

# JAMES STREET NORTH RADCLIFFE

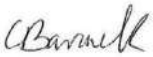
## PHASE 1: PRELIMINARY RISK ASSESSMENT

**Job Number: LKC 20 1984**  
**Date: 8<sup>th</sup> January 2021**  
**Client: Mairose Property Developments Ltd**



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|------------------------------|----------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------|
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## 1 Introduction

LK Consult Ltd (LKC) has been retained to carry out a Phase 1 Preliminary Risk Assessment (PRA) for James Street North, Radcliffe.

In accordance with current guidance (including LMRM<sup>1</sup> and the National Planning Policy Framework (NPPF)<sup>2</sup>), the PRA will include a site reconnaissance, site history, geology, hydrogeology, hydrology, mineral search and a landfill search. Information gathered from the desk study and site reconnaissance will be used to develop a contamination conceptual model for the site.

In addition, the information gathered will be used to identify potential geotechnical constraints associated with the redevelopment of the site.

Based on the findings of this report, an appropriate site investigation can be derived, if required.

Site details are provided in Table 1-1. Figure 1 shows the site location and boundary.

|                             |                                                                                                                                                                                    |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Location</b>        | North east end of James Street, and southwest end of James Street North, Radcliffe, Greater Manchester.<br>Centred at approximate National Grid Reference 378640E 406660N.         |
| <b>Approximate Area</b>     | 200m <sup>2</sup> .                                                                                                                                                                |
| <b>Topography</b>           | Approximately 78 metres Above Ordnance Datum (AOD).<br>Site is general uneven and slightly higher than the road to the west. Land adjacent to the west slopes down the north west. |
| <b>Current Site Use</b>     | Vacant site covered by overgrown vegetation.                                                                                                                                       |
| <b>Purpose of Report</b>    | Pre-planning.                                                                                                                                                                      |
| <b>Proposed Development</b> | It is understood that the development will include residential housing with soft landscaping / gardens. No proposed development plan has been provided at this stage however.      |

Table 1-1: Summary of site details

<sup>1</sup> Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

<sup>2</sup> "National Planning Policy Framework." The Ministry of Housing, Communities and Local Government. February 2019.

## 2 Historical Review

In compiling the site history, LKC consulted Envirocheck historical mapping (Appendix A) and other public domain maps / aerial photography.

Table 2-1 summarises features on site.

Table 2-2 summarises potentially contaminative land uses within approximately 50m and potentially infilled features within approximate 250m.

| Site Features         | Location on Site | Dates Present |              | Comments                                                                                                                                                     |
|-----------------------|------------------|---------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       |                  | From          | To           |                                                                                                                                                              |
| Unreferenced Building | N                | 1972          | 1992         | Small unreferenced building. Use unknown. No longer annotated by 1996 mapping.                                                                               |
| Vacant Site           | Whole Site       | 1850<br>1996  | 1965<br>2020 | Site vacant between 1850-1965, with development by 1972 mapping.<br>Site vacant again by 1996 mapping with dense vegetation shown on 2000 aerial photograph. |

Table 2-1: Summary of site features. Dates based on available historical map editions.

| Surrounding Area Features | Distance (m) | Direction | Dates Present |      | Comments                                                                                                                                                                                                                                |
|---------------------------|--------------|-----------|---------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |              |           | From          | To   |                                                                                                                                                                                                                                         |
| Reservoir                 | 5            | W         | 1850          | 1989 | Disused by 1988 mapping. No longer annotated by 1992 mapping, potentially infilled feature.                                                                                                                                             |
| Depot                     | 30           | NW        | 1992          | 2020 |                                                                                                                                                                                                                                         |
| Blue Mill                 | 35           | N         | 1891          | 1937 | Annotated as 'Bleach and Dye Works'. No longer annotated by 1938 mapping.                                                                                                                                                               |
| Chimney                   | 40           | N         | 1909          | 1937 | Associated with 'Blue Mill'. No longer annotated by 1938 mapping.                                                                                                                                                                       |
| Paper Mill                | 40           | S         | 1937          | 2000 | Annotated as 'Radcliffe Paper Mill'. Building present prior to 1937, however located over 50m from site. Extension to mill from 1937 mapping and now extends to within 50m of site. Replaced by residential properties by 2020 mapping. |
| Reservoir                 | 85           | SW        | 1850          | 1895 | No longer annotated by 1909 mapping, potentially infilled feature.                                                                                                                                                                      |
| Reservoir                 | 115          | S         | 1850          | 1989 | No longer annotated by 1992 mapping, potentially infilled feature.                                                                                                                                                                      |
| Reservoir                 | 120          | W         | 1850          | 1985 | No longer annotated by 1898 mapping, potentially infilled feature.                                                                                                                                                                      |
| Reservoir                 | 130          | S         | 1850          | 1910 | No longer annotated by 1922 mapping, potentially infilled feature.                                                                                                                                                                      |
| Reservoir                 | 135          | NW        | 1891          | 1893 | No longer annotated by 1894 mapping, potentially infilled feature.                                                                                                                                                                      |
| Reservoir                 | 180          | E         | 1850          | 1909 | No longer annotated by 1910 mapping, potentially infilled feature.                                                                                                                                                                      |
| Reservoir                 | 180          | W         | 1891          | 1965 | No longer annotated by 1972 mapping, potentially infilled feature.                                                                                                                                                                      |
| Reservoir                 | 200          | SE        | 1893          | 1965 | No longer annotated by 1975 mapping, potentially infilled feature.                                                                                                                                                                      |

Table 2-2: Summary of potentially contaminative features within 50m and potentially infilled features with 250m. Dates are based on available historical map editions.

| Surrounding Area Features | Distance (m) | Direction | Dates Present |      | Comments                                                                                                          |
|---------------------------|--------------|-----------|---------------|------|-------------------------------------------------------------------------------------------------------------------|
|                           |              |           | From          | To   |                                                                                                                   |
| Reservoir                 | 230          | NW        | 1891          | 1910 | No longer annotated by 1922 mapping, potentially infilled feature.                                                |
| Old Coal Pit / Shaft      | 245          | SE        | 1850          | 1938 | Associated with 'Stand Lane Colliery'. Annotated as 'Shaft' by 1891 mapping. No longer annotated by 1956 mapping. |

Table 2-2: Summary of potentially contaminative features within 50m and potentially infilled features with 250m. Dates are based on available historical map editions.

Plate 2-1 shows the features noted in Table 2-1 and 2-2.



Plate 2-1: Historical features.

The 1937 mapping showing the adjacent reservoir, and mills to the north and south is shown on Plate 2-2.



Plate 2-1: Extract from 1937 mapping.

### 3 Environmental Setting

A summary of environmental settings is presented in Table 3-1, based on a review of available environmental data.

| Categories <sup>(data sources)</sup> |                                      | Details                                                                                                                                                                  |
|--------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Geology <sup>1, 2</sup>              | Artificial                           | - None recorded on site.                                                                                                                                                 |
|                                      | Superficial                          | - Till across the majority of site.<br>- Glaciofluvial Deposits (Sand and Gravel) along the NW boundary and in the far most northern corner of site.                     |
|                                      | Bedrock                              | - Nob End Rock (Sandstone).                                                                                                                                              |
|                                      | BGS Logs (<50m)                      | - None available within 50m.                                                                                                                                             |
| Hydro-geology <sup>1</sup>           | Aquifer Designation                  | - Superficial<br>- Secondary A Aquifer in N.<br>- Secondary Undifferentiated Aquifer in NW.                                                                              |
|                                      |                                      | - Bedrock<br>- Secondary A Aquifer.                                                                                                                                      |
|                                      | Source Protection Zone (SPZ)         | - Site not within an SPZ.                                                                                                                                                |
|                                      | Groundwater Abstractions (100m)      | - None recorded within 100m.                                                                                                                                             |
| Hydrology <sup>1</sup>               | Surface Water Courses (100m)         | - 157m NW, River Irwell.                                                                                                                                                 |
|                                      | Flooding risk                        | - Flood Zone 1.<br>- Potential for groundwater flooding of property situated below ground level.                                                                         |
|                                      | Surface Water Abstractions (100m)    | - None recorded within 100m.                                                                                                                                             |
|                                      | Discharge Consents                   | - None recorded on site.                                                                                                                                                 |
|                                      | Pollution Incidents                  | - None recorded on site.                                                                                                                                                 |
| Minerals & Mining <sup>1,4,5</sup>   | Coal Mining                          | - Within a Coal Reporting Area.<br>- Not within a Development High Risk Area.                                                                                            |
|                                      | Surface Mineral Extractions (250m)   | - 6no. within 250m.<br>- Nearest 34m SE: 'Stand Lane Colliery'. Underground extraction of coal (deep). Operations ceased.<br>- No active mineral extraction within 250m. |
|                                      | Cheshire Brine Compensation District | - Not within Compensation District.<br>- Not within Consultation Area.                                                                                                   |
|                                      | Non-Coal Mining Area                 | - Not within an area of conclusive metalliferous mining.                                                                                                                 |
|                                      |                                      |                                                                                                                                                                          |
| Ground Stability <sup>1</sup>        | Collapsible Ground                   | - Very low hazard.                                                                                                                                                       |
|                                      | Compressible Ground                  | - No hazard.                                                                                                                                                             |
|                                      | Ground Dissolution                   | - No hazard.                                                                                                                                                             |
|                                      | Landslide                            | - Very low hazard.                                                                                                                                                       |
|                                      | Running Sand                         | - Very low hazard.                                                                                                                                                       |
|                                      | Shrinking / Swelling Clay            | - No hazard.                                                                                                                                                             |

Table 3-1: Summary of the environmental setting.

**Notes:** Distance in brackets is the distance from site that features are included. Where no distance given, features relate to on site only.

**Data Sources:**

1 Envirocheck Report (Appendix A & B)

2 BGS Sheet 85 1:50,000

3 BGS GeoIndex <http://mapapps2.bgs.ac.uk/geoindex/home.html>

4 The Coal Authority Web Mapping Services (WMS) /

Interactive Map Viewer <http://coal.decc.gov.uk/en/coal/cms/publications/data/map/map.aspx>

5 Cheshire Brine Subsidence Compensation Board Compensation District & Consultation Areas <http://www.cheshirebrine.com/wp-content/uploads/2016/11/NL08134-001-002.pdf>

| Categories <sup>(data sources)</sup>            |                                                                              | Details                                                                                                                                                                                      |
|-------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Landfill Sites (250m) <sup>1</sup>              | Known / Registered                                                           | - None recorded within 250m.                                                                                                                                                                 |
|                                                 | Potentially Infilled Land (non-water and water), based on Envirocheck Report | - 7no. features: 4m NW, 93m SW, 117m W, 140m S, 147m S, 202m E, 231m SE.                                                                                                                     |
|                                                 | Potentially infilled sites, based on LKC historical review                   | - 10no. features: See Table 2-1.                                                                                                                                                             |
| Radon Potential <sup>1</sup>                    |                                                                              | - 1-3% of homes above Action Level. No protective measures are necessary in the construction of new dwellings or extensions.                                                                 |
| Designated Sites (50m) <sup>1</sup>             |                                                                              | - None recorded within 50m.                                                                                                                                                                  |
| Contemporary Trade Directory (50m) <sup>1</sup> |                                                                              | - 3no. within 50m.<br>- 21m SE: Pottery Manufacturers and Suppliers. Inactive.<br>- 31m NW: Commercial Vehicle Bodybuilders and Repairers. Active.<br>- 32m NW: Sheet Metal Works. Inactive. |
| Fuel Station Entries (50m) <sup>1</sup>         |                                                                              | - None recorded within 50m.                                                                                                                                                                  |
| Unexploded Ordnance Risk (UXO)                  | Zetica Risk Map <sup>6</sup>                                                 | - Low.                                                                                                                                                                                       |
|                                                 | Historical / Current Military Activity                                       | - None identified within 100m                                                                                                                                                                |

Table 3-1 Continued: Summary of the environmental setting.

**Notes:** Distance in brackets is the distance from site that features are included. Where no distance given, features relate to on site only.

**Data Sources:**

**1** Envirocheck Report (Appendix A & B)

**6** Zetica UXO Unexploded Bomb Risk Map (Appendix D)

As the site is located close to a Development High Risk Area (recorded approximately 35m south of site) and within a coal reporting area, a Groundsure CON29 Official Coal Mining Search has been obtained by the client for the site as a precaution and provided to LKC. The report is presented in Appendix C and states ***'We consider the property to be acceptably free from coal mining related risk. No further action is required with regards to past coal mining.'***

## 4 Site Reconnaissance

A site reconnaissance was carried out on 05 January 2021. Hand dug trial holes were undertaken in accessible areas to confirm the shallow ground conditions.

Relevant features identified on site are summarised below:

- The site is currently vacant with no buildings and covered by dense vegetation.
- Fly tipping of household waste is present in the south and west of site.
- Access for site investigation is currently limited due to dense vegetation. It is understood that the vegetation is to be cleared. The site is bound by a wooden fence with concrete blocks beneath it which further limit access.
- Vegetation is most dense in the centre and north of site (brambles), with ivy covering most of the surface in the southwest.
- A metal fence is present along the north western boundary.
- The site is generally uneven, with a possible mound of material in the south-eastern corner making the site topographically higher than the road to the west. A large tree is present in the southeast.
- A steep slope to the northwest is present just off the northwest boundary.
- No visual evidence of significant contamination identified.

The surrounding area comprises residential properties to the east and south, with vacant land to the north, and industrial / commercial properties to the west and south. Relevant photographs are provided in Plate 4-1.

|                                                                                     |                                                                                                    |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  |                |
| <b>Photograph 1:</b> View showing dense vegetation across site facing northwest.    | <b>Photograph 2:</b> View showing tree in southeast corner, possible mound, fly tipping and fence. |
|  |                |
| <b>Photograph 3:</b> View showing ivy and fencing materials in southwest.           | <b>Photograph 4:</b> View of fence along northwest boundary.                                       |

Plate 4-1: Site photographs.

Hand dug pits were carried out in 2no. locations and are summarised in Plate 4-2.

| HD101                                                                                                                                                                           | HD102                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| GL-0.2m Made Ground (silty gravelly sand with occasional brick and rootlets).<br>Hole could not be penetrated deeper due to frozen ground and the presence of large tree roots. | GL-0.3m Made Ground (very silty slightly gravelly sand with occasional brick and glass).<br>Hole could not be penetrated deeper due to frozen ground. |

Plate 4-2: Hand Dug Pit Logs.

Hand dug pit locations are shown on Plate 4-3.



Plate 4-3: Plan showing relevant site walkover features.

## 5 Preliminary Conceptual Model

### 5.1 Introduction

The aim of the conceptual model is to provide a preliminary assessment of the likelihood of a pollutant linkage for each potential combination of contaminant, pathway and receptor. A conceptual model can be used to make an informed decision on the contamination risks associated with the site and whether further site investigation work is required.

The Sections below are therefore divided into potential contaminant, potential pathway and potential receptor as described in LMRM<sup>3</sup>, on the premise that, if there is no pollutant linkage, then there will be no risk to the receptor. The final Section provides an assessment of the potential pollutant linkages that may still be present on the site if redevelopment were to occur.

### 5.2 Potential Contaminants

Potential viable contamination sources are detailed in Table 5-1. These are split into onsite sources, offsite sources and underlying geology.

| Potential Source                                                                                                                            | Contaminants                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| On Site                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Shallow Made Ground below some or all of site (e.g. small former unreferenced building, mound of unknown material, fly tipping on surface). | <ul style="list-style-type: none"> <li>- Assuming predominantly reworked natural soils with possible demolition rubble, ash and clinker: Asbestos, heavy metals, sulphates, PAHs<sup>4</sup>.</li> <li>- Not expected to be a significant source of gas given anticipated depth and nature of Made Ground.</li> </ul>                                                                                                                                                      |
| Demolished unreferenced building                                                                                                            | <ul style="list-style-type: none"> <li>- Asbestos Containing Material (ACM).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                    |
| Surrounding Area                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Current Depot (30m NW)                                                                                                                      | <ul style="list-style-type: none"> <li>- Possible heavy metals, PAHs, sulphates, organic and inorganic contamination.</li> <li>- Unlikely to be significant source of contamination due to topography difference between feature and site (feature topographically lower).</li> </ul>                                                                                                                                                                                      |
| Former bleach and dye works (Blue Mills) and associated chimney (35m N) <sup>5</sup>                                                        | <ul style="list-style-type: none"> <li>- Typical contaminants include bleaching agents and dyes such as acids and alkalis, chlorine, and caustic soda.</li> <li>- Other ancillary activities could include coal fired boilers producing large quantities of boiler ash (heavy metals, sulphates and PAHs).</li> <li>- Unlikely to be significant source of contamination due to topography difference between feature and site (feature topographically lower).</li> </ul> |
| Radcliffe Paper Mill (40m S) <sup>6</sup>                                                                                                   | <ul style="list-style-type: none"> <li>- Typical contaminants could include heavy metals, PAHs, acids, alkalis, solvents, other organic and inorganic contaminants.</li> <li>- The feature has since been redeveloped for residential purposes and likely remediated, therefore unlikely to pose a significant risk.</li> </ul>                                                                                                                                            |
| Offsite potentially infilled features within 250m                                                                                           | <ul style="list-style-type: none"> <li>- Given size, distance and age of features, there is considered to be a source of hazardous gas (principally carbon dioxide and methane).</li> </ul>                                                                                                                                                                                                                                                                                |

Table 5-1: Potential contamination sources.

<sup>3</sup> Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

<sup>4</sup> Defra (2002). "Potential Contaminants for the Assessment of Land". R&D Publication CLR 8.

<sup>5</sup> Department of the Environment. Industry Profile. Textile Works and Dye Works. 1995

<sup>6</sup> Department of the Environment. Industry Profile. Pulp and Paper Manufacturing Dye Works. 1995

### 5.3 Potential Receptors

Potential receptors are detailed in Table 5-2.

| Receptors                                    |                                                                                                                                                         |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Human Health                                 | <ul style="list-style-type: none"> <li>- Future site users (including residents, visitors and site workers).</li> <li>- Offsite land users.</li> </ul>  |
| Controlled Waters                            | <ul style="list-style-type: none"> <li>- Secondary A and Undifferentiated Aquifers.</li> <li>- No surface water within influencing distance.</li> </ul> |
| Buildings and structures.                    |                                                                                                                                                         |
| Potable water pipes.                         |                                                                                                                                                         |
| Flora within future gardens and landscaping. |                                                                                                                                                         |

Table 5-2: Potential receptors.

### 5.4 Potential Pathways

Potential pathways are detailed in Table 5-3.

| Pathways      |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Soil          | Human Health <sup>7</sup> (residential land use: houses with private gardens) | <ul style="list-style-type: none"> <li>- Ingestion of soil.</li> <li>- Ingestion of soil-derived indoor dust.</li> <li>- Ingestion of contaminated vegetables.</li> <li>- Ingestion of soil attached to vegetables.</li> <li>- Dermal contact with soil.</li> <li>- Dermal contact with soil-derived indoor dust.</li> <li>- Inhalation of soil-derived outdoor dust.</li> <li>- Inhalation of soil-derived indoor dust.</li> <li>- Inhalation of vapours outside.</li> <li>- Inhalation of vapours inside.</li> </ul> |
|               |                                                                               | - Windblown dust and fibres to adjacent receptors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|               |                                                                               | - Direct contact with receptors (building foundations, services).                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|               |                                                                               | - Root uptake.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Water         |                                                                               | <ul style="list-style-type: none"> <li>- Surface run-off over impermeable surface.</li> <li>- Site is relatively flat and grassed; therefore, surface run-off will be limited.</li> </ul>                                                                                                                                                                                                                                                                                                                              |
|               |                                                                               | - Infiltration into the ground, through potentially contaminated material (contamination possibly going into solution).                                                                                                                                                                                                                                                                                                                                                                                                |
| Water and Gas |                                                                               | <ul style="list-style-type: none"> <li>- Migration through potentially permeable strata and preferential pathways.</li> <li>- Superficial (Till) expected beneath majority of site likely to be of low permeability.</li> <li>- Superficial (sand and gravel) expected in the north is likely to be relatively permeable.</li> <li>- Bedrock (sandstone) likely to be relatively permeable.</li> <li>- No preferential pathways are anticipated.</li> </ul>                                                            |
| Gas           |                                                                               | - Migration into buildings (e.g. via services) and accumulation of gases in confined spaces (potentially causing explosion if methane is present).                                                                                                                                                                                                                                                                                                                                                                     |

Table 5-3: Potential pathways.

### 5.5 Preliminary Contamination Conceptual Model

The Preliminary Contamination Conceptual Model is illustrated in Table 5-4 and has identified seven generic potential pollutant linkages.

Each linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552<sup>8</sup>.

<sup>7</sup> EA (2008). "Updated Technical Background to the CLEA Model". Science Report – SC050021/SR3.

<sup>8</sup> CIRIA (2001). "Contaminated Land Risk Assessment: A Guide to Good Practice". C552.

In order to assess the potential risk for each pollutant linkage, an assessment of the magnitude of the potential consequence (severity) of the risk occurring and the magnitude of the probability (likelihood) of the risk occurring has been considered and classified. This is based on the guidance provided in CIRIA C552 and further details including a risk matrix is provided in Appendix E.

Where LKC identified a low to very low risk, targeted or low density intrusive investigation work, a watching brief (during construction work) or no investigation work will be recommended. This will be dependent on the nature of the site and the proposed development.

Where the risk falls into the moderate/low risk, LKC will undertake an assessment to establish what category the pollutant linkage will fall into (i.e. moderate or low risk will be chosen).

Where LKC identifies a moderate or higher risk, intrusive investigation work or precautionary remedial measures will be recommended.

It should be noted that there may be risk from short term exposure from contaminated soil to site workers. The Preliminary Contamination Conceptual Model deals with long term exposure to key receptors. Acute risks can be easily mitigated by good environmental management of the site during site works. Standard health and safety precautions (as per HSE guidance<sup>9</sup>) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

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<sup>9</sup> HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land". London HMSO.

| PL | Pathway                                                                                                                                                                                                                      | Receptor                                                                                                                    | Contaminants of Concern (CoC)                                                                                                                                                             | Probability                                                                                                              | Consequence | Risk                                                                                                           | Recommendations                                                                                                                              |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <ul style="list-style-type: none"> <li>- Dermal contact.</li> <li>- Inhalation of soil, fibres and dust.</li> <li>- Ingestion of soils, dust, vegetables, soil attached to vegetables.</li> <li>- Windblown dust.</li> </ul> | <ul style="list-style-type: none"> <li>- Future site users.</li> <li>- Offsite receptors.</li> </ul>                        | <ul style="list-style-type: none"> <li>- ACM</li> <li>- Heavy metals.</li> <li>- PAHs.</li> <li>- Petroleum hydrocarbons.</li> <li>- Other inorganic and organic contaminants.</li> </ul> | Low Likelihood<br>(given site history no significant demolition recorded and no significant onsite source identified)    | Medium      | <b>Moderate / Low</b><br>(moderate assumed until ground conditions confirmed given sensitive proposed end use) | Intrusive investigation required.<br>Precautionary soil analysis of CoC.                                                                     |
| 2  | <ul style="list-style-type: none"> <li>- Inhalation of vapours.</li> <li>- Migration via permeable strata and preferential pathways.</li> </ul>                                                                              | <ul style="list-style-type: none"> <li>- Future site users.</li> <li>- Offsite receptors.</li> </ul>                        | <ul style="list-style-type: none"> <li>- Volatile contaminants (TPHCWG, SVOC, VOCs).</li> </ul>                                                                                           | Low Likelihood<br>(given site history, site conditions and proposed end use)                                             | Medium      | <b>Moderate / Low</b><br>(low assumed given no significant anticipated source)                                 | Intrusive investigation required, to include PID testing.<br>Soil analysis of CoC, subject to ground conditions encountered and PID testing. |
| 3  | <ul style="list-style-type: none"> <li>- Inhalation of gas.</li> <li>- Migration via permeable strata and preferential pathways.</li> <li>- Explosion in confined spaces.</li> <li>- Exposure to radon.</li> </ul>           | <ul style="list-style-type: none"> <li>- Future site users.</li> <li>- Buildings.</li> <li>- Offsite land users.</li> </ul> | <ul style="list-style-type: none"> <li>- Hazardous gas (carbon dioxide, methane).</li> </ul>                                                                                              | Likely<br>(given viable gas source, proposed end use and viable pathway)                                                 | Severe      | <b>High</b>                                                                                                    | Gas monitoring or precautionary gas protection measures required.                                                                            |
|    |                                                                                                                                                                                                                              |                                                                                                                             | <ul style="list-style-type: none"> <li>- Radon</li> </ul>                                                                                                                                 | Unlikely<br>(as 1-3% of homes above action level)                                                                        | Medium      | <b>Low</b>                                                                                                     | (1-3%) No protective measures are necessary in the construction of new dwellings or extensions.                                              |
| 4  | <ul style="list-style-type: none"> <li>- Surface run-off.</li> <li>- Migration via permeable strata and preferential pathways.</li> <li>- Perched waters migration.</li> </ul>                                               | <ul style="list-style-type: none"> <li>- Groundwater (Secondary A and Undifferentiated Aquifers).</li> </ul>                | <ul style="list-style-type: none"> <li>- Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds.</li> </ul>                                                           | Low Likelihood<br>(given site history and anticipated cohesive superficial deposits expected beneath majority of site)   | Medium      | <b>Moderate / Low</b><br>(moderate assumed until ground conditions confirmed)                                  | Intrusive investigation required.<br>Groundwater sampling, subject to ground conditions encountered.<br>Analysis of CoC.                     |
| 5  | <ul style="list-style-type: none"> <li>- Sulphate attack on concrete.</li> </ul>                                                                                                                                             | <ul style="list-style-type: none"> <li>- Building structure.</li> </ul>                                                     | <ul style="list-style-type: none"> <li>- Sulphate.</li> </ul>                                                                                                                             | Likely<br>(given ground conditions not confirmed across site)                                                            | Mild        | <b>Moderate / Low</b><br>(moderate assumed until ground conditions confirmed)                                  | Low density intrusive investigation required.<br>Soil analysis of CoC.                                                                       |
| 6  | <ul style="list-style-type: none"> <li>- Ingestion of tainted water supply.</li> </ul>                                                                                                                                       | <ul style="list-style-type: none"> <li>- Future site users.</li> <li>- Water pipes.</li> </ul>                              | <ul style="list-style-type: none"> <li>- Organic contaminants such as petroleum hydrocarbons, naphthalene, volatile compounds.</li> </ul>                                                 | Low Likelihood<br>(although some contamination may be present, significant contamination not expected at pipeline depth) | Medium      | <b>Moderate / Low</b><br>(moderate risk assumed until ground conditions confirmed)                             | Intrusive investigation required.<br>Soil analysis of CoC, subject to ground conditions encountered.                                         |
| 7  | <ul style="list-style-type: none"> <li>- Direct contact (plant uptake).</li> </ul>                                                                                                                                           | <ul style="list-style-type: none"> <li>- Flora.</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>- Phytotoxic contaminants such as heavy metals.</li> </ul>                                                                                         | Likely<br>(given site conditions and proposed end use)                                                                   | Minor       | <b>Low</b>                                                                                                     | Low density intrusive investigation required.<br>Soil analysis of CoC.                                                                       |

Table 5-4: Preliminary Contamination Conceptual Model.

**Notes:** PL = Pollutant Linkage. Contaminant of Concern (CoC) - See Table 5-1 for contamination sources. Site conditions based on observations during site reconnaissance.

## 6 Preliminary Geotechnical Risk Assessment

Table 6-1 summarises the possible geotechnical constraints of the site, based on the site history, environmental settings and site reconnaissance. Investigation work will be required to confirm the risks and provide a detailed geotechnical assessment and foundation design.

|                                                     |                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Coal Mining</b>                                  | Site is not within a Development High Risk Area. CON29M Report states no further assessment required with regards to past coal mining.                                                                                                                                                   |
| <b>Slope Stability</b>                              | Site is relatively level.<br>An offsite slope noted to northwest of site. This may need to be considered further subject to development proposals (i.e. if building is close to top of slope).                                                                                           |
| <b>Envirocheck<br/>Ground Stability<br/>Hazards</b> | No to very low hazard identified. No further action required.                                                                                                                                                                                                                            |
| <b>Made Ground</b>                                  | Unknown depth and constituent of made ground across the site.<br>Initial information indicates relatively shallow made ground.<br>Possible in-ground structures relating to former building on site.<br>Unlikely to be a suitable founding strata unless engineering work is undertaken. |
| <b>Superficial</b>                                  | Unknown strength of soils for foundation design.<br>Clay / sand anticipated below the site.<br>Strata may be variable giving differential settlement.                                                                                                                                    |
| <b>Bedrock</b>                                      | Unknown depth to bedrock.                                                                                                                                                                                                                                                                |
| <b>Groundwater</b>                                  | Unknown depth and variability of groundwater.<br>Shallow / fluctuating groundwater can affect the strength of the soil, particularly in granular ground.<br>Shallow groundwater can also affect construction works.                                                                      |
| <b>Plasticity</b>                                   | Plasticity of clay deposits should be confirmed, particularly where trees are present or proposed, to identify the shrink / swell risk.                                                                                                                                                  |
| <b>Sulphate</b>                                     | Unknown sulphate content of the made ground and natural.                                                                                                                                                                                                                                 |
| <b>Road / Pavement<br/>Design</b>                   | Unknown CBR values for footpath and road design.                                                                                                                                                                                                                                         |

Table 6-1: Summary of geotechnical constraints.

## 7 Summary Conclusions and Recommendations

### 7.1 Summary Conclusions

Table 7-1 summarises the site details, historical review, environmental settings and site reconnaissance.

|                                    |                                                                                                                                                                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current Site Use</b>            | Vacant site with no current buildings. Covered in dense vegetation.                                                                                                                                                         |
| <b>Proposed Development</b>        | Residential housing with gardens / soft landscaping.                                                                                                                                                                        |
| <b>Main Historical Features</b>    | Onsite: former building in north of site, mostly vacant.<br>Surrounding Area: Reservoirs, mills, depot.                                                                                                                     |
| <b>Geology / Hydrogeology</b>      | Artificial: No BGS recorded artificial.<br>Superficial: Till, Secondary A Aquifer. Glaciofluvial deposits (sand and gravel), Secondary Undifferentiated Aquifer.<br>Bedrock: Nob End Rock (sandstone), Secondary A Aquifer. |
| <b>Landfills / Infilled ground</b> | No recorded landfills within 250m. Potentially infilled ground identified.                                                                                                                                                  |
| <b>Coal Mining</b>                 | The site is within a coal reporting area, but not within a development high risk area. CON29M Report states that no further action is required with regards to past coal mining.                                            |
| <b>Site walkover</b>               | The site is currently vacant with no buildings and covered by dense vegetation. Fly tipping of household waste is present in the south and west of site.                                                                    |

Table 7-1: Summary of site details, historical review, environmental settings and site reconnaissance.

A preliminary contamination conceptual model has been produced by LKC, which is summarised in Table 7-2.

| Pollutant Linkage                                                                                                                                |                                                                                   | Risk                  | Recommendations                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PL1:</b> Contaminants posing a risk to future site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables). | ACM, heavy metals, PAHs, petroleum hydrocarbons, organic / inorganic contaminants | <b>Moderate / Low</b> | Intrusive investigation required.<br>Precautionary soil analysis of CoC.                                                                     |
| <b>PL2:</b> Volatile contaminants posing a risk to future site users via the inhalation of vapours.                                              |                                                                                   | <b>Moderate / Low</b> | Intrusive investigation required, to include PID testing.<br>Soil analysis of CoC, subject to ground conditions encountered and PID testing. |
| <b>PL3:</b> Gas posing a risk to buildings and future site users via the migration of gas into building causing explosion and asphyxiation.      | Carbon dioxide & methane                                                          | <b>High</b>           | Gas monitoring or precautionary gas protection measures required.                                                                            |
|                                                                                                                                                  | Radon                                                                             | <b>Low</b>            | (1-3%) No protective measures are necessary in the construction of new dwellings or extensions.                                              |
| <b>PL4:</b> Mobile contamination posing a risk to controlled waters via the migration through permeable strata.                                  |                                                                                   | <b>Moderate</b>       | Intrusive investigation required.<br>Groundwater sampling, subject to ground conditions encountered.<br>Analysis of CoC.                     |

Table 7-2: Summary risk table.

Where moderate / low risk had been identified, the assumed risk is shown in bold.

| Pollutant Linkage                                                                    | Risk                  | Recommendations                                                                                                  |
|--------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------|
| <b>PL5:</b> Sulphate posing a risk to building via direct contact (sulphate attack). | <b>Moderate / Low</b> | Intrusive investigation required.<br>Soil analysis of CoC.                                                       |
| <b>PL6:</b> Organic contaminants posing a risk to water pipes.                       | <b>Moderate / Low</b> | Intrusive investigation required.<br>Soil analysis of CoC, subject to ground conditions encountered.             |
| <b>PL7:</b> Phytotoxic metals posing a risk to flora via root uptake.                | <b>Low</b>            | Low density intrusive investigation required.<br>Soil analysis of CoC, subject to ground conditions encountered. |

Table 7-2 Continued: Summary risk table.

Where moderate / low risk had been identified, the assumed risk is shown in bold.

A preliminary geotechnical assessment has been carried out by LKC. Table 7-3 summarises the geotechnical constraints.

|                               |                                                                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Coal Mining</b>            | Site is not within a Development High Risk Area. CON29M Report states no further assessment required with regards to past coal mining.                                                         |
| <b>Slope Stability</b>        | Site is relatively level.<br>An offsite slope noted to northwest of site. This may need to be considered further subject to development proposals (i.e. if building is close to top of slope). |
| <b>Made Ground</b>            | Unknown depth and constituent of made ground across the site.                                                                                                                                  |
| <b>Superficial</b>            | Unknown strength of soils for foundation design.                                                                                                                                               |
| <b>Bedrock</b>                | Possible shallow bedrock below the site.                                                                                                                                                       |
| <b>Groundwater</b>            | Unknown depth and variability of groundwater.                                                                                                                                                  |
| <b>Plasticity</b>             | Plasticity of clay deposits should be confirmed.                                                                                                                                               |
| <b>Sulphate</b>               | Unknown sulphate content of the made ground and natural.                                                                                                                                       |
| <b>Road / Pavement Design</b> | Unknown CBR values for footpath and road design should be calculated.                                                                                                                          |

Table 7-3: Summary of geotechnical constraints.

## 7.2 Recommendations

Recommendations are provided in Table 7-4.

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contamination status</b>               | There is sufficient information on the potential contaminative status of the site to allow conditional approval of a planning application, based on the proposed end use detailed in the PRA.                                                                                                                                                                                                                                                                                                                      |
| <b>Further assessment recommendations</b> | Phase 2 intrusive investigation required.<br>Phase 2 investigation to be carried out in line with current guidance, including BS10175 <sup>10</sup> , BS5930 <sup>11</sup> CIRIA C665 <sup>12</sup> , RB17 <sup>13</sup> and BS8485 <sup>14</sup> .<br>'Detailed investigation' recommended 1 sample per 10-25m square centres with a minimum of 3no. sampling locations.<br>Plus targeted investigation locations in areas of concern (contamination and geotechnical).<br>To be agreed with the local authority. |
| <b>Type of investigation work</b>         | Boreholes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Table 7-4: Recommendations.

<sup>10</sup> British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice". BS10175:2017.

<sup>11</sup> British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

<sup>12</sup> CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings". CIRIA C665.

<sup>13</sup> CL:AIRE Research Bulletin RB17 (November 2012) "A Pragmatic Approach to Ground Gas Risk Assessment".

<sup>14</sup> BSI (2015). "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings". BS8485:2015.

|                         |                                                                                                                                                                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PL 1, 2, 5, 6, 7</b> | Intrusive investigation work recommended to confirm ground conditions across the site.<br>Testing of contaminants of concern based on preliminary conceptual model and field observations (PID tests and visual / olfactory evidence). |
| <b>PL 3</b>             | Gas monitoring or precautionary gas protection measures required.<br>Precautionary gas protection measures: type of measures to be determined once ground conditions established.                                                      |
| <b>PL 4</b>             | Groundwater sampling, subject to ground conditions encountered.                                                                                                                                                                        |
| <b>Reporting</b>        | Information from the above can be used to carry out a contamination and geotechnical assessment and provide a remediation strategy for the site.                                                                                       |

Table 7-4 Continued: Recommendations.

## Figures



|                                              |                 |                   |                    |                                                      |           |                                                                                       |  |
|----------------------------------------------|-----------------|-------------------|--------------------|------------------------------------------------------|-----------|---------------------------------------------------------------------------------------|--|
| Client:<br>Mairose Property Developments Ltd |                 |                   |                    | Title:<br>Site Location &<br>Boundary Plan           |           |  |  |
| Site:<br>James Street North, Radcliffe       |                 |                   |                    | Scale (see scale bar):<br>1:25,000 &<br>1:1,000 @ A4 |           |                                                                                       |  |
| Job No.:<br>LKC 20 1984                      | Drawn By:<br>HM | Checked By:<br>HM | Drawn:<br>Jan 2021 | Figure:<br>1                                         | Revision: |                                                                                       |  |

# **Appendix A**

## **Historical Maps**

# Historical Mapping Legends

## Ordnance Survey County Series 1:10,560

|  |                                               |  |                             |  |               |
|--|-----------------------------------------------|--|-----------------------------|--|---------------|
|  | Gravel Pit                                    |  | Sand Pit                    |  | Other Pits    |
|  | Quarry                                        |  | Shingle                     |  | Orchard       |
|  | Osiers                                        |  | Reeds                       |  | Marsh         |
|  | Mixed Wood                                    |  | Deciduous                   |  | Brushwood     |
|  | Fir                                           |  | Furze                       |  | Rough Pasture |
|  | Arrow denotes flow of water                   |  | Trigonometrical Station     |  |               |
|  | Site of Antiquities                           |  | Bench Mark                  |  |               |
|  | Pump, Guide Post, Signal Post                 |  | Well, Spring, Boundary Post |  |               |
|  | •285 Surface Level                            |  |                             |  |               |
|  | Sketched Contour                              |  | Instrumental Contour        |  |               |
|  | Main Roads                                    |  | Minor Roads                 |  |               |
|  | Sunken Road                                   |  | Raised Road                 |  |               |
|  | Road over Railway                             |  | Railway over River          |  |               |
|  | Railway over Road                             |  | Level Crossing              |  |               |
|  | Road over River or Canal                      |  | Road over Stream            |  |               |
|  | Road over Stream                              |  |                             |  |               |
|  | County Boundary (Geographical)                |  |                             |  |               |
|  | County & Civil Parish Boundary                |  |                             |  |               |
|  | Administrative County & Civil Parish Boundary |  |                             |  |               |
|  | County Borough Boundary (England)             |  |                             |  |               |
|  | County Burgh Boundary (Scotland)              |  |                             |  |               |
|  | Rural District Boundary                       |  |                             |  |               |
|  | Civil Parish Boundary                         |  |                             |  |               |

## Ordnance Survey Plan 1:10,000

|  |                                                                       |  |                                                         |
|--|-----------------------------------------------------------------------|--|---------------------------------------------------------|
|  | Chalk Pit, Clay Pit or Quarry                                         |  | Gravel Pit                                              |
|  | Sand Pit                                                              |  | Disused Pit or Quarry                                   |
|  | Refuse or Slag Heap                                                   |  | Lake, Loch or Pond                                      |
|  | Dunes                                                                 |  | Boulders                                                |
|  | Coniferous Trees                                                      |  | Non-Coniferous Trees                                    |
|  | Orchard                                                               |  | Scrub                                                   |
|  | Bracken                                                               |  | Heath                                                   |
|  | Marsh                                                                 |  | Reeds                                                   |
|  | Building                                                              |  | Glasshouse                                              |
|  | Sloping Masonry                                                       |  | Pylon                                                   |
|  | Cutting                                                               |  | Embankment                                              |
|  | Road Under                                                            |  | Road Over                                               |
|  | Level Crossing                                                        |  | Foot Bridge                                             |
|  | Standard Gauge Multiple Track                                         |  | Standard Gauge Single Track                             |
|  | Siding, Tramway or Mineral Line                                       |  | Narrow Gauge                                            |
|  | Geographical County                                                   |  | Administrative County, County Borough or County of City |
|  | Municipal Borough, Urban or Rural District, Burgh or District Council |  | Borough, Burgh or County Constituency                   |
|  | Civil Parish                                                          |  |                                                         |
|  | BP, BS Boundary Post or Stone                                         |  | Police Station                                          |
|  | Church                                                                |  | Post Office                                             |
|  | Club House                                                            |  | Public Convenience                                      |
|  | Fire Engine Station                                                   |  | Public House                                            |
|  | Foot Bridge                                                           |  | Signal Box                                              |
|  | Fountain                                                              |  | Spring                                                  |
|  | Guide Post                                                            |  | Telephone Call Box                                      |
|  | Mile Post                                                             |  | Telephone Call Post                                     |
|  | Mile Stone                                                            |  | Well                                                    |

## 1:10,000 Raster Mapping

|  |                                                          |  |                                            |
|--|----------------------------------------------------------|--|--------------------------------------------|
|  | Gravel Pit                                               |  | Refuse tip or slag heap                    |
|  | Rock                                                     |  | Rock (scattered)                           |
|  | Boulders                                                 |  | Boulders (scattered)                       |
|  | Shingle                                                  |  | Mud                                        |
|  | Sand                                                     |  | Sand Pit                                   |
|  | Slopes                                                   |  | Top of cliff                               |
|  | General detail                                           |  | Underground detail                         |
|  | Overhead detail                                          |  | Narrow gauge railway                       |
|  | Multi-track railway                                      |  | Single track railway                       |
|  | County boundary (England only)                           |  | Civil, parish or community boundary        |
|  | District, Unitary, Metropolitan, London Borough boundary |  | Constituency boundary                      |
|  | Area of wooded vegetation                                |  | Non-coniferous trees                       |
|  | Non-coniferous trees (scattered)                         |  | Coniferous trees                           |
|  | Coniferous trees (scattered)                             |  | Positioned tree                            |
|  | Orchard                                                  |  | Coppice or Osiers                          |
|  | Rough Grassland                                          |  | Heath                                      |
|  | Scrub                                                    |  | Marsh, Salt Marsh or Reeds                 |
|  | Water feature                                            |  | Flow arrows                                |
|  | Mean high water (springs)                                |  | Mean low water (springs)                   |
|  | Telephone line (where shown)                             |  | Electricity transmission line (with poles) |
|  | Bench mark (where shown)                                 |  | Triangulation station                      |
|  | Point feature (e.g. Guide Post or Mile Stone)            |  | Pylon, flare stack or lighting tower       |
|  | Site of (antiquity)                                      |  | Glasshouse                                 |
|  | General Building                                         |  | Important Building                         |

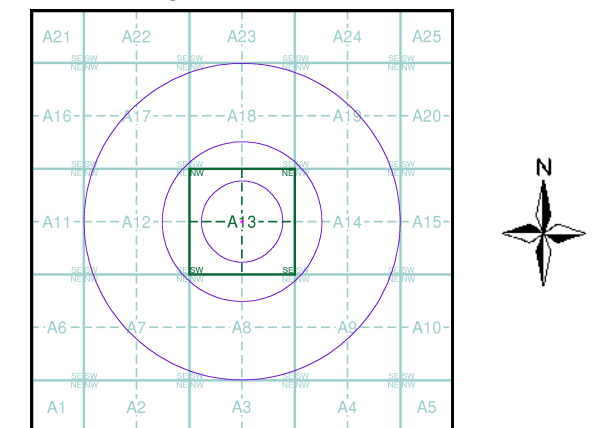


GROUP

Historical Mapping & Photography included:

| Mapping Type           | Scale    | Date        | Pg |
|------------------------|----------|-------------|----|
| Lancashire And Furness | 1:10,560 | 1848 - 1851 | 3  |
| Lancashire And Furness | 1:10,560 | 1894 - 1895 | 4  |
| Lancashire And Furness | 1:10,560 | 1910 - 1911 | 5  |
| Lancashire And Furness | 1:10,560 | 1923 - 1931 | 6  |
| Lancashire And Furness | 1:10,560 | 1932        | 7  |
| Lancashire And Furness | 1:10,560 | 1938        | 8  |
| Ordnance Survey Plan   | 1:10,000 | 1955        | 9  |
| Ordnance Survey Plan   | 1:10,000 | 1965        | 10 |
| Manchester             | 1:25,000 | 1975        | 11 |
| Ordnance Survey Plan   | 1:10,000 | 1980        | 12 |
| Ordnance Survey Plan   | 1:10,000 | 1989        | 13 |
| Ordnance Survey Plan   | 1:10,000 | 1992        | 14 |
| 10K Raster Mapping     | 1:10,000 | 1999        | 15 |
| 10K Raster Mapping     | 1:10,000 | 2006        | 16 |
| VectorMap Local        | 1:10,000 | 2020        | 17 |

## Historical Map - Slice A



## Order Details

Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

## Site Details

James Street North, Radcliffe, Manchester, M26 1LL

**Landmark**  
INFORMATION GROUP

Tel: 0844 844 9952  
Fax: 0844 844 9951  
Web: www.envirocheck.co.uk

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale    b. Drawn to scale

Government and Administrative Buildings

Military and Industrial Buildings

Military and Communication Areas

Subway Entrance

Fireproof Building

Prominent Fireproof Building

Non-fireproof Building

Non-fireproof Building (non-dwelling)

Factory, mill, and flour mill, with chimneys

Factory, mill, and flour mill, without chimneys

Power Station, drawn to scale

Hydroelectric Power Station

Radio Station, drawn to scale

Telephone Station, drawn to scale

Abandoned Open-pit Mine or Quarry

Open-pit Salt Mine

Pit

Oil Deposit or Well

Oil Seepage

Tailings Pile

Fuel Storage Tanks

Natural Gas Tank

Bench Mark

Drill Hole

Burial Mound

Triangulation Point on Burial Mound

Single-track Railroad

Double-track Railroad and Station Building

Coniferous Forest

Deciduous Forest

Mixed Forest

Lawns

Citrus Orchard

Wet Ground

Scattered Vegetation

**243.8** Values for prominent elevations  
**186.0** Numbers for spot elevations, depth soundings, contour lines, etc.  
**0.2** Velocity of the current, width of river bed, depth of river  
**180/12** Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

|                 |                |                 |                       |
|-----------------|----------------|-----------------|-----------------------|
| <b>А а (A)</b>  | <b>З з (Z)</b> | <b>П п (P)</b>  | <b>Ч ч (CH)</b>       |
| <b>Б б (B)</b>  | <b>И и (I)</b> | <b>Р р (R)</b>  | <b>Ш ш (SH)</b>       |
| <b>В в (V)</b>  | <b>Й й (Y)</b> | <b>С с (S)</b>  | <b>Щ щ (SHCH)</b>     |
| <b>Г г (G)</b>  | <b>К к (K)</b> | <b>Т т (T)</b>  | <b>Ъ (-)</b>          |
| <b>Д д (D)</b>  | <b>Л л (L)</b> | <b>У у (U)</b>  | <b>Ы (Y)</b>          |
| <b>Е е (E)</b>  | <b>М м (M)</b> | <b>Ф ф (F)</b>  | <b>Ь (')</b>          |
| <b>Ё ё (YO)</b> | <b>Н н (N)</b> | <b>Х х (KH)</b> | <b>Э э (E)</b>        |
| <b>Ж ж (ZH)</b> | <b>О о (O)</b> | <b>Ц ц (TS)</b> | <b>Ю ю (YU or IU)</b> |
|                 |                |                 | <b>Я я (YA or IA)</b> |

1:25,000 mapping

a. Not drawn to scale    b. Drawn to scale

Government and Administrative Buildings

Military and Industrial Buildings

Military and Communication Areas

Subway Entrance

Partly Demolished Buildings

Demolished Buildings

Built-Up Area with Fireproof Buildings Predominant

Built-Up Area with Non-Fireproof Buildings Predominant

Individual Fireproof Building

Prominent Industrial Building

Individual Dwelling, Fireproof

Ruins of an Individual Dwelling

Factory or Mill Chimney

Factory or Mill with Chimney

Factory or Mill without Chimney

Mine or Open Pit Mine

Operating Shaft or Mine

Non-Operating Shaft or Mine

Salt Mine

Tailings Pile

Pit

Stone Quarry

Gas Pump or Service Station

Fuel Storage or Natural Gas Tank

Oil or Natural Gas Derrick

Small Hydroelectric Power Station

Power Station

Transformer Station

Cemetery

Burial Mound (height in metres)

Triangulation Point on Burial Mound

Triangulation Point

Bench Mark

Bench Mark (monumented)

Telegraph Office

Telephone Station

Radio Station

Radio Tower

Airfield or Seaplane Base

Landing Strip

Telegraph/Telephone Lines

Main Highway

Highway under Construction

Improved Dirt Road (former truck road)

Double-track Railroad with First Class Station

Railroad Under Construction

Shore Embankment

River or Ditch with Embankment

Water Gauge

Water Level Mark

Well

Water Reservoir or Rain Water Pit

Spring

Isobath with value

Heavy (Index) Contour Line

Contour Line and Value

Half Contour Line

Spot Elevation Value

Coniferous

Deciduous

Mixed

Scrub

Key to Numbers on Mapping

SD70\_Manchester

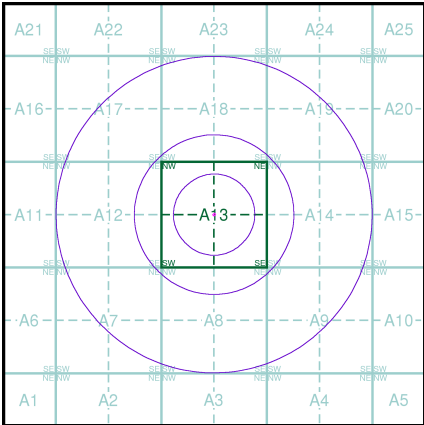
| No. | Description                        |
|-----|------------------------------------|
| 11  | Industrial Buildings (Use Unknown) |



Historical Mapping & Photography included:

| Mapping Type           | Scale    | Date        | Pg |
|------------------------|----------|-------------|----|
| Lancashire And Furness | 1:10,560 | 1848 - 1851 | 3  |
| Lancashire And Furness | 1:10,560 | 1894 - 1895 | 4  |
| Lancashire And Furness | 1:10,560 | 1910 - 1911 | 5  |
| Lancashire And Furness | 1:10,560 | 1923 - 1931 | 6  |
| Lancashire And Furness | 1:10,560 | 1932        | 7  |
| Lancashire And Furness | 1:10,560 | 1938        | 8  |
| Ordnance Survey Plan   | 1:10,000 | 1955        | 9  |
| Ordnance Survey Plan   | 1:10,000 | 1965        | 10 |
| Manchester             | 1:25,000 | 1975        | 11 |
| Ordnance Survey Plan   | 1:10,000 | 1980        | 12 |
| Ordnance Survey Plan   | 1:10,000 | 1989        | 13 |
| Ordnance Survey Plan   | 1:10,000 | 1992        | 14 |
| 10K Raster Mapping     | 1:10,000 | 1999        | 15 |
| 10K Raster Mapping     | 1:10,000 | 2006        | 16 |
| VectorMap Local        | 1:10,000 | 2020        | 17 |

Russian Map - Slice A



Order Details

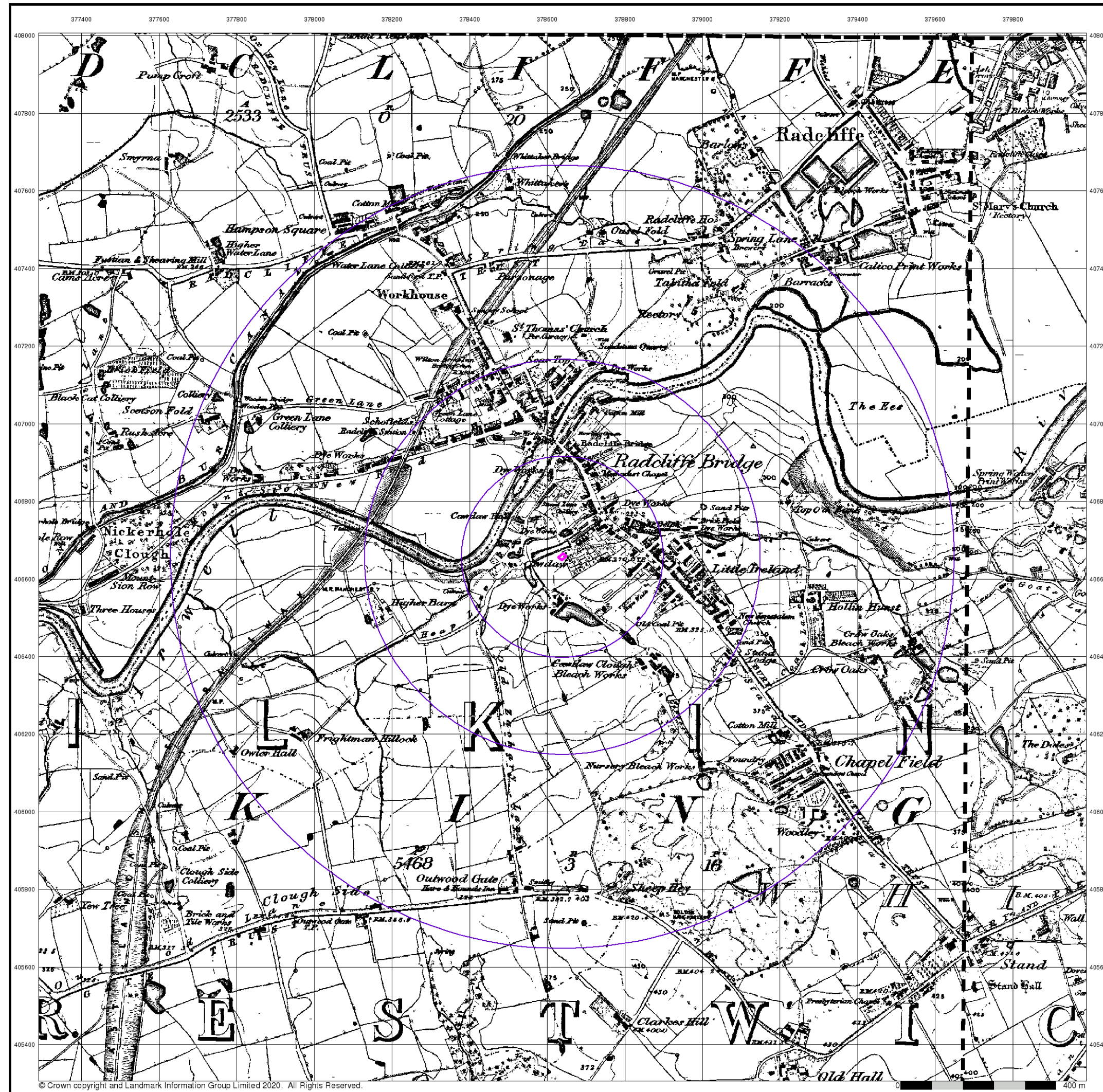
Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

Site Details

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# LK GROUP

## Lancashire And Furness

Published 1848 - 1851

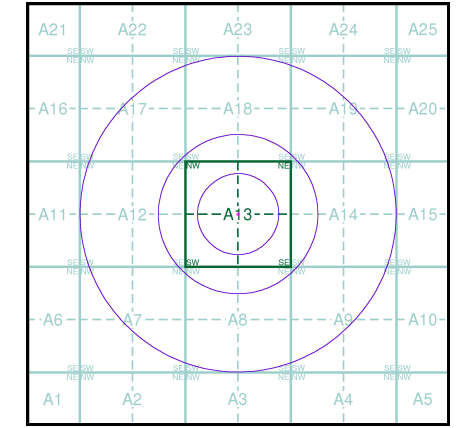
Source map scale - 1:10,560

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

|                           |                           |
|---------------------------|---------------------------|
| 08700<br>1850<br>1:10,560 | 08800<br>1851<br>1:10,560 |
| 09500<br>1850<br>1:10,560 | 09600<br>1848<br>1:10,560 |

### Historical Map - Slice A



### Order Details

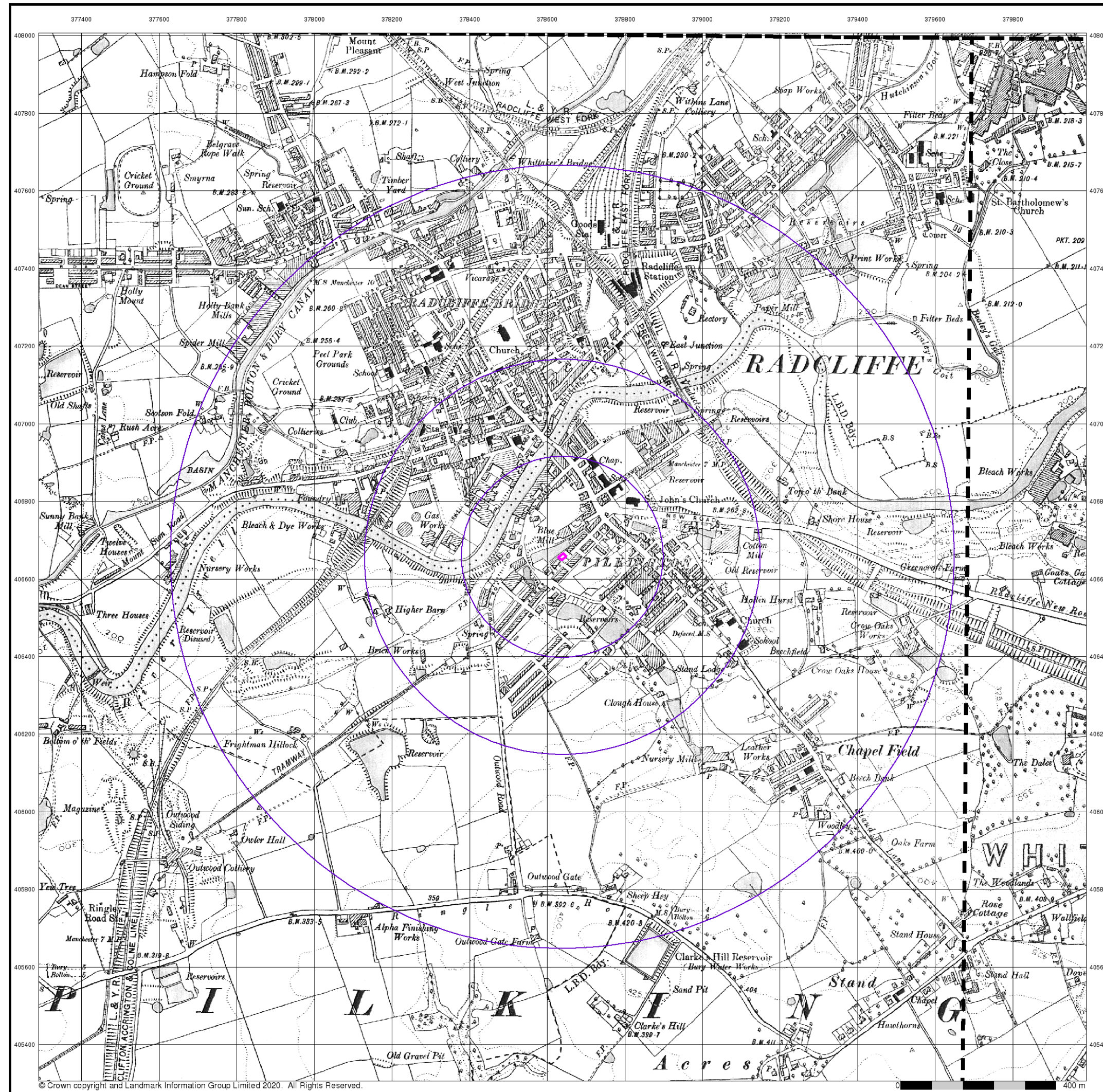
Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

### Site Details

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# LK GROUP

## Lancashire And Furness

Published 1894 - 1895

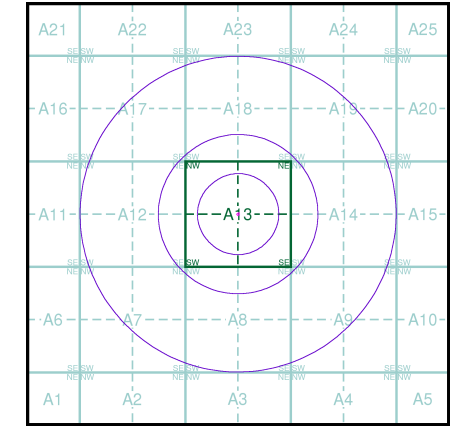
Source map scale - 1:10,560

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

|                           |                           |
|---------------------------|---------------------------|
| 087SE<br>1894<br>1:10,560 | 088SW<br>1894<br>1:10,560 |
| 095NE<br>1895<br>1:10,560 | 096NW<br>1894<br>1:10,560 |

### Historical Map - Slice A



### Order Details

Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

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Published 1910 - 1911

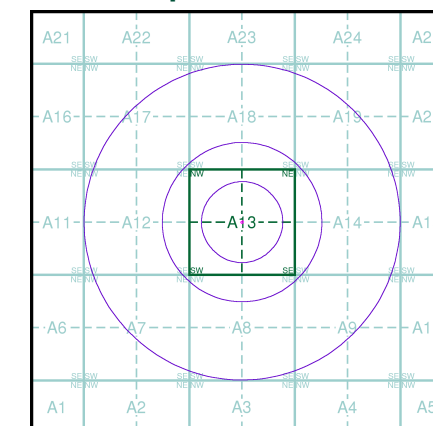
Source map scale - 1:10,560

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

|                           |                           |
|---------------------------|---------------------------|
| 087SE<br>1911<br>1:10,560 | 088SW<br>1910<br>1:10,560 |
| 095NE<br>1910<br>1:10,560 | 096NW<br>1910<br>1:10,560 |

### Historical Map - Slice A

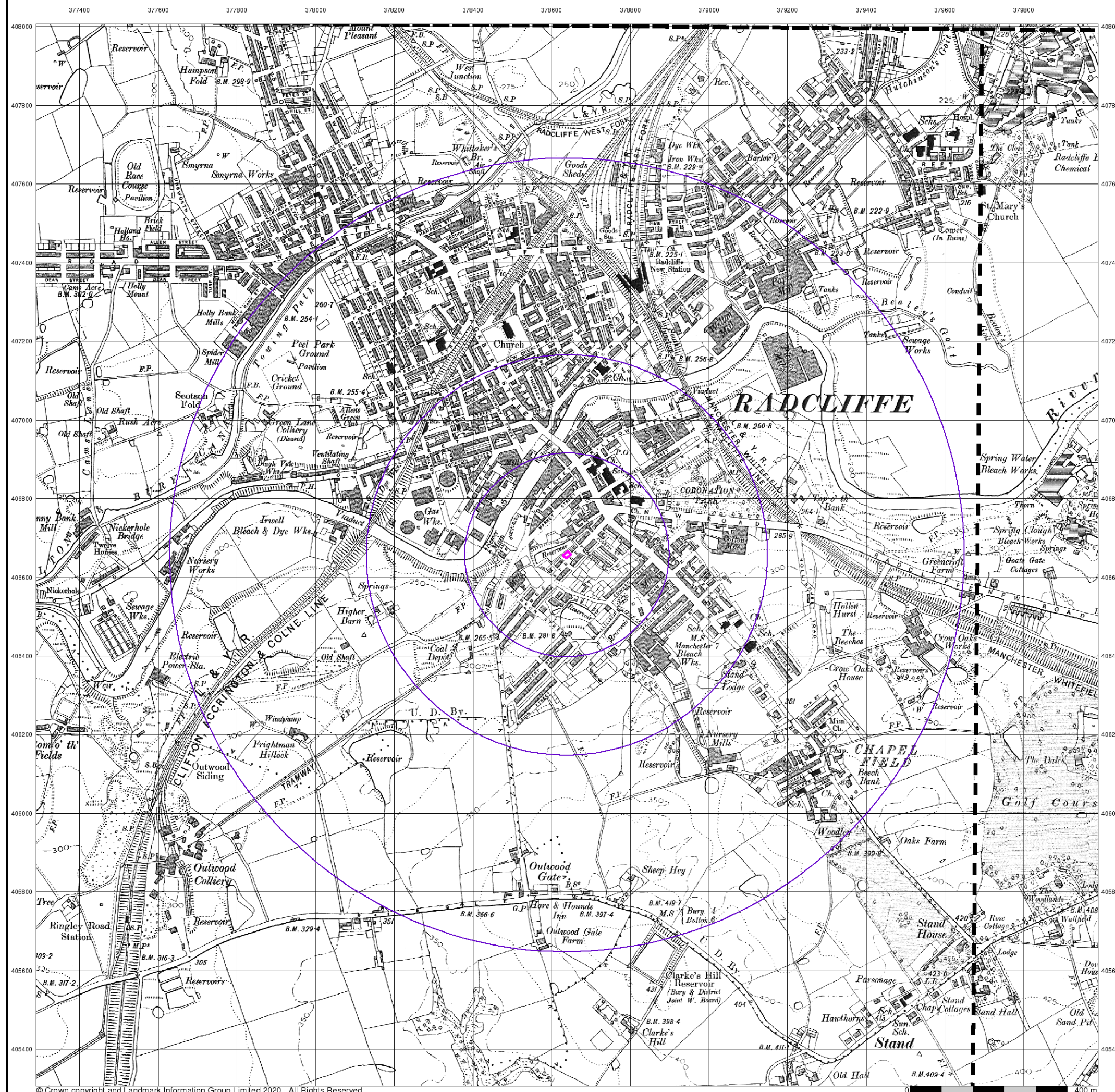


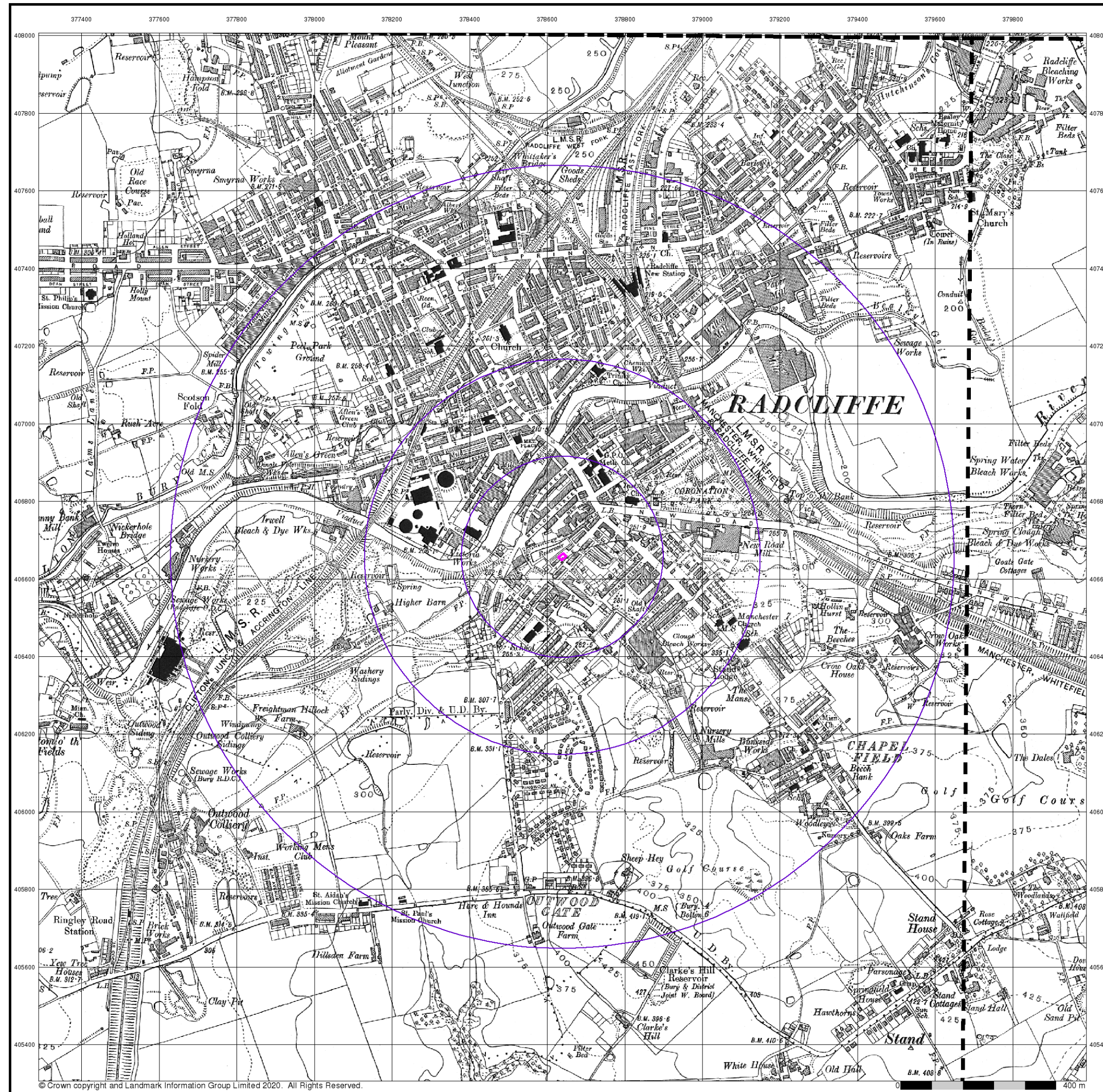
### Order Details

Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

### Site Details

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# LK GROUP

## Lancashire And Furness

### Published 1923 - 1931

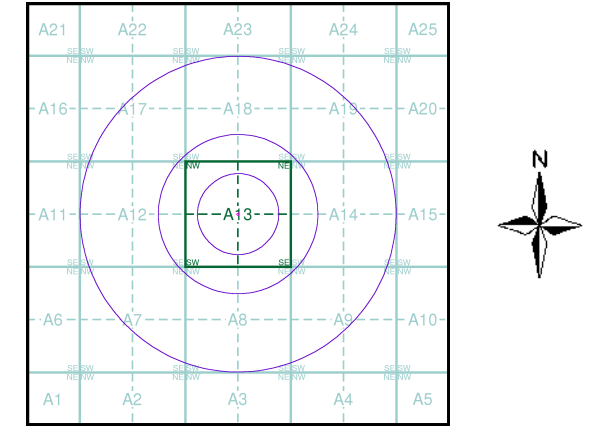
#### Source map scale - 1:10,560

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

#### Map Name(s) and Date(s)

|                           |                           |
|---------------------------|---------------------------|
| 087SE<br>1931<br>1:10,560 | 088SW<br>1931<br>1:10,560 |
| 095NE<br>1930<br>1:10,560 | 096NW<br>1923<br>1:10,560 |

#### Historical Map - Slice A



#### Order Details

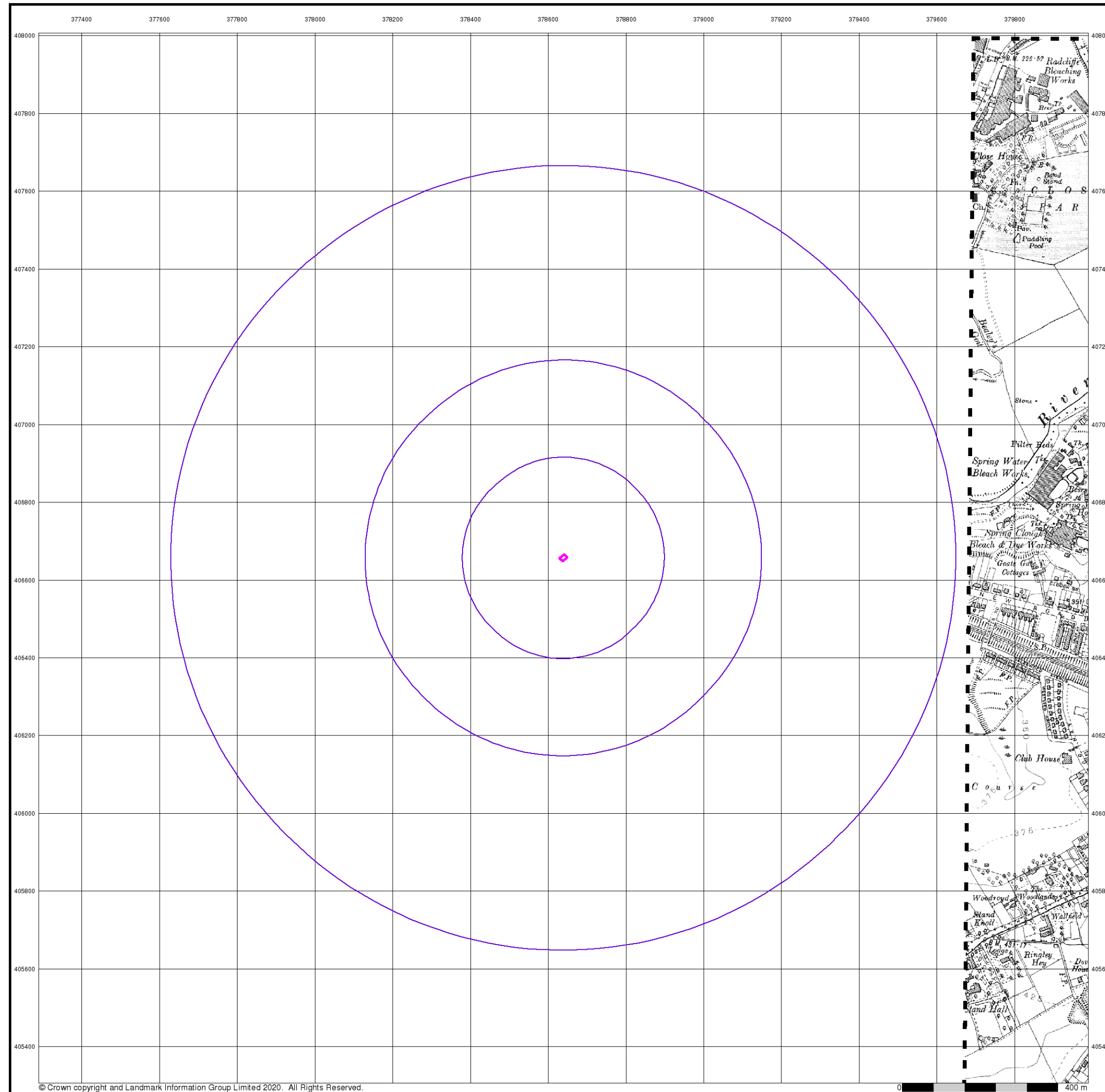
Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

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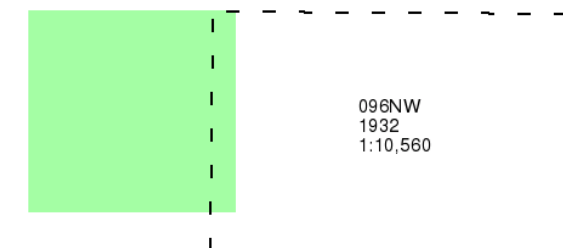
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Published 1932

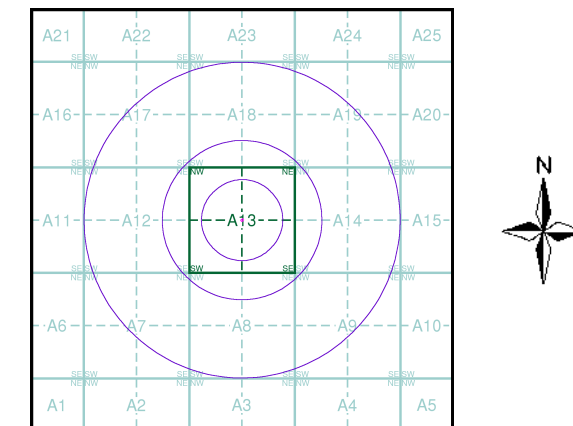
Source map scale - 1:10,560

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



### Order Details

Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

### Site Details

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Published 1938

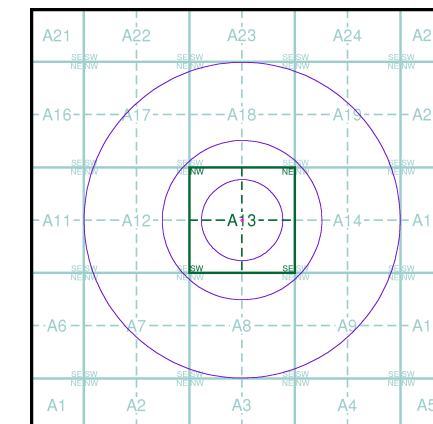
Source map scale - 1:10,560

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

|                           |                           |
|---------------------------|---------------------------|
| 087SE<br>1938<br>1:10,560 | 088SW<br>1938<br>1:10,560 |
| 095NE<br>1938<br>1:10,560 | 096NW<br>1938<br>1:10,560 |

### Historical Map - Slice A

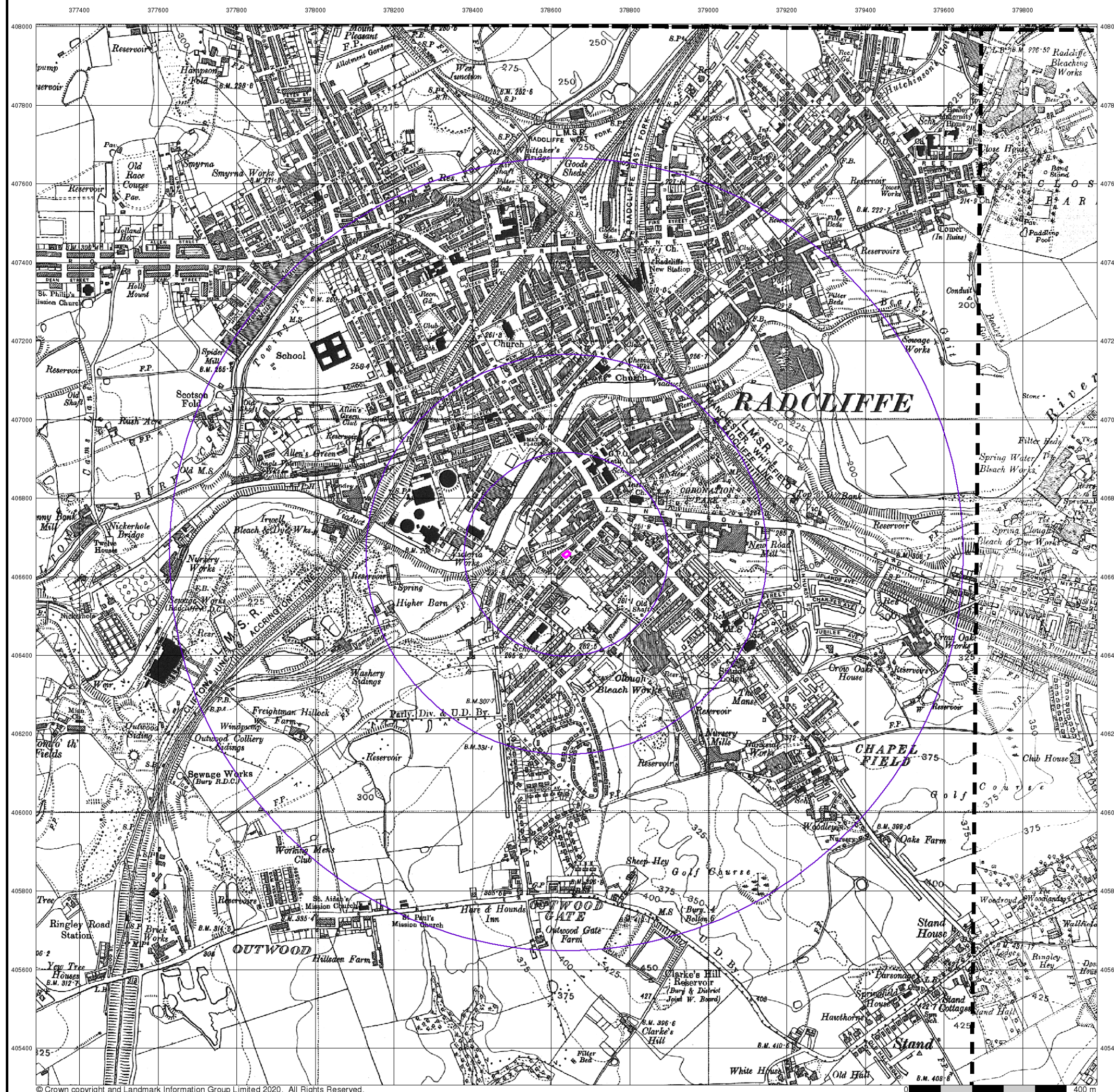


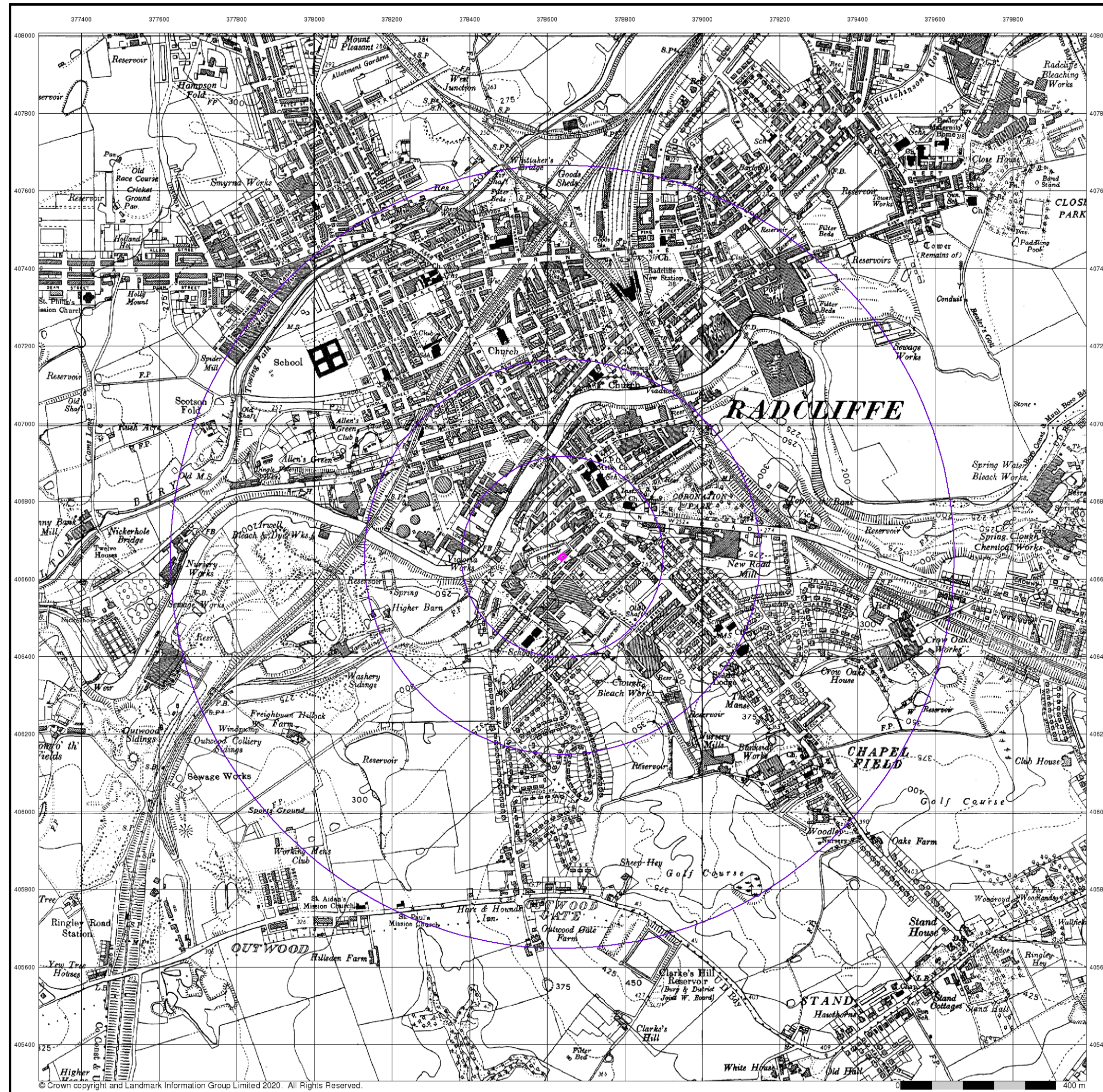
### Order Details

Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

### Site Details

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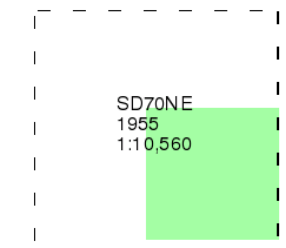
## ORDNANCE SURVEY PLAN

Published 1955

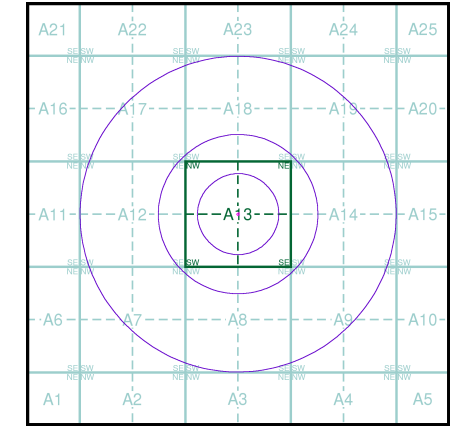
Source map scale - 1:10,000

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



### Order Details

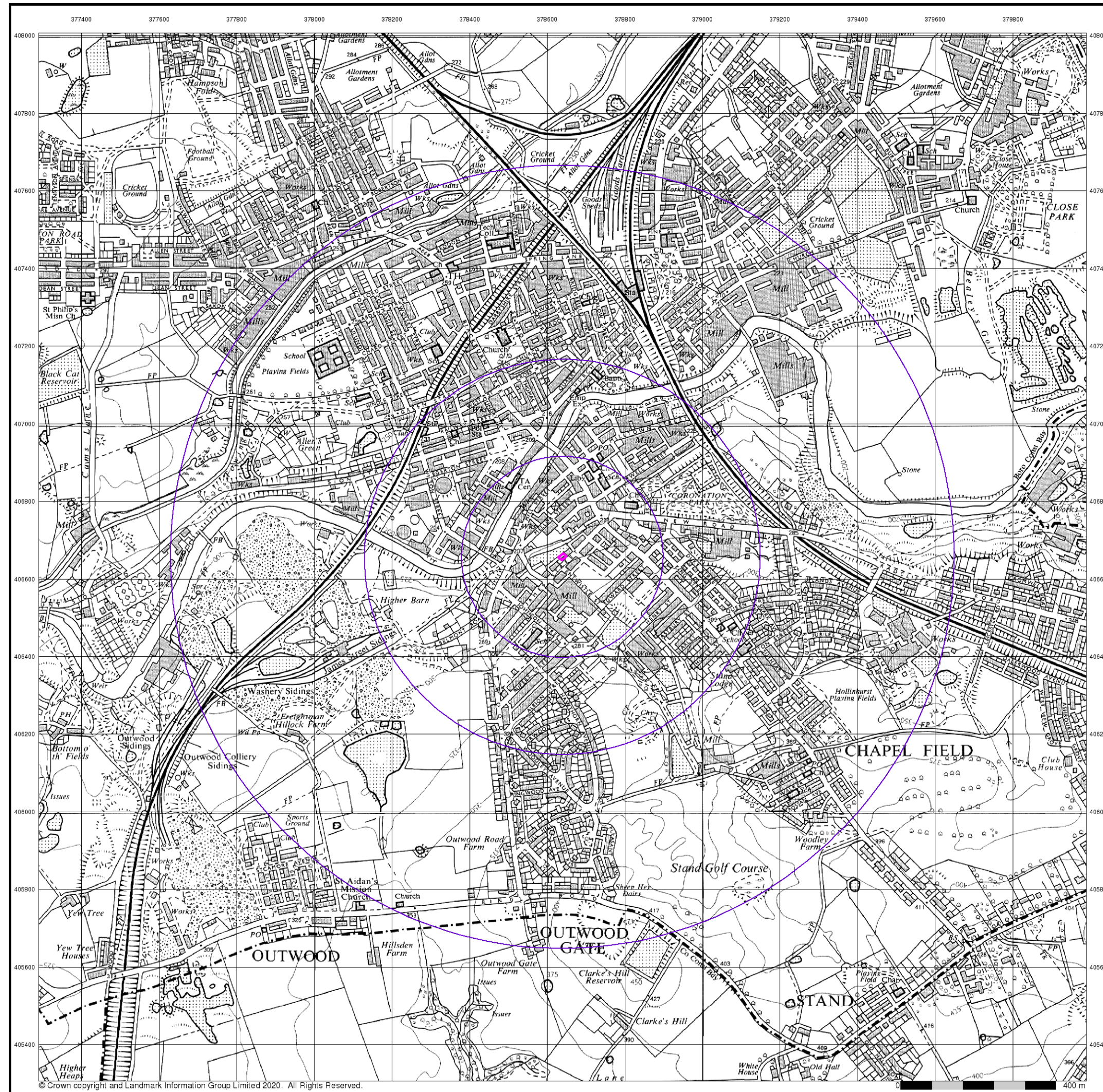
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Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

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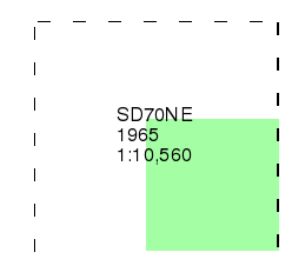
## Ordnance Survey Plan

Published 1965

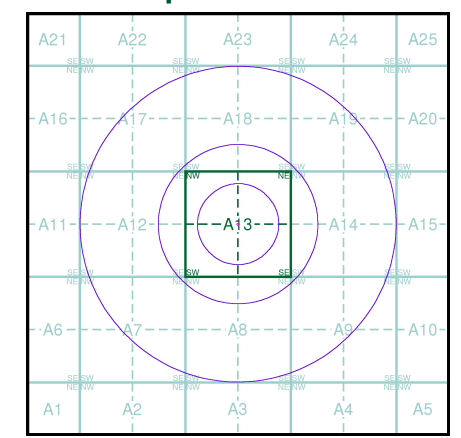
Source map scale - 1:10,000

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



### Order Details

Order Number: 270921128\_1\_1  
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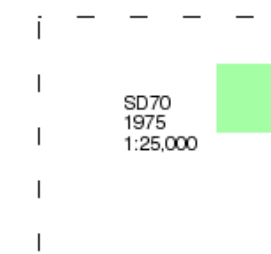
**LK**  
GROUP  
Manchester

Published 1975

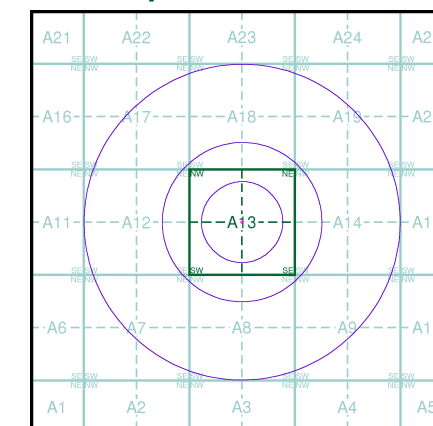
Source map scale - 1:25,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use. They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

### Map Name(s) and Date(s)



### Russian Map - Slice A



### Order Details

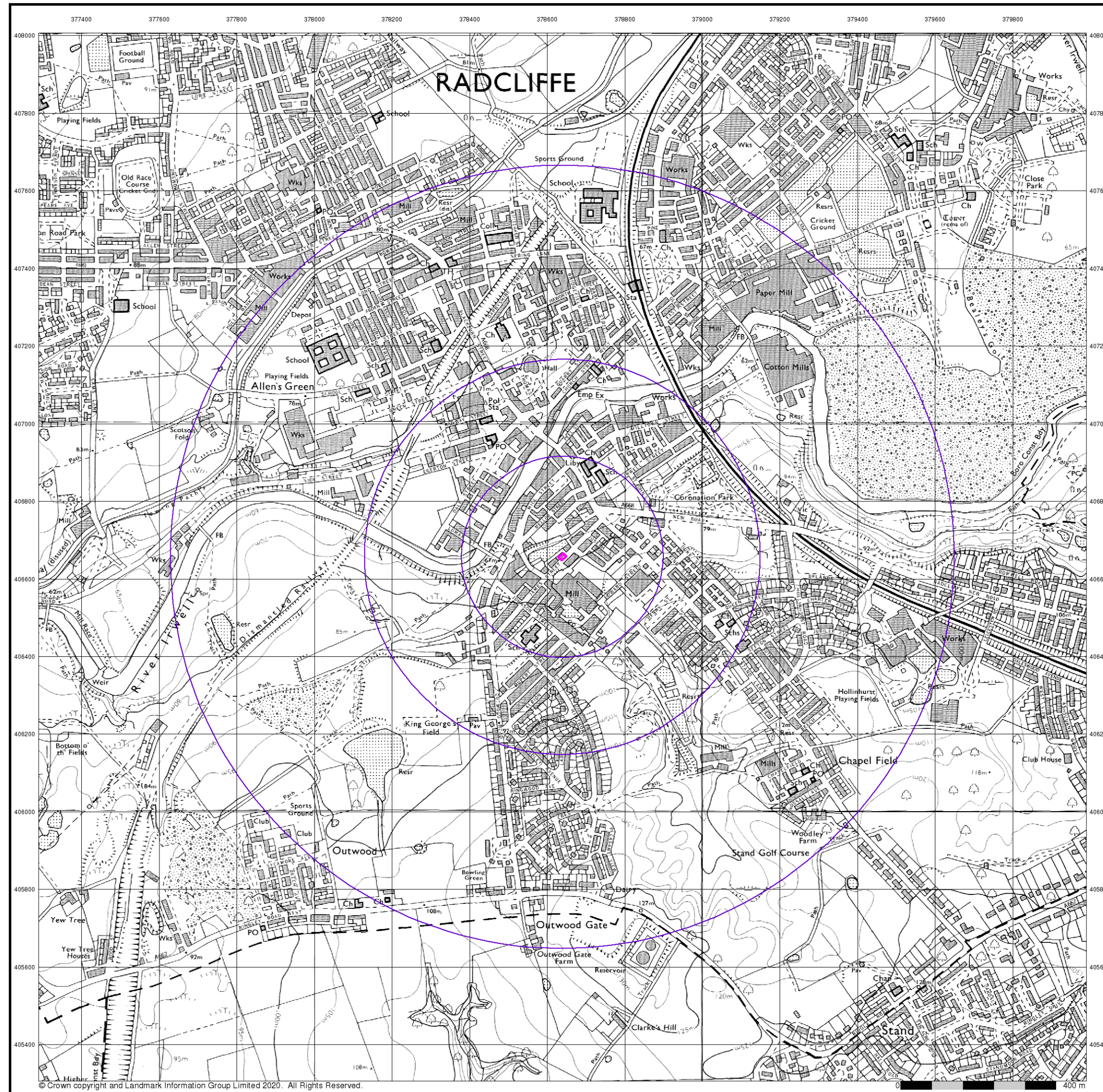
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Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

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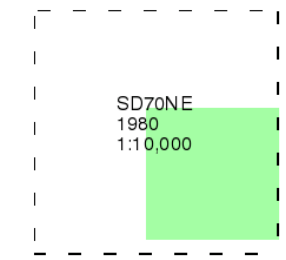
## Ordnance Survey Plan

### Published 1980

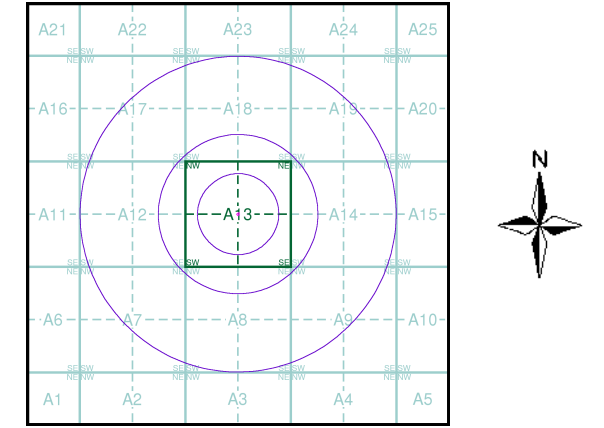
#### Source map scale - 1:10,000

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A

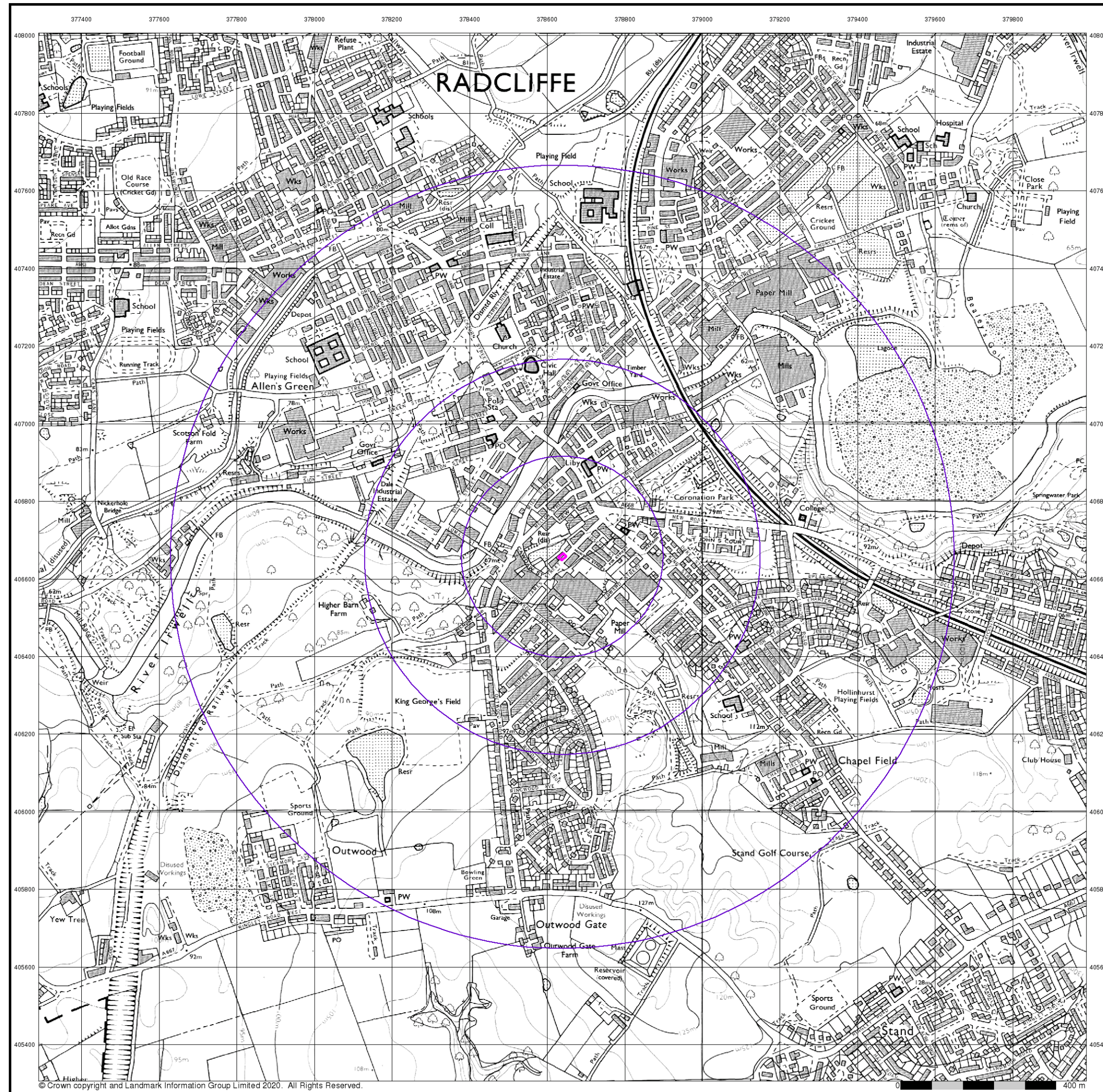


### Order Details

Order Number: 270921128\_1\_1  
Customer Ref: LKC 20 1984  
National Grid Reference: 378640, 406660  
Slice: A  
Site Area (Ha): 0.02  
Search Buffer (m): 1000

### Site Details

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# LK GROUP

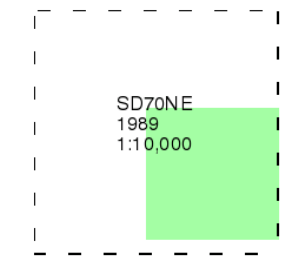
## Ordnance Survey Plan

### Published 1989

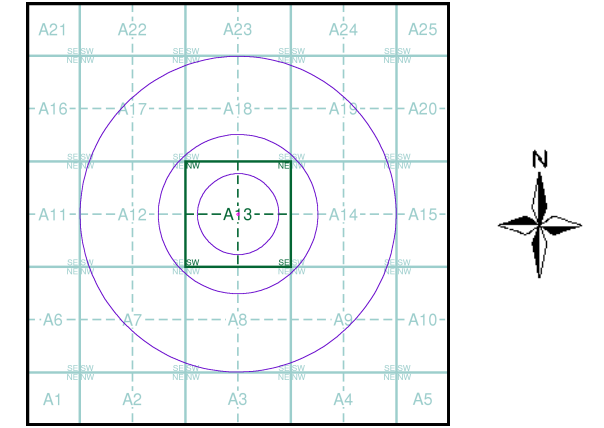
#### Source map scale - 1:10,000

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



### Order Details

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# LK GROUP

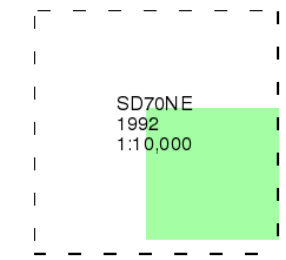
## Ordnance Survey Plan

### Published 1992

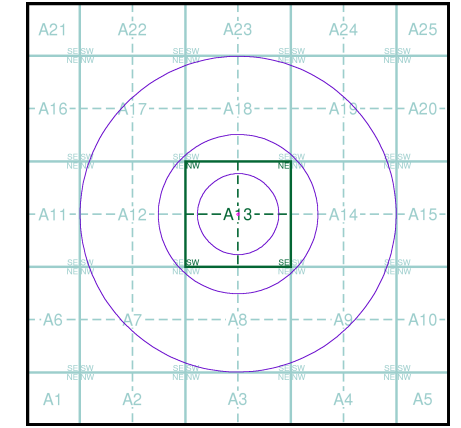
#### Source map scale - 1:10,000

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; these maps were used to update the 1:10,560 maps. The published date given therefore 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. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

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### Historical Map - Slice A



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