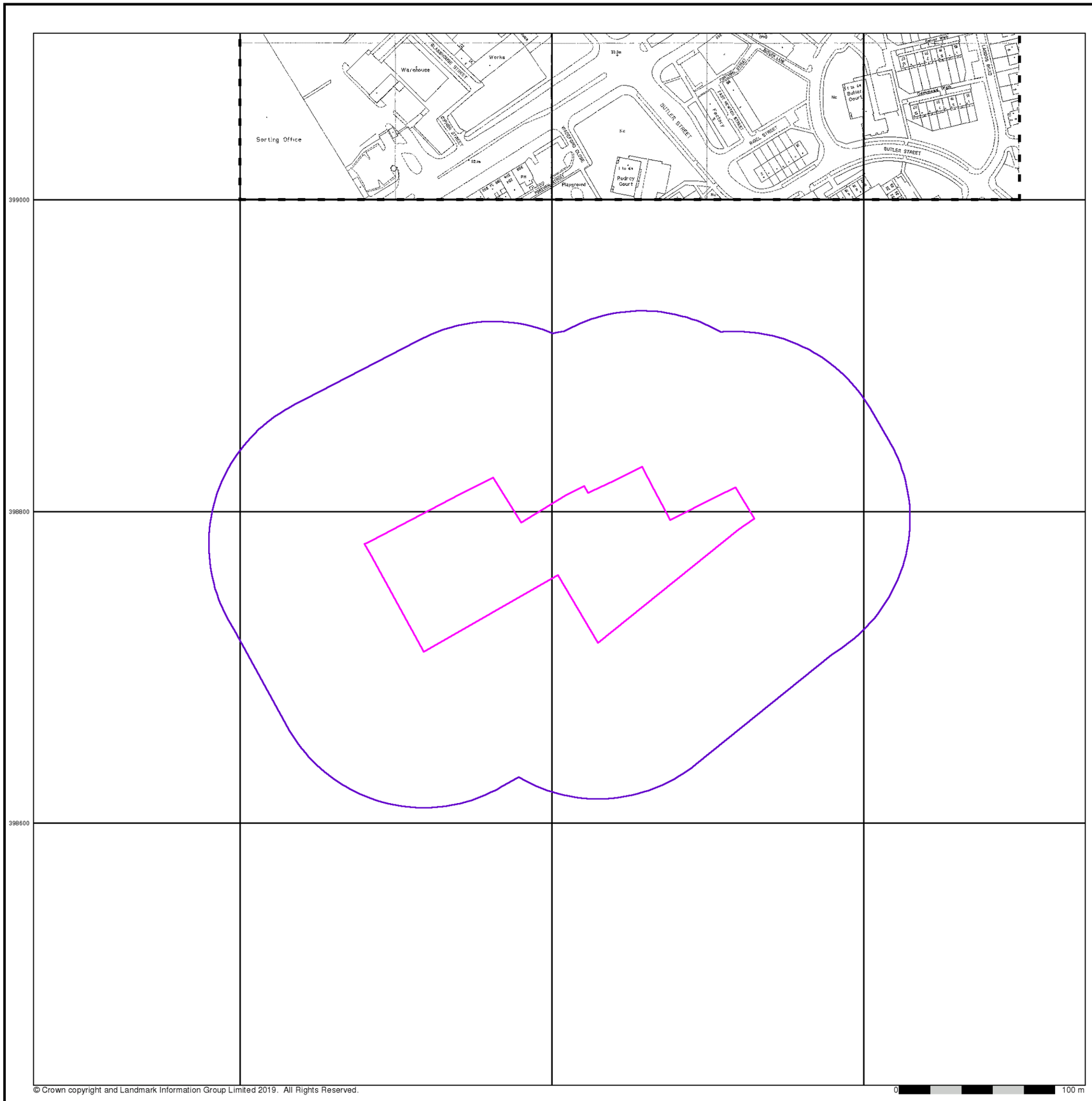

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Large-Scale National Grid Data

Published 1996

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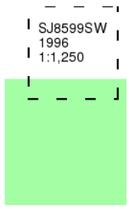
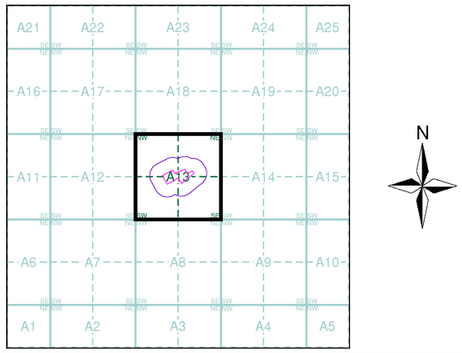


Historical Map - Segment A13



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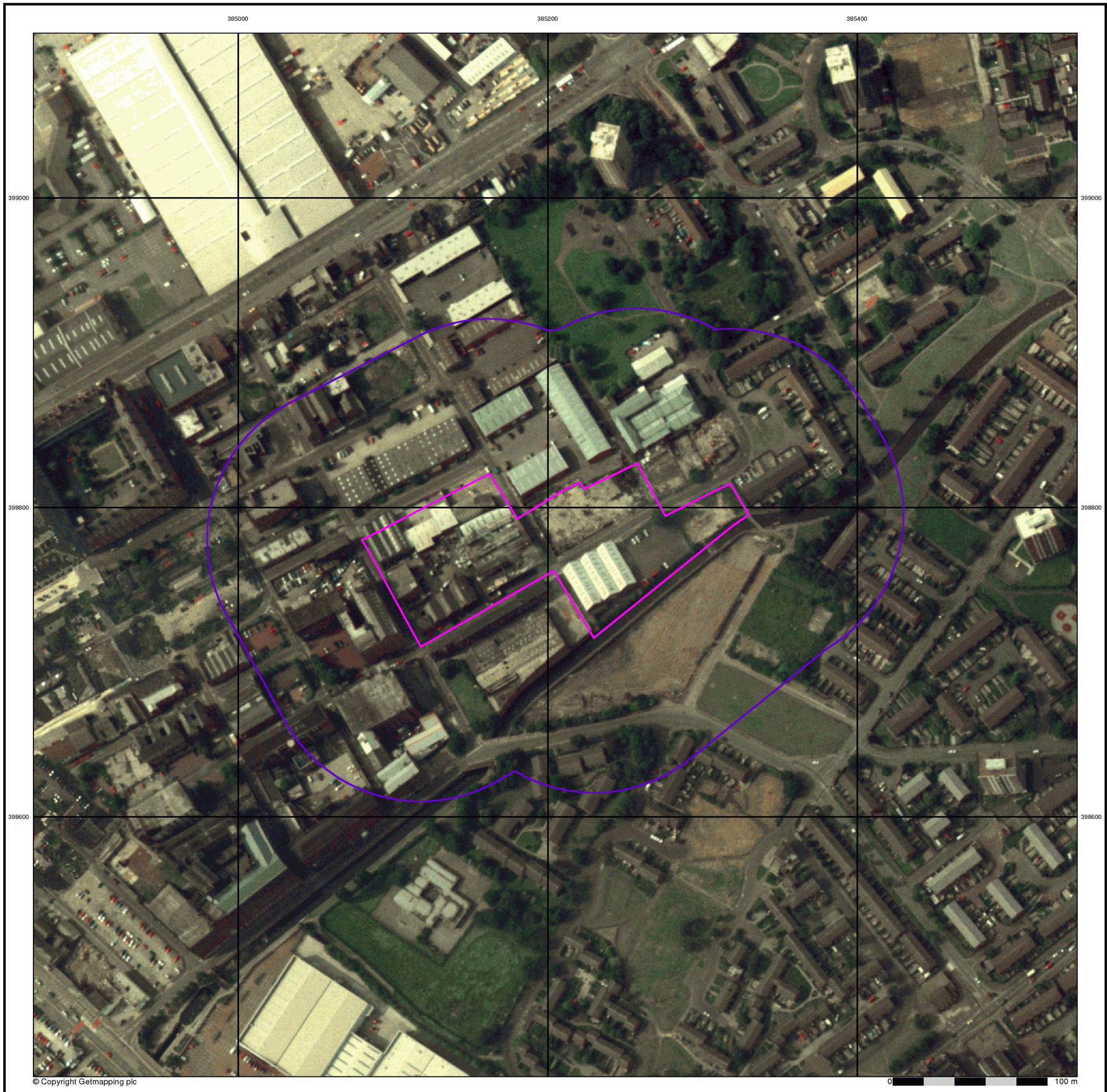
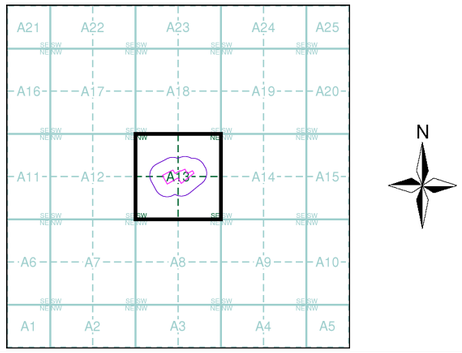


Historical Aerial Photography

Published 2000

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



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