

**Geotechnical and Geo-Environmental
Report:**

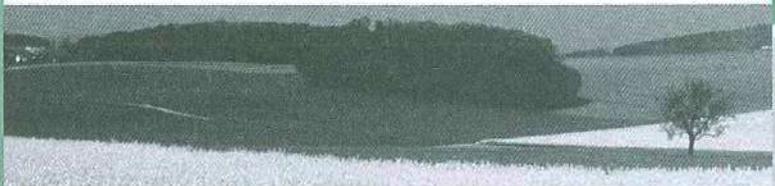
Proposed Residential Development,
Kirby Daniel Court,
Newport

PREPARED FOR:

Charter Housing Association Ltd

June 2018

Job No: 14632



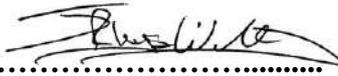

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REPORT TITLE : **Geotechnical and Geo-environmental Report:**
Proposed Residential Development, Kirby Daniel
Court, Newport

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Executive Summary

Site Location and Proposed Development	<p>Charter Housing Association Ltd is proposing the development of residential housing at the current site of Kirby Daniel Court, off Charlotte Drive, Newport. The development site is square in shape and centres on an approximate National Grid Reference of 331260 187090, occupying a plan area of approximately 0.38 Hectares.</p> <p>Kirby Daniel Court residential housing block is situated on the site. The structure positions along the site boundary with a community garden at its centre. The garden comprises areas of grass, pathways, patio and vegetation including semi-mature trees.</p>
Site History	<p>The earliest map edition 1883 shows the majority of the site to be developed with terrace housing and Lewis Street crossing through the its centre. The site remains largely unchanged until c.1977 when all structure are removed. By 1983 Kirby Daniel Court has been built and the surrounding area has seen significant redevelopment.</p>
Geology	<p>The 1:50,000 scale geological map of the area (Sheet 249) was consulted for geology underlying the site. The site is shown to be underlain by the St Maughans Formation which is Devonian in age. The rocks comprise interbedded argillite and sandstone.</p> <p>Superficial Tidal Flat deposits of clay and silt are recorded at the site. BGS borehole records from the local area indicate superficial deposits to have a thickness of approximately 15m.</p> <p>Made ground is expected at the site.</p>
Radon	<p>No radon protection is required for new developments on the investigation site.</p>
Ground Conditions	<p>Typical ground conditions encountered beneath the site comprised made ground CLAY and GRAVEL to a maximum depth of 1.10m. Over firm quickly tending to very soft brown or gray CLAY.</p>
Laboratory Chemical Testing	<p>Chemical testing resulted in exceedences of Lead, Arsenic, Benzo(b)fluoranthene and Dibenzo(ah)anthracene. Exceedences were recorded in made ground soils between surface and 1.10m.</p> <p>Sulphate levels were seen to exceed BRE guideline in one sample WS04. Sulphate levels need only be considered for buried concrete risk assessment and is not human health related.</p> <p>The sample obtained from boreholes WS01 and WS03 were further scheduled for lead and arsenic leachate testing. Leachate results did not exceed Water Framework Directive guidelines.</p>
Foundation Solution	<p>It is recommended that for the new development a driven concrete pile foundation socketed into the underlying bedrock should be used.</p> <p>In order to determine the length, diameter and working load of the pile at least one shell and auger borehole should be sunk beneath the proposed development.</p> <p>Based on local BGS borehole data bedrock is expected at a depth of approximately 15.00 below ground level.</p>

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Drawings

Drawing 01 Site Location
Drawing 02 Proposed Site Layout

SECTION 1 Introduction and Proposed Development

1.1 Introduction

Charter Housing Association Ltd is proposing the development of residential housing at the current site of Kirby Daniel Court, off Charlotte Drive, Newport.

Terra Firma (Wales) Limited have been commissioned by Charter Housing Association Ltd to undertake a geo-environmental assessment and geotechnical investigation of the site.

The main objectives of the geo-environmental assessment programme were to:

- Investigate the potential environmental liabilities at the site associated with any soil contamination
- Provide a summary of the environmental conditions at the site, together with any necessary further intrusive works and / or remediation works to render the site fit for its intended use

The main objectives of the geotechnical site investigation were to:

- Determine the type, strength and bearing characteristics of the shallow superficial and underlying solid geology
- Provide engineering foundation and floor slab recommendations for the development
- Provide recommendations with regard to any other geotechnical aspects pertaining to the development

In order to achieve the above objectives, Terra Firma (Wales) Limited carried out an assessment programme including a site walkover, a review of existing data, followed by a field investigation to collect geotechnical and environmental data from selected locations.

1.2 Limitations and Exceptions of Investigation

Charter Housing Association Ltd has requested that a Geo-environmental Site Assessment (GSA) and Geotechnical Investigation (GI) be performed in order to determine if contamination is present beneath the site and to determine an appropriate foundation and floor slab solution for the proposed development.

The GSA and GI were conducted and this report has been prepared for the sole internal reliance of Charter Housing Association Ltd and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geo-environmental and geotechnical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

SECTION 2 Review of Existing Data

2.1 Physical Setting and Current Site Use

The development site is square in shape and centres on an approximate National Grid Reference of 331260 187090, occupying a plan area of approximately 0.38 Hectares.

Kirby Daniel Court residential housing block is situated on the site. The structure positions along the site boundary with a community garden at its centre. The garden comprises areas of grass, pathways, patio and vegetation including semi-mature trees.

The development site is largely surrounded by residential housing and accessed from Charlotte Drive to the north.

The site elevation is approximately 10m AOD and generally level.

The site location can be seen on **Drawing 01** along with the proposed site layout on **Drawing 02**.

2.2 Site History

Historical maps of the site have been obtained in an Envirocheck Report, provided by Landmark Information Group. The history plans are supplied in **Annex A** of this report, and the most relevant editions are summarised below. Distances are approximate, and any changes in-between map editions may not be recorded

Table 2.1 Historical Development from Map Information		
Map Edition and Scale	Key Features on Site	Key Features off Site
1883 1:2500	Terrace housing occupies the site. Lewis Street crosses the centre of the site northeast to southwest	Residential housing surrounds the site. Charlotte Street delineates the eastern boundary. Alma Street Church locates to the north.
1902 1:2500	The site remains unchanged.	Alma Street Church has expanded to the south.
1921 1:2500	The site remains unchanged.	The immediate surrounding area remains unchanged.
1937 1:2500	A new square structure has been developed to the southeast. The majority of the site remains unchanged.	The immediate surrounding area remains unchanged.
1956 1:2500	The site remains unchanged.	A ruin located 5m north of the site in the grounds of Alma Street Church.
1972 1:1250	The site remains unchanged.	Minor redevelopment of structures has occurred to the northwest.
1977 1:1250	All structures have been removed from the site. Lewis Street still crosses the site.	Structures to the east of Charlotte Street have been redeveloped. Structure to the north, west and south have been removed.
1983 1:1250	Kirby Daniel Court is now developed. Lewis Street has been removed.	Residential housing has been developed to the north and west.

Table 2.2 Historical Development from Map Information (Continued)		
Map Edition and Scale	Key Features on Site	Key Features off Site
1993 1:1250	The site remains unchanged.	The immediate surrounding area remains unchanged.
2006 1:10000	The site remains unchanged.	The immediate surrounding area remains unchanged.
2018 1:10000	The site remains unchanged.	The immediate surrounding area remains unchanged.

2.3 Geological Setting

2.3.1 Geology

The 1:50,000 scale geological map of the area (Sheet 249) was consulted for geology underlying the site. The site is shown to be underlain by the St Maughans Formation which is Devonian in age. The rocks comprise interbedded argillite and sandstone.

Superficial Tidal Flat deposits of clay and silt are recorded at the site. BGS borehole records from the local area indicate superficial deposits to have a thickness of approximately 15m.

Made ground is expected at the site.

2.3.2 Radon

The Envirocheck Report (**Annex A**) details that the site is in an intermediate probability radon area, as between 1 and 3% of homes are estimated to be at or above the action level.

No radon protective measures are required for new developments on the investigation site.

2.3.3 Natural Hazards

The underlying geology is not prone to dissolution and the risk of natural cavities in the bedrock is considered negligible.

The Envirocheck Report identifies a potential moderate risk of compressible ground and running sand stability hazard at the site. No other significant natural hazards were identified.

2.4 Environmental Setting

The following sections have been compiled using the Landmark Information Group Envirocheck datasheet and maps which can be found in **Annex A**.

2.4.1 Hydrogeology and Hydrology

The Envirocheck Report records the nearest river network locates 479m to the west. This feature is an unnamed drainage channel. The River Usk is located 760m to the east and is tidally influenced.

Generally the topography of the site is level.

Deeper groundwater flow within the underlying bedrock will be controlled by the strata dip and any fractures or bedding planes within the rock units.

The hydraulic gradient will be at its steepest during periods of heavy rainfall and aquifer recharge.

The bedrock deposits beneath the site have an aquifer designation of 'Secondary A'. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Superficial deposits are designated as unproductive.

2.4.2 Groundwater

The Envirocheck Report does not place the site within a groundwater source protection zone.

There is no recorded groundwater abstraction point within 250m of the site.

2.4.3 Flooding

The Envirocheck Report records the site is not at risk from extreme flooding from rivers of sea.

2.4.4 Waste

There is no recorded historical or currently active landfill site within a 250m of the site.

There are no licensed waste management facilities or waste transfer sites within 250m of the site.

2.4.5 Pollution

The Envirocheck Reports records no pollution incidents to have occurred to controlled waters within 250m radius of the site.

2.4.6 Sensitive Land Use

The Envirocheck Report details the site to not locate within a designated sensitive land use area.

2.4.7 Estimated Soil Chemistry

The BGS have published estimated soil concentrations for a number of common contaminants, i.e. arsenic, cadmium, chromium, lead and nickel. All of the given determinants have anticipated concentrations on the site that are below the recognised trigger levels for a residential with plant uptake scenario.

2.4.8 Current Land Use

The Envirocheck Report records one industrial points of interest within 150m of the site. Current industrial data is summarised in **Table 2.3**.

Table 2.1 Current Industrial Data Summary			
Company	Distance/Direction from site	Classification	Status
Minerals 4 Life	147m East	Distribution Services	Active

2.4.9 Infilled Land

The Envirocheck Report does not identify any potentially infilled land features to be situated within 250m of the site.

2.5 Unexploded Ordnance (UXO) Risk Assessment

The UXO report identified a threat from high explosive bombs, incendiary bombs and Anti-Aircraft Ammunition at the site. The report states that all types of aggressive intrusive activities including trial pitting, boring and piling may generate a significant risk pathway.

The UXO report presents a list of mitigation measures to reduce the risk associated with listed activities to as low as reasonably practicable. Mitigation measures are summarised below.

1. Operational UXO Emergency Response Plan
2. UXO Safety & Awareness Briefings
3. On-Call Engineer

The detailed unexploded ordnance risk assessment report is presented in **Annex B**.

SECTION 3 Preliminary Human Health and Environmental Risk Assessment

3.1 General

The contaminated land regime is set out in Part IIA of the Environmental Protection Act (EPA) 1990 and was introduced on the 1st April 2000 in England and 1st July 2001 in Wales. A similar regime was introduced in Scotland on 14th July 2000. Part IIA was introduced to achieve two aims:

- (1) The identification of contaminated land
- (2) The remediation of contaminated land that poses an unacceptable risk to human health and/or the environment

Under Part IIA the statutory definition of 'contaminated land' is: any land which appears to the local authority in whose area it is situated, to be in such a condition, by reason of substances in, on, or under the land, that:

- (a) Significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) Pollution of controlled waters is being, or is likely to be, caused."

For land to be classified as 'Contaminated Land' there must be a 'pollutant linkage'.

For our definitions of pollution linkage and how we define risk please refer to **Annex C** which includes our classifications of consequence and probability and risk assessment matrix.

3.2 Preliminary Site Conceptual Model

The preceding sections enable a preliminary conceptual model of the site to be drawn up, to illustrate the likely ground conditions beneath the site together with a preliminary assessment of the nature of any underlying aquifers and groundwater movement. The preliminary site conceptual model is used as a model for the design and implementation of the site investigation, whereby areas of potential contamination can be targeted as well as investigating the site as a whole.

3.3 Potential Sources of Contamination and Gas

The potential contamination beneath the site, whether in the matrix of soil or groundwater is related to the sites past use.

The earliest map edition 1883 shows the majority of the site to be developed with terrace housing and Lewis Street crossing through the its centre. The site remains largely unchanged until c.1977 when all structure are removed. By 1983 Kirby Daniel Court has been built and the surrounding area has seen significant redevelopment.

The risk of potential contamination related to the sites past use is therefore considered low. Made ground associated with past development and demolition is expected and is likely to comprise waste building materials or reworked natural material. Made ground soils may therefore including waste building products or their by-products such as sulphates and asbestos containing materials. Other common determinants to consider include metals, oils and fuels.

If significant thicknesses of made ground is identified at the site then the generation of ground gas from degrading soils should be considered a potential risk.

No potential source of gas has been identified during the survey.

Radon protection measures are not required for the development.

No other potential on-site or off-site sources of contamination have been identified during the desk study.

3.4 Potential Receptors and Pollution Pathways

There are human and hydrological receptors to any contamination that may be present on site.

Construction workers will be excavating in soils and will be exposed via dermal contact with soils and dust, ingestion of soil dust and inhalation of soil dust and asbestos fibres, if present.

A residential end use is proposed. Once developed, future site users (residents and visitors) will potentially be at risk from contaminated soils through the same pathways as well as through consumption of site grown produce and potable drinking water.

Gasses may also present a risk to site end users through inhalation or from the risk of explosion of gases in confined spaces.

Neighbouring site users and passers-by may potentially be exposed to soil dust and inhalation of potential asbestos fibres.

If contamination is identified it may be leachable, enabling it to mobilise through perched groundwater within site soils and impact on deeper groundwater or surface water.

A Preliminary Human Health and Environmental Risk Assessment summarises the above and is detailed in the **Table 3.1**.

3.5 Preliminary Human Health and Environmental Risk Assessment

Table 3.1 Preliminary Qualitative Human Health and Environmental Risk Assessment			
Potential Source	Potential Pathway	Potential Target	Preliminary Assessment Risk
Human Health			
Site Soil	Dermal contact with soil, ingestion of soil/soil dust, inhalation of soil dust/asbestos fibres	Construction workers	Low Risk COSHH assessment and good level of PPE/ hygiene by site workers/ staff; dust suppression measures if required. Potential made ground including asbestos
Site Soil	Dermal contact with soil, ingestion of soil/soil dust, inhalation of soil dust/asbestos fibres	Passers by/neighbouring site users	Low Risk Potential made ground including asbestos
Site Soil	Dermal contact with soil, ingestion of soil/soil dust or site grown vegetables, inhalation of soil dust/asbestos fibres	Site End Users – Residents and visitors.	Low Risk Potential made ground including asbestos
Radon Gas from underlying bedrock	Migration into indoor air	Site End Users – Residents and visitors.	Low Risk No radon protection measures required
Landfill gas	Migration through superficial deposits and bedrock and accumulation indoors	Site End Users – Residents and visitors.	No Risk Identified No source identified
Ground gas	Direct from any made ground/buried organic matter on site and accumulation indoors	Site End Users – Residents and visitors.	Low Risk No significant source identified
Vapours	Migration into indoor air	Site End Users – Residents and visitors.	Low Risk No source identified
Site Soils	Permeation of drinking water pipes	Site End Users – Residents and visitors.	Low Risk Potential made ground
Aquatic Environment			
Site Soils	Surface runoff and leaching of contamination into the perched groundwater	Perched groundwater beneath the site	Low Risk Potential made ground
Site Soils	Groundwater transport	Nearest significant surface water feature – River 479m to west	Low Risk Potential made ground
Site Soils	Groundwater transport	Underlying bedrock: Secondary A Aquifer. Superficial Unproductive Aquifer	Low Risk Potential made ground
Vegetation			
Site Soils	Uptake of phytotoxic contaminants	Vegetation	Low Risk Potential made ground
Building Materials			
Site Soils	Damage of building materials	New buildings	Low Risk Correct class of concrete to be chosen. Potential made ground and Sulphates.

SECTION 4 Field Investigation

4.1 Site Works

A geotechnical and geo-environmental site investigation comprising ten mini percussive boreholes was undertaken between the 15th and 16th May 2018.

The fieldwork was supervised by Terra Firma (Wales) Limited, who logged the exploratory holes to the requirements of BS5930:2015. The proposed locations of the exploratory holes were determined by Terra Firma (Wales) Limited.

The boreholes referenced WS01 to WS10, were formed using a Dando Terrier mini percussive drilling rig. Dynamic sampling techniques were employed from surface to produce a continuous disturbed sample.

Representative disturbed samples were taken and retained in airtight containers for environmental and geotechnical testing.

The borehole logs are presented in **Annex D**.

Soakaway tests were carried out in boreholes WS03 and WS07 in general accordance with BRE365 (2016) but on a small scale. The boreholes were extended to a maximum depth of 1.00m. The boreholes were filled with clean water using a dedicated drum and the fall in level recorded against time. The results are presented in **Annex E**.

On completion all boreholes were either installed with gas monitoring standpipes or backfilled with arisings.

DCP tests, referenced DCP01 to DCP04, were carried out using a CNS Farnell A2465 dynamic cone penetrometer. Probe depths were measured with respect to ground level and the number of blows for the penetration of the probe was recorded. Equivalent CBR values have been calculated and presented with the results in **Annex F**. The results of the tests are discussed in **Section 7.5**.

Exploratory hole locations are shown on **Drawing 01**.

4.2 Exploratory Strategy

It is considered that the number and spacing of exploratory holes was adequate to:

- Investigate the presence, nature and distribution of contamination on site in an efficient but cost effective manner.
- Optimise the chances of finding contamination hot spots of various sizes and orientations.
- Provide good representation of the ground conditions beneath the site.
- Provide sufficient data to determine suitable remedial measures if necessary.

4.3 Ground Conditions

The ground conditions encountered by the exploratory holes can in general be summarised as shown in **Table 4.1**.

Table 4.1 Summary of Typical Ground Conditions		
Depth (m)	Thickness (m)	Stratum
0.00 - 0.50/1.10	0.50/1.10	MADE GROUND comprising firm dark brown slightly gravelly silty CLAY over variable GRAVEL . Including fragments of brick and concrete
0.50/1.10 - >3.00	-	Firm quickly tending to very soft brown or grey CLAY . Locally with sand partings or coarse gravel sized peat inclusions

4.4 Water Strikes

Groundwater was not encountered during the investigation works.

4.5 Stability and Obstructions

No obstructions were encountered during advancement of the boreholes.

4.6 Laboratory Chemical Testing

4.6.1 Quality Assurance

During the intrusive investigation, several small disturbed soil samples were collected.

Care was taken to ensure that sampling quality assurance occurred during site works. This included the following measures:

- Soil samples were collected by hand with nitrile gloves.
- Clean gloves were used for each sample.
- Soil samples were stored at a temperature below 4 degrees.
- No head space was left in sample containers.
- Appropriate sample containers were used.
- Samples were submitted for laboratory testing within holding times.

4.6.2 Sampling Regime

The sampling regime was conducted in accordance with BS10175 (2011) in order to satisfy the following criteria:

- Investigate suspected sources of contamination
- Investigate type and concentration of contamination
- Ensure good representation of the site
- Provide data to advise on remedial measures if necessary

Sample locations were selected on a non-targeted basis.

The sample locations and depths are illustrated in the following table:

Table 4.2 Sample Locations and Depths		
Sample	Depth (m)	Laboratory Sample Description
WS01	0.2	Dark brown gravelly, sandy CLAY
WS03	0.45	Dark brown gravelly, sandy CLAY
WS04	0.7	Dark brown gravelly, sandy CLAY (Made ground - brick)
WS08	0.6	Dark brown gravelly, sandy CLAY (Made ground - brick)
WS09	0.1	Dark brown gravelly, sandy CLAY including numerous rootlets (Made ground - brick)

4.6.3 Soil Laboratory Analysis

During the site works a number of soil samples were taken and despatched to the laboratories of Derwentside Environmental Testing Services for laboratory chemical testing;

Metals and Metalloids

Arsenic
Cadmium
Chromium III
Chromium VI
Copper
Lead
Mercury
Nickel
Selenium
Zinc

In-Organics

Cyanide
Sulphate

Others

pH (acidity)
Asbestos

Organic Chemicals

Phenols
Polycyclic Aromatic Hydrocarbons (PAH)
Petroleum Hydrocarbons TPHCWG

The results are discussed in detail in **Section 5** and the laboratory test results certificates may be found in **Annex G**.

4.6.4 Soil Leachate Laboratory Analysis

Substances found to be elevated in soils were further scheduled for leachate laboratory testing of the below listed determinants;

Metals

Lead
Arsenic

The results are discussed in detail in **Section 5** and the laboratory test results certificates may be found in **Annex G**.

4.7 Soil Property Testing

4.7.1 In-situ Permeability Testing

During the site investigation two in-situ borehole soakaway tests were undertaken in boreholes WS03 and WS07 and carried out in general accordance with BRE Digest 365 (2016) but on a small scale.

The test results are discussed in **Section 7.6** and the calculation sheets may be found in **Annex E**.

SECTION 5 Evaluation of Soil Analytical Results

5.1 Soil Assessment Methodology

Comparison of the analytical results has been made with the 2015 Suitable 4 Use Levels (S4UL) provided by Land Quality Management (LQM) Limited and the Chartered Institute of Environmental Health (CIEH) or provisional Category 4 Screening Levels (pC4SL). Where S4UL or C4SL values are not available, reference has been made to Soil Guideline Values (SGV) sourced from the now withdrawn Environment Agency Contaminated Land Exposure Assessment (CLEA).

The soil leachate analytical results have been compared with available guidelines published in the Water Framework Directive.

Sulphate results have been compared to British Research Establishment (BRE) guidelines as sulphate levels need only be considered for buried concrete risk assessment only, not human health related.

5.2 Soil Test Results

A summary of the chemical test results which include the regulatory soil guideline values used in a residential setting are given in **Tables 5.1 to 5.3**. The complete results can be found in **Annex G**.

Five samples were tested for a standard suite of metals, inorganics and phenols. The summarised results are shown below in **Table 5.1**.

Table 5.1 Summary of Soil Chemical Test Results - Standard Suite					
Substance	GAC/SGV (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Arsenic	37	LQM/CIEH	12	42	1
Cadmium	11	LQM/CIEH	0.2	1.8	0
Chromium III	910	LQM/CIEH	14	24	0
Chromium VI	6	LQM/CIEH	<1.0	<1.0	0
Copper	2400	LQM/CIEH	26	110	0
Lead	200	pC4SL	53	440	2
Mercury (inorganic)	40	LQM/CIEH	0.08	0.83	0
Nickel	180	LQM/CIEH	13	38	0
Selenium	250	LQM/CIEH	<0.5	1.0	0
Zinc	3700	LQM/CIEH	69	550	0
Cyanide	8	CLEA	<0.1	0.6	0
Phenols	120	LQM/CIEH	<0.3	<0.3	0
Sulphate	2400	BRE	600	4400	1
Organic Matter (%)	-	-	3.3	11	-
pH	-	-	7.9	10.9	-
Total PAH	-	-	0.21	28	See Table 5.2

Notes:

- GSC - Generic assessment criteria
- - No available guidelines

Five samples were tested for speciated polycyclic aromatic hydrocarbons. The summarised results are shown below in **Table 5.2**.

Table 5.2 Summary of Soil Chemical Test Results - Speciated Polycyclic Aromatic Hydrocarbons					
Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	LQM/CIEH	<0.03	0.27	0
Acenaphthylene	170	LQM/CIEH	<0.03	0.08	0
Acenaphthene	210	LQM/CIEH	<0.03	0.12	0
Fluorene	170	LQM/CIEH	<0.03	1.0	0
Phenanthrene	95	LQM/CIEH	0.04	3.6	0
Anthracene	2400	LQM/CIEH	<0.03	0.96	0
Fluoranthene	280	LQM/CIEH	0.06	5.3	0
Pyrene	620	LQM/CIEH	0.05	4.1	0
Benzo(a)anthracene	7.2	LQM/CIEH	<0.03	2.6	0
Chrysene	15	LQM/CIEH	0.04	2.5	0
Benzo(b)fluoranthene	2.6	LQM/CIEH	<0.03	2.8	1
Benzo(k)fluoranthene	77	LQM/CIEH	<0.03	1.3	0
Benzo(a)pyrene	2.2	LQM/CIEH	<0.03	1.9	0
Indeno(123cd)pyrene	27	LQM/CIEH	<0.03	0.77	0
Dibenzo(ah)anthracene	0.24	LQM/CIEH	<0.03	0.28	1
Benzo(ghi)perylene	320	LQM/CIEH	<0.03	0.86	0
Total PAH	-	-	0.21	28	-

Notes:

- GAC - Generic assessment criteria
- Thresholds based on 1.0% soil organic matter
- - No available guidelines

Five samples were tested for petroleum hydrocarbon testing. The summarised results are shown below in **Table 5.3**.

Table 5.3 Summary of Soil Chemical Test Results Petroleum Hydrocarbons					
Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Aliphatic					
PH C5 – C6 Ali	42	LQM/CIEH	<0.01	<0.01	0
PH C6 – C8 Ali	100	LQM/CIEH	<0.01	<0.01	0
PH C8 – C10 Ali	27	LQM/CIEH	<0.01	<0.01	0
PH C10 – C12 Ali	130	LQM/CIEH	<1.5	<1.5	0
PH C12 – C16 Ali	1100	LQM/CIEH	<1.2	<1.2	0
PH C16 – C21 Ali	65000*	LQM/CIEH	<1.5	<1.5	0
PH C21 – C35 Ali	65000*	LQM/CIEH	<3.4	31	0
Aromatic					
PH C5 – C7 Arom	70	LQM/CIEH	<0.01	<0.01	0
PH C7 – C8 Arom	130	LQM/CIEH	<0.01	<0.01	0
PH C8 – C10 Arom	34	LQM/CIEH	<0.01	<0.01	0
PH C10 – C12 Arom	74	LQM/CIEH	<0.9	<0.9	0
PH C12 – C16 Arom	140	LQM/CIEH	<0.5	0.8	0
PH C16 – C21 Arom	260	LQM/CIEH	<0.6	6.0	0
PH C21 – C35 Arom	1100	LQM/CIEH	<1.4	26	0

Notes:

- GAC - Generic assessment criteria
- PH – Petroleum Hydrocarbon
- Ali - Aliphatic
- Arom - Aromatic
- Thresholds based on 1.0% soil organic matter
- * - Ali C16-21 and C21-C35 based on criteria for Ali EC >16-35

5.2.1 Soil Asbestos Screening

Five samples were scheduled for asbestos screening. Asbestos was not identified.

5.2.2 Leachate Test Results

Substances found to be elevated in soil samples were submitted for leachate testing. The results are summarised below in **Table 5.4**.

Table 5.4 Summary of Leachate Chemical Test Results					
Substance	Threshold (µg/l)	Source	Measured Concentrations of Tested Substances (µg/l)		Number of Exceedences
			Minimum	Maximum	
Metals					
Lead	1.2 ⁽¹⁾	WFD	0.66	1.0	0
Arsenic	50 ⁽²⁾	WFD	6.0	6.0	0

Notes:

- WFD - Water Framework Directive
- (1) – Environmental quality standards for priority substances (Annual Average Inland Surface Waters)
- (2) – Standards for specific pollutants (Freshwater Long Term Mean)

SECTION 6 Gas Monitoring

6.1 Gas Risk Classification

Three shallow gas monitoring wells were installed in boreholes WS01, WS04 and WS05. Installation details are shown on the relevant log.

One round of monitoring has been carried out to date.

Methane levels were recorded between 0.8% and 0.9% V/V.

Carbon dioxide levels varied between 0.3% and 1.5% V/V.

Oxygen concentrations varied between 19.0% and 20.5% V/V.

The gas flow rate from the boreholes was also assessed. A maximum flow rate of 0.1l/hr was recorded.

Based on a flow rate of 0.1 l/hr and the highest recorded carbon dioxide concentration of 1.5%, a gas screening value of 0.0015 l/hr is calculated, as follows:

$$(1.5/100) \times 0.1 = 0.0015 \text{ l/hr}$$

When this result is compared with Table 8.5 of CIRIA report C665, the site is classified as 'Gas Characteristic Situation 1' (GSC1).

For sites classed as Gas Characteristic 1, no special gas precautions are required to be installed into new development.

Upon completion of the full six rounds of monitoring the recommendation will be reviewed in a letter report and if necessary amended.

The results to date are presented in **Annex H**.

SECTION 7 Quantitative Risk Assessment

7.1 Contaminants of Concern

7.1.1 Contaminants of Concern in Soil

Chemical testing resulted in exceedences of Lead, Arsenic, Benzo(b)fluoranthene and Dibenzo(ah)anthracene. Exceedences were recorded in made ground soils between surface and 1.10m.

Sulphate levels were seen to exceed BRE guideline in one sample WS04. Sulphate levels need only be considered for buried concrete risk assessment and is not human health related.

All other substances tested for were found to be present at concentrations below their respective human health threshold levels for a residential setting with home grown produce.

7.1.2 Leachable Contaminants of Concern

The sample obtained from boreholes WS01 and WS03 were further scheduled for lead and arsenic leachate testing. Leachate results did not exceed Water Framework Directive guidelines.

7.1.3 Gasses of Concern

No gasses of concern have been identified.

7.2 Potential Receptors and Pathways

7.2.1 Human Receptors

Construction workers may be in intimate contact with the site soils and are potentially at risk from exposure to determinants within the made ground through inhalation pathways, dermal contact and ingestion.

Neighbouring site users and passers-by are similarly potentially at risk of exposure to determinants during construction works at the site.

Similarly future site users, residents and visitors, are potentially at risk of determinants through inhalation pathways, dermal contact and ingestion if site soils are not remediated.

The guidelines were exceeded on five occasions therefore near surface made ground soils can be considered unsuitable for its proposed end use and will require a suitable remediation strategy.

7.2.2 Aquatic Environment

Soil sampling revealed three elevated lead or arsenic levels within made ground soils. The exceeded soil sample was subsequently scheduled for leachate testing. Testing has confirmed that these determinants will not significantly impact on the aquatic environment.

Elevated levels of Benzo(b)fluoranthene and Dibenzo(ah)anthracene were also recorded to marginally exceed guideline levels in soils. However statistically using a US₉₅ confidence, values for the site are significantly below guideline levels.

The nearest watercourse is located 479m west of the site and the underlying superficial deposits are designated as an unproductive aquifer. Superficial deposits of alluvial silt and clay are expected beneath the site up to thickness of 15m thus retarding any surface water percolation to the underlying Secondary A bedrock aquifer. Identified receptors and pathways are therefore intercepted or at a significant distance from the site and unlikely to be affected.

7.3 Mitigation and Remedial Measures

7.3.1 Human Health

Remedial measures will be required with regards to the recorded exceedences of lead and arsenic in soils.

Generally contaminants are contained within made ground soils between surface and 1.10m depth. It is therefore recommended that made ground soils be capped in the location of all proposed garden/landscaped areas. The capping layer would comprise a 600mm thick layer of imported clean soils. Beneath areas of the site due to be covered by hard-standing or developed upon, the development/hard-standing itself constitutes the required remedial measures are required.

Any imported soils should be tested and validated as suitable prior to use in accordance with 'Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation Cover Systems' published by the Welsh Contaminated Land Working Group.

Alternatively all made ground materials can be removed from the location of all proposed garden/landscaped areas and disposed of at a licensed landfill facility.

As good practise, construction workers should adhere to good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate. Ground workers should complete their own risk assessment for this issue.

Neighbouring site occupants and passers-by can be protected by site screening and dust suppression measures if necessary.

If during development works any other unexpected ground conditions or evidence of contamination is found, inspection by a geo-environmental engineer should be made, and any required testing or investigation carried out prior to continuation of works.

For proposed new supply water pipes, the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' should be consulted.

In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM3 soils and other materials destined for off-site disposal should be classified on the basis of their hazard phrases prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties. Terra Firma (Wales) Ltd offer this service if required.

7.3.2 Aquatic Environment

There are not considered to be any significant risks to the aquatic environment from site soils.

During the construction period, there is a risk to the environment/adjacent sites from de-watering, digging foundations, moving contaminated soil, drainage misconnections, discharges to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills.

The risk is considered to be negligible as any adverse effects will be easily preventable by due diligence to good construction practise and housekeeping in preventing surface runoff and the spillage of materials.

The basic measures that should be taken are as follows:

- Prepare a drainage plan and mark the manholes to prevent pollutants accidentally reaching the surface water sewers;
- Carry out any activities that could cause pollution in a designated, bunded area, away from rivers or boreholes. Where possible it should drain to the foul sewer;
- Use settlement ponds to remove silty water;
- Store all oils and chemicals in a fully bunded area to prevent leaks or spills;
- Get advice on whether you need an environmental permit and apply in good time

SECTION 8 Engineering Recommendations

8.1 Preparation of Site

Prior to site works commencing an appropriate asbestos survey should be carried out in the existing buildings. Following the removal of all deleterious materials to an appropriate landfill facility, all structures (including foundations), hard-standing and granular sub-base materials should be stripped and removed from beneath the proposed development area.

Remaining vegetation including all roots should also be stripped and removed from the site.

Contingencies should be made for the protection/diversion any underground/overhead services present beneath/above the site brought about as a result of the proposed works.

Any reduced levels should be brought up to the required levels with suitable inert mainly granular materials. Department of Transport (Dtp) type 2 sub base or similar should be used and should be compacted in layers to the requirements of the Specification for Highway works.

Allowances should also be made for the excavation of any soft spots/areas and their replacement with well compacted imported granular materials.

In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM3 soils and other materials destined for off-site disposal should be classified on the basis of their hazard phrases prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties. Terra Firma (Wales) Ltd offer this service if required.

8.2 Foundation and Floor Slab Solution

It is recommended that for the new development a precast driven concrete pile foundation socketed into the underlying bedrock should be used.

In order to determine the length, diameter and working load of the pile at least one shell and auger borehole should be sunk beneath the proposed development.

Based on local BGS borehole data bedrock is expected at a depth of approximately 15.00 below ground level.

During piling measurements should put in place to monitor vibrations during installation. If vibrations exceed guideline levels then measures should also be taken to dampen such vibrations. If, however, vibrations exceed permissible values then consideration should be given to an alternative solution.

If the piles are located within influencing distance of trees, consideration should be given to installing pile sleeves to protect the piles against swelling soils.

The floor slabs should be designed as suspended.

All foundation formations should be inspected by a suitably qualified Engineer before being concreted.

8.3 Excavations and Formations

Most of the shallow excavations will be possible with normal soil excavating machinery.

Shallow perched water and groundwater flows were not encountered during the investigation, any water inflows together with rainwater infiltration should be dealt with by conventional pumping techniques. However it should be noted that during times of heavy rainfall a higher water table will be encountered.

The sides of any excavations deeper than 1.20m, or shallower if unstable, should be supported by planking and strutting or other proprietary means.

The sub-formations/formations are likely to be susceptible to loosening, softening and deterioration by exposure to weather (rain, frost and drying conditions), the action of water (flood water or removal of groundwater) and site traffic.

Formations should never be left unprotected and continuously exposed to rain causing degradation, or left exposed/uncovered overnight, unless permitted by a qualified engineer.

Construction plant and other vehicular traffic should not be operated on unprotected formations.

As a minimum the formation/excavation surfaces must be protected by blinding concrete immediately after exposure.

Allowances should be made for the removal of soft spots/areas and their replacement with well compacted granular materials.

Allowances should also be made for special precautions to prevent formation deterioration in addition to the above.

8.4 Protection of Buried Concrete

Elevated sulphate levels were recorded in one sample of made ground in borehole WS04.

Levels of total sulphate within the in-situ materials measured between 600mg/kg to 4400mg/kg and the pH varied between 7.9 and 10.9.

When the results are compared with Table C2 of BRE Digest 1:2005, it indicates that buried concrete should most likely as a minimum conform to Class AC-2.

8.5 Access Roads and Car Parking Areas

For car parking and road areas, formations within the in-situ soils a CBR value of 3% may be used

Dynamic cone penetrometer (DCP) testing results indicate this CBR value will be achievable at depths between 0.12-0.53m below current ground level. The DCP results are presented in **Annex F**.

Allowances should be made for the removal of any 'soft spots/areas' and their replacement with well-compacted granular materials as previously described.

8.6 Storm Water Drainage

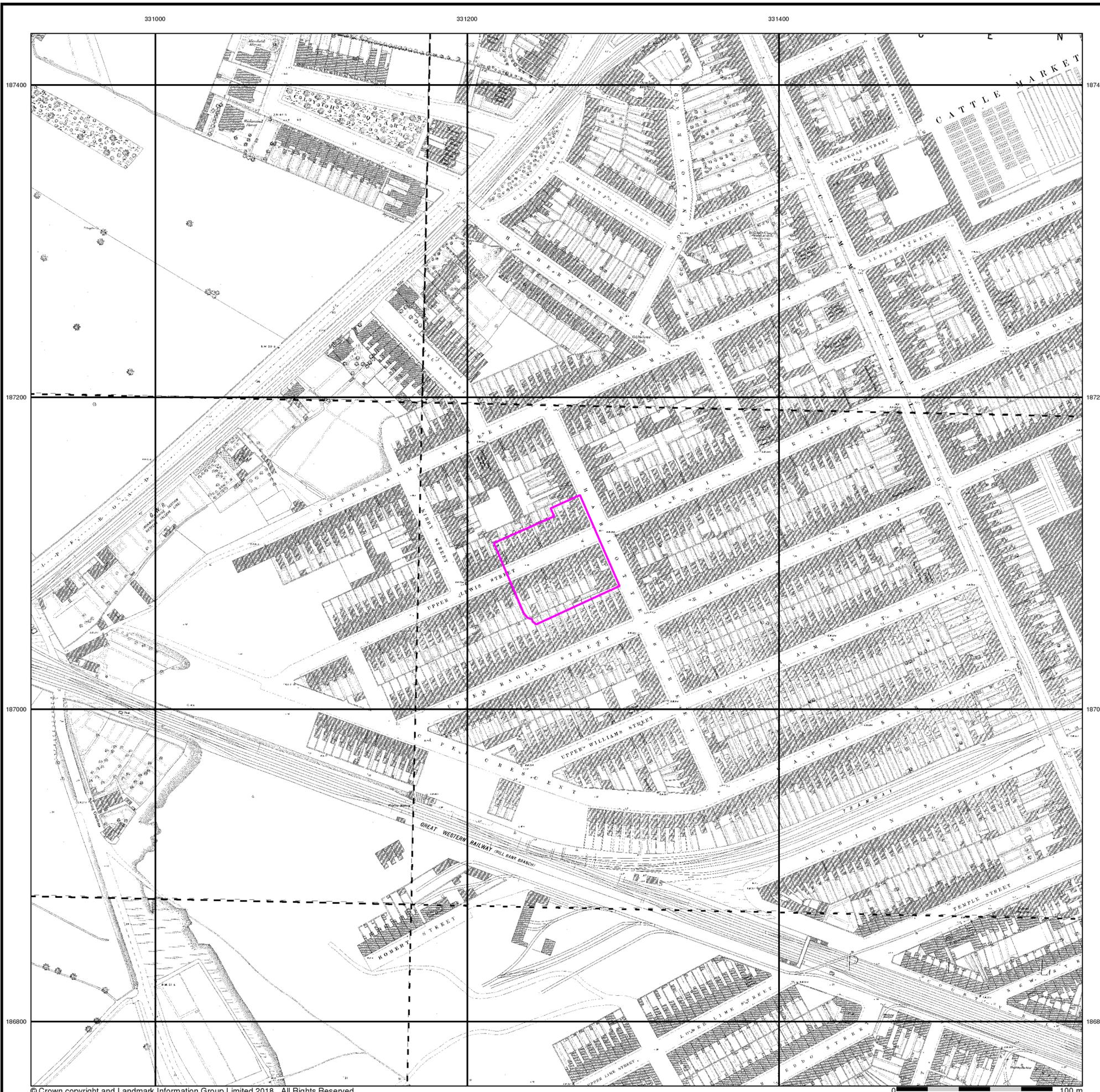
During the site investigation two soakaway tests were undertaken in general accordance of BRE 365 (2016) but on a small scale in boreholes. The soakaway tests were carried out in WS03 and WS07.

Soakaway tests recorded negligible infiltration failing to reach a 25% outflow over a four hour period. The tests were typically undertaken between ground level and 1.00m within made ground deposits.

The soakaway calculation sheets are presented in **Annex E** for reference.

It is considered that soakaway storm water drainage is unsuitable at the site.

ANNEX A
Envirocheck Report



Monmouthshire
Published 1883 - 1884
Source map scale - 1:500

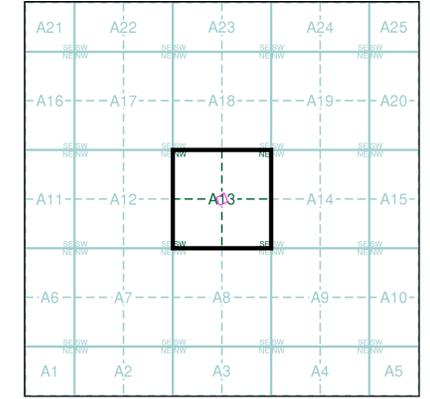
The 1:500 scale Ordnance Survey mapping was introduced in 1855 as a replacement for the 1:528 scale and to complement the 1:2500 scale that had been implemented in 1853. By 1895, the 1:500 scale covered most towns over a population of about 4000 at the time of survey, although very few towns were mapped more than once at this scale, and none have been since 1910. The 1:500 scale gives particular emphasis to such features as lamp posts, man holes, arched passages and minor building projections. Also often featured are divisions between tenements, interior ground floor layouts of public buildings, and on earlier plans, the functions of the various parts of larger industrial premises are also indicated. Content of the plans does vary however, from one town to the next in terms of, for example, the completeness of railway tracks and the coverage of public buildings.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)

033_04_008	1883	1:500	033_04_009	1884	1:500
033_04_013	1884	1:500	033_04_014	1884	1:500
033_04_018	1883	1:500	033_04_019	1884	1:500

Historical Town Plan - Segment A13



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 0

Site Details

Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER



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

Historical Mapping Legends

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

Quarry **Gravel Pit** **Sand Pit**
Clay Pit **Shingle** **Refuse Heap**
Sloping Masonry **Flat Rock**
Marsh **Reeds** **Osiers**
Rough Pasture **Furze** **Wood**
Mixed Wood **Brushwood** **Orchard**
Fir **Ford** **Stepping Stones**
Ferry **Waterfall** **Lock**
Trig. Station **Altitude at Trig. Station**
B.M. 325.9 **Bench Mark** **Surface Level**
Arrow denotes flow of water **Antiquities (site of)**
Cutting **Embankment**
Railway crossing Road **Level Crossing** **Road crossing Railway**
Railway crossing River or Canal **Road over single stream** **Road over River or Canal**
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
County Borough Boundary (England)
County Burgh Boundary (Scotland)
Co. Boro. Bdy.
Co. Burgh Bdy.
BP BS Boundary Post or Stone **P.C.B** Police Call Box
B.R. Bridle Road **P** Pump
E.P Electricity Pylon **S.P** Signal Post
F.B. Foot Bridge **SL** Sluice
F.P. Foot Path **Sp.** Spring
G.P Guide Post or Board **T.C.B** Telephone Call Box
M.S Mile Stone **Tr.** Trough
M.P M.R Mooring Post or Ring **W** Well

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

Inactive Quarry, Chalk Pit or Clay Pit **Active Quarry, Chalk Pit or Clay Pit**
Rock **Boulders**
Cliff **Slopes** **Top**
Roofed Building **Glazed Roof Building**
Sloping Masonry **Archway**
Non-Coniferous Tree (surveyed) **Coniferous Tree (surveyed)**
Non-Coniferous Trees (not surveyed) **Coniferous Trees (not surveyed)**
Orchard Tree **Scrub** **Bracken**
Coppice, Osier **Reeds** **Marsh, Saltings**
Rough Grassland **Heath** **Culvert**
Direction of water flow **Bench Mark** **Antiquity (site of)**
Cave Entrance **Triangulation Station** **Electricity Pylon**
Electricity Transmission Line
County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
London Borough Boundary
Symbol marking point where boundary mereing changes
BH Beer House **P** Pillar, Pole or Post
BP, BS Boundary Post or Stone **PO** Post Office
Cn, C Capstan, Crane **PC** Public Convenience
Chy Chimney **PH** Public House
D Fn Drinking Fountain **Pp** Pump
EI P Electricity Pillar or Post **SB, S Br** Signal Box or Bridge
FAP Fire Alarm Pillar **SP, SL** Signal Post or Light
FB Foot Bridge **Spr** Spring
GP Guide Post **Tk** Tank or Track
H Hydrant or Hydraulic **TCB** Telephone Call Box
LC Level Crossing **TCP** Telephone Call Post
MH Manhole **Tr** Trough
MP Mile Post or Mooring Post **Wr Pt, Wr T** Water Point, Water Tap
MS Mile Stone **W** Well
NTL Normal Tidal Limit **Wd Pp** Wind Pump

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

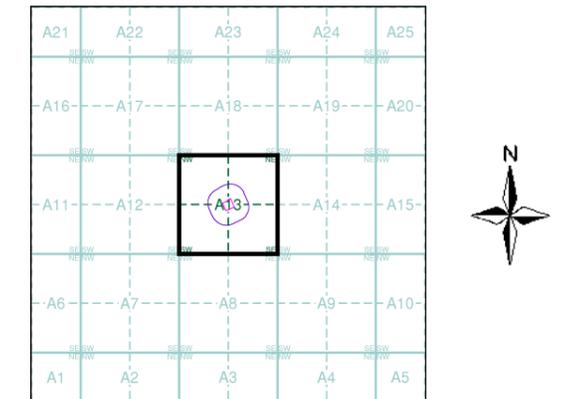
Cliff **Slopes** **Top**
Rock **Rock (scattered)**
Boulders **Boulders (scattered)**
Positioned Boulder **Scree**
Non-Coniferous Tree (surveyed) **Coniferous Tree (surveyed)**
Non-Coniferous Trees (not surveyed) **Coniferous Trees (not surveyed)**
Orchard Tree **Scrub** **Bracken**
Coppice, Osier **Reeds** **Marsh, Saltings**
Rough Grassland **Heath** **Culvert**
Direction of water flow **Triangulation Station** **Antiquity (site of)**
Electricity Transmission Line **Electricity Pylon**
B.M. 231.60m Bench Mark **Buildings with Building Seed**
Roofed Building **Glazed Roof Building**
Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)
Bks Barracks **P** Pillar, Pole or Post
Bty Battery **PO** Post Office
Cemy Cemetery **PC** Public Convenience
Chy Chimney **Pp** Pump
Cis Cistern **Ppg Sta** Pumping Station
Dismtd Rly Dismantled Railway **PW** Place of Worship
EI Gen Sta Electricity Generating Station **Sewage Ppg Sta** Sewage Pumping Station
EI P Electricity Pole, Pillar **SB, S Br** Signal Box or Bridge
EI Sub Sta Electricity Sub Station **SP, SL** Signal Post or Light
FB Filter Bed **Spr** Spring
Fn / D Fn Fountain / Drinking Ftn. **Tk** Tank or Track
Gas Gov Gas Valve Compound **Tr** Trough
GVC Gas Governor **Wd Pp** Wind Pump
GP Guide Post **Wr Pt, Wr T** Water Point, Water Tap
MH Manhole **Wks** Works (building or area)
MP, MS Mile Post or Mile Stone **W** Well



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Monmouthshire	1:2,500	1884	2
Monmouthshire	1:2,500	1902	3
Monmouthshire	1:2,500	1921	4
Monmouthshire	1:2,500	1937	5
Ordnance Survey Plan	1:2,500	1956 - 1957	6
Ordnance Survey Plan	1:1,250	1956	7
Ordnance Survey Plan	1:1,250	1966 - 1977	8
Ordnance Survey Plan	1:2,500	1970	9
Supply of Unpublished Survey Information	1:1,250	1974	10
Additional SIMs	1:1,250	1977 - 1986	11
Ordnance Survey Plan	1:1,250	1983 - 1986	12
Additional SIMs	1:1,250	1983 - 1991	13
Additional SIMs	1:1,250	1991 - 1992	14
Additional SIMs	1:1,250	1992	15
Large-Scale National Grid Data	1:1,250	1993	16
Large-Scale National Grid Data	1:1,250	1993 - 1995	17
Large-Scale National Grid Data	1:1,250	1995	18
Large-Scale National Grid Data	1:1,250	1995	19
Large-Scale National Grid Data	1:1,250	1996	20
Historical Aerial Photography	1:2,500	2000	21

Historical Map - Segment A13



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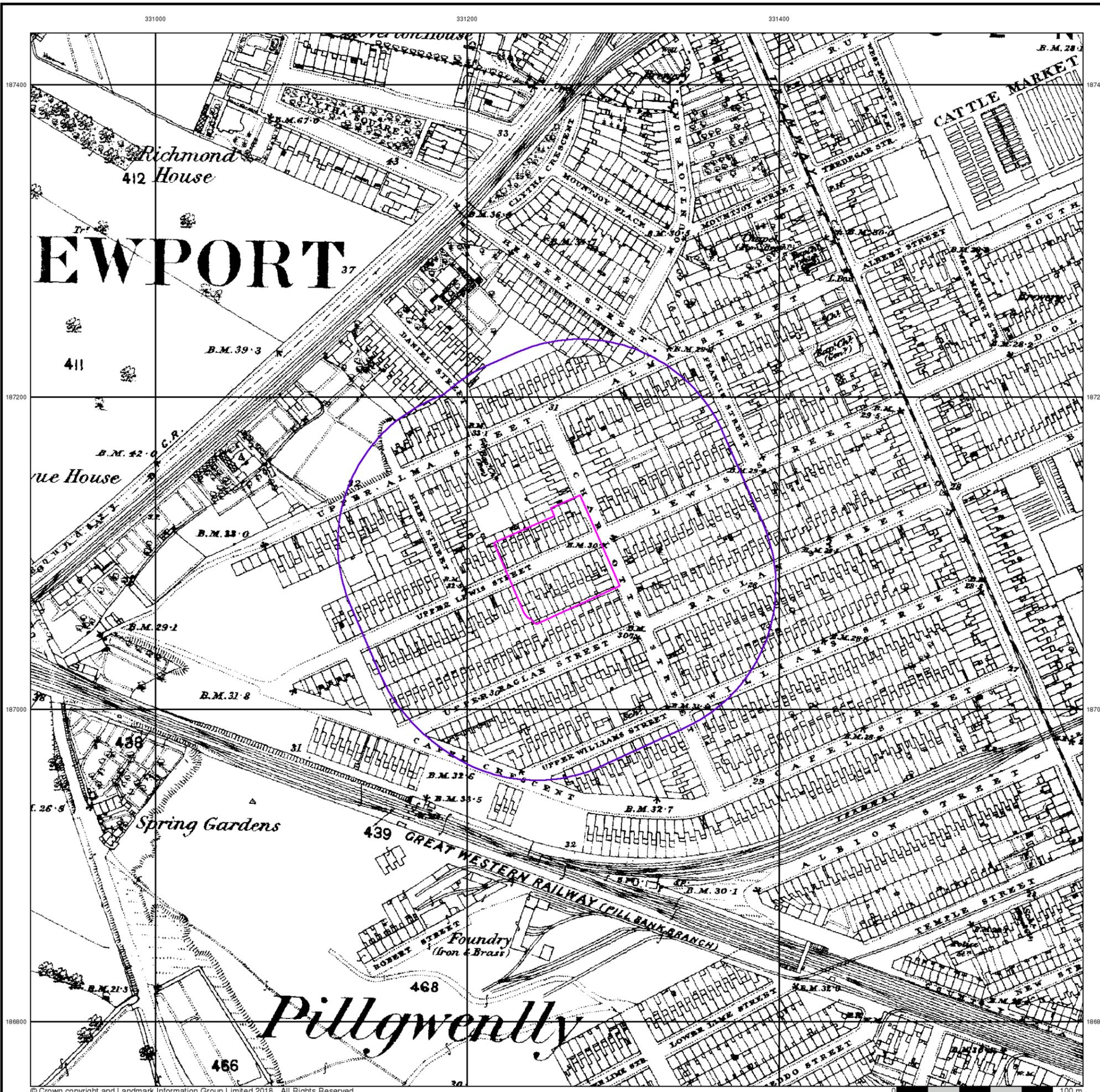
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 Site Area (Ha): 0.38
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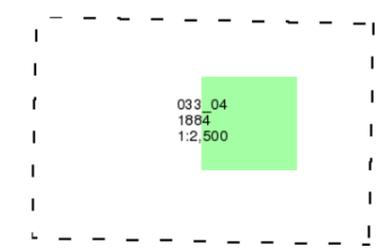


Monmouthshire
Published 1884

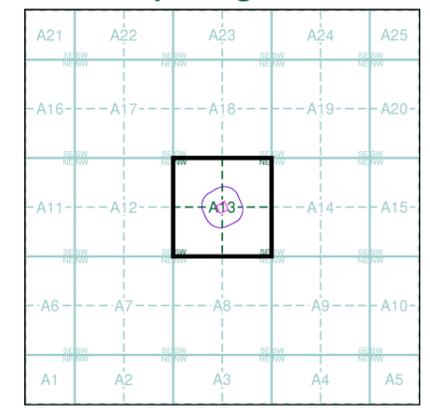
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered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

Map Name(s) and Date(s)



Historical Map - Segment A13



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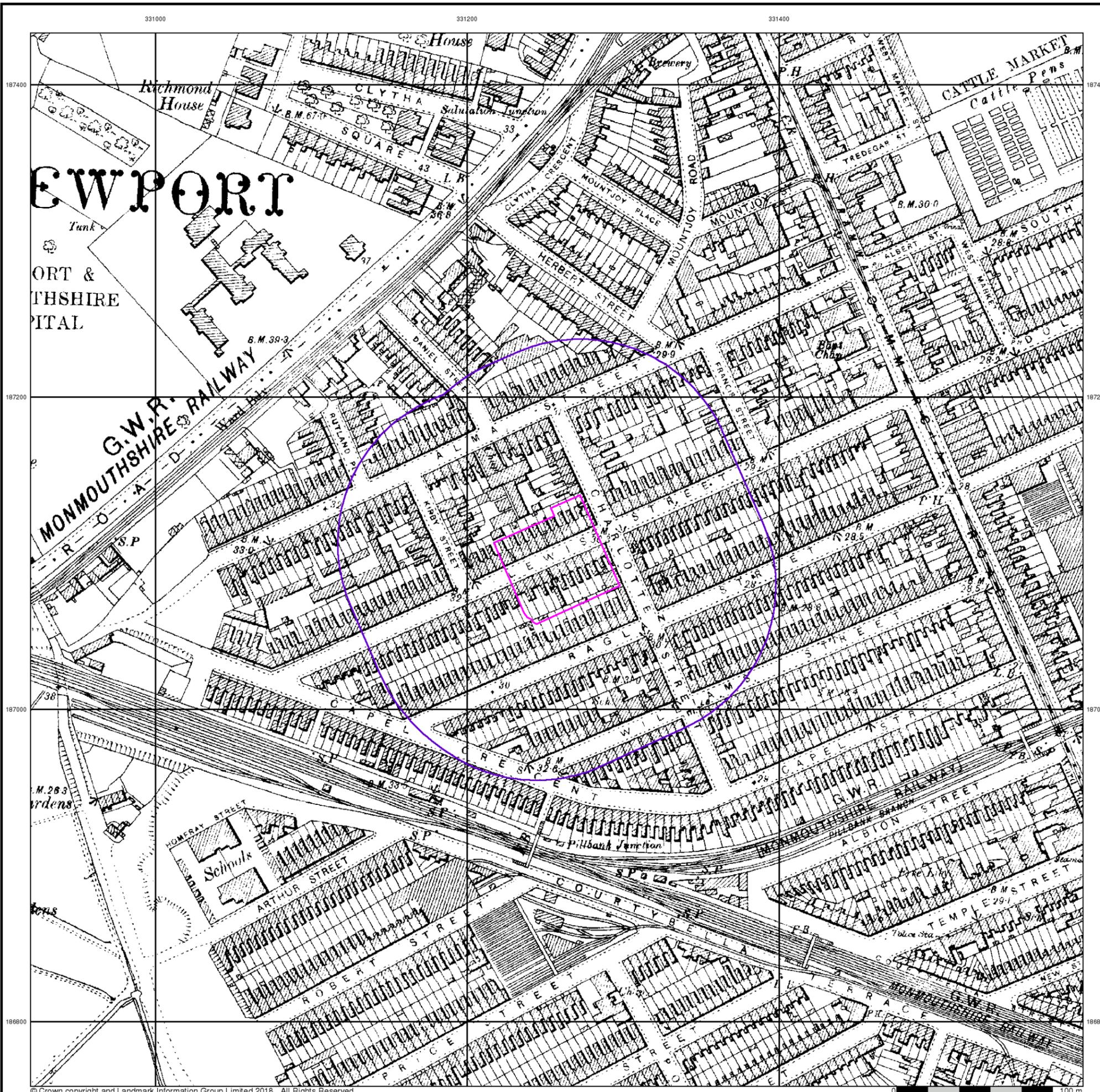
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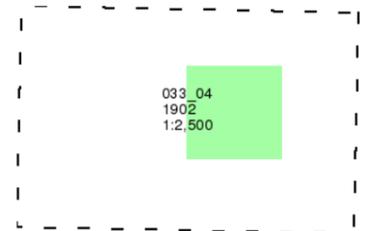
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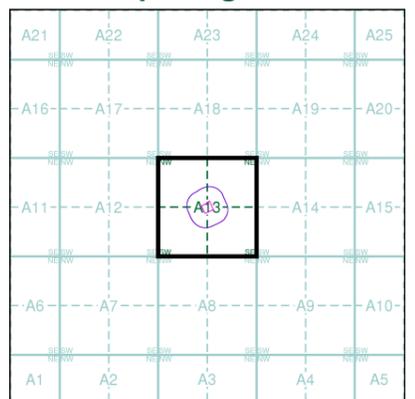
Monmouthshire
Published 1902
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Map Name(s) and Date(s)



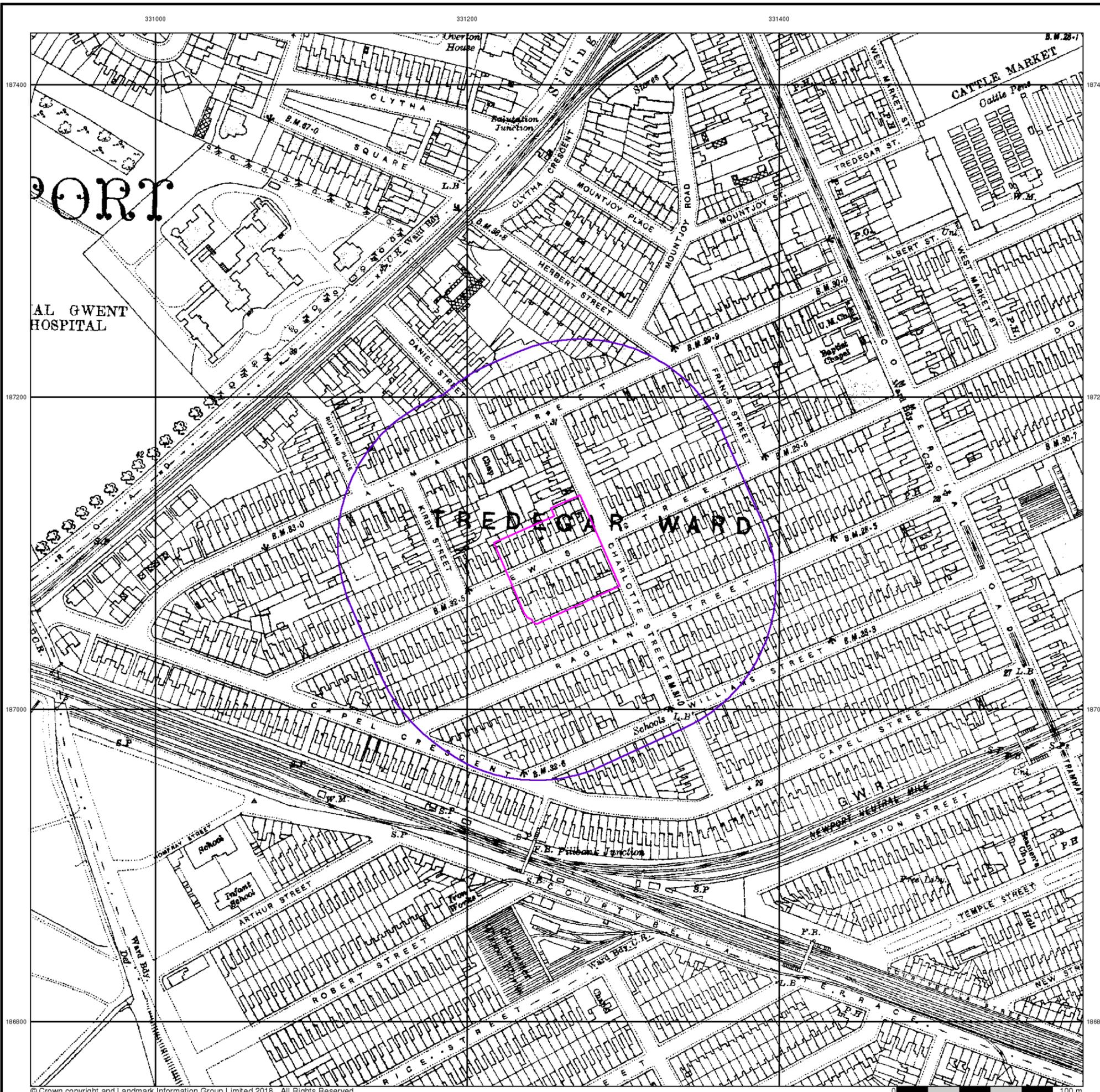
Historical Map - Segment A13



Order Details
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 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
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 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details
 Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER

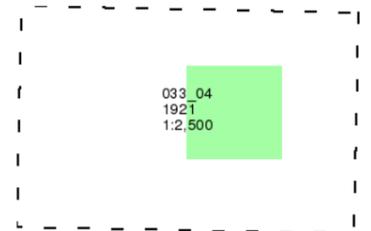
Landmark
 INFORMATION GROUP
 Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



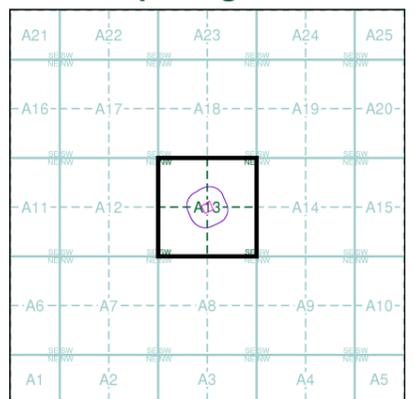
Monmouthshire
Published 1921
Source map scale - 1:2,500

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Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

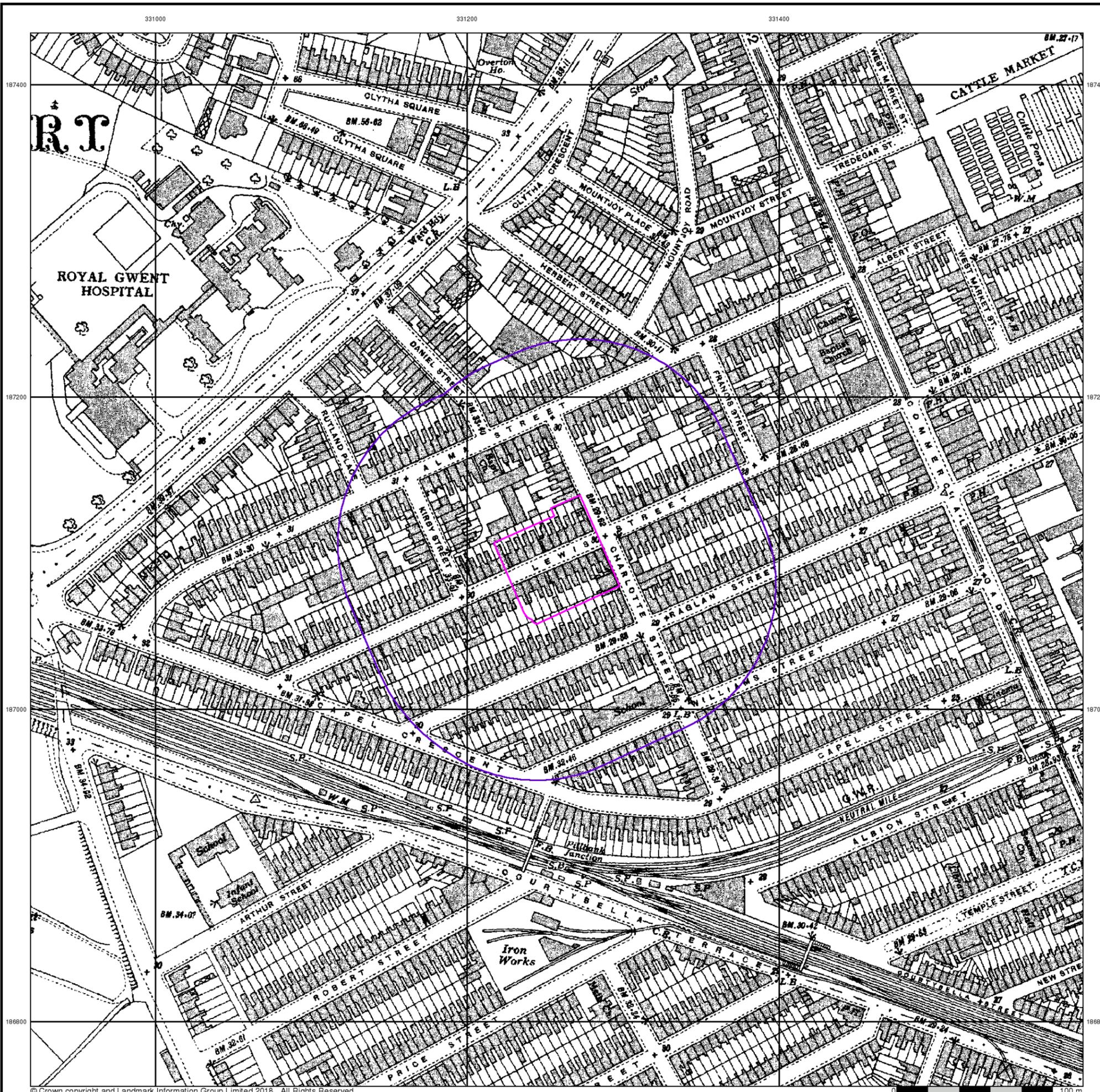
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 Customer Ref: 14632JRW
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 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details

Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER



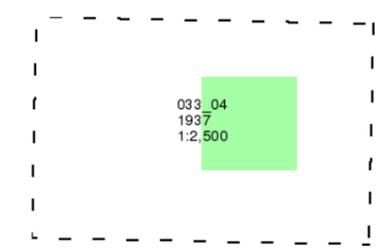
Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



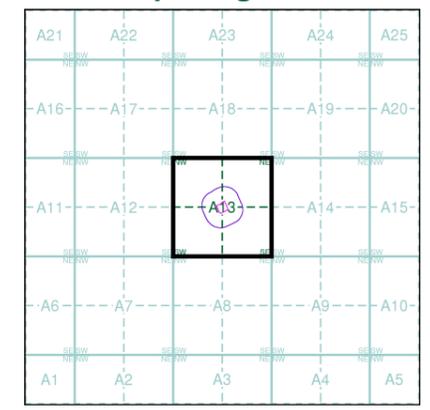
Monmouthshire
Published 1937
Source map scale - 1:2,500

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

Map Name(s) and Date(s)



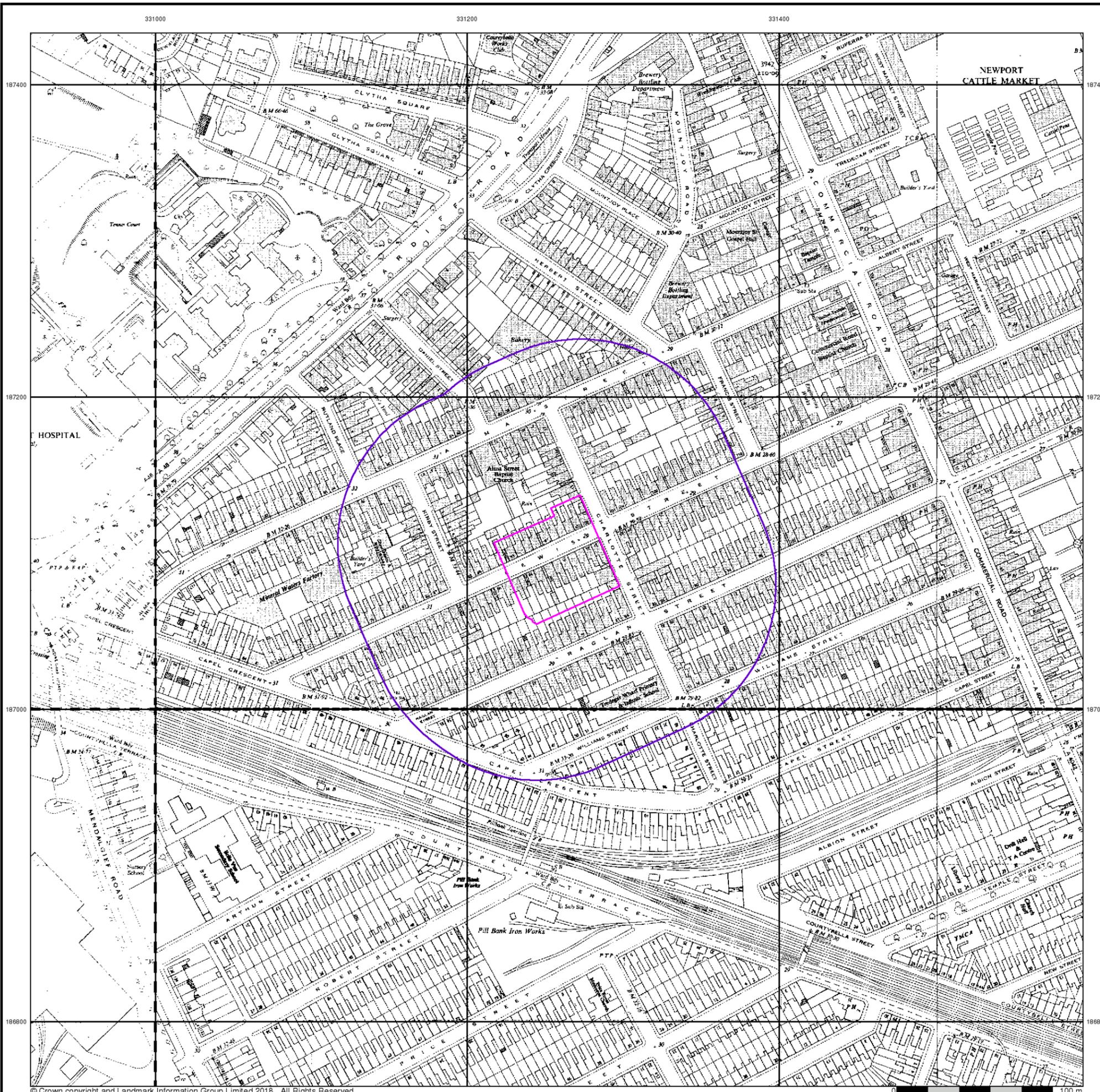
Historical Map - Segment A13



Order Details
 Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details
 Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER

Landmark
 INFORMATION GROUP
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 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



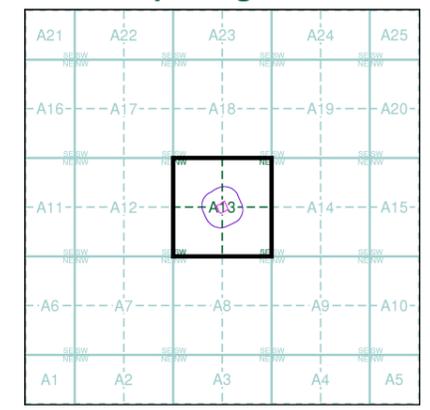
Ordnance Survey Plan
Published 1956 - 1957
Source map scale - 1:2,500

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

Map Name(s) and Date(s)

ST3087 1956 12,500	ST3187 1956 12,500
ST3086 1957 12,500	ST3186 1956 12,500

Historical Map - Segment A13



Order Details

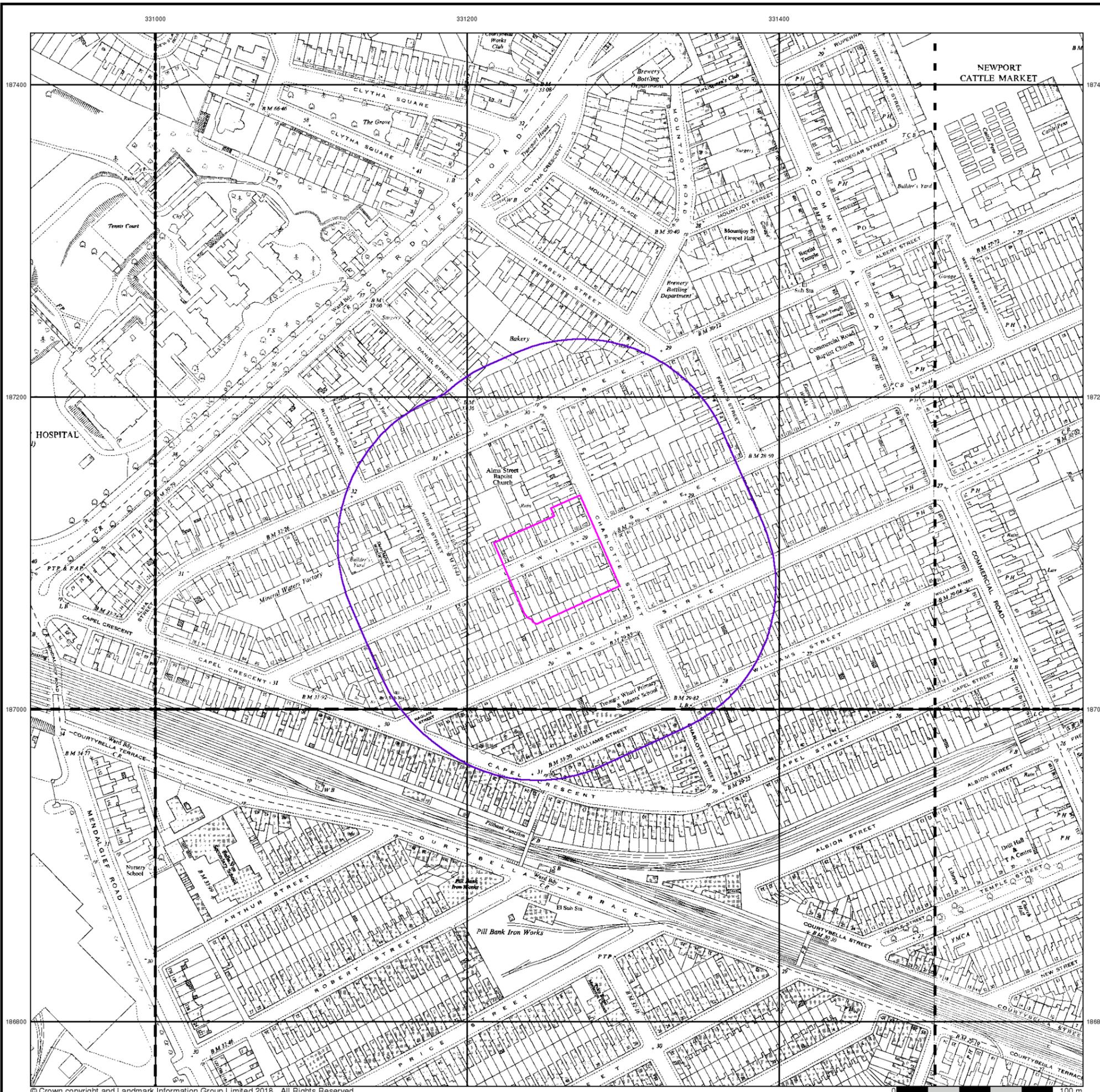
Order Number: 166179293_1_1
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 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
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Site Details

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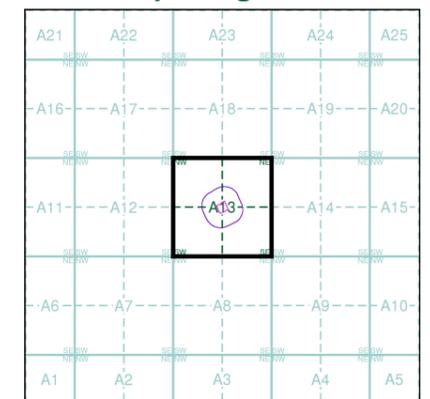
Ordnance Survey Plan
Published 1956
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

ST3087SE 1956 1:1,250	ST3187SW 1956 1:1,250	ST3187SE 1956 1:1,250
ST3086NE 1956 1:1,250	ST3186NW 1956 1:1,250	ST3186NE 1956 1:1,250

Historical Map - Segment A13



Order Details

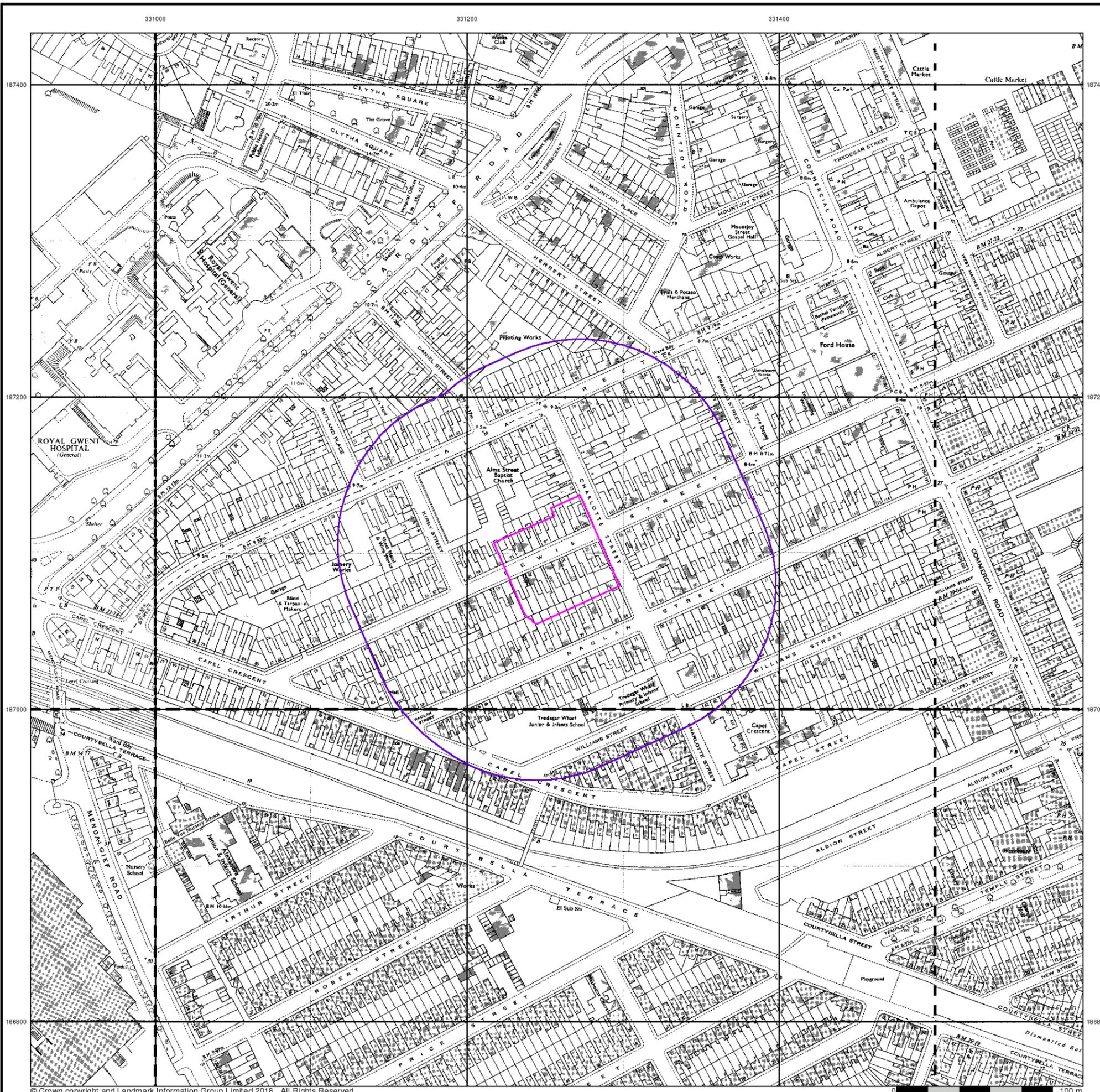
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Site Details

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 Web: www.envirocheck.co.uk



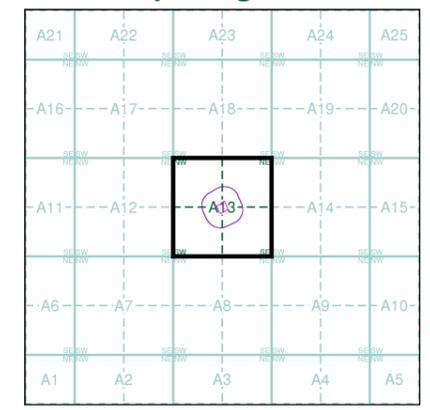
Ordnance Survey Plan
Published 1966 - 1977
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

ST3087SE 1968 1:1,250	ST3187SW 1972 1:1,250	ST3187SE 1967 1:1,250
ST3086NE 1966 1:1,250	ST3186NW 1977 1:1,250	ST3186NE 1968 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details

Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER



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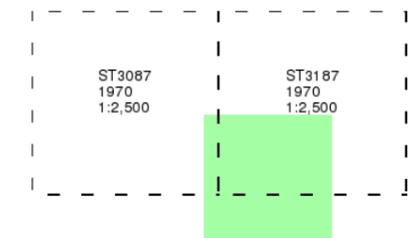
Ordnance Survey Plan

Published 1970

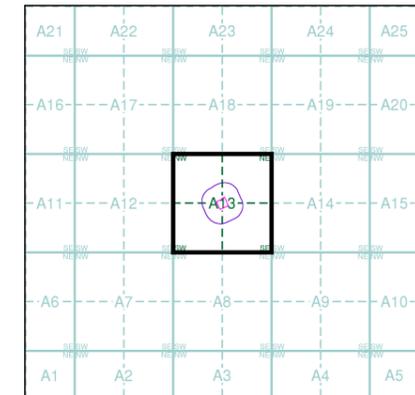
Source map scale - 1:2,500

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

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

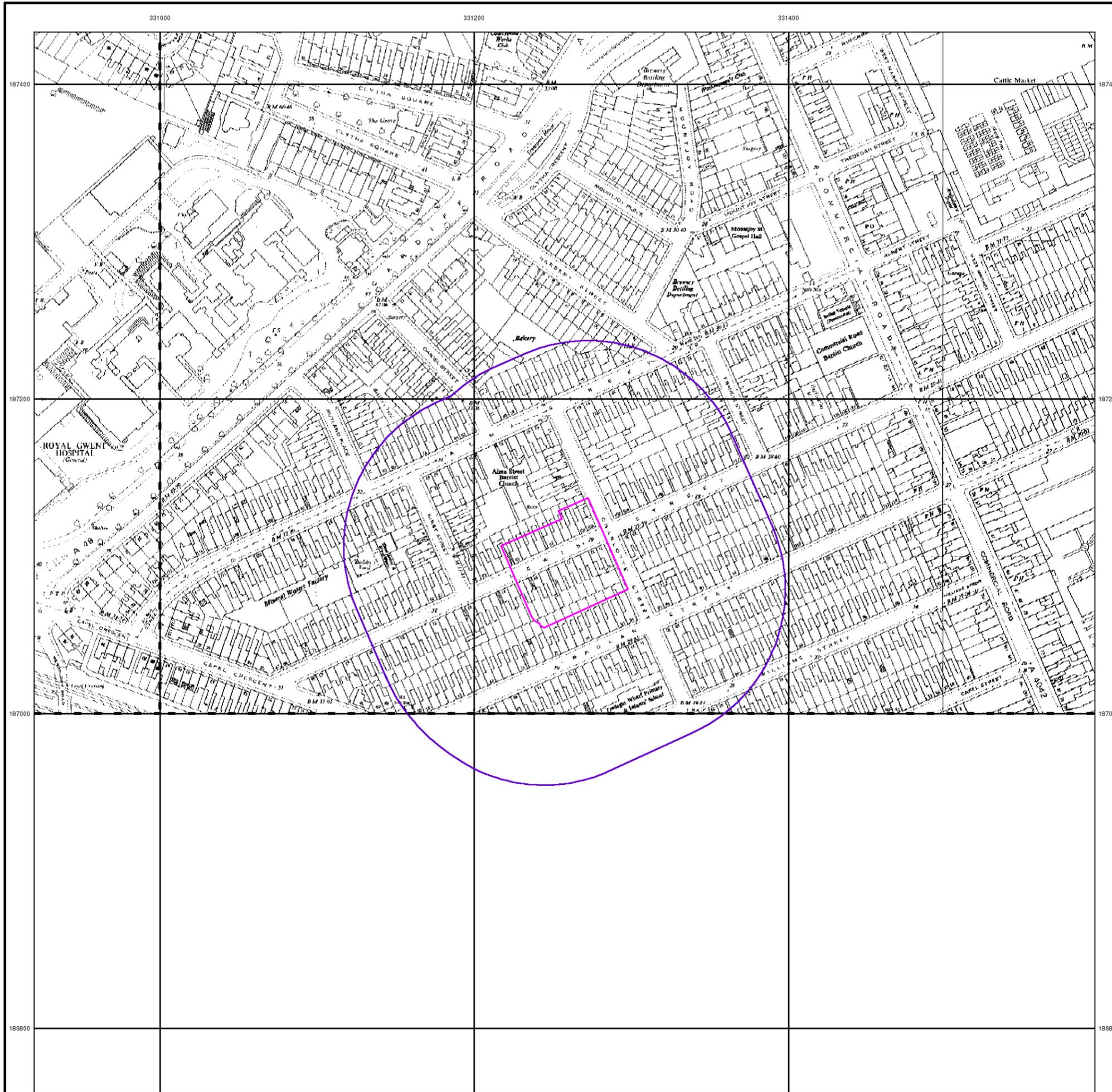
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Site Details

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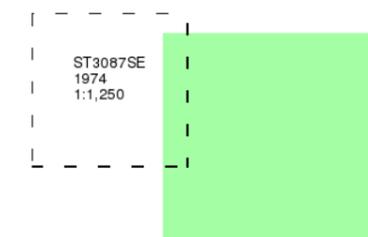
Supply of Unpublished Survey Information

Published 1974

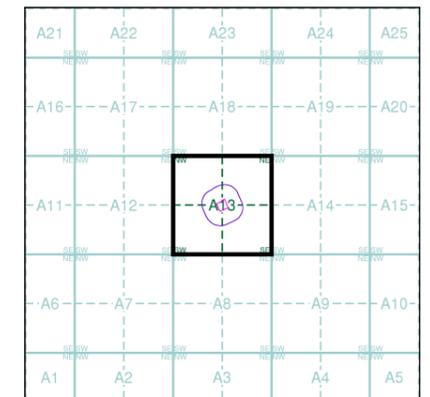
Source map scale - 1:1,250

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

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

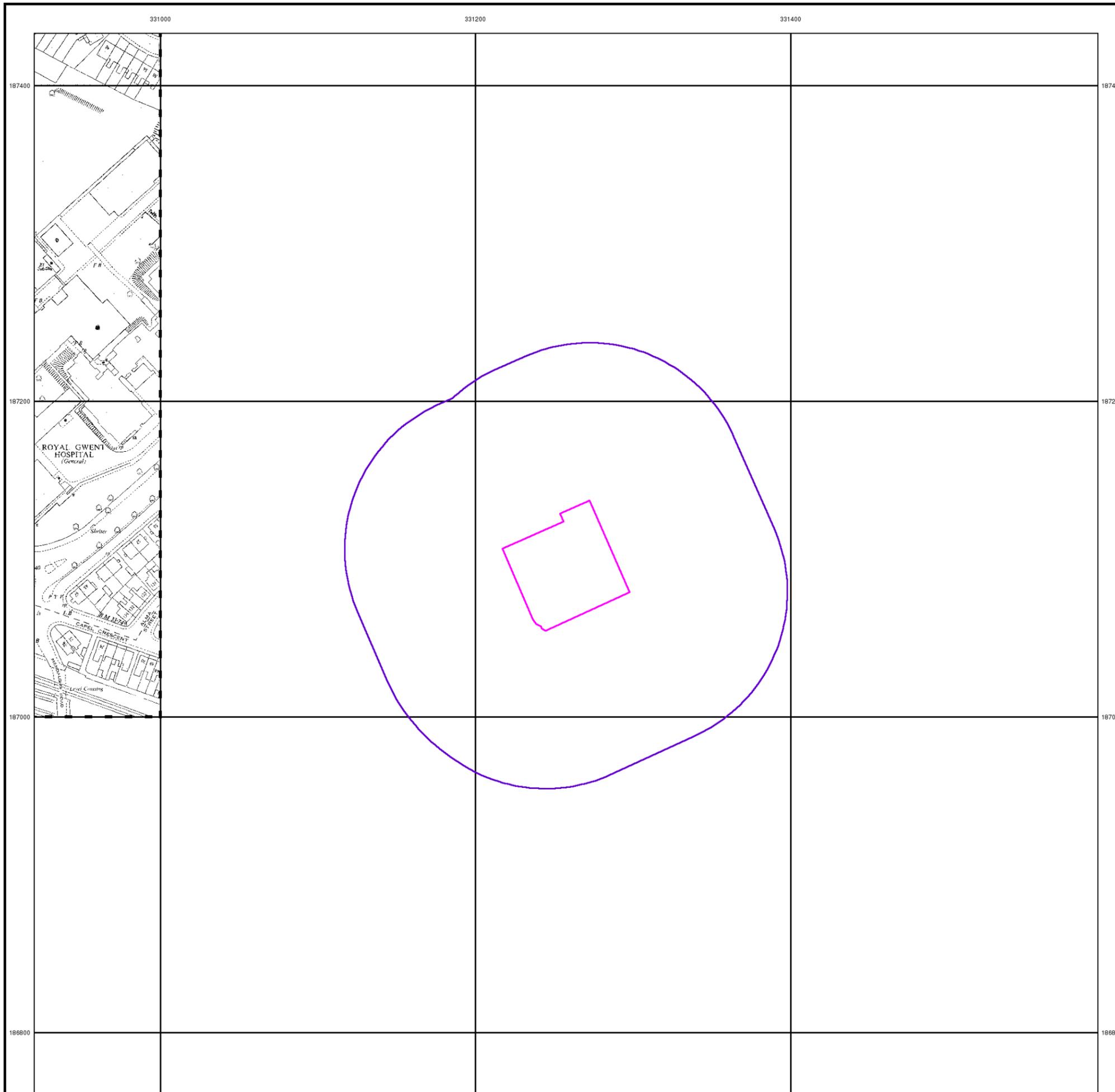
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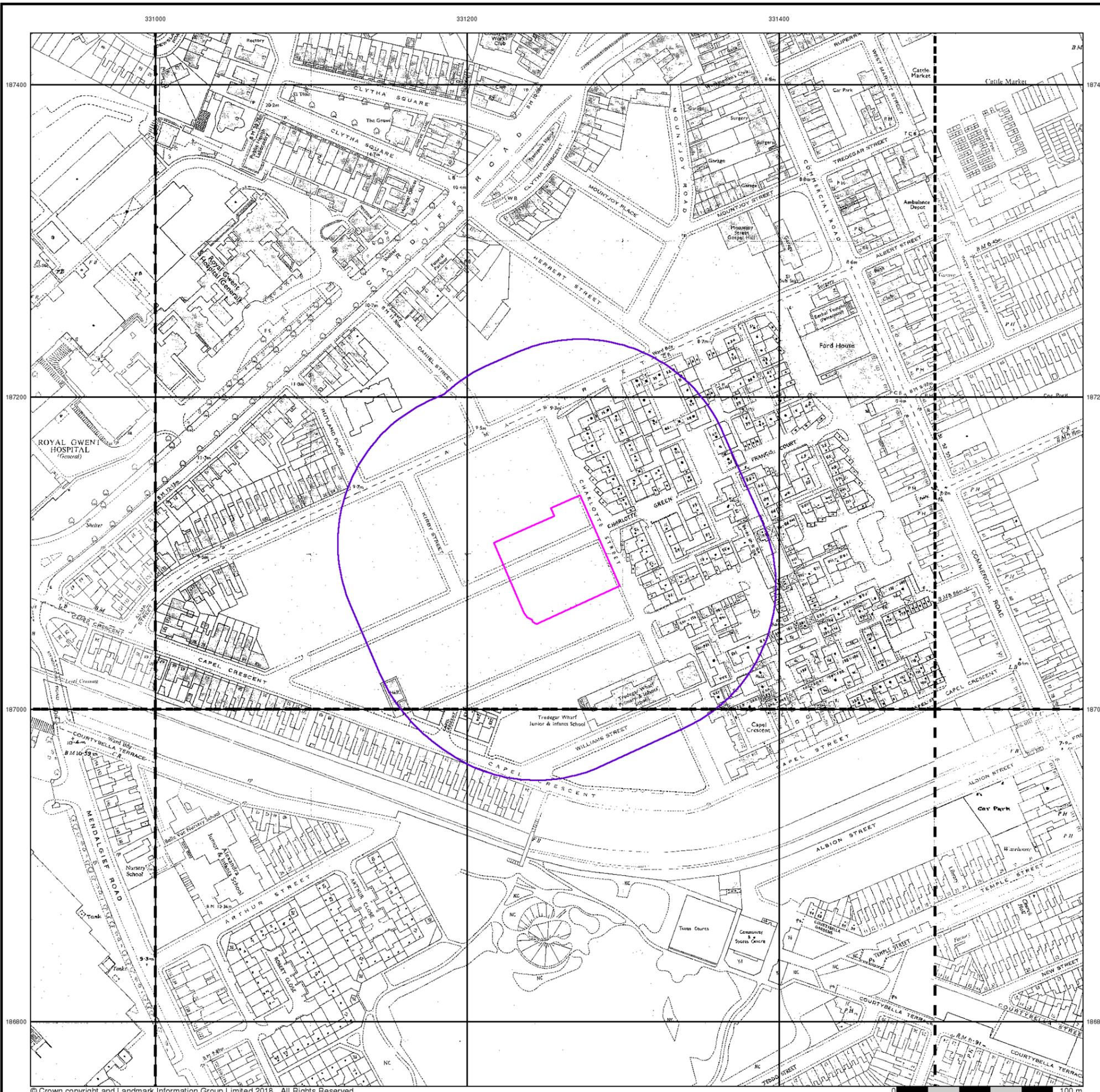
Site Details

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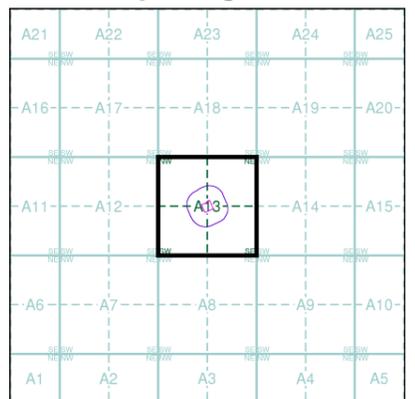
Additional SIMs
Published 1977 - 1986
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

ST3087SE 1977 1:1,250	ST3187SW 1977 1:1,250	ST3187SE 1986 1:1,250
ST3086NE 1978 1:1,250	ST3186NW 1983 1:1,250	ST3186NE 1978 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1983 - 1986

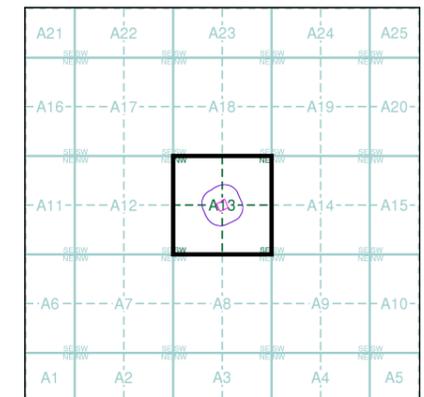
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

ST3187SW
1983
1:1,250
ST3186NW
1986
1:1,250

Historical Map - Segment A13



Order Details

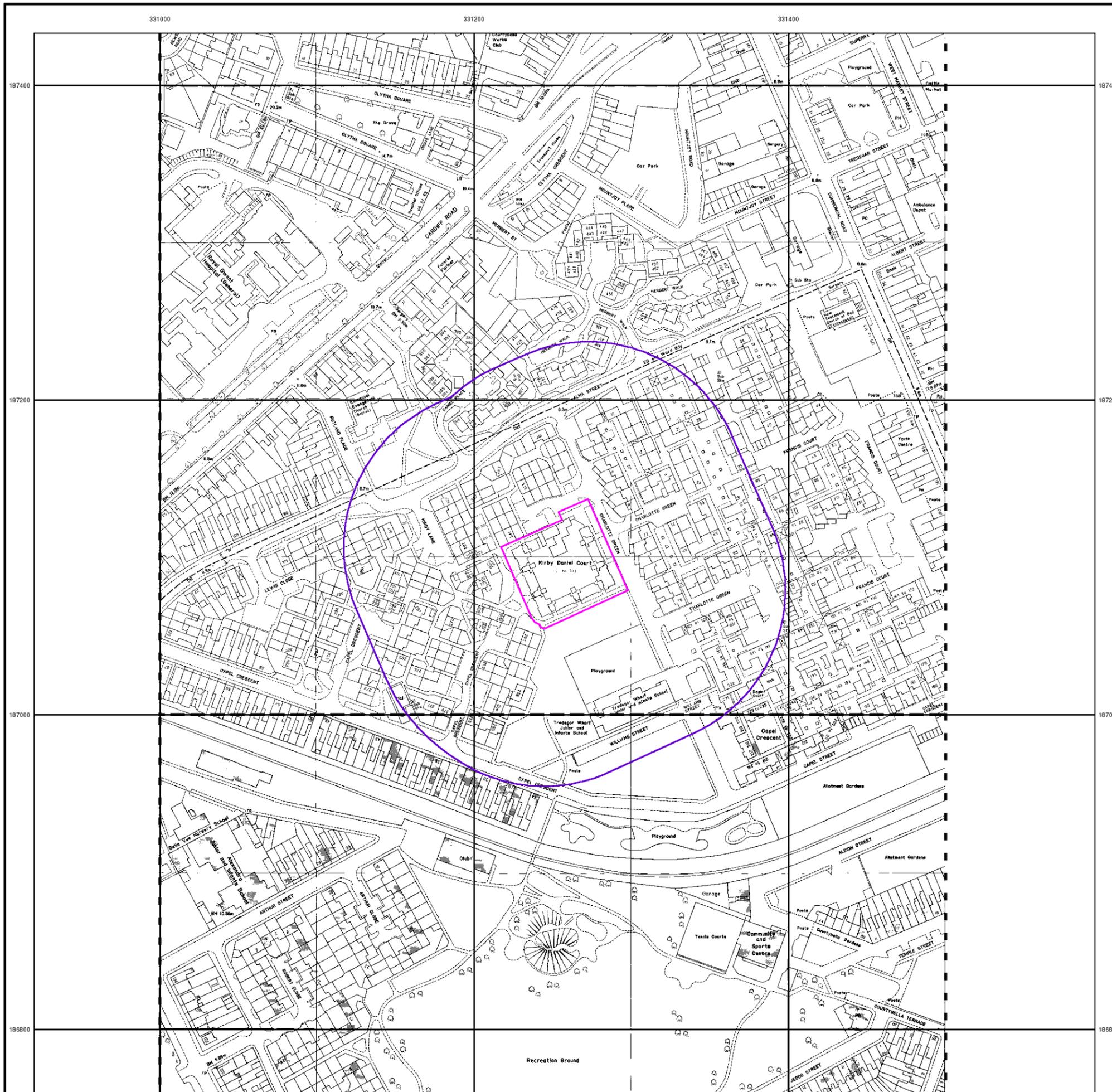
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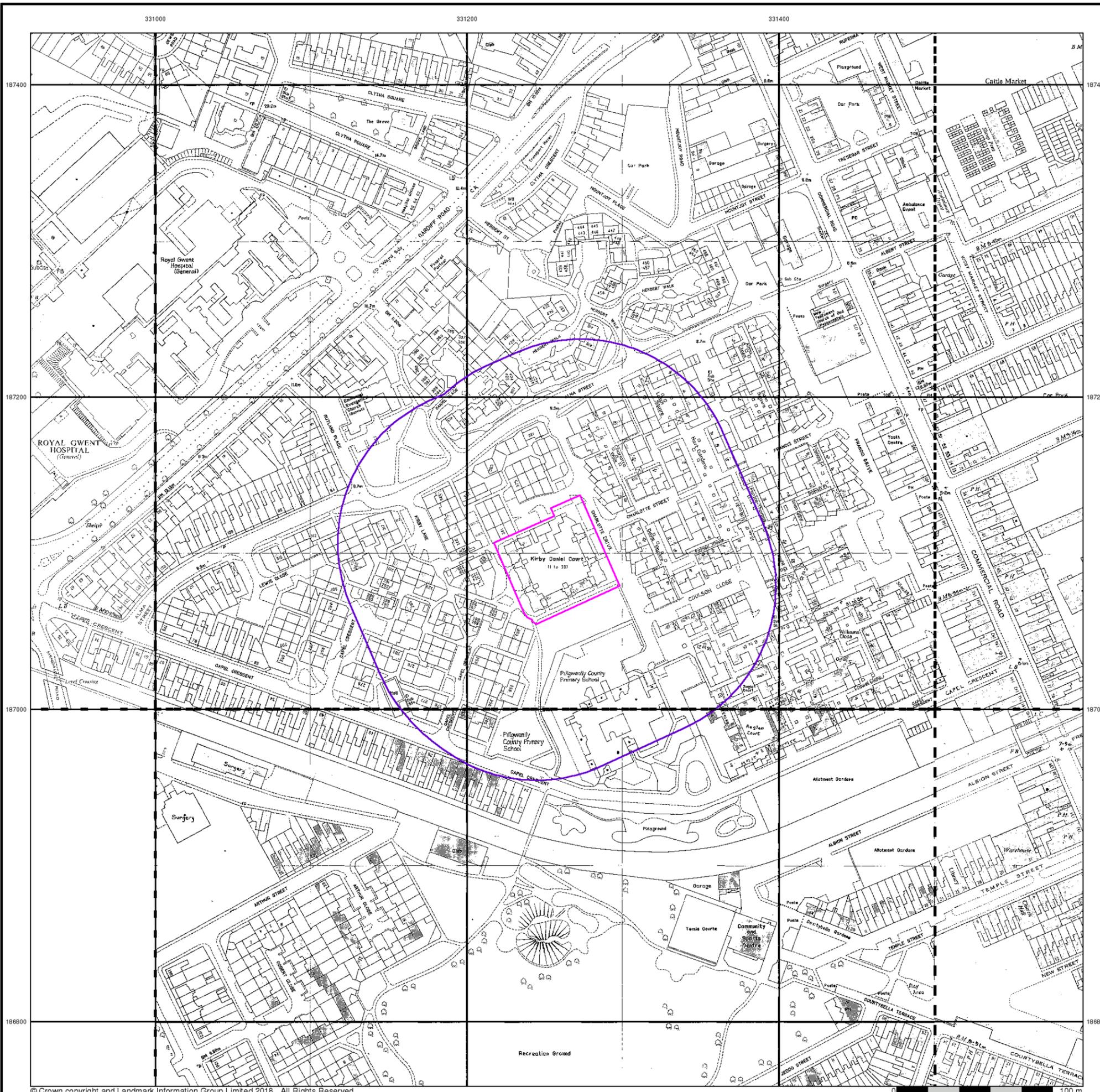
Site Details

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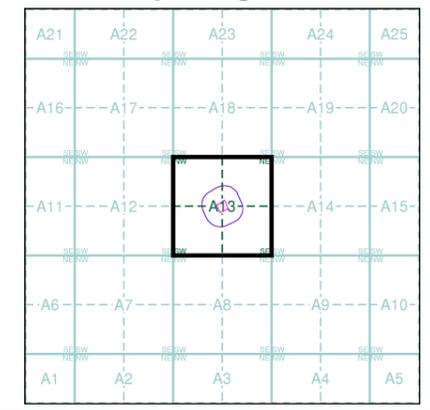
Additional SIMs
Published 1983 - 1991
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

ST3087SE 1991 1:1,250	ST3187SW 1983 1:1,250	ST3187SE 1989 1:1,250
	ST3186NW 1986 1:1,250	ST3186NE 1983 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details

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Additional SIMs

Published 1991 - 1992

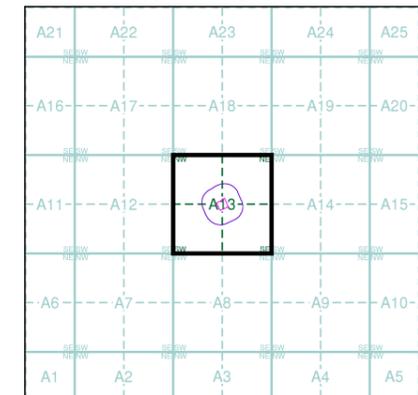
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

	ST3187SE
	1991 1:1,250
	ST3186NE
	1992 1:1,250

Historical Map - Segment A13



Order Details

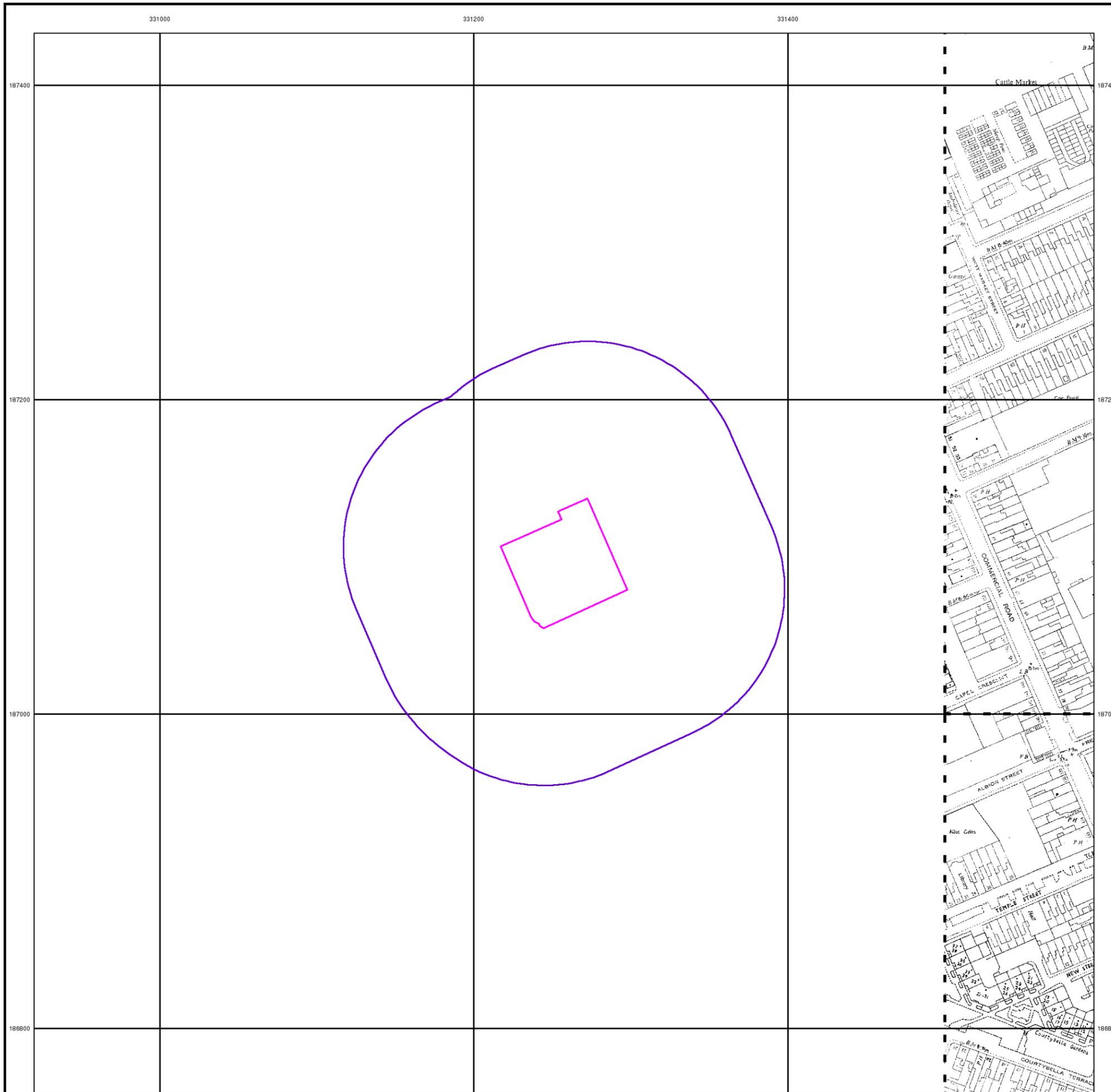
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Site Details

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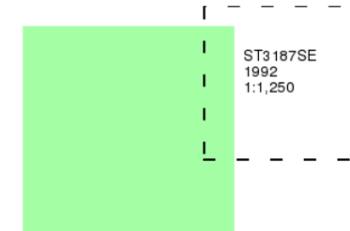
Additional SIMs

Published 1992

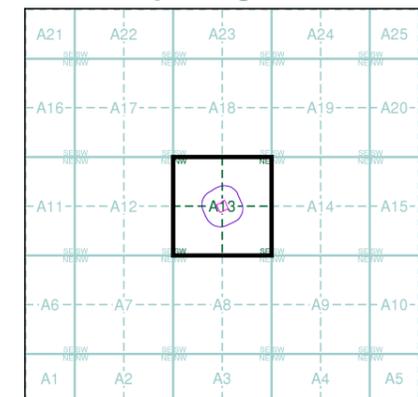
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The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information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

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

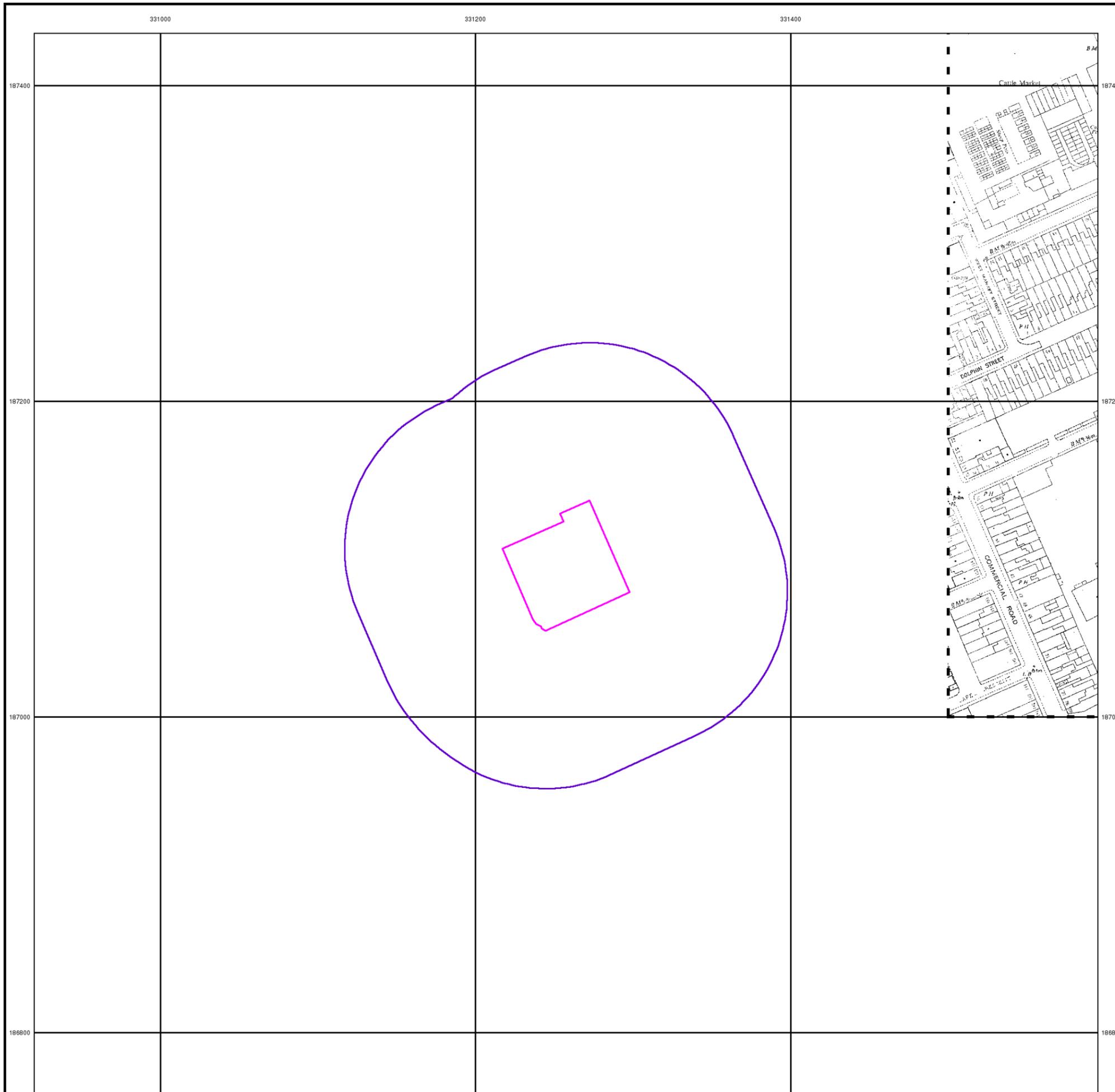
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Slice: A
Site Area (Ha): 0.38
Search Buffer (m): 100

Site Details

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Large-Scale National Grid Data

Published 1993

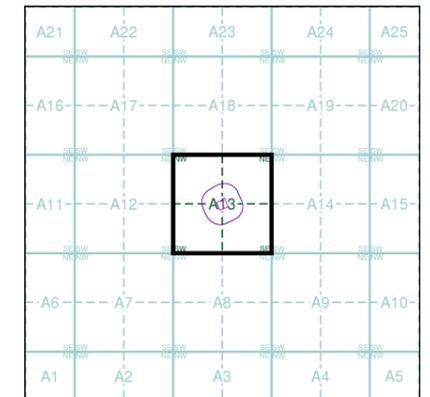
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

ST3087SE 1993 1:1,250	ST3187SW 1993 1:1,250	ST3187SE 1993 1:1,250
ST3086NE 1993 1:1,250	ST3186NW 1993 1:1,250	ST3186NE 1993 1:1,250

Historical Map - Segment A13



Order Details

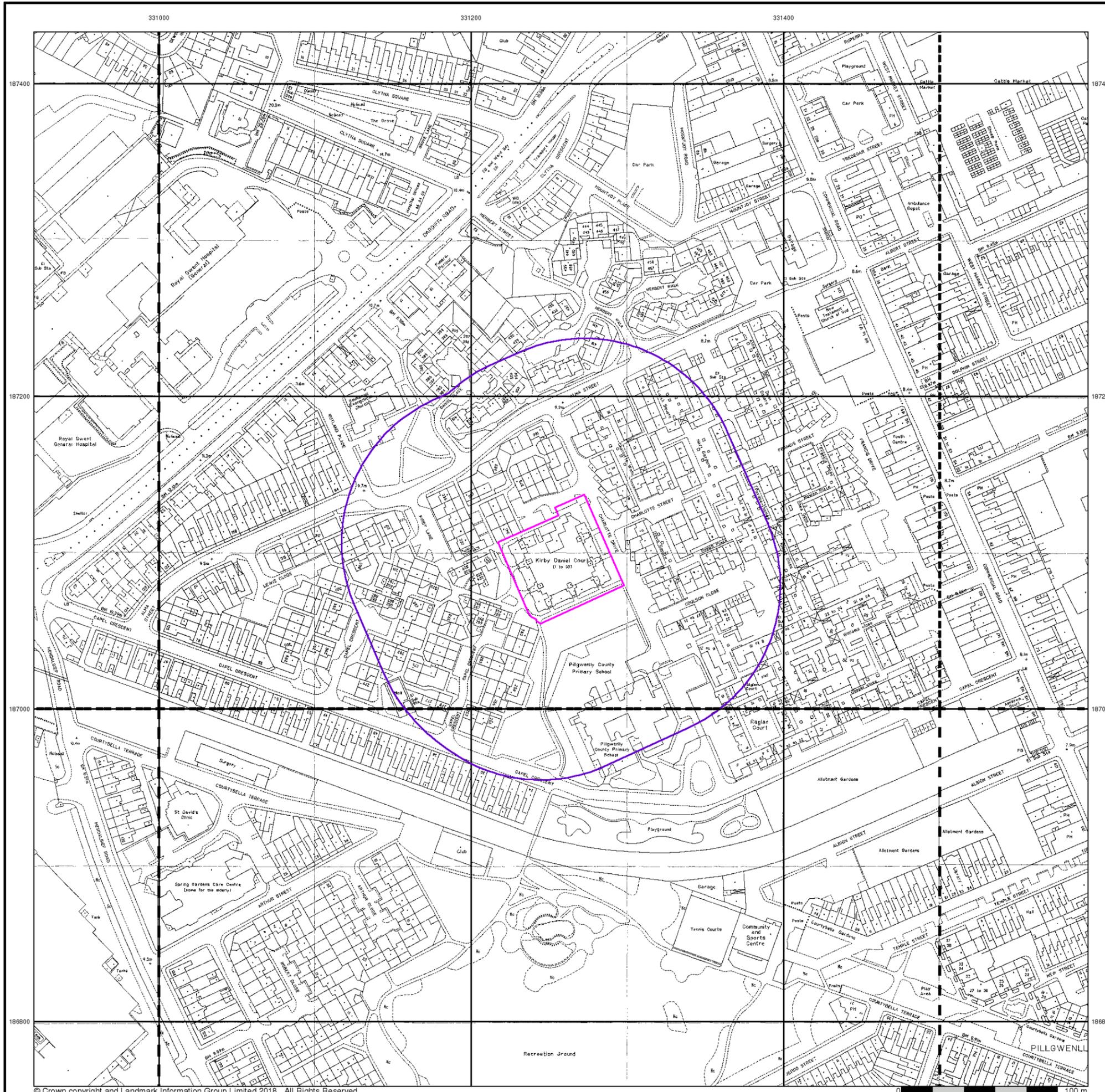
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Site Details

Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER



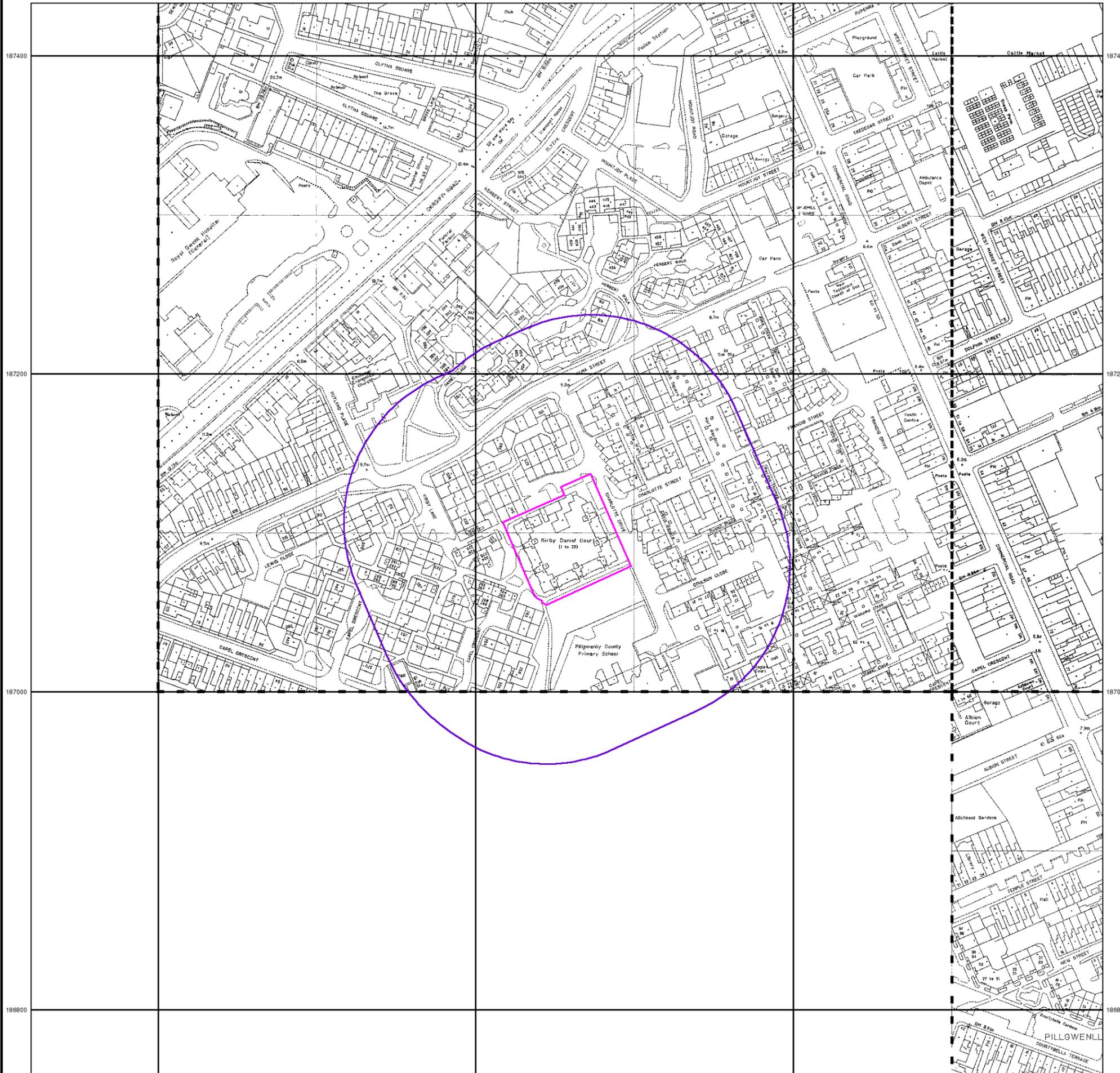
Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



331000

331200

331400



Large-Scale National Grid Data

Published 1993 - 1995

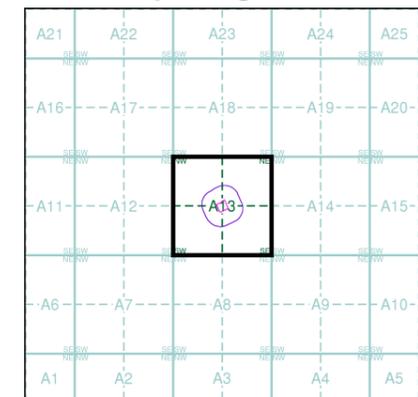
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'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information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

Map Name(s) and Date(s)

ST3187SW 1993 1:1,250	ST3187SE 1993 1:1,250
	ST3186NE 1995 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details

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Large-Scale National Grid Data

Published 1995

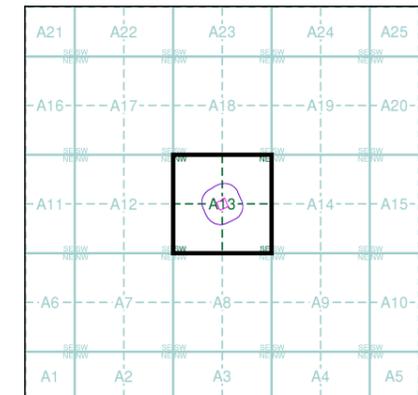
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

■	ST3187SE
	1995 1:1,250
■	ST3186NE
	1995 1:1,250

Historical Map - Segment A13



Order Details

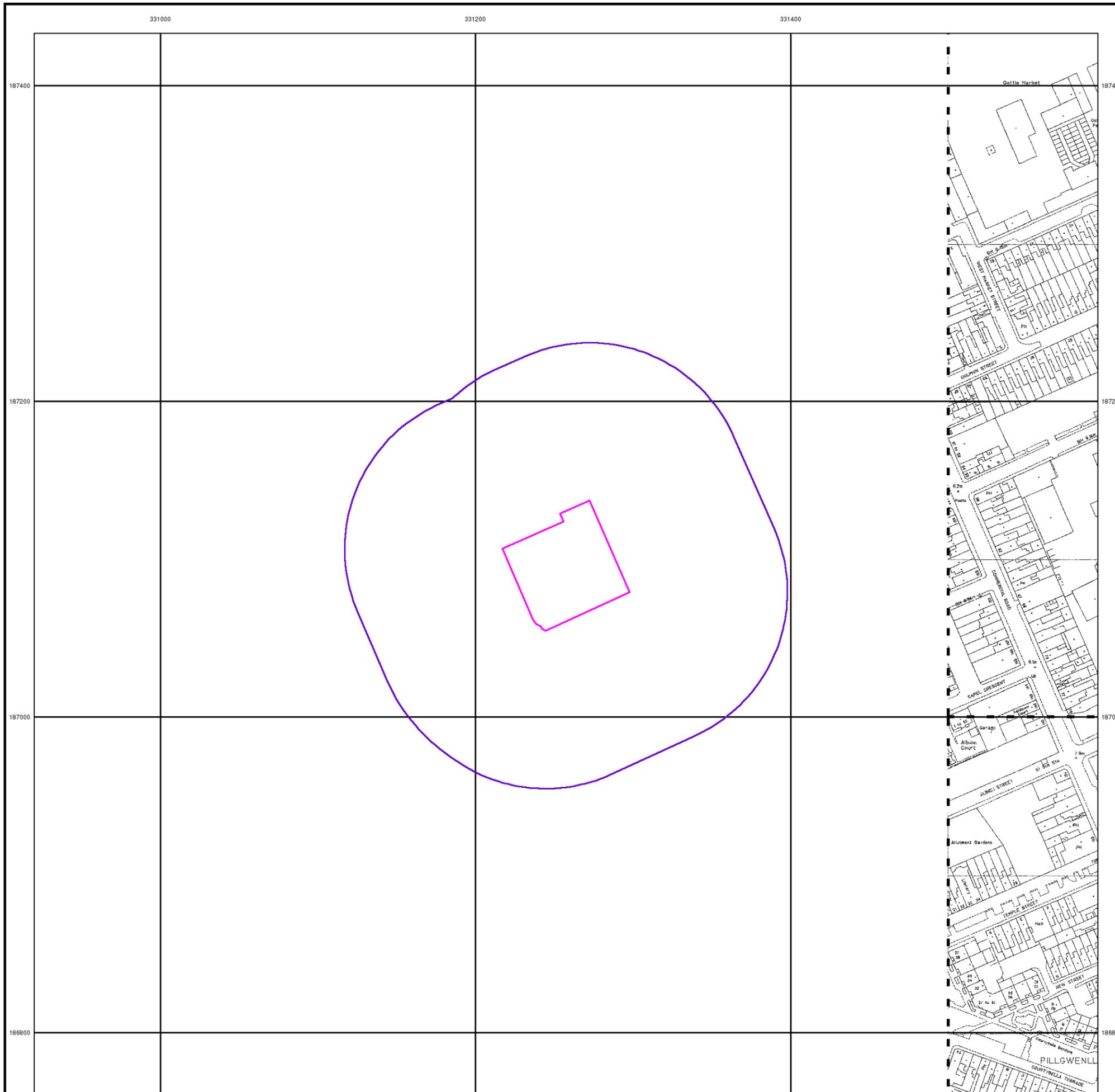
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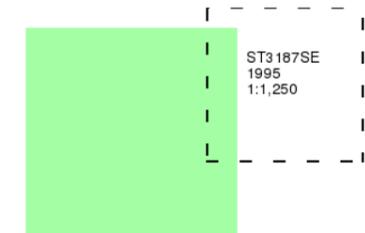
Large-Scale National Grid Data

Published 1995

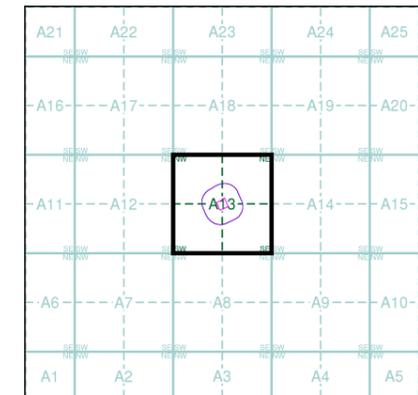
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'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information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

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

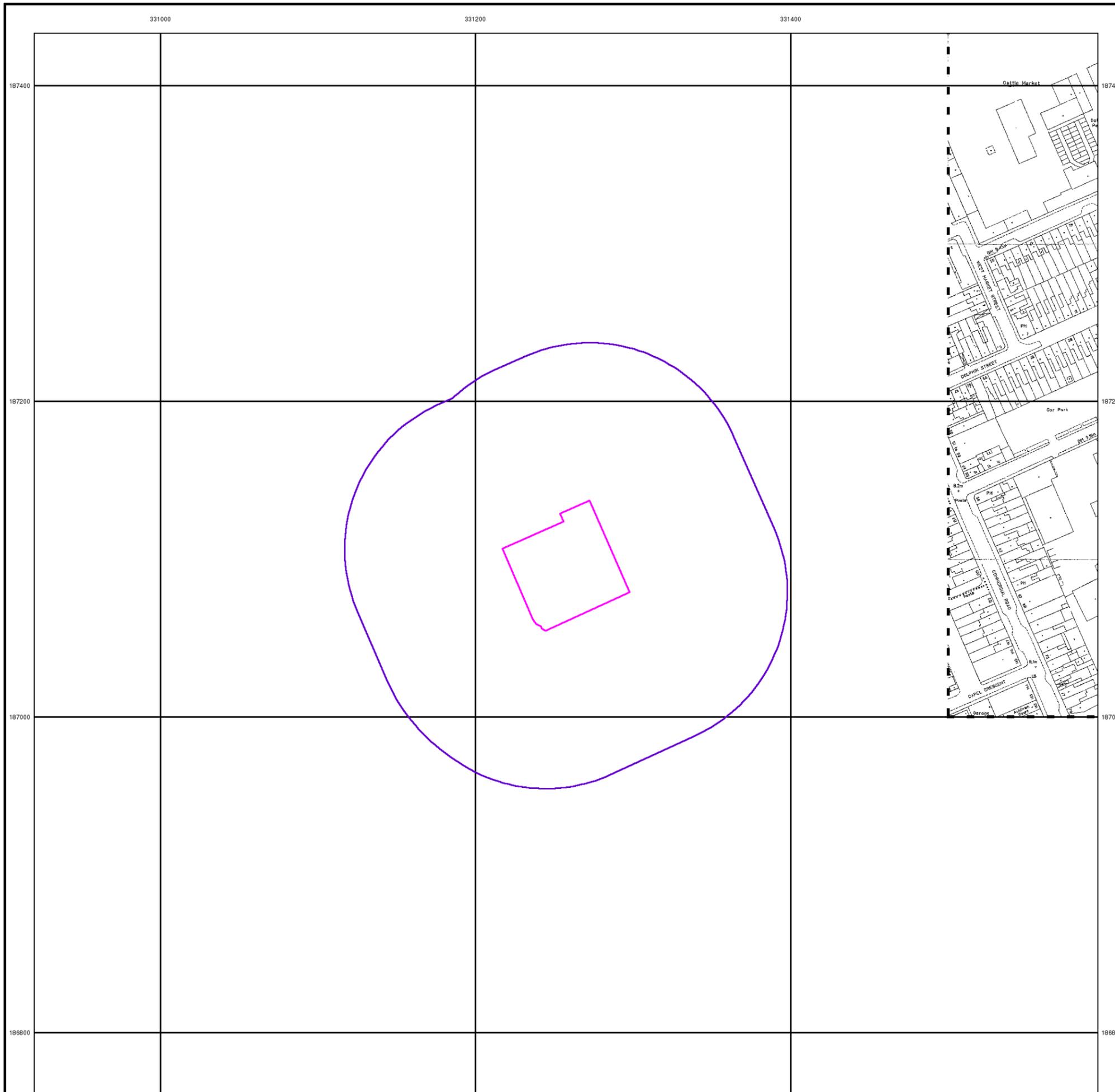
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Slice: A
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Site Details

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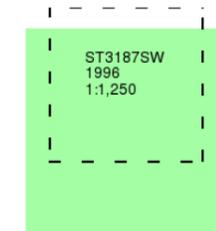
Large-Scale National Grid Data

Published 1996

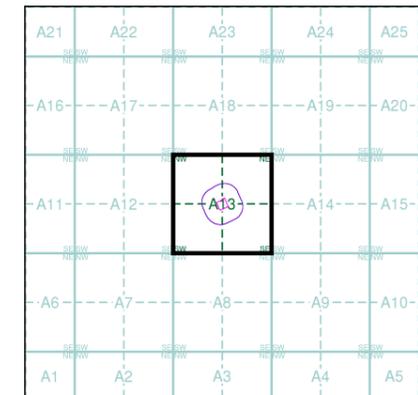
Source map scale - 1:1,250

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

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

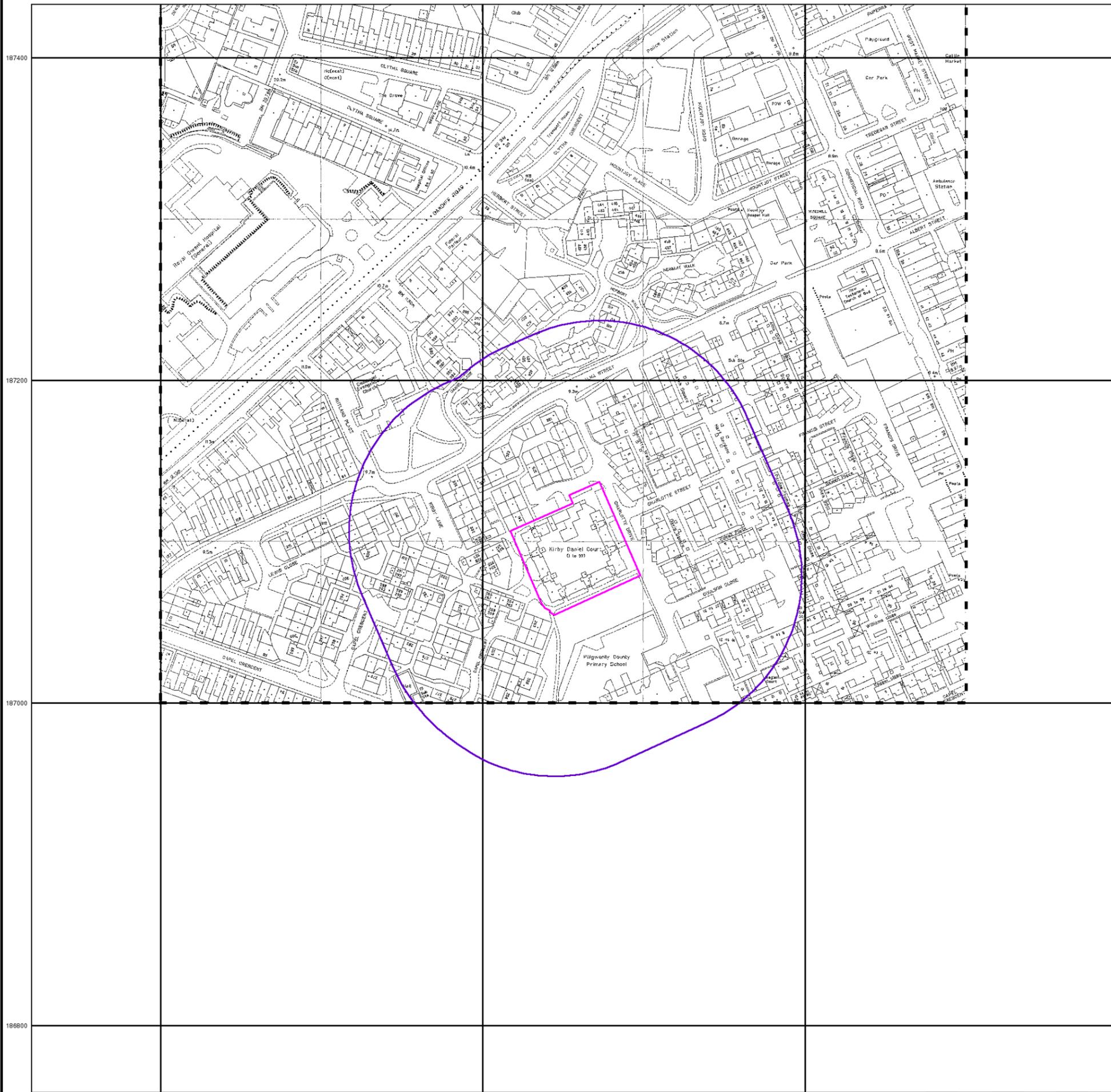
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Customer Ref: 14632JRW
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Slice: A
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Site Details

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331000

331200

331400

187400

187400

187200

187200

187000

187000

186800

186800



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0 100 m



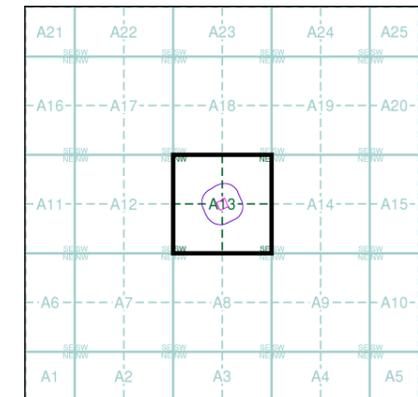
terrafirma

Historical Aerial Photography

Published 2000

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

Historical Aerial Photography - Segment A13



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 100

Site Details

Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER

Landmark
 INFORMATION GROUP

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

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
	Coppice		
	Bracken		Heath
	Rough Grassland		
	Marsh		Reeds
	Saltings		
	Building		Glasshouse
	Sloping Masonry		Pylon
	Electricity Transmission Line		Pole
	Cutting		Embankment
	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 Shown only when not coincident with other boundaries		
	Civil Parish Shown alternately when coincidence of boundaries occurs		
	BP, BS Boundary Post or Stone		Pol Sta Police Station
	Ch Church		PO Post Office
	CH Club House		PC Public Convenience
	F E Sta Fire Engine Station		PH Public House
	FB Foot Bridge		SB Signal Box
	Fn Fountain		Spr Spring
	GP Guide Post		TCB Telephone Call Box
	MP Mile Post		TCP Telephone Call Post
	MS Mile Stone		W Well

1:10,000 Raster Mapping

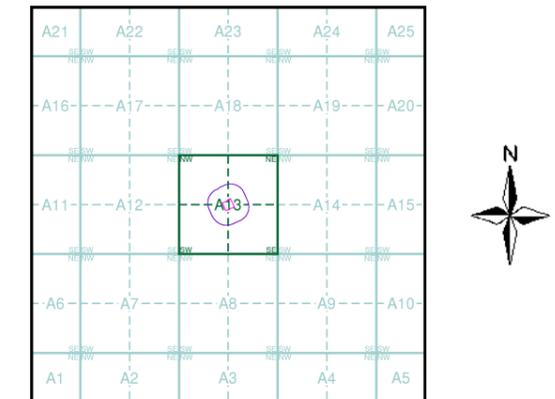
	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, 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
	MHW(S) Mean high water (springs)		MLW(S) 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



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Monmouthshire	1:10,560	1886 - 1887	3
Monmouthshire	1:10,560	1902	4
Monmouthshire	1:10,560	1922	5
Monmouthshire	1:10,560	1938	6
Historical Aerial Photography	1:10,560	1947	7
Historical Aerial Photography	1:10,560	1947	8
Monmouthshire	1:10,560	1954	9
Ordnance Survey Plan	1:10,000	1964 - 1965	10
Ordnance Survey Plan	1:10,000	1972 - 1973	11
Ordnance Survey Plan	1:10,000	1981 - 1982	12
Newport	1:10,000	1983	13
Ordnance Survey Plan	1:10,000	1987	14
Ordnance Survey Plan	1:10,000	1992	15
10K Raster Mapping	1:10,000	1999	16
10K Raster Mapping	1:10,000	2006	17
VectorMap Local	1:10,000	2018	18

Historical Map - Slice A



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
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 Search Buffer (m): 1000

Site Details

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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		Natural Gas Tank
	Tailings Pile		Fuel Storage Tanks
	Bench Mark		Drill Hole
	Burial Mound		Triangulation Point on Burial Mound
	Single-track Railroad		Double-track Railroad
	Railroad and Station Building		Small Bridge
	Tunnel		Pipe (Culvert)
	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)

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

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		Salt Mine
	Tailings Pile		Mine or Open Pit Mine
	Operating Shaft or Mine		Non-Operating Shaft or Mine
	Pit		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		Telegraph Office
	Telephone Station		Radio Station
	Radio Tower		Airfield or Seaplane Base
	Landing Strip		Cut
	Fill		Km Post
	Plantings		Width of Road
	Steep Grade		Telegraph/Telephone Lines
	Main Highway		Highway under Construction
	Improved Dirt Road (former truck road)		Small Bridge
	Pipe (Culvert)		Tunnel
	Dismantled Railroad		Double-track Railroad with First Class Station
	Railroad Under Construction		Shore Embankment
	River or Ditch with Embankment		Water Reservoir or Rain Water Pit
	Spring		Water Gauge
	Isobath with value		Direction and velocity of current
	Water Level Mark		Well
	Contour Line and Value		Half Contour Line
	Spot Elevation Value		Coniferous
	Deciduous		Mixed
	Scrub		

Key to Numbers on Mapping

ST38NW_Newport

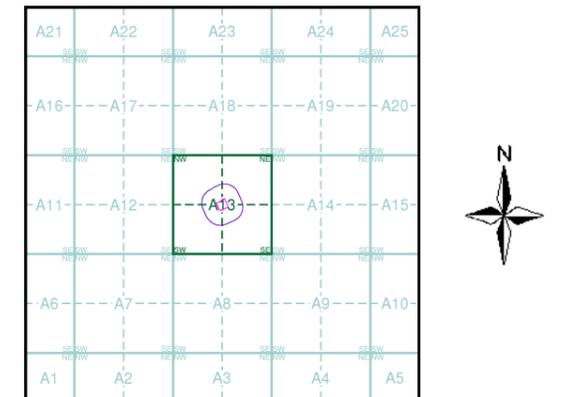
No.	Description
2	Dockyard (Ship Building)
3	Dockyard (Ship Building And Repairs)
5	Factories (Instruments And Metal Works) And Industrial Buildings (Use Unknown)
7	Depot (Railway)
13	Factory (Railway Carriages)
19	Factory (Machinery)
20	Factory (Machinery)
22	Factory (Metal Works) And Mill (Steel)
26	Factory (Metals)
34	Factory (Non-Ferrous Metals)
38	Bridge (Road)
39	Council/Government Buildings/Courts
43	Railway Park
52	Post Office
54	Post Office
60	Warehouses (Use Unknown)
72	Railway Station
74	Railway Station
84	Power Station (Thermo-Electric)



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Monmouthshire	1:10,560	1886 - 1887	3
Monmouthshire	1:10,560	1902	4
Monmouthshire	1:10,560	1922	5
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Ordnance Survey Plan	1:10,000	1992	15
10K Raster Mapping	1:10,000	1999	16
10K Raster Mapping	1:10,000	2006	17
VectorMap Local	1:10,000	2018	18

Russian Map - Slice A



Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 1000

Site Details

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Monmouthshire

Published 1886 - 1887

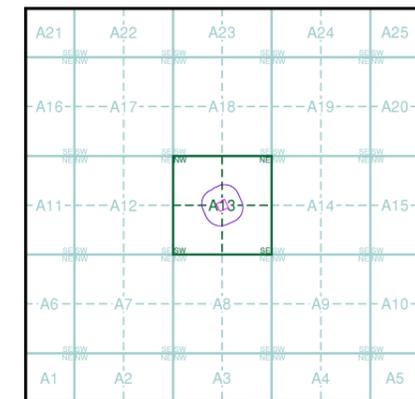
Source map scale - 1:10,560

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)

02800 1886 1:10,560	02900 1886 1:10,560
03300 1887 1:10,560	03400 1887 1:10,560

Historical Map - Slice A



Order Details

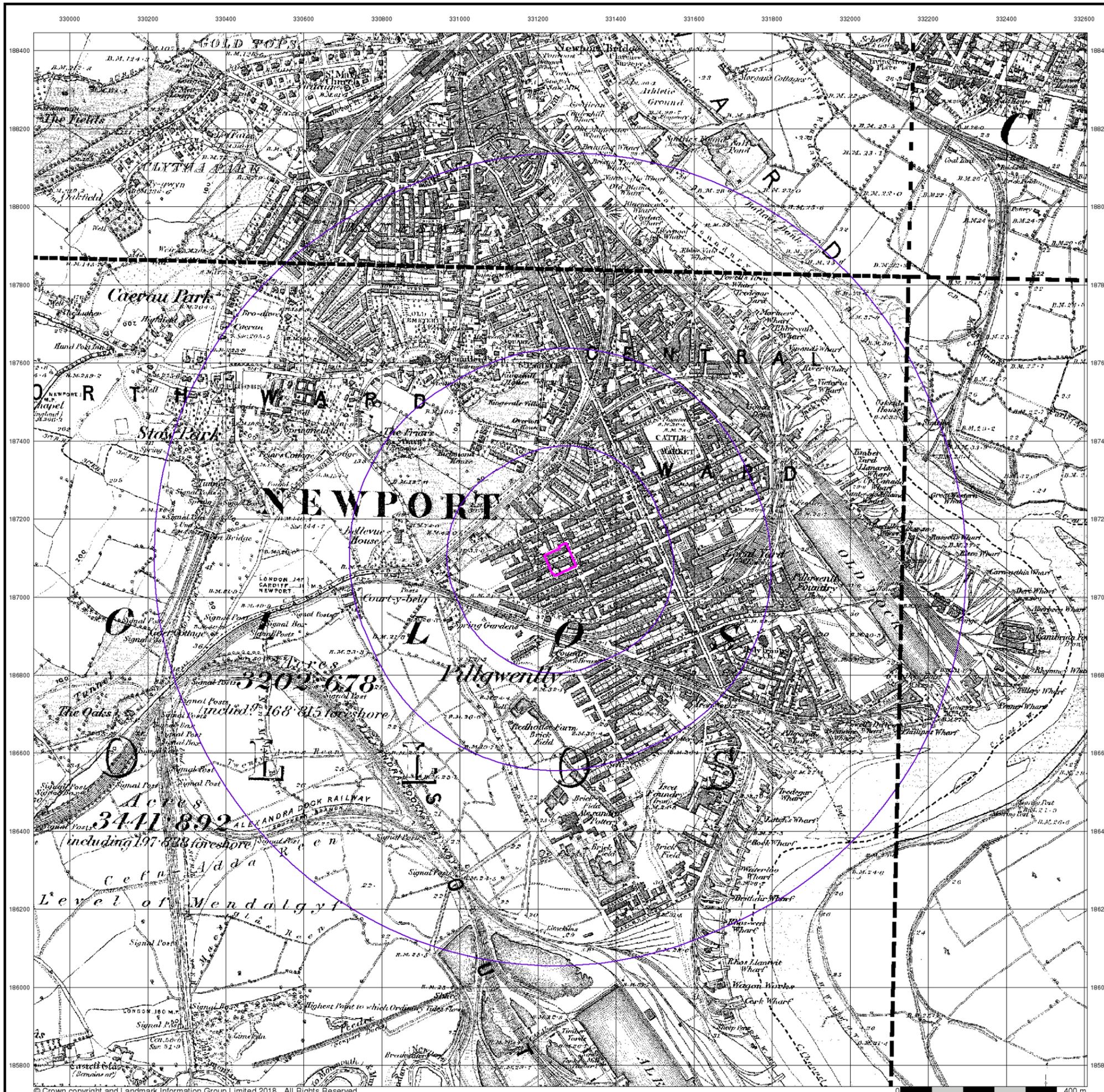
Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 1000

Site Details

Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER



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Monmouthshire

Published 1902

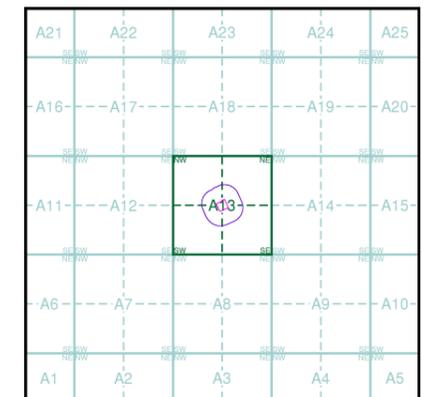
Source map scale - 1:10,560

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)

028SE 1902 1:10,560	029SW 1902 1:10,560
033NE 1902 1:10,560	034NW 1902 1:10,560

Historical Map - Slice A



Order Details

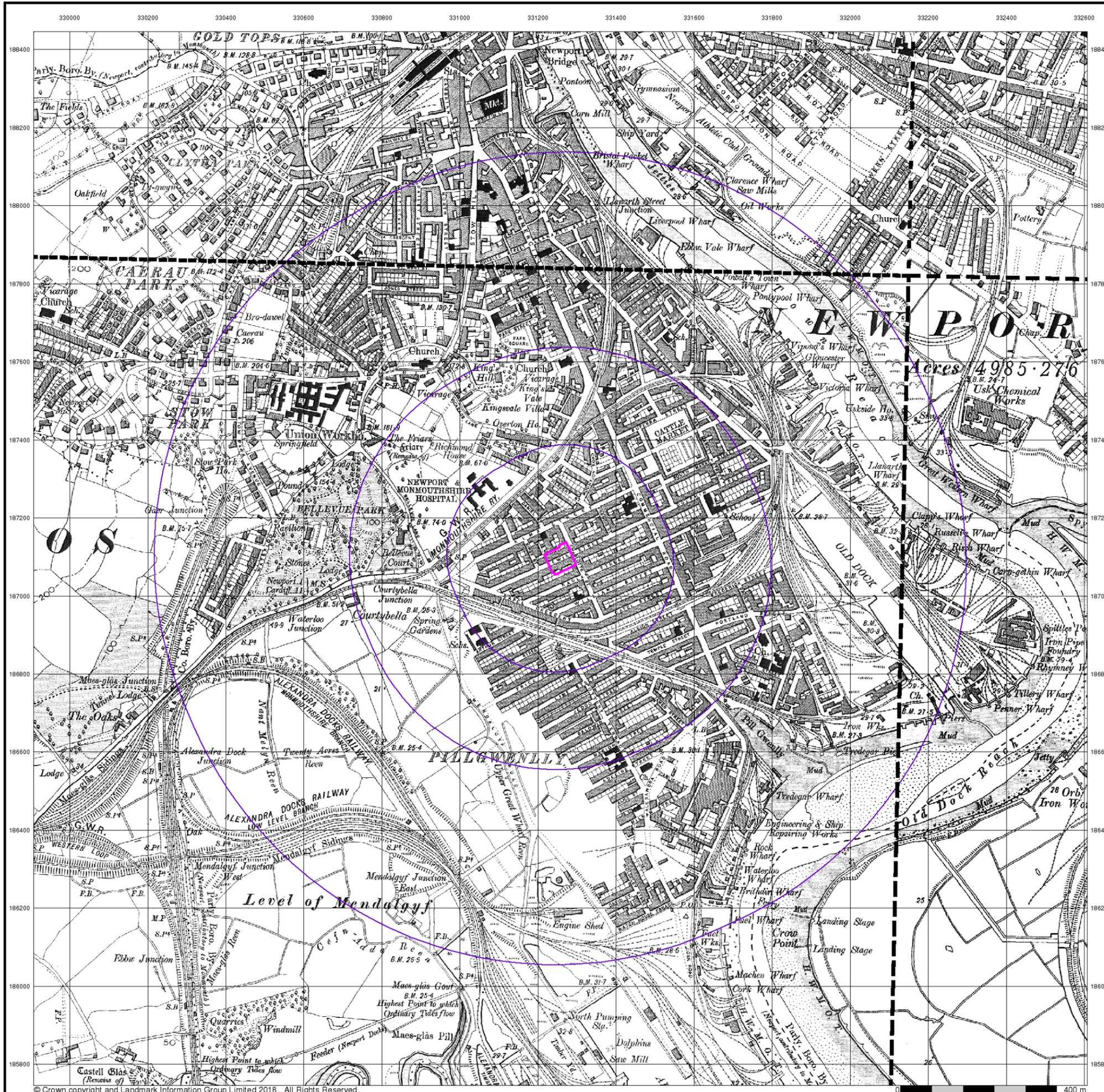
Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 1000

Site Details

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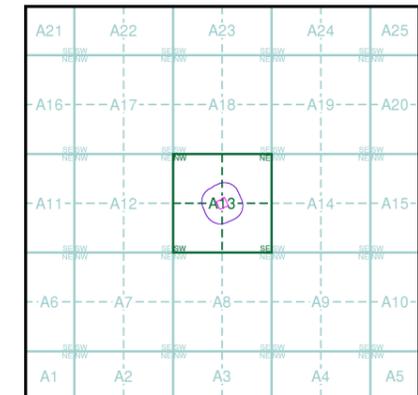


The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

028SE 1938 1:10,560	029SW 1938 1:10,560
033NE 1938 1:10,560	034NW 1938 1:10,560

Historical Map - Slice A

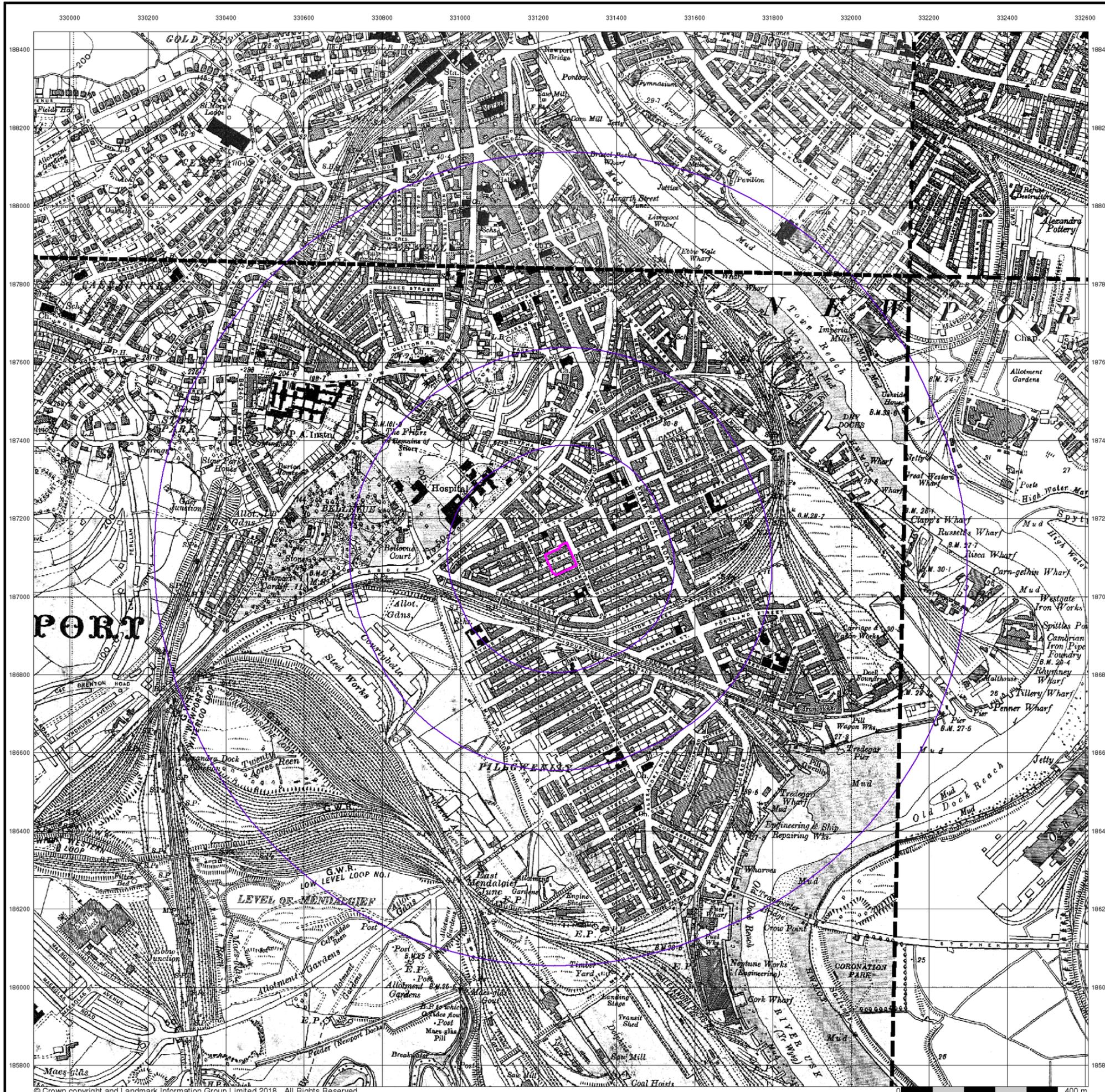


Order Details

Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 1000

Site Details

Flat 1, Kirby Daniel Court, Charlotte Green, NEWPORT, NP20 2ER





Historical Aerial Photography

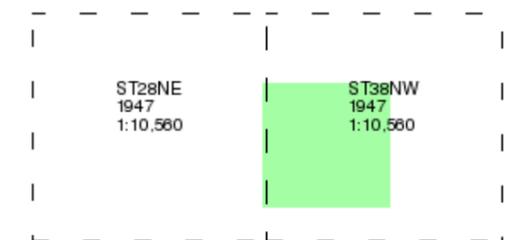
Published 1947

Source map scale - 1:10,560

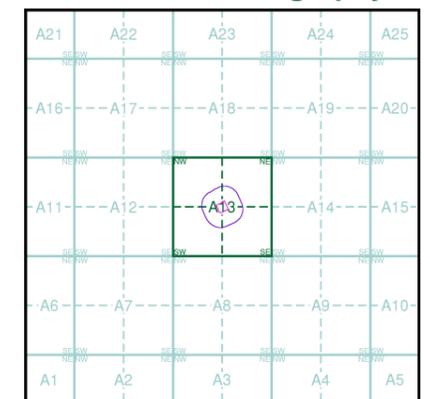
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

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Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



Order Details

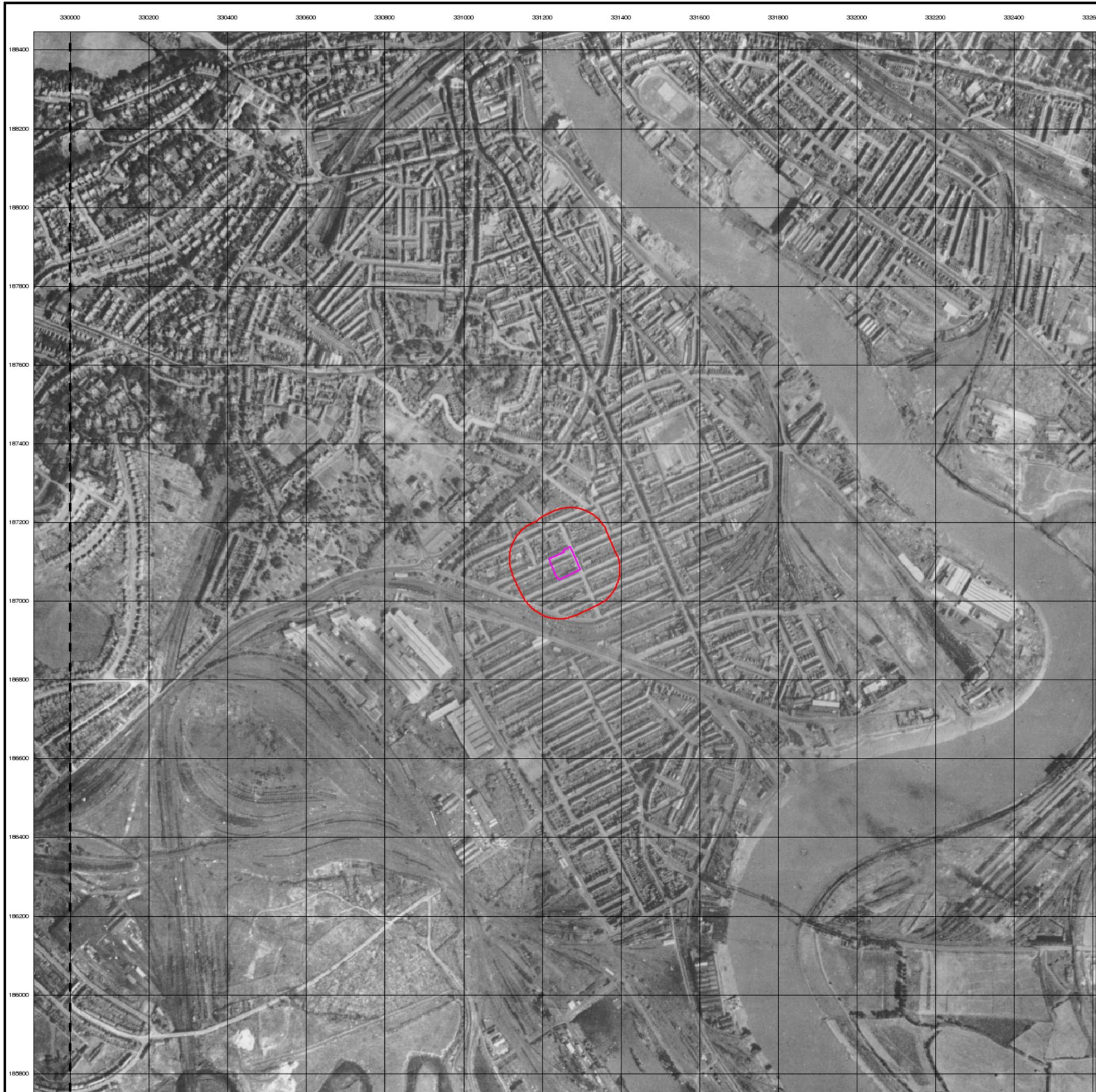
Order Number: 166179293_1_1
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Historical Aerial Photography

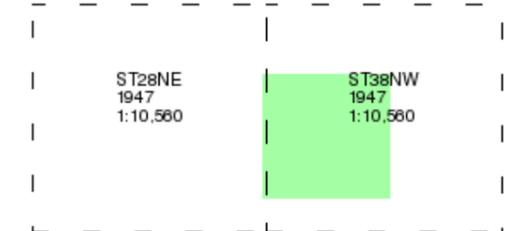
Published 1947

Source map scale - 1:10,560

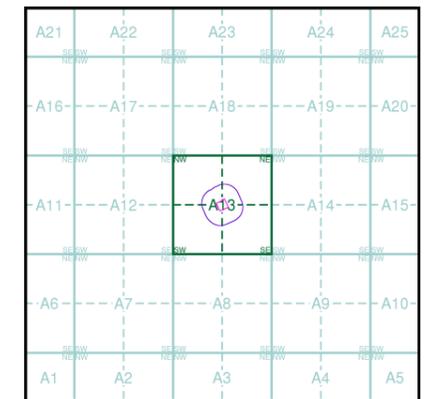
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

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Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



Order Details

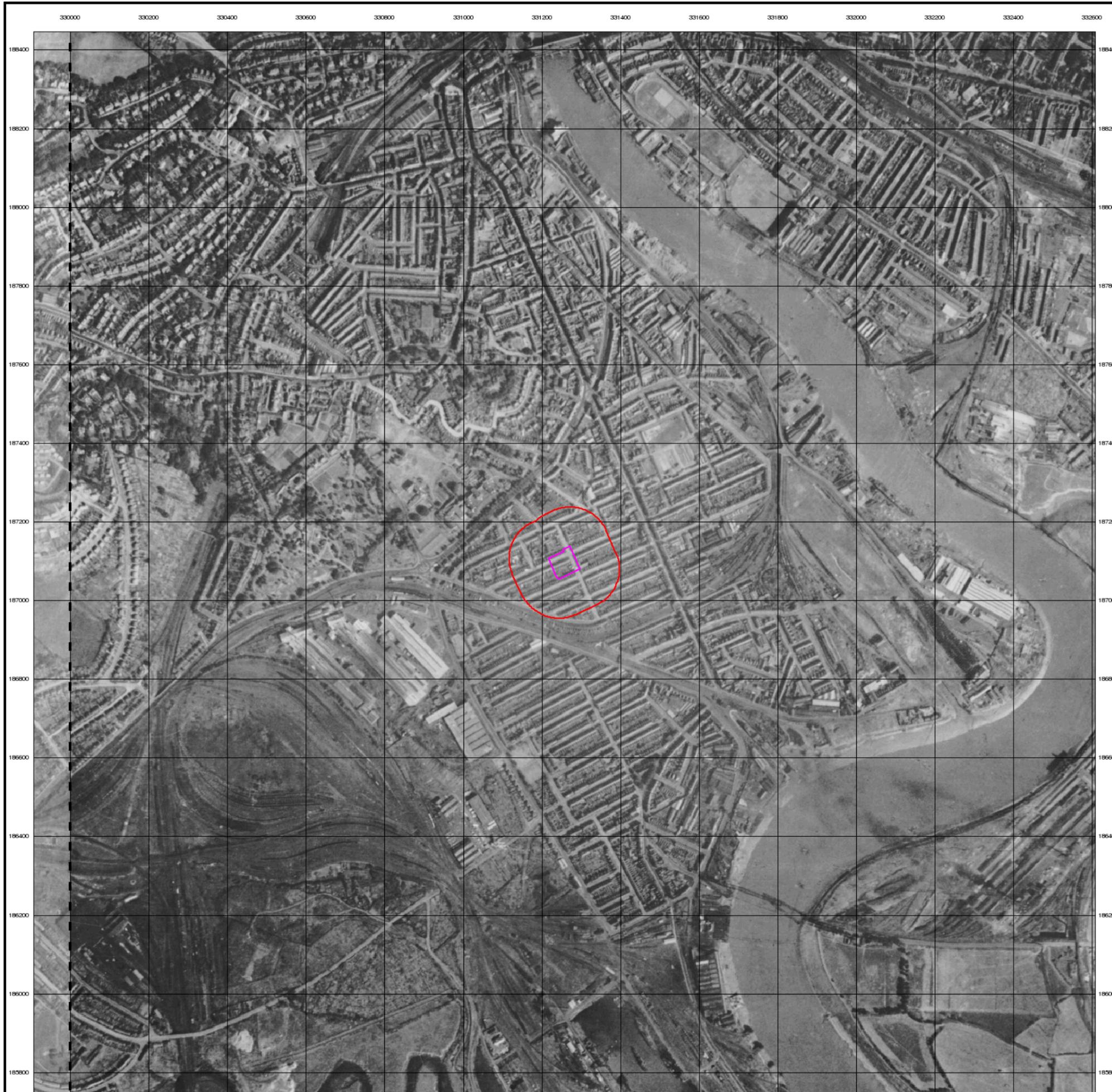
Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
 Slice: A
 Site Area (Ha): 0.38
 Search Buffer (m): 1000

Site Details

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Monmouthshire

Published 1954

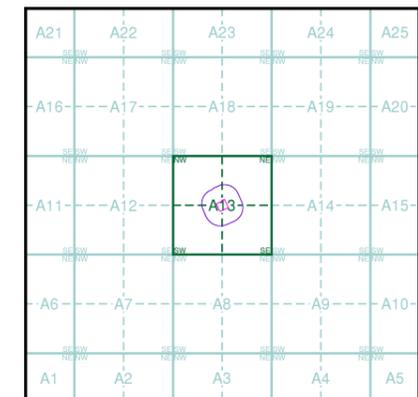
Source map scale - 1:10,560

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)

028SE 1954 1:10,560	029SW 1954 1:10,560
033NE 1954 1:10,560	034NW 1954 1:10,560

Historical Map - Slice A



Order Details

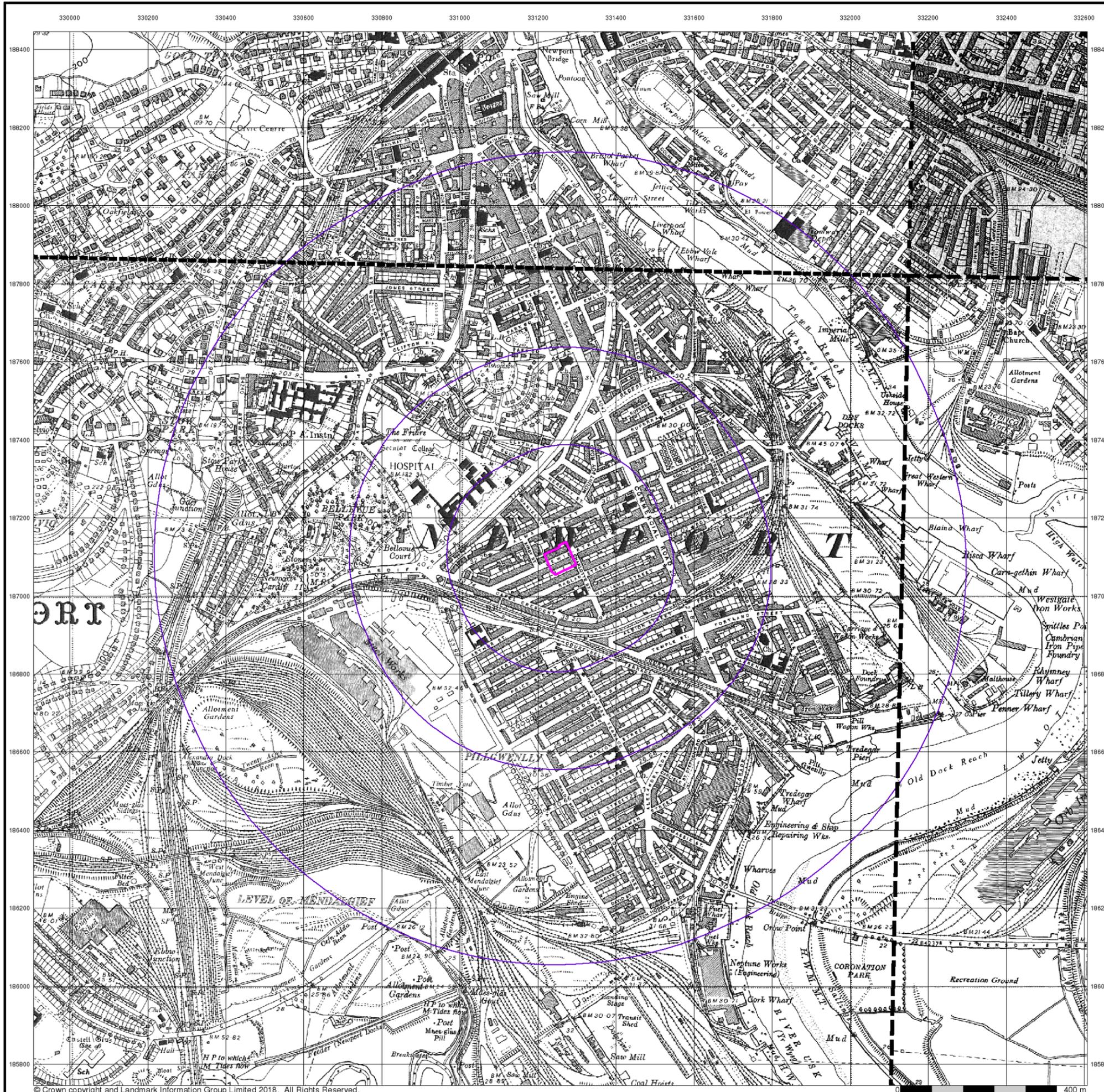
Order Number: 166179293_1_1
 Customer Ref: 14632JRW
 National Grid Reference: 331260, 187100
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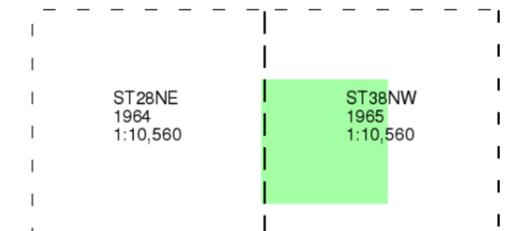
Ordnance Survey Plan

Published 1964 - 1965

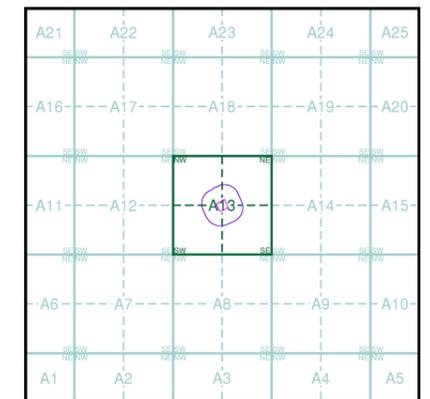
Source map scale - 1:10,000

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

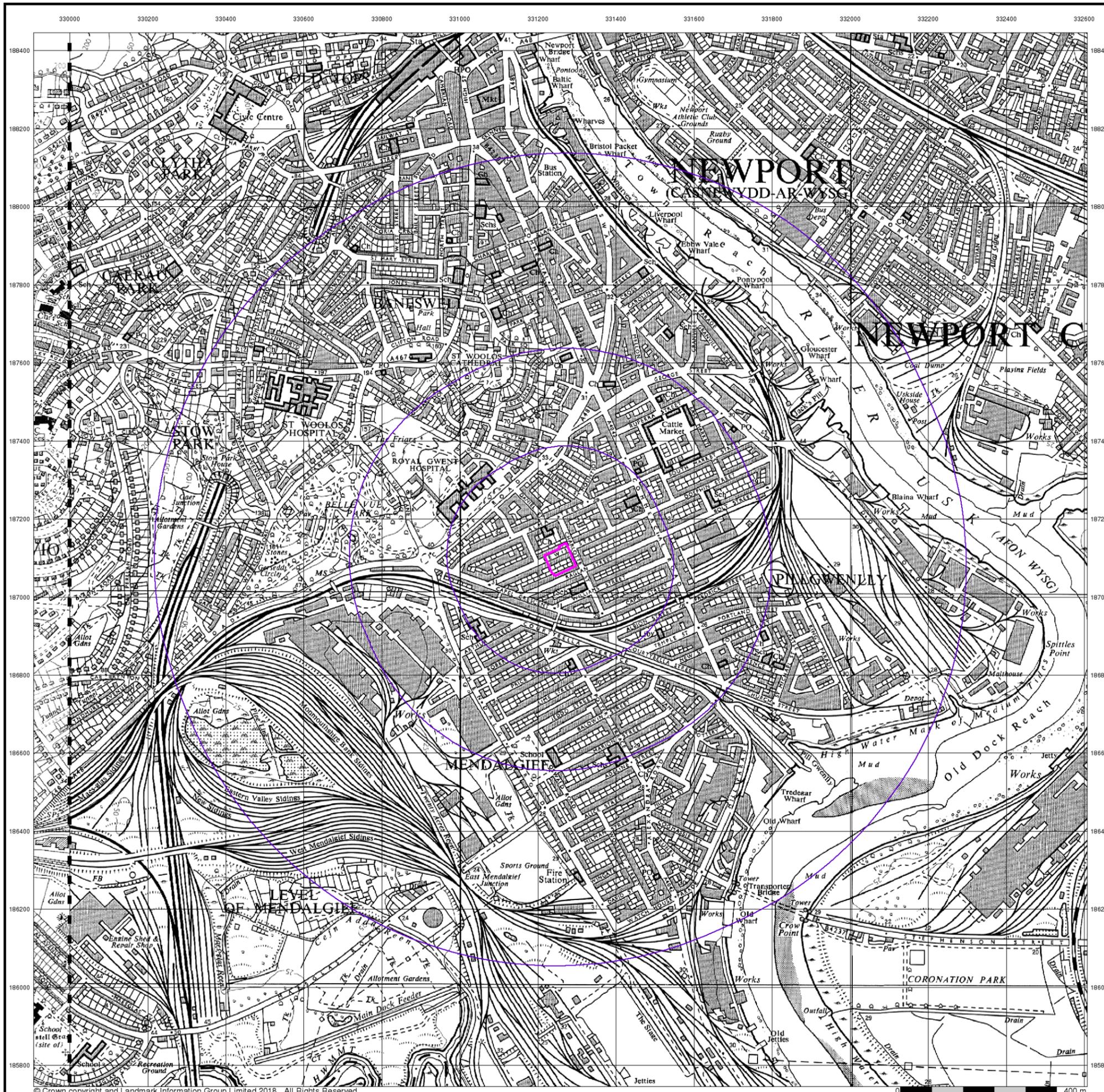
Order Number: 166179293_1_1
Customer Ref: 14632JRW
National Grid Reference: 331260, 187100
Slice: A
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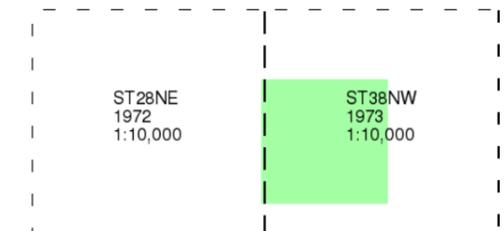
Ordnance Survey Plan

Published 1972 - 1973

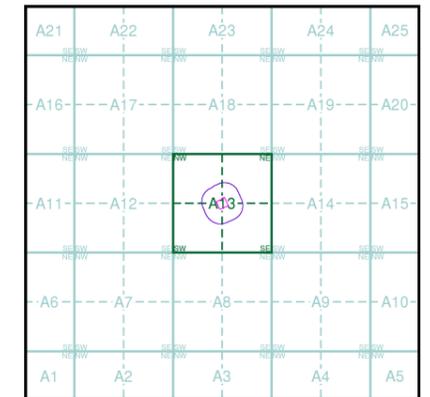
Source map scale - 1:10,000

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

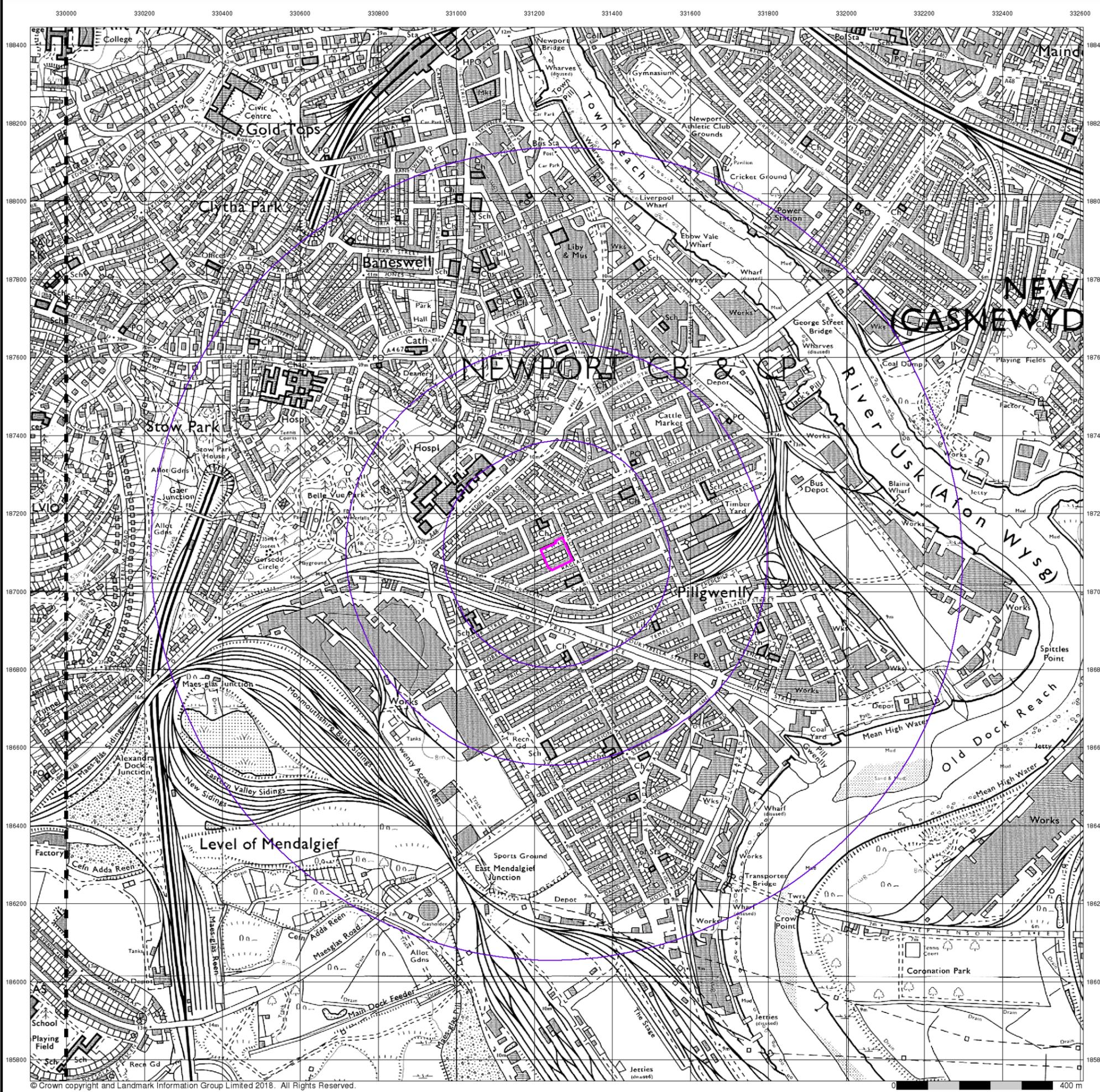
Order Number: 166179293_1_1
Customer Ref: 14632JRW
National Grid Reference: 331260, 187100
Slice: A
Site Area (Ha): 0.38
Search Buffer (m): 1000

Site Details

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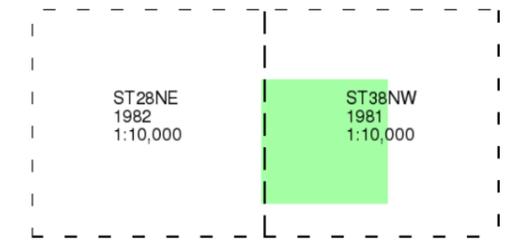
Ordnance Survey Plan

Published 1981 - 1982

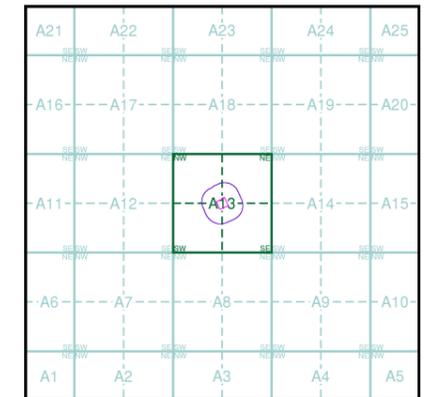
Source map scale - 1:10,000

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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

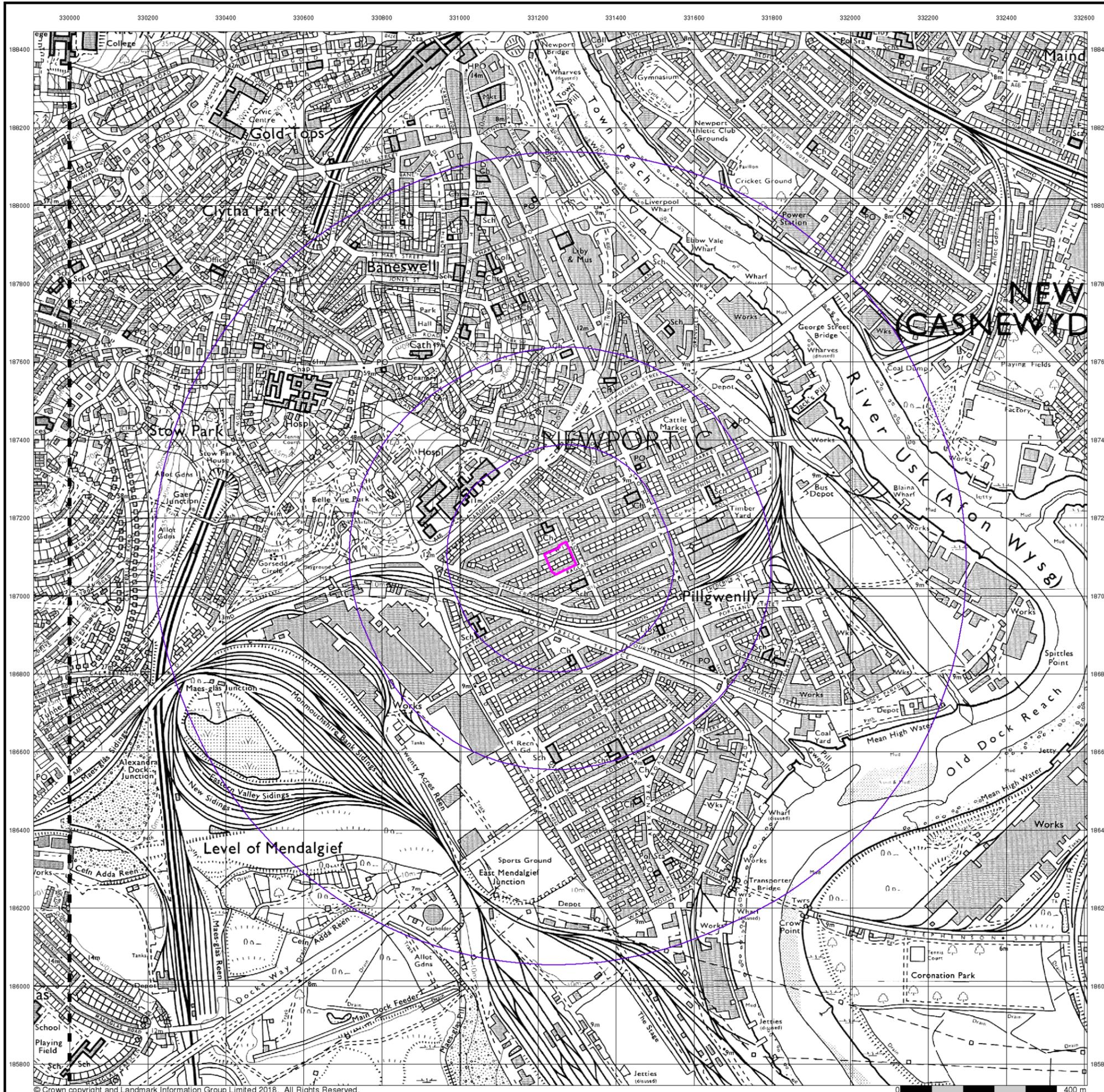
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Newport

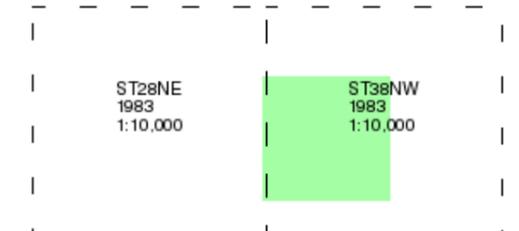
Published 1983

Source map scale - 1:10,000

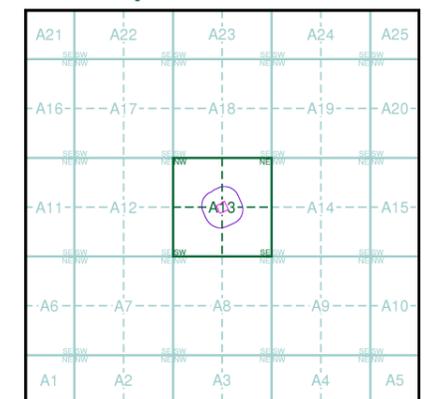
These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed 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

Order Number: 166179293_1_1
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 Slice: A
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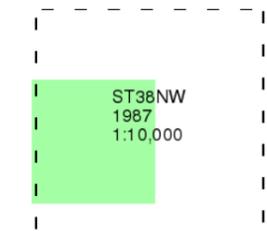
Ordnance Survey Plan

Published 1987

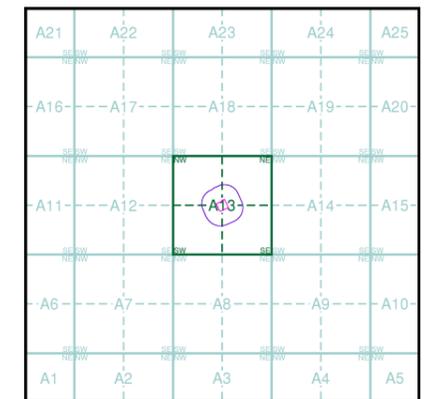
Source map scale - 1:10,000

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



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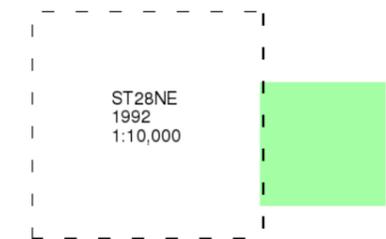
Ordnance Survey Plan

Published 1992

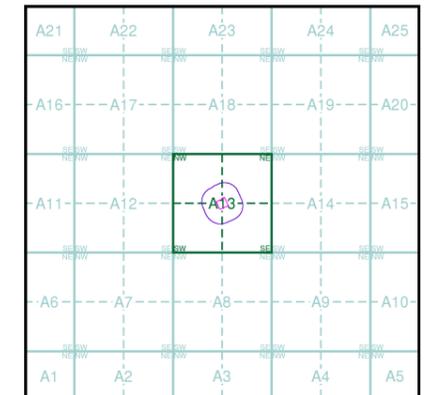
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. 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



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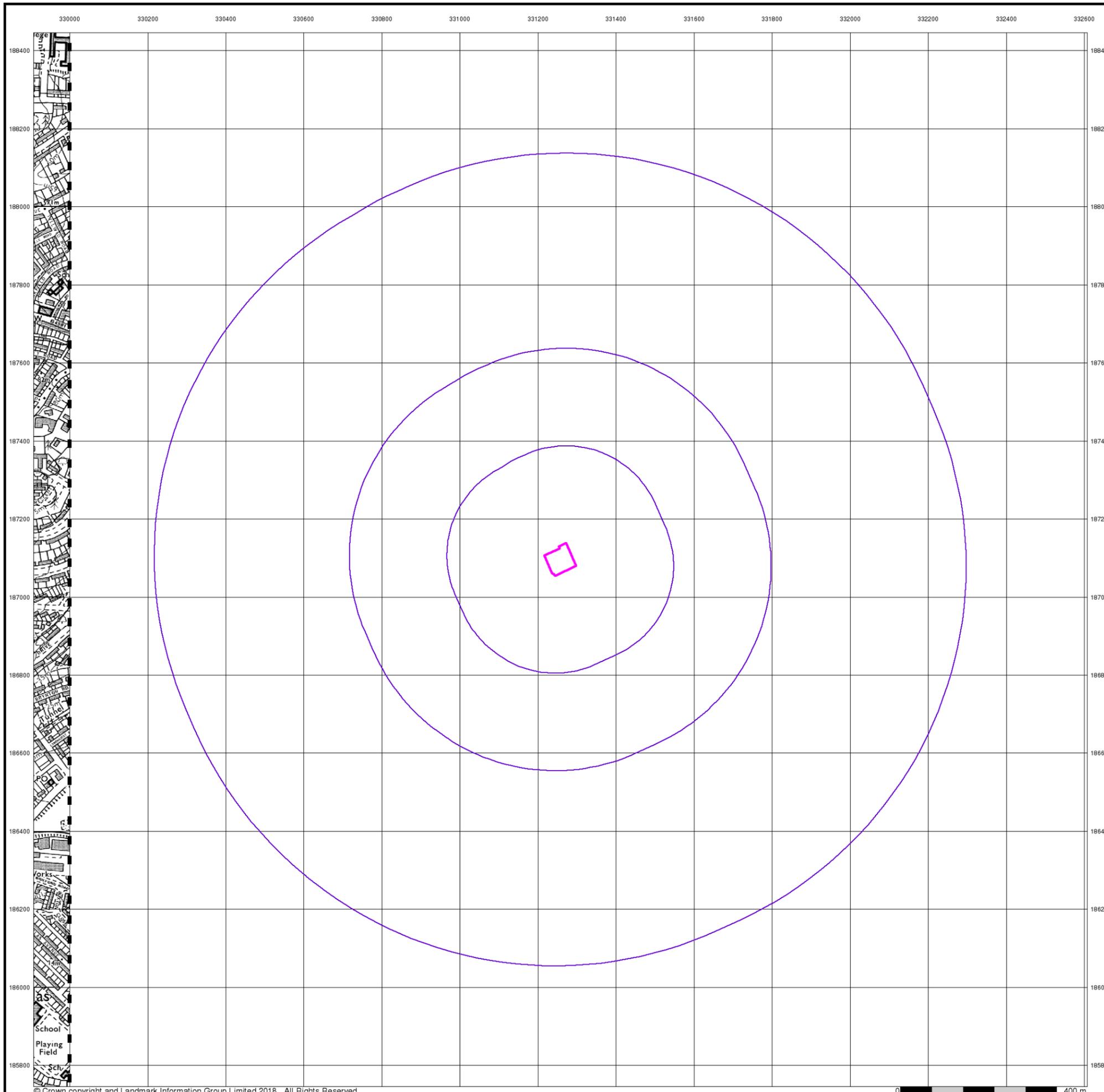
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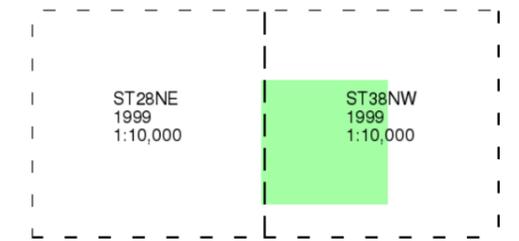
10k Raster Mapping

Published 1999

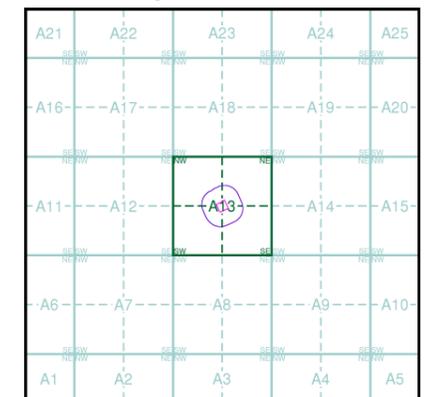
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

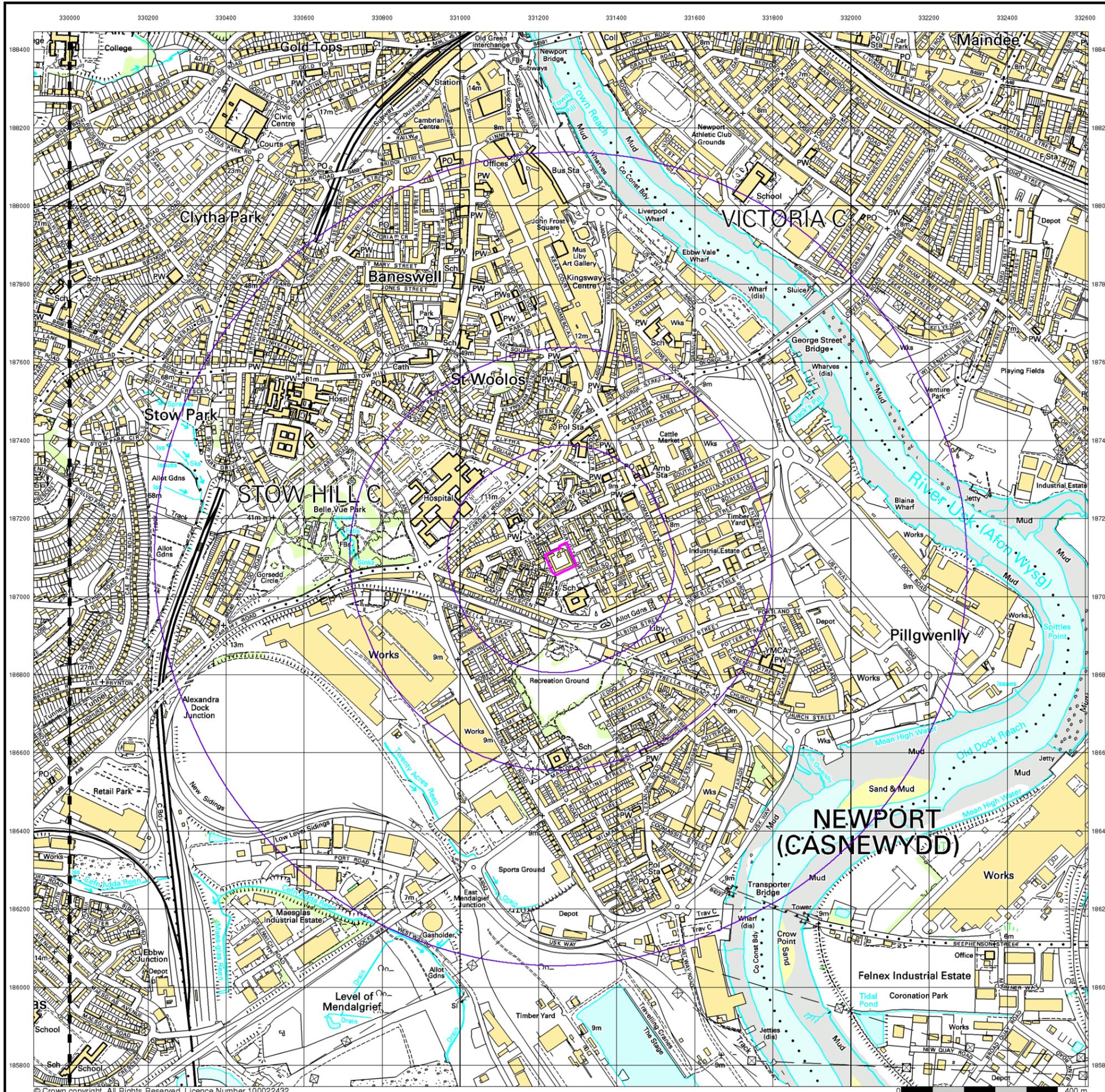
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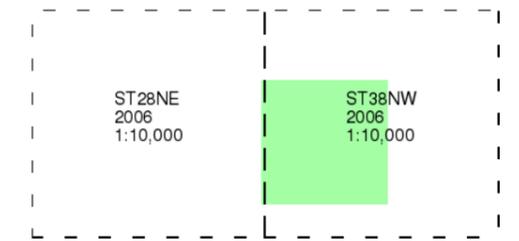
10k Raster Mapping

Published 2006

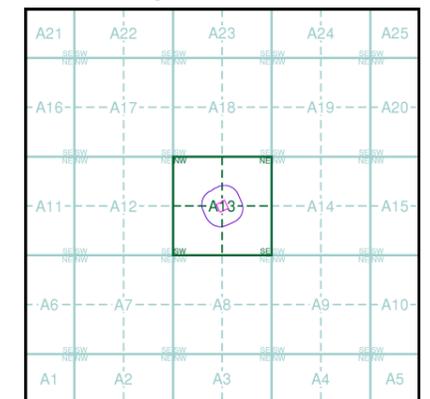
Source map scale - 1:10,000

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Map Name(s) and Date(s)



Historical Map - Slice A



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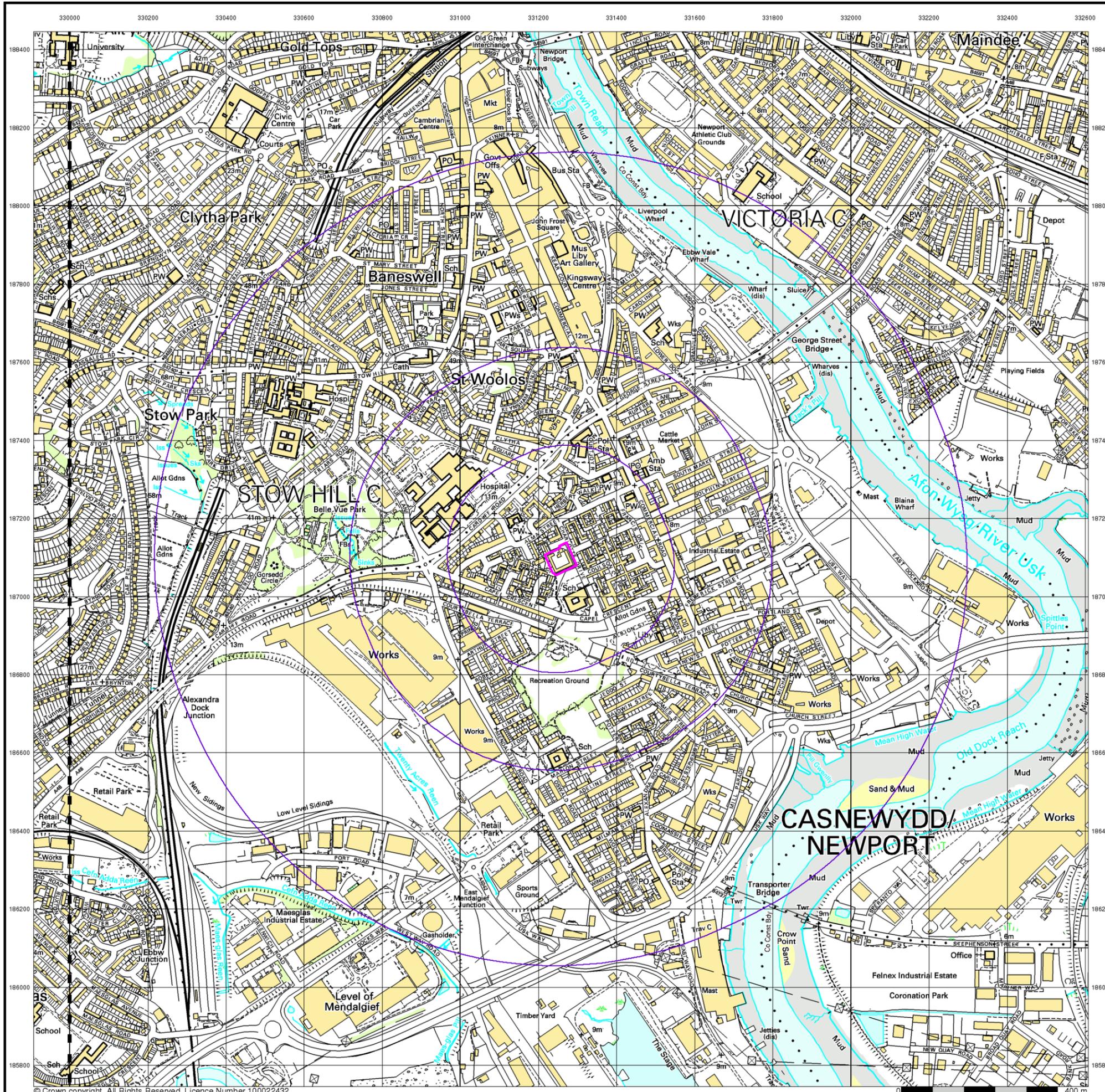
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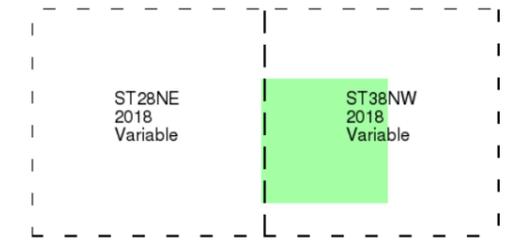
VectorMap Local

Published 2018

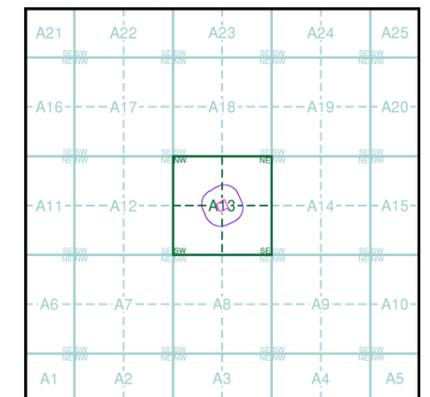
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

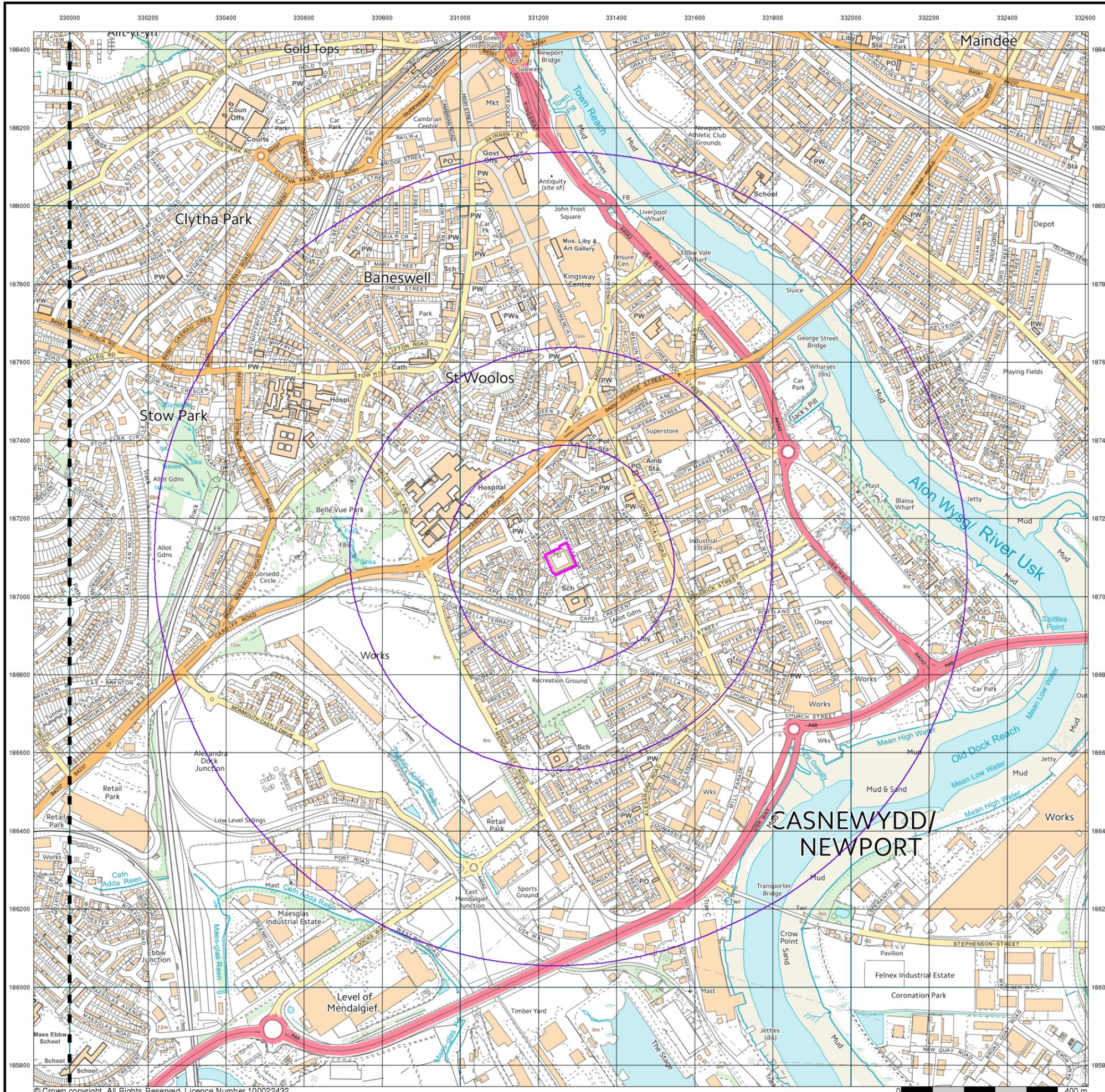
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