



**NEW COMMERCIAL DEVELOPMENT AT
NEATH ABBEY BUSINESS PARK**

PHASE I ASSESSMENT OF LAND QUALITY/ DESK STUDY

Report No. G641/FR

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0. FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

The recommendations made and opinions expressed in the report are based upon the study of historical Ordnance Survey maps of the area, GroundSure® GeoInsight and EnviroInsight reports, Coal Authority Mining Report and geological maps where available.

Where other plan sources, borehole records from adjacent sites and published data are considered, these are specifically referred to in the text.

We regret that no responsibility can be held for conditions, which have not been revealed by the sources referred to. Whilst the report may suggest the likely configuration of strata below the site, this is only indicative and no liability can be accepted for its accuracy.

1. INTRODUCTION

1.1. General

Upon the instructions of ATT Engineering Ltd (Client) of Neath Abbey Business Park, Neath Port Talbot, Quantum Geotechnical Ltd (QGL) has been commissioned to undertake a Phase I Assessment of Land Quality/ Desk Study for the proposal to build a new commercial property (structure details unknown at time of writing although anticipated to be a steel portal framed building) located within Neath Abbey Business Park to the immediate rear (north) of the existing Plumbing Trade Supplies unit. The instruction from the Client was received by official purchase order dated 1st April 2015.

This report presents an assessment of both geotechnical and environmental ground conditions to provide information on any potential risks or hazards that may be posed to development of the site.

The following sources of information have been used;

- Site specific GroundSure[®] Report,
- Site specific EnviroInsight[®] Report,
- Ordnance Survey Historical Map Collection,
- Site specific Coal Authority Mining Report,
- Published Geological Map for the area: British Geological Survey Sheet 247 'Swansea' solid and drift editions at 1:50,000 scale,
- Radon, Guidance on protective measures for new buildings (BRE Press, 2007),
- Environment Agency Maps Website,
- British Geological Survey Website.

1.2. Objectives and Scope of Work

1.2.1. Objectives

The objectives of this report are to provide a preliminary assessment of the land quality and to assess the likely geotechnical and geo-environmental characteristics, which could have an impact on the development and long-term viability of the site.

The main objectives are:

- To provide an early indication of possible land quality issues that could impact on the development proposals,
- To provide a guide to decision making,
- Enable an adequate ground investigation design to be undertaken.

1.2.2. Scope of Work

The general Scope of Work undertaken in the preparation of this assessment was as follows:

- The collation of archival and recent information relating to the geological, geotechnical and geo-environmental conditions at the site,
- Undertake a review of the information obtained which included historical and recent survey maps, geological maps and environmental information,
- Provision of a preliminary appraisal of the data and identification of ground conditions that could potentially impact on the proposed development,
- Produce a conceptual model of the site detailing potential contamination source pathways and receptors.

General notes on the techniques employed by Quantum Geotechnical are described in the Foreword together with the limitations inherent in this type of work.

2. THE SITE

2.1. Site Description

The proposed development site is located on a parcel of land located just north of the existing Plumbing Trade Supplies unit within Neath Abbey Business Park, Neath, approximately 15m south of the Tennant Canal waterway.

The National Grid Reference of the site is E: 273346 N: 197236 (see site location plan, Figure 1, Appendix I).

The site is approximately square in shape, covers an area 0.19ha and resides within a commercial and industrial location some 0.5km southwest of Neath Abbey town centre.

At time of writing, the site was partially covered in mature trees, dense undergrowth and short grass. To the immediate north runs the Tenant Canal and disused access bridge. To the east is undeveloped lands part overgrown. To the south is an existing commercial building and car park facility with the business park access road defining the western boundary. Access to the site is gained immediately off the business park access road from the west or through neighbouring property in the south.

A 1-1.5m high soil bund some 1.5m in width currently defines the southern and eastern boundaries. There are isolated areas towards the northeastern area of site of suspected Japanese Knotweed.

A selection of site photographs are presented collectively within Appendix I.

2.2. Topography

The site is generally flat but does display sporadic mounded features and slightly hummocky nature indicating the possibility that these undulations in the ground profile could possibly be man made.

Aerial photographs of the site are included in the Groundsure reports presented in Appendix V.

3. GEOLOGY AND SITE HISTORY

3.1 Published Geology

3.1.1. Superficial Deposits

The British Geological Survey (BGS) Sheet 247, 'Swansea' at 1:50,000 scale, solid and drift edition indicates the site is underlain by Glacial Till (Devensian) typically comprising silty clayey gravels in the northern section with Tidal Deposits in the southern section typically comprising consolidated soft silty clays, with layers of sand, gravel and peat, associated with the River Clydach to the east-southeast which joins to the River Neath just south of Neath Abbey Business Park. The BGS Online GeoIndex search facility indicates Artificial Ground to be present across the site, depth not shown, described as Man Made. No further information is offered.

3.1.2. Solid Geology

The solid geology beneath the site is indicated by Sheet 247 Solid Edition to comprise Mudstones, Siltstones and Sandstones with productive coal seams from the Swansea Beds of the Upper Coal Measures, Carboniferous Period.

3.1.3. Structural Geology

Geological sheet SS79NW at a scale of 1: 10,560 or 6 Inch to 1 Mile, shows the geology of the site in greater detail. The site resides in an area of extensive faulting with the major Duffryn Fault running north-south downthrowing to the east located some 400m west of site and the Cwm Felin major fault located some 450m east of site also trending north-south but downthrowing to the west. Several minor west-east faults are indicating in the vicinity, however, none are shown to impinge upon the proposed development site. The general dip of the solid geology is shown as being northwards ranging between 18-26 degrees throughout the area.

3.1.4. British Geological Survey (BGS) Borehole Records

There are a number of records available from BGS within the local area, however only one historical borehole may be regarded as relating to the proposed development site. This is borehole reference SS79NW/13, which revealed 0.6m of overlying Made Ground underlain by approximately 1.4m of soft to firm silty Clay. Alternating sandy Clays and clayey Sands continued to a depth of approximately 2.4mbgl before the prevailing Sands and Gravels with cobbles and boulders progressed to the base of the borehole at a depth of 19'5" (circa. 6m bgl).

A copy of the borehole log is presented in Appendix II.

3.1.5. Mining

The site lies within the historically mined South Wales Coalfield. A number of coal seams are shown in the local area, with associated mine entries, though none are shown to cross the site. The conjectured line of crop of the Tir Edmond and Graigola coal seams is indicated some 300 and 400m south of site respectively trending northwest-southeast. With a the nearest recorded dip showing a value of 18 degrees north this would place the seams at a sufficient depth below the proposed development site as to not impinge upon the site itself. To the northeast of site, on the western side of the Tennant Canal a mine entry is indicated, namely 'Main Colliery No. 8 Pit' which places the Graigola seam at a depth of 223 feet equivalent to circa 68m.

3.2. Coal Authority Mining Report

A Coal Authority Mining Report (Ref: 51000883348001, May 2015) is presented in Appendix III.

The report states that the site is within the zone of likely physical influence from workings in 1 seam of coal at 70m to 80m depth, and last worked in 1920. The report continues by stating that any ground movement from these coal workings should have stopped by now.

The site is listed as not in the likely zone of influence of any present underground coal workings or in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods in the future. However, reserves of coal exist in the local area which could be worked at some time in the future.

There are no records of any mine entries as being within, or within 20 metres of the site boundary.

The site does not lie within the boundary of any past opencast coal mining operations nor does it lie within any present or future planned boundary opencast operations.

The Coal Authority Mining Report also details that no damage notices relating to subsidence of the property have been received since records began in 1994 furthermore, no mine gas emissions requiring action or any hazards relating to coal mining requiring remedial works have been identified for this property.

3.3. Radon Assessment

The Radon Atlas of England and Wales 2007 (BRE Press) indicates the site does not require any Radon protective measures as less than 1% of properties are above the Action Level.

3.4. Site History

A review of the site history has been undertaken based on archive and recent maps provided by GroundSure and presented in Appendix IV. A summary of the details contained within the Ordnance Survey maps is provided as follows.

1876-1877 1:2,500 & 1:10,560 scale

The site is located in an open area some 60-70m north of the Mines Royal Works (Copper Works). It would appear that the site is divided north-south by a track way which leads to a bridge further north which crosses the Tennant Canal. The maps indicate that some form of earthworks has taken place onsite with demarcations indicating possible surface depressions or mounded features. The Tennant Canal lies in its present day location some 15m north of the site with the Great Western Railway a further 25m north again. 250m southeast of site lies Cheadle Works – Iron Shipbuilding on the banks of the River Clydach whilst the tidally influenced River Neath lies 350-400m south of site.

1899 1:2,500 scale

The site remains unchanged with the Mines Royal Works now shown as 'Disused'.

1914-1921 1:2,500 & 1:10,560 scale

The site remains unchanged whilst the surrounding area of Pentreffynnon and Neath Abbey continues to grow in both residential properties, commercial and industrial properties and associated infrastructure. Whilst the Copper works to the south remain disused – the buildings remain in place. Some 120m northwest of site on the northern side of the Great Western Railway (marked as the 'Vale of Neath Line'), the Main Colliery (No. 7 Pit) is shown with a mineshaft marked and associated headgear and facilities buildings. A mineral railway/ tramway is shown associated with the colliery which runs parallel to the Great Western Railway and also heads northwards towards the Great Western Railway on the northern side of Neath Abbey.

1944-1948 1:2,500 & 1:10,560 scale

A second track is now shown onsite branching off the main track and heading eastwards towards open lands. The track alignment and land features indicate this to be a possible land depression which may be being used for waste soil tipping or extraction of soils. By 1940 the Main Colliery is no longer shown and the associated mineral railway/ tramway removed.

1950 1:2,500

This OS edition map clearly shows that the site is being used as an access way to neighbouring lands to the east to permit refuse tipping. 'Refuse Heaps' are labelled less than 100m east of site, with 'Slag Heaps' noted some 140m south-southeast of site. The general area around the site appears to be used as a tipping ground.

1970 1:1,250

This map shows that the neighbouring lands to the east, which also appear to include the eastern half of the site, labelled as 'Refuse Tip'.

1978 1:10,000

By 1978 the two trackways that divided the site are no longer shown with the remnant buildings of the Copper works to the south also removed. The general area around site is shown as open land with no structures evident. The A465 Trunk Road is now shown on the map some 150m south of site.

1984-1986 1:1,250

The site shows as being 'undeveloped' as part of open land, however, a new access road is established along the site's western boundary which heads north over the Tennant Canal and also southwards where Neath Abbey Business Park is clearly labelled with the infrastructure now in place. A number of commercial units are located some 140m southwest of site in the corner of the newly established Business Park.

1989 1:1,250

No significant/pertinent changes have occurred on site, however, Neath Abbey Business Park is firmly established with a number of commercial properties constructed to the south, with the present day 'Plumbing Trade Supplies' premises now shown to neighbour the proposed development site to the south.

1992 – Present Day National Grid and Raster Various Scales

No significant/pertinent changes have occurred on site during this period, whilst early in the 1990s Neath Abbey Business Park continued to expand.

4. GEO-ENVIRONMENTAL APPRAISAL

4.1. General

As part of the Desk Study searches, an environmental report, a combined geological/ ground stability report, and a radon assessment report have been obtained from GroundSure®. The GeoInsight® Report provides details on the geology of the site as well as information relating to ground workings in the area of the site, mining, extraction, natural cavities and natural ground subsidence. The EnviroInsight® report details site specific environmental issues including pollution incidents, discharge consents, flooding issues and any areas of significant contamination potential as well the risk to any existing or planned properties from the underlying ground conditions.

Copies of the GroundSure® reports are included in Appendix V.

4.2. GeoInsight® Report– Geology and Ground Stability

4.2.1. Artificial Ground

The geology section of the combined geological/ground stability GroundSure® GeoInsight® report (Report Ref: HMD-213-2060608, presented in Appendix V) states that the site is underlain by Artificial / Made Ground with no further details as to composition.

4.2.2. Superficial Geology & Landslips

The report concurs with section 3.1.1 of this desk study indicating Tidal Flat Deposits in the southeastern half of site and Devensian Till (Diamicton) beneath the northwestern area of site with permeability of the superficial deposits onsite in general ranging between low-high permeability.

There are no records of any landslide within 500m of the site boundary.

4.2.3. Bedrock, Solid Geology & Faults

The report identifies the bedrock under the site consists of mudstone, siltstone and sandstone of the Swansea Member (as per section 3.1.2 of this report) which has low to moderate permeability of 'fracture' flow type.

There are a number of faults within the local area. The nearest of which is a fault 326m west of site with also 3 inferred coal seams noted, the nearest seams being 246m northeast of site and 246m southwest of site.

The report states that the Health Protection Agency defines the site as not being in a Radon Affected Area, as less than 1% of the properties are above the action level, requiring no Radon protective measures for the

proposed new development.

4.2.4. Ground Workings

The GeolInsight® report identifies a number of records (11 No. entries) indicating that ground workings have taken place onsite between 1877 to 1978 ranging from unspecified ground workings to colliery related surface workings and Canal related surface working features. There are no records of historical surface ground workings at the site. An additional 65 No. entries are noted for surface ground working features within the wider 250m search radius including refuse heaps, cutting, ponds, canals, unspecified workings and dry docks workings.

A number of historical underground working features have been identified within 1000m of the site boundary. Two entries are detailed as being onsite relating to colliery use in 1914 and 1921 – no further details are provided. An additional 20 No. entries are shown in this section for historical underground workings each relating to historic coal mining activity.

There are a number of current ground workings (all now shown as 'ceased' status) within 1000m of the site boundary. The closest is 427m to the northwest at Graig Pit – producing sandstone.

4.2.5. Mining, Extraction & Natural Cavities

The GeolInsight® report indicates that the site is located within a coal mining area.

A number of historical mining records have been identified, the closest being detailed as a colliery onsite in 1914 and 1921, this is likely to pertain to the potentially worked Graigola seam at circa 69m bgl and possible surface related waste tipping rather than mine entries onsite.

There are no records of natural cavities or mineral extraction within 1000m of the site boundary.

4.2.6. Natural Ground Subsidence

The Geology & Ground Stability Report also details any other ground related hazards and a relevant hazard rating for the related occurrence of natural ground subsidence on site. Table 1 lists these entries.

Table 1: Natural Hazards

Hazard	Hazard Rating	Details
Shrink - Swell Clays	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with shrink-swell clays.

Landslides	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
Soluble Rocks	Negligible	No actions required/No special ground investigation.
Compressible ground	Negligible-Very Low	No actions required/No special ground investigation.
Collapsible deposits	Negligible-Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
Running Sand	Negligible-Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required to avoid problems due to running sand. No special ground investigation required. Increased construction costs or financial risks are unlikely due to potential problems with running sand.

4.2.7. **Estimated Background Soil Chemistry**

Records of the estimated background soil chemistry indicate the following concentrations on site:

Table 2: Estimated Geometric Mean Soil Concentrations (mg/kg)

Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
25-45	3.0-6.0	60 – 90	15-45	<100

4.3. **EnviroInsight® Report – Site Environmental Appraisal**

4.3.1. **General**

The GroundSure® EnviroInsight® report (Report Ref: HMD-213-2060607) presents environmental data pertinent to the site and its surrounding area.

The datasets covered within the report are:

- Authorisations Incidents and Registers
- Landfill and Other Waste Sites
- Current Land Uses
- Geology

- Hydrogeology and Hydrology
- Flooding
- Designated Environmentally Sensitive Sites

The data contained in these sections are described in more detail on the following pages.

4.3.2. Environmental Permits, Incidents and Registers

This section of the report provides information on Regulated Industrial Activity and Pollution Incidents by Regulated Authorities and sites determined as contaminated land, which occur within 500m of the site.

The report identifies a single entry for Water Industry Referral for a site 236m east of site which now has a 'dead' status.

14 No. Licensed Discharge Consents are listed, the two nearest located 32m southwest of site. Both of which are for a sewer storm overflow system entering the River Clydach.

2 No. Environment Agency Recorded Pollution Incidents are detailed, the nearest being 291m southwest of site with the pollutant being biodegradable material, water impact was category 4 (no impact), land impact category 3 (minor) and air impact category 4 (no impact).

4.3.3. Landfills and Other Waste Sites

The report identifies two records of Environment Agency landfill data within 1000m of the site, located 901m and 920m respectively to the south, the first for 'The Saltings' receiving Special Waste, and the second being 'Giants Grave' receiving household and industrial waste both based in Briton Ferry.

Three records of Environment Agency historic landfill sites are shown, the first of these being shown as onsite, however there are no details offered regarding waste type, size or dates, but the accompanying plan does show that this historic landfill stretched from the eastern half of the site eastwards which was previously documented in section 3.4 of this report.

In addition there are ten entries for records of landfills from Local Authority and Historical Mapping within 1500m search radius of the site which indicate that the historic landfill detailed as being on site is a 'Refuse Tip'.

Numerous Environment Agency licensed waste sites are shown in the GroundSure® EnviroInsight® report with the nearest some 439m northeast of site at Unit 9, Monastery Business Centre, Neath Abbey for a vehicle de-pollution facility and salvage yard.

4.3.4. Current Land Use

There are twenty records of potentially contaminative industrial sites identified within 250m of the site mainly relating to manufacturing premises, however the nearest to site is 32m southwest relating to an electrical sub-station.

No fuel sites are listed within 500m of site, similarly no National Grid high voltage underground electricity transmission cables or gas transmission pipelines are indicated to be within 500m of the site.

4.3.5. Hydrogeology and Hydrology

In this section data is provided on groundwater vulnerability, soil leaching potential, abstraction licences, source protection zones and river quality. Searches are conducted with radius of up to 500m.

The report indicates that there is an Unproductive aquifer and a Secondary aquifer within the superfcials on site whilst the bedrock on-site has been identified as a Secondary A aquifer which states that it has “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”.

There are no Groundwater, Surface Water or Potable Water Abstraction Licenses within 2000m of the site.

There are no Source Protection Zones within 500m of the site.

The report identifies a network of Secondary, Tertiary, and Culvert river channels predominantly north and southeast of the site, with the more prominent waterways being the Tennant Canal shown as 10m north, the River Clydach 210m southeast and River Neath 350m south.

4.3.6. Flooding

Information on surface water flooding, flood defences, flood storage and groundwater flood areas are provided in this section within a radius of 250m of the site.

The Groundsure Report states that the risk of flooding at the centre of the site is very low with the highest risk of flooding within 25m of the centre of the study site being low.

The data contained in this section indicates British Geological Survey (BGS) Groundwater Flooding Susceptibility Areas within 50m of site, which is attributed to superficial deposit flooding potentially at surface.

The BGS confidence rating in this result is classed as “Moderate” based on a threefold scale – low, moderate and high. The confidence rating provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding and is based on the amount and precision of the information used in the assessment.

4.3.7. Designated Environmentally Sensitive Sites

There is a presence of Designated Environmentally Sensitive Site within 2000m of the study site, this is in the shape of 107 No. records of ancient woodland. The closest of unknown name is located 400m north.

A single local nature reserve is noted 1765m southeast of site at Eaglesbush Valley.

5. CONCEPTUAL SITE MODEL

5.1. Legal Framework for Contaminated Land

Part 2A of the Environmental Protection Act 1990 created a regime for the identification and remediation of contaminated land. Contaminated land is defined by the potential to cause significant harm to human health and/or the environment. It establishes that responsibility for deciding when land is contaminated lies solely with local authorities.

Part 2A of the Environmental Protection Act 1990, Section 78A(2) defines “Contaminated Land” as:

“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.”

The definition is subject to statutory guidance issued by the Secretary of State which defines significant harm and a significant possibility of such harm with respect to the definition of contaminated land. The statutory guidance sets the definition of contaminated land within the context of Government policy including the “suitable for use” approach.

Under the planning regime, land contamination is also a material consideration. A local authority has the duty to consider potential implications of contamination when it is considering applications for planning permission. A planning authority may require investigations to be undertaken where there is potential contamination or contamination is known to exist at a site before granting planning permission. Alternatively, planning permission may be conditional requiring appropriate investigation and, if necessary, remediation.

5.2. Conceptual Site Model

The conceptual site model is a representation of the current understanding of the site and its surrounding environment with regards to geology, groundwater, surface waters, and potential contamination on-site and adjacent off-site and any migration pathways.

The potential risks to the proposed development and adjacent land have been assessed by consideration of the potential pollution linkages. For a risk to exist there must be a source of contamination, a receptor that may be harmed and a pathway by which the receptor could be exposed to the contaminant. Only when all three factors are present (i.e. source, pathway, receptor) can a pollution linkage, and consequently an unacceptable risk, exist. The conceptual site model considers all three elements and the potential for pollution linkages that may exist. If no linkage is identified then there is considered to be no or negligible risk.

The information gained from the land use assessment has been collated to identify any potential pathways that may exist between any contamination source and its receptors. The Conceptual Site Model has been developed for the proposed end use. Receptors specific for the proposed end use considered in the assessment are as follows:

- Human Health – end users
- Controlled Waters – ground water and surface waters
- Buildings and Services

Historical records indicate much of the site may have been subject to waste tipping with a refuse heap detailed on neighbouring lands to the east. With numerous industrial activities both historic and present day, there is a high potential for contaminants to be present within the near surface soils at the proposed development site location. Any Artificial or Made Ground that may be present could contain Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons and Asbestos.

Details of the pathways associated with each of the components are highlighted in the following set of tables:

Table 5: Existing Pollutant Linkages on-site to on-site

Potential Sources onsite	• MADE GROUND (HISTORIC LANDFILL 'REFUSE HEAP')- Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, and Asbestos.	
Potential Pathways on-site to on-site		Receptors onsite
• Dermal contact with contaminated soils – dermatitis. • Ingestion of soil, water or dust through ground maintenance etc. • Inhalation of dust or land gas emissions from Made Ground and organic soils. • Leaching of contaminated soils into groundwater. • Migration of groundwater across site.		Future Site End Users including Workers, Construction Workers, Visitors and School personnel. Groundwater: – Superficial deposits – Bedrock: 'Secondary A' aquifer
• Chemically aggressive contaminants identified at raised concentrations.		Buildings and services.

Table 6: Existing Pollutant Linkages on-site to off-site

Potential Sources onsite	MADE GROUND (HISTORIC LANDFILL 'REFUSE HEAP')- - Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, and Asbestos.	
Potential Pathways on-site to off-site		Receptors offsite
- Inhalation of dust or land gas emissions from possible Made Ground and organic soils. - Leaching of contaminated soils into groundwater. - Migration from groundwater to surface waters. - Migration of contaminants through groundwater off-site leading to potential dermal contact, ingestion of soil, water or dust and inhalation of gas emissions.		Neighbouring site users and occupiers Groundwater: – Superficial deposits: 'Unproductive' aquifer. – Bedrock: 'Secondary A' aquifer

Table 7: Existing Pollutant Linkages off-site to on-site

Potential Sources offsite	MADE GROUND (HISTORIC LANDFILL 'REFUSE HEAP')- - Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, and Asbestos.	
Potential Pathways off-site to on-site		Receptors onsite
- Inhalation of dust or land gas emissions from Made Ground and organic soils. - Migration of contaminants through groundwater on-site leading to potential dermal contact, ingestion of soil, water or dust and inhalation of gas emissions.		Future Site End Users including Workers, Construction Workers, Visitors and School personnel. Groundwater: – Superficial deposits – Bedrock: 'Secondary A' aquifer

6. CONCLUSIONS

6.1. General

From the Phase 1 Land Quality Assessment/ Desk Study the following points have been identified:

GEOTECHNICAL ISSUES:

- The Geological maps for the area indicate the site is underlain by Glacial Till deposits of Devensian age in the western half and Tidal Flat Deposits in the eastern half associated with the nearby tidally influenced River Neath.
- The solid geology of the site is indicated to be the Swansea Beds of Upper Coal Measures consisting of mudstone, siltstone and sandstone.
- It is highly likely that a substantial thickness of Artificial/ Made Ground is present on and around the site from historic landfilling use as a result of predominantly nearby coal mining, copper works and general refuse tipping practices spanning the past 70 years.
- The Coal Authority Report indicated a single worked seam at a depth of 70m beneath the site, with any ground movement relating to this having ceased by now. Searches by Quantum concur with this mine working finding, calculated as being the Graigola coal seam worked at a depth of circa 68m bgl by the Main Colliery No. 7/8 located on the northern side of the Tennant Canal and Great Western Railway to the north of site.
- The depth of this working is considered to pose negligible risk to the proposed development and no further consideration is given to this aspect.
- A very low risk of shrink swell clays, landslides, collapsible deposits and running sands, a negligible risk of compressible deposits, and a Null-Negligible risk of soluble rocks are indicated across the site.

ENVIRONMENTAL ISSUES:

- There is a history of surface ground workings both onsite and the adjacent lands to the east with historic landfills noted and refuse tipping having taken place since at least the 1940s. Therefore, there is the high potential for potentially contaminated Made Ground to be present on the site. Any Made Ground that may be present could contain Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons and Asbestos.
- There is the possibility of leaching of contaminated soils into the groundwater depending on the nature of the permeability of the superficial strata on site. Consequently there is a low risk of potential contaminant migration through groundwater and across site and off-site.
- The site does not lie in a Radon Affected Area, therefore no special precautions are required for the new build.
- There are no water abstraction licences within 1000m of the site.

- There are no Source Protection Zones within 500m of the site.
- The closest watercourse is surface water features 10m to the north – Tennant Canal with the River Clydach and River Neath to the south at respective distances of approximately 210m and 350m.

6.2. Evaluation and Recommendations

A number of potential geotechnical and environmental issues have been identified within this study. The following evaluations and subsequent recommendations are made:

- In relation to any environmental/contaminated land issues, the site is considered to be at moderate to high risk from land contamination. The desk study has identified the strong likelihood of Made Ground to be present on-site and therefore a potential source of land contamination that may have impacted upon the site. However, the migration of any such contamination may be limited by the permeability of the superficial strata, which is classed as 'Unproductive' or Secondary A (low permeability) on site and therefore have negligible significance for water supply or river base flow.
- Given the potential for substantial thickness of Made Ground plus the possibility of soft, cohesive Tidal Flat Deposits in the eastern and southern area of site the thicknesses, strength and extents of these deposits will need investigating.
- It is recommended an intrusive ground investigation and subsequent laboratory testing is undertaken. A day's window sampling using a mini-rig (Terrier or similar) due to limited access around site given the overgrown nature of some areas, would permit sampling of the superficial soils and in-situ testing using both super heavy dynamic probing techniques and Standard Penetration Testing (SPT). The window sampling element of the works would obtain the necessary samples for geotechnical and contamination testing within the shallow superficials. Landgas assessment is also recommended relating to the possibility of gases emanating from the adjacent historic refuse tip.
- An interpretative report would detail the site findings, and give recommendations for foundation design and other geotechnical issues that may have come to light. In addition, a preliminary human health risk assessment and risk to controlled waterways should be undertaken to assess risk to construction workers and future site users as well as risks to the surrounding environment. Dependent on the above preliminary intrusive ground investigation findings it may be necessary to undertake further investigation in the form of cable percussive and/ or rotary drilled boreholes to assess deeper lying ground conditions.
- Additional Note: Any intrusive works onsite must take precautions against the suspected Japanese Knotweed identified in the northeastern area of site. Prevention controls for cross-contamination and spreading must be in place.

7. REFERENCES

Ordnance Survey Plans:

- Collection of Historical Plans from 1876 to 2014, at 1:1,250, 1:2,500, 1:10,560 and 1:10,000 Scale.

British Geological Survey:

- British Geological Survey Sheet 247 'Swansea' solid and drift editions at 1:50,000 scale
- Geological sheet SS79NW at a scale of 1: 10,560 or 6 Inch to 1 Mile
- BGS Borehole Records; SS79NW/13.

Environmental and Ground Stability:

- GroundSure® EnviroInsight® Report (Ref: HMD-213-2060607)
- GroundSure® GeoInsight® Report (Ref: HMD-213-2060608)

Environmental Protection Act 1990

Radon, Guidance on protective measures for new buildings (BRE Press, 2007)

For and on behalf of QUANTUM GEOTECHNICAL LTD

Written by:



R. McDERMOTT, B.Sc. (Hons), M.Sc., C.Geol., F.G.S.
Principal Engineering Geologist

15/5/15

Date

Checked & Approved by:

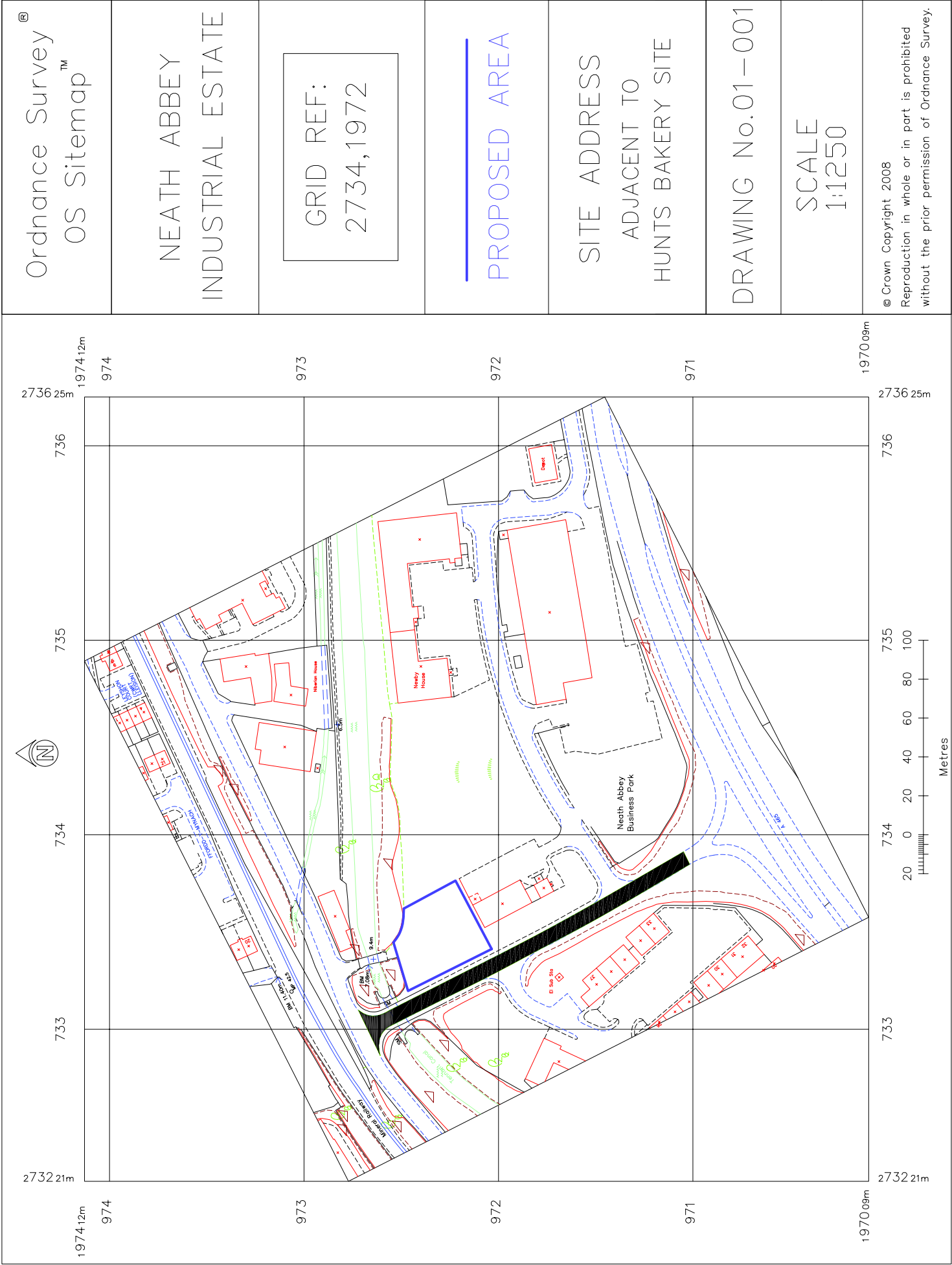


J.E. STARK, B.Sc. (Hons), C.Geol., F.G.S.
Technical Director

15/5/15

Date

APPENDIX I – SITE PLANS



Contract : Proposed Extension to ATT Engineering Ltd

Client : ATT Engineering Ltd

Dates : -

Location : Neath Abbey

Job Number : G641

Engineer : Quantum Geotechnical Ltd



Photo 1: View from north of site across the bridge over Tennant Canal



Photo 2: View across southern boundary of site showing banded feature. Plumbing Trade Supplies just right of photo.

Contract : Proposed Extension to ATT Engineering Ltd

Client : ATT Engineering Ltd

Dates : -

Location : Neath Abbey

Job Number : G641

Engineer : Quantum Geotechnical Ltd



Photo 3: Looking northwards towards centre of site



Photo 4: Northern area of site, small pathways shown

Contract : Proposed Extension to ATT Engineering Ltd

Client : ATT Engineering Ltd

Dates : -

Location : Neath Abbey

Job Number : G641

Engineer : Quantum Geotechnical Ltd



Photo 5: Western boundary of site parallel to Business Park access road



Photo 6: Central and northern area of site, suspected Japanese Knotweed shown

APPENDIX II – BGS BOREHOLE RECORDS

SOIL SURVEY, NEATH-ABERGAUENNY TRUNK ROAD

S.S. 79 NW/13

British Geological Survey

British Geological Survey

British Geological Survey

15.5' (4.72m)

6 INS. TO

19 FT. 6"

INS. TO

FT.

VERTICAL

1" = 3 FT.

(SHEET 1 OF 1)

SHELL and AUGER

447

British Geological Survey

British Geological Survey

British Geological Survey

Made Ground.

S.W.L. at 1' 0". 15th Jun. 67.

Soft/lean, blue/gray Silty Clay with dark brown bands.

S.W.L. at 3' 0". 14th - 16th Jun. 67.

Dark brown slightly Sandy Clay.

Light gray slightly Clayey Sand.

Dark gray Clayey Silt and Gravel.

Fawn Sand and Gravel with Cobbles and Boulders.

TX = Triaxial Test

CV = Consolidation Test

U = Undrained Test

C = Compression Test

APPENDIX III – COAL AUTHORITY MINING REPORT

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG

Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**QUANTUM GEOTECHNICAL LTD
BYNEA BUSINESS PARK
HEOL Y BWLCH
LLANELLI
SA14 9ST**

Our reference: **51000883348001**
Your reference: **G641**
Date of your enquiry: **12 May 2015**
Date we received your enquiry: **12 May 2015**
Date of issue: **12 May 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

NEATH ABBEY BUSINESS PARK ROAD, NEATH ABBEY, SA10 7DR

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 1 seam of coal at 70m to 80m depth, and last worked in 1920.

Any ground movement from these coal workings should have stopped by now.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

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

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

Coal mining geology

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

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

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

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

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

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

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

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

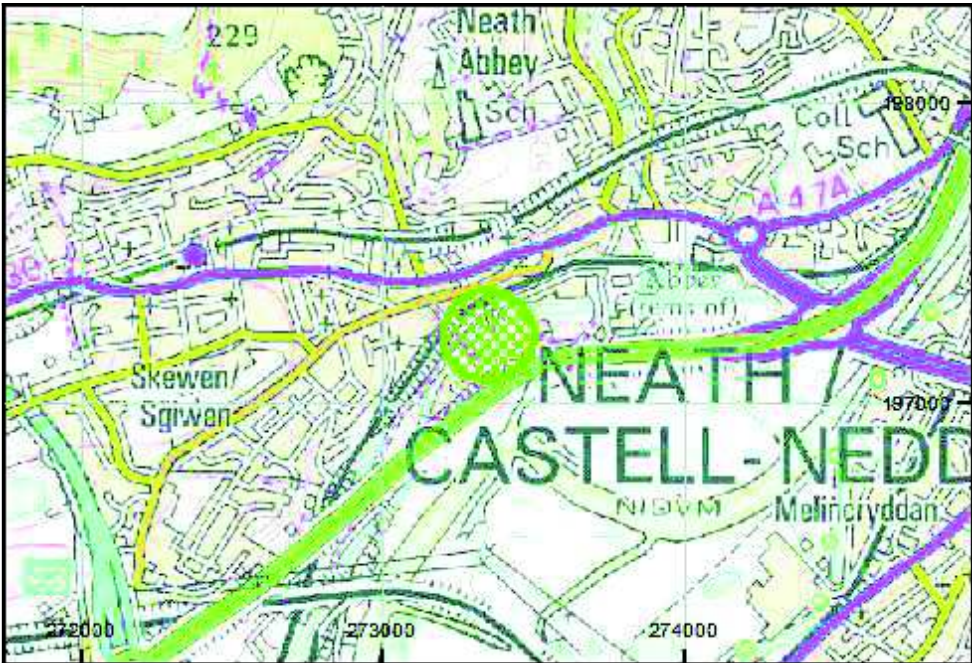
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Tax Point Date:	12 May 2015
Issued to:	QUANTUM GEOTECHNICAL LTD BYNEA BUSINESS PARK HEOL Y BWLCH LLANELLI SA14 9ST
Property Search for:	NEATH ABBEY BUSINESS PARK ROAD, NEATH ABBEY, SA10 7DR
Reference Number:	51000883348001
Date of Issue:	12 May 2015
Cost:	£59.00
VAT @ 20%:	£11.80
Total Received:	£70.80
VAT Registration	598 5850 68

Location map



Approximate position
of property



Enquiry boundary

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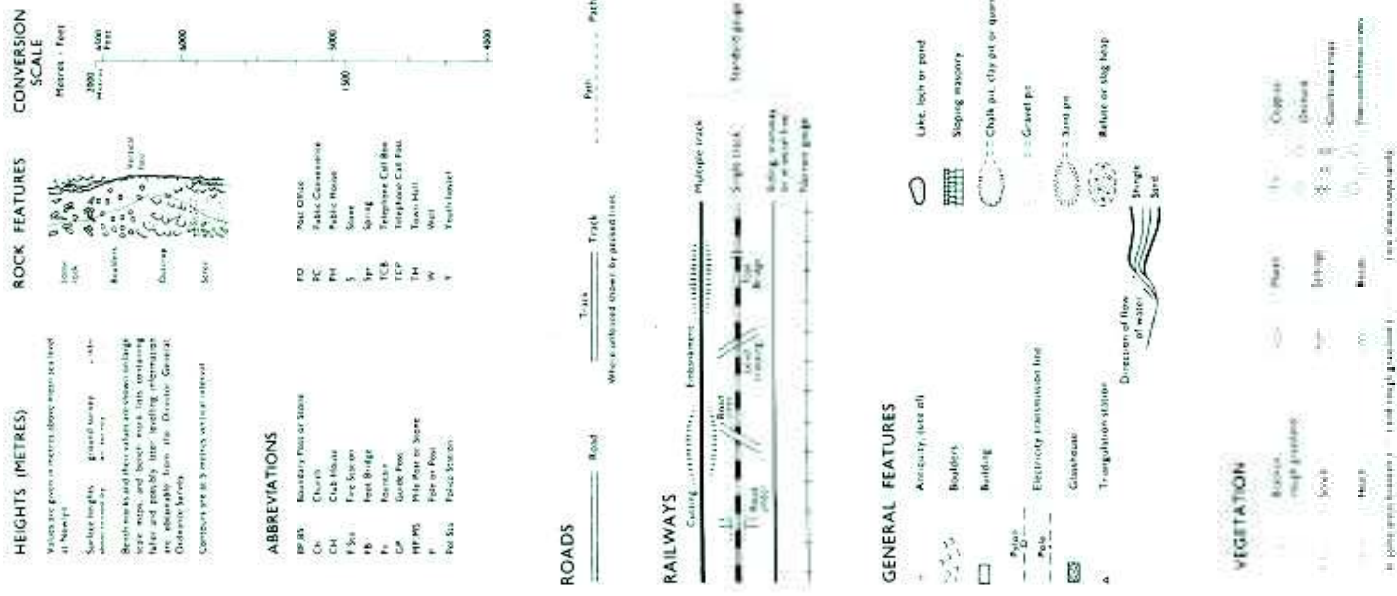
Key

Approximate position of enquiry
boundary shown

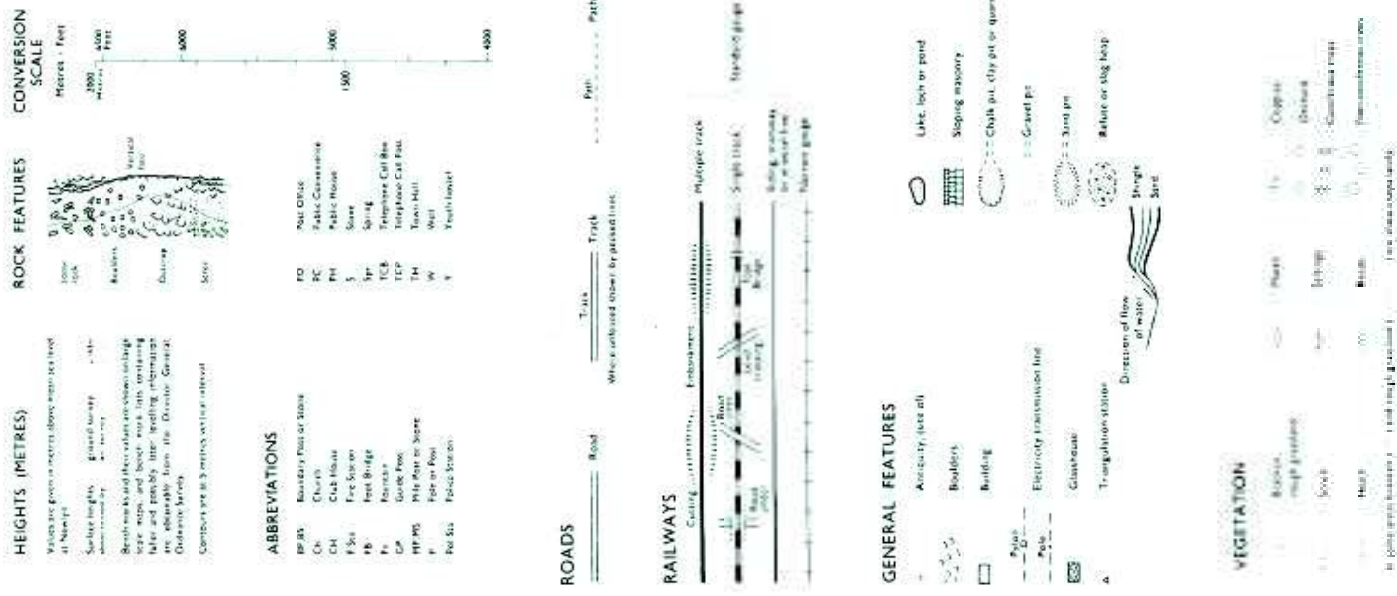


APPENDIX IV – HISTORICAL MAPS

National Grid 1:10,000 scale



County Series 1:10,560 scale



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Tel: 01273 819 700
maps&data@groundsure.com
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Site Details:

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BUSINESS PARK, NEATH, SA10
7DR

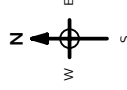
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Grid Ref: 273349, 197233

Map Name: County Series

Map date: 1876-1877

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1877
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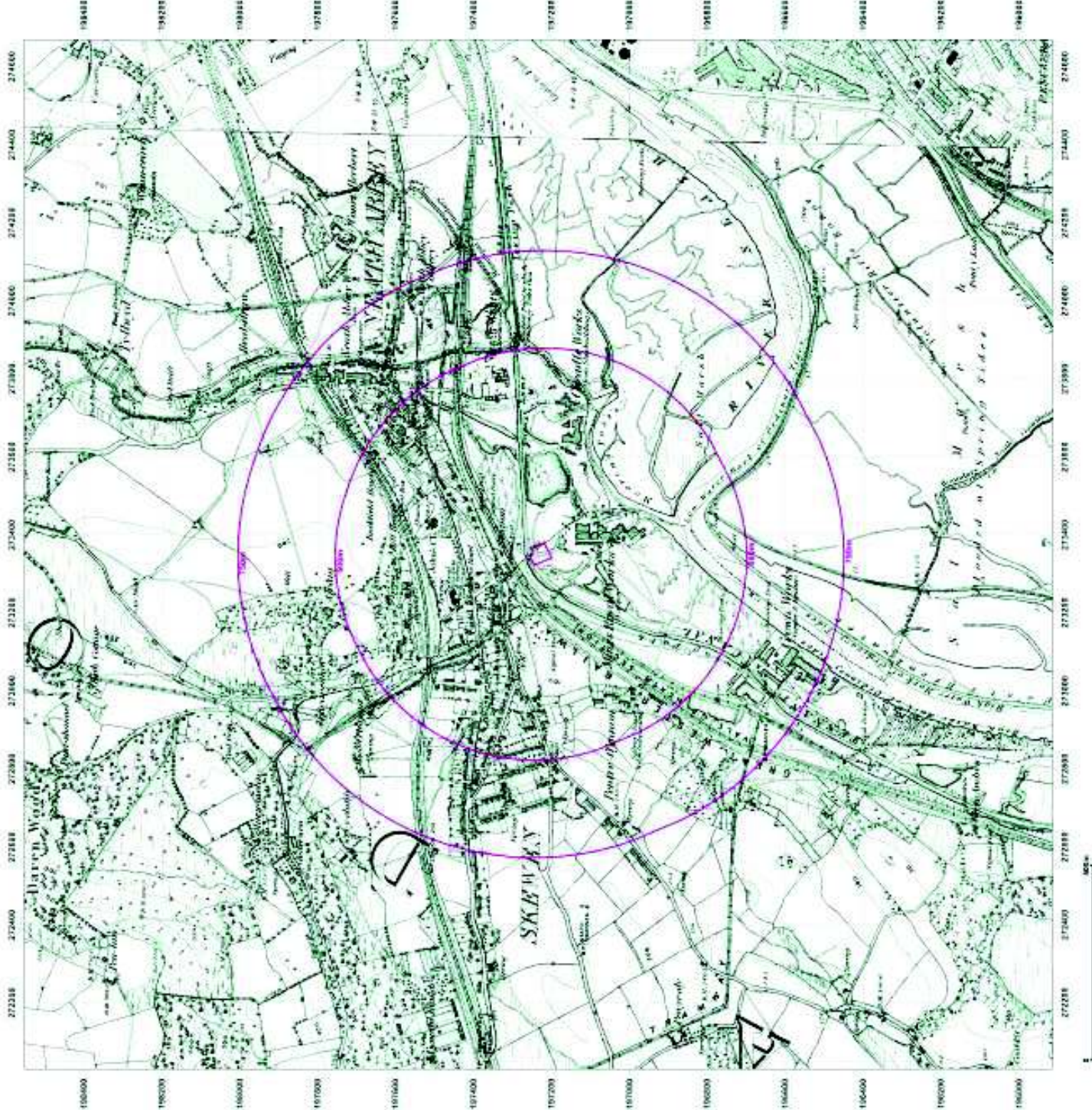


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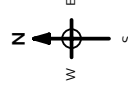
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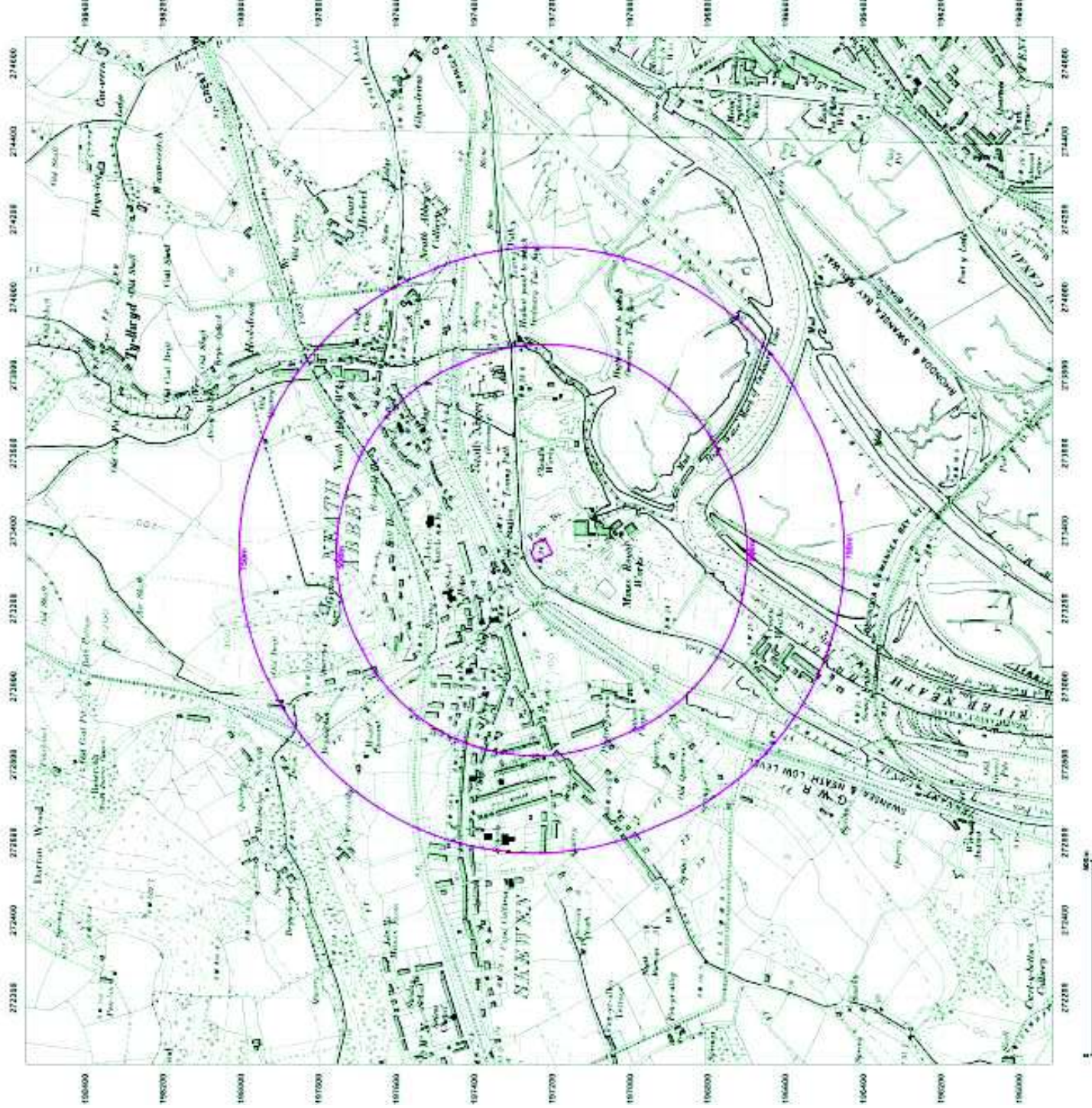


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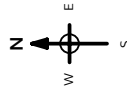
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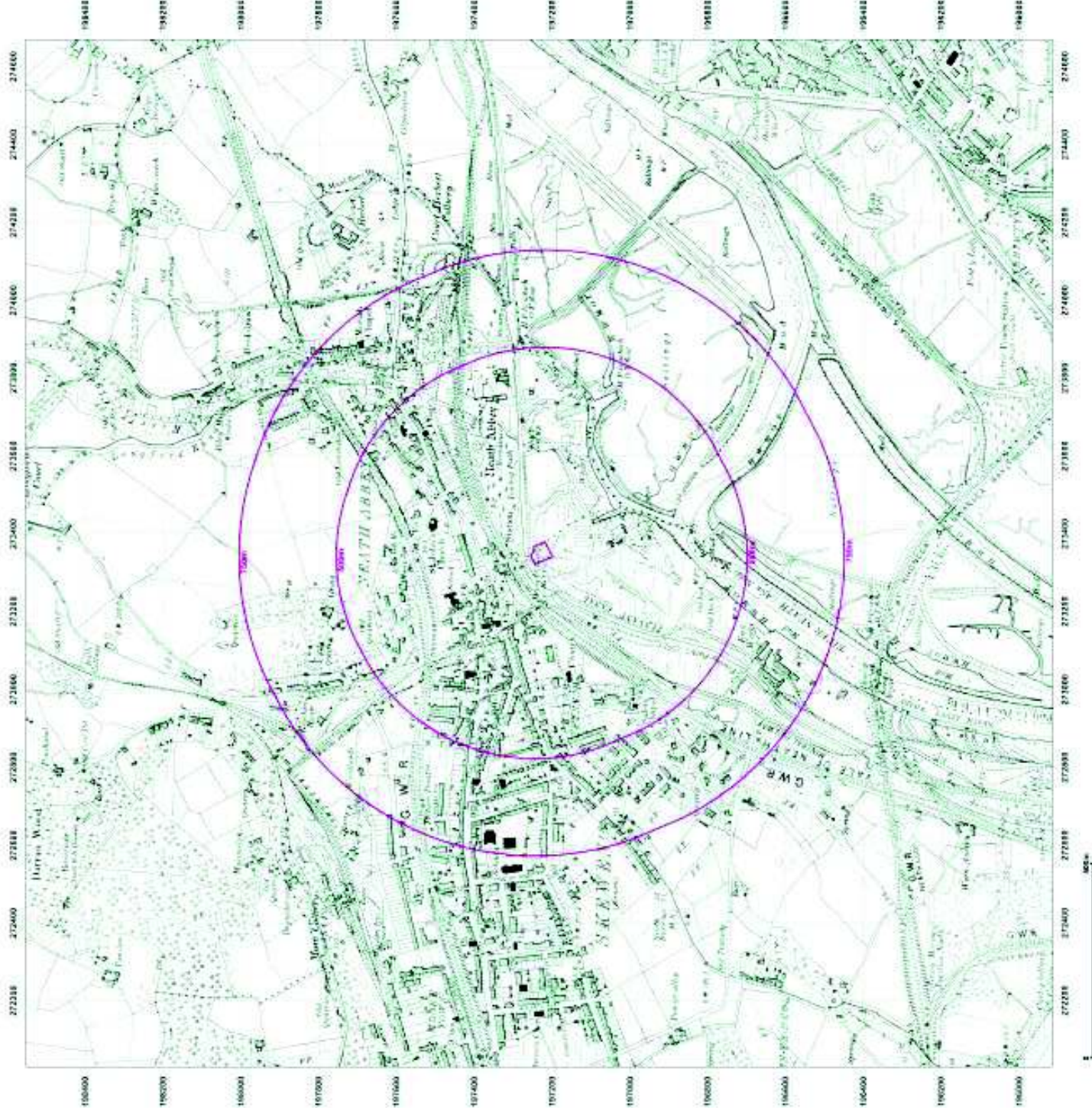


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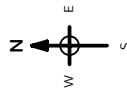
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Surveyed 1827
Revised 1921
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Surveyed 1876
Revised 1921
Editor N/A
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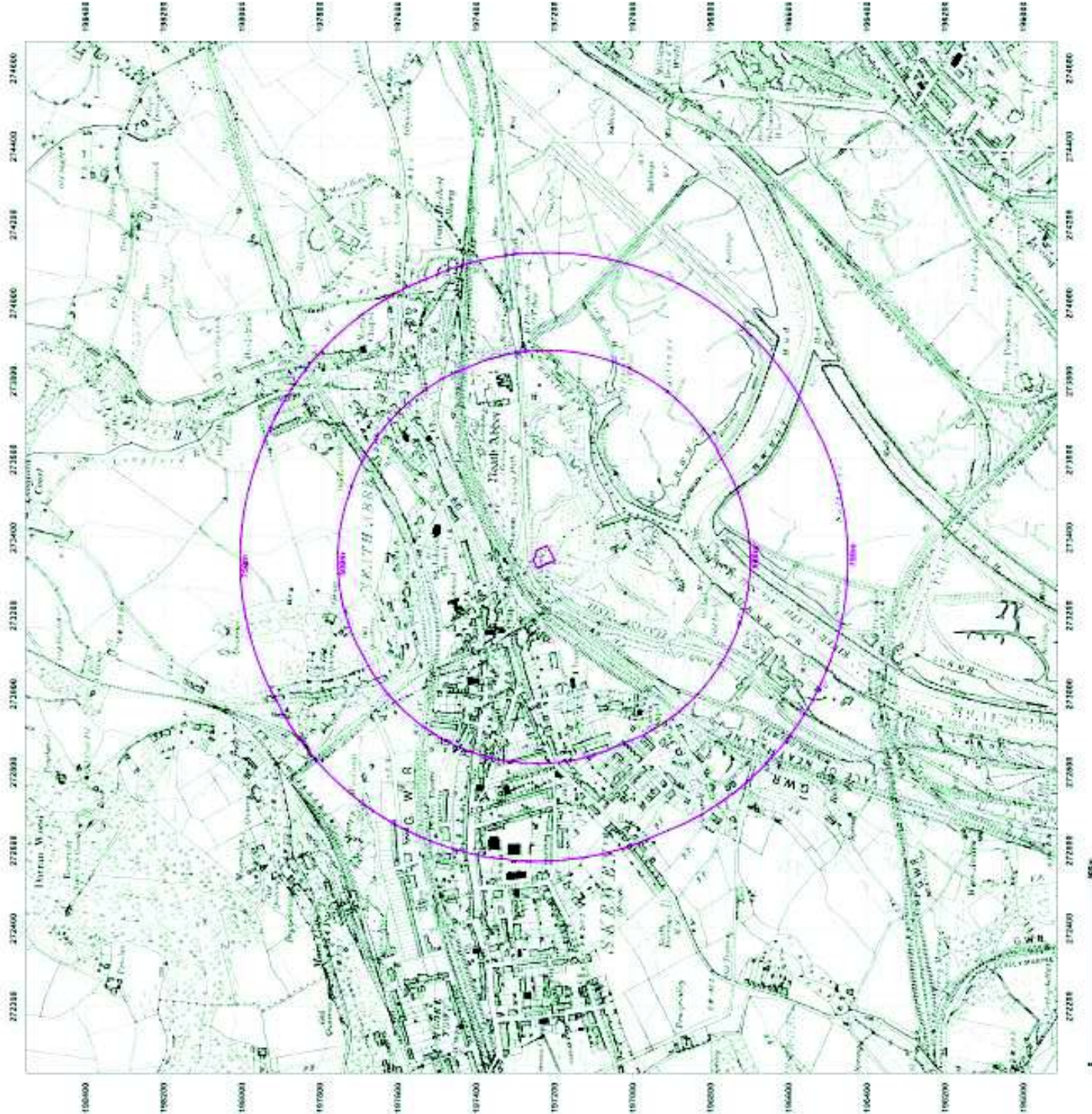


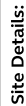
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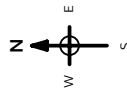
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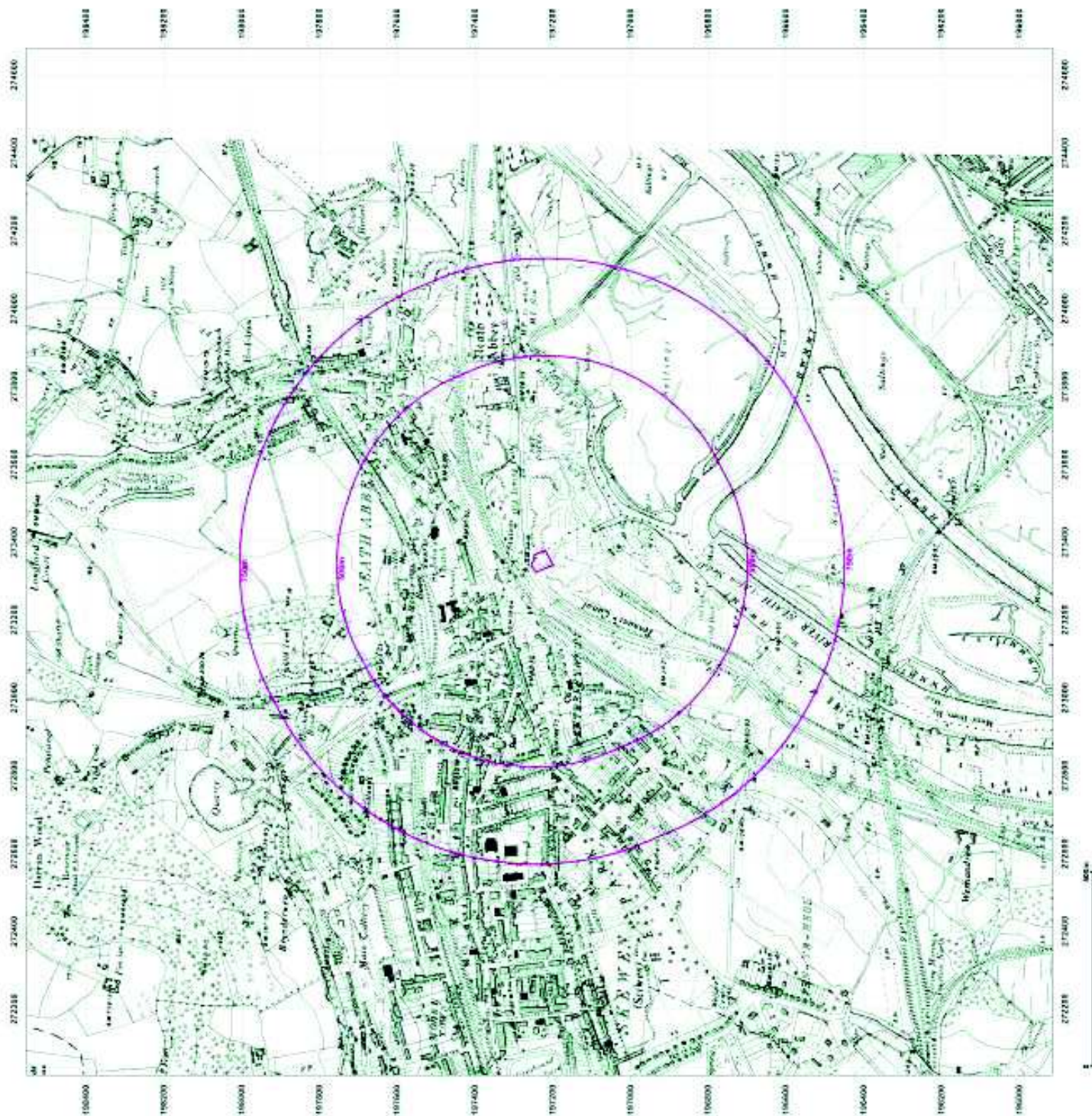
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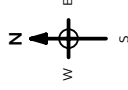
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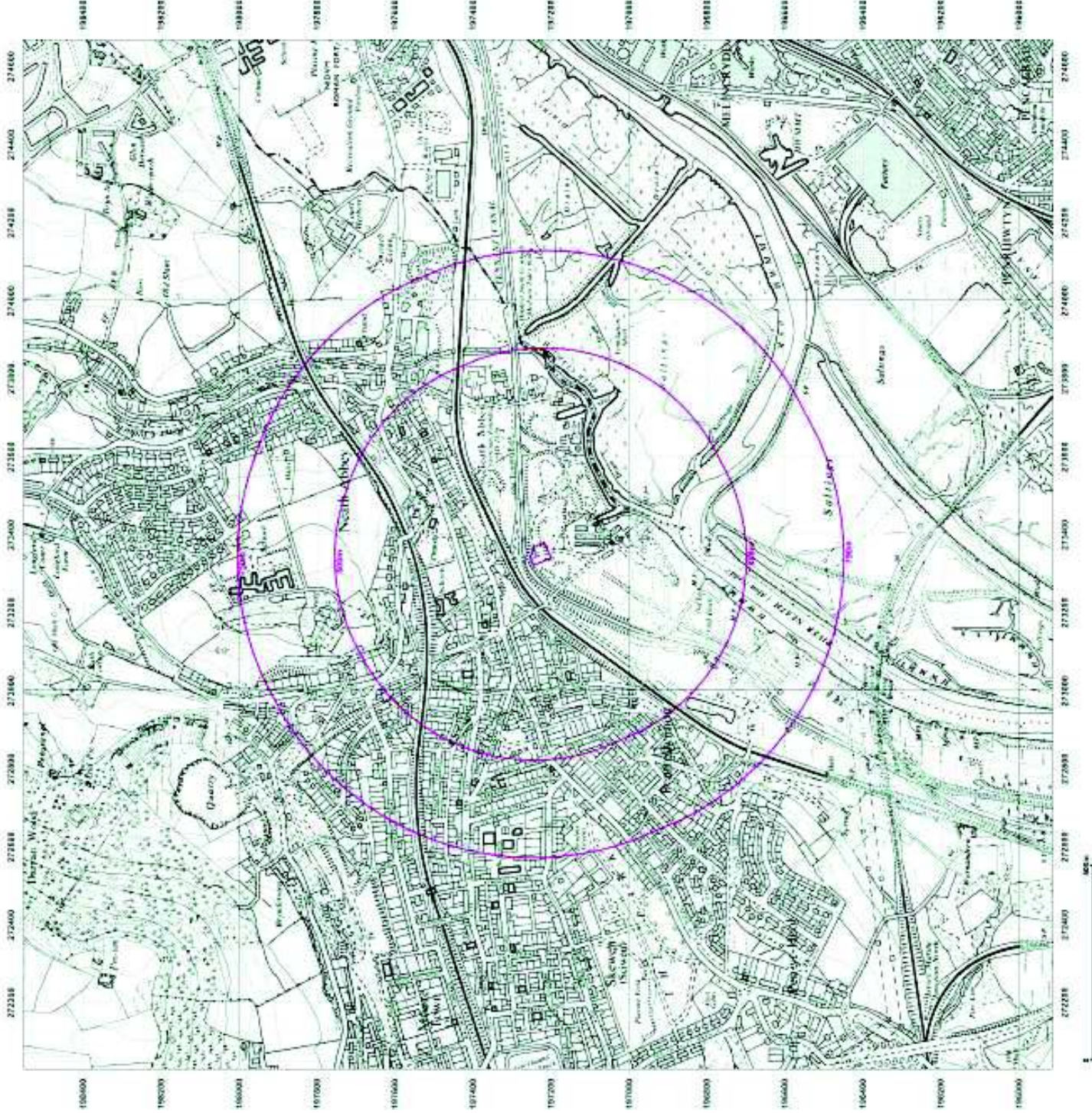


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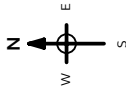
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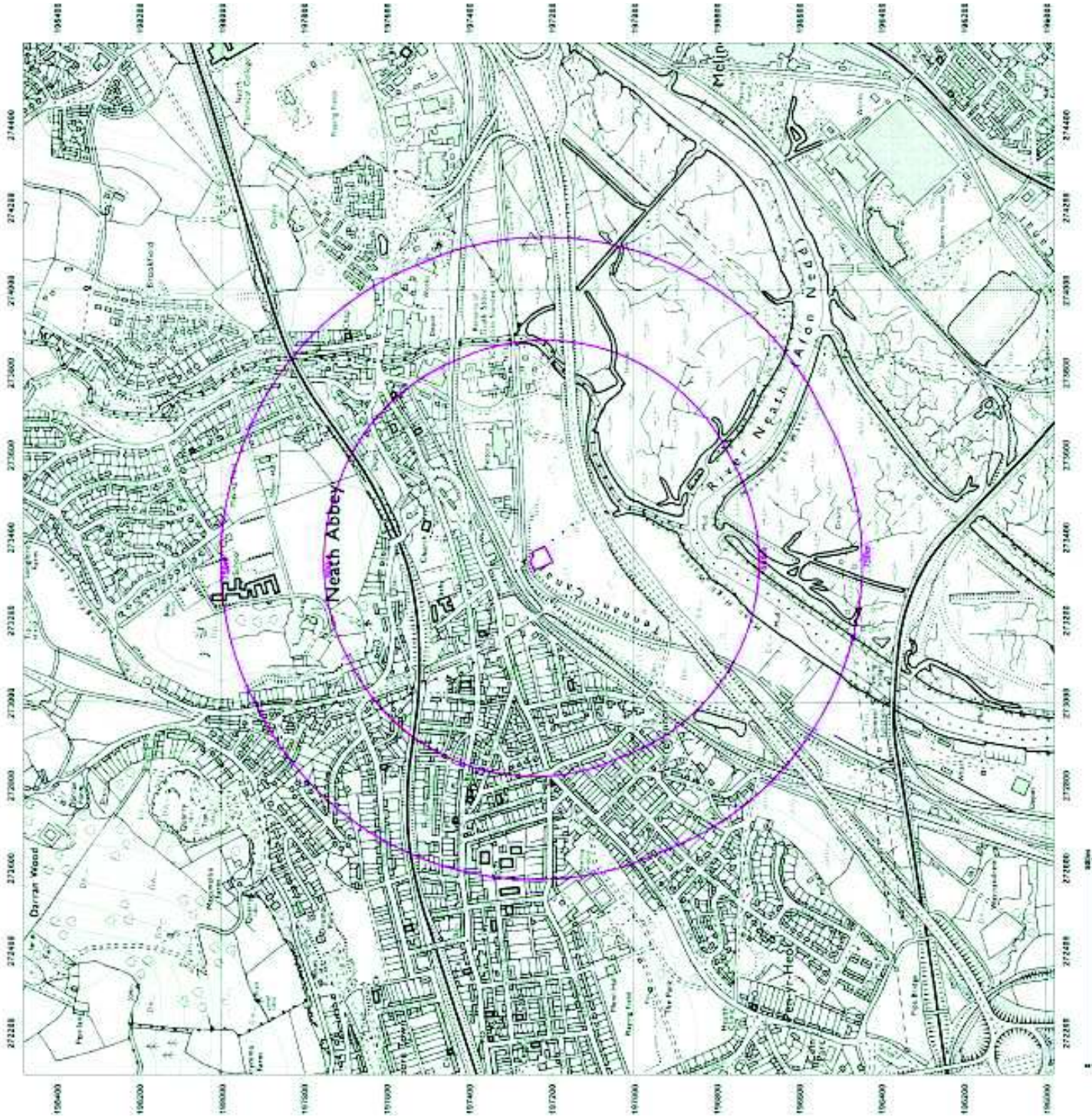


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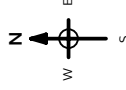
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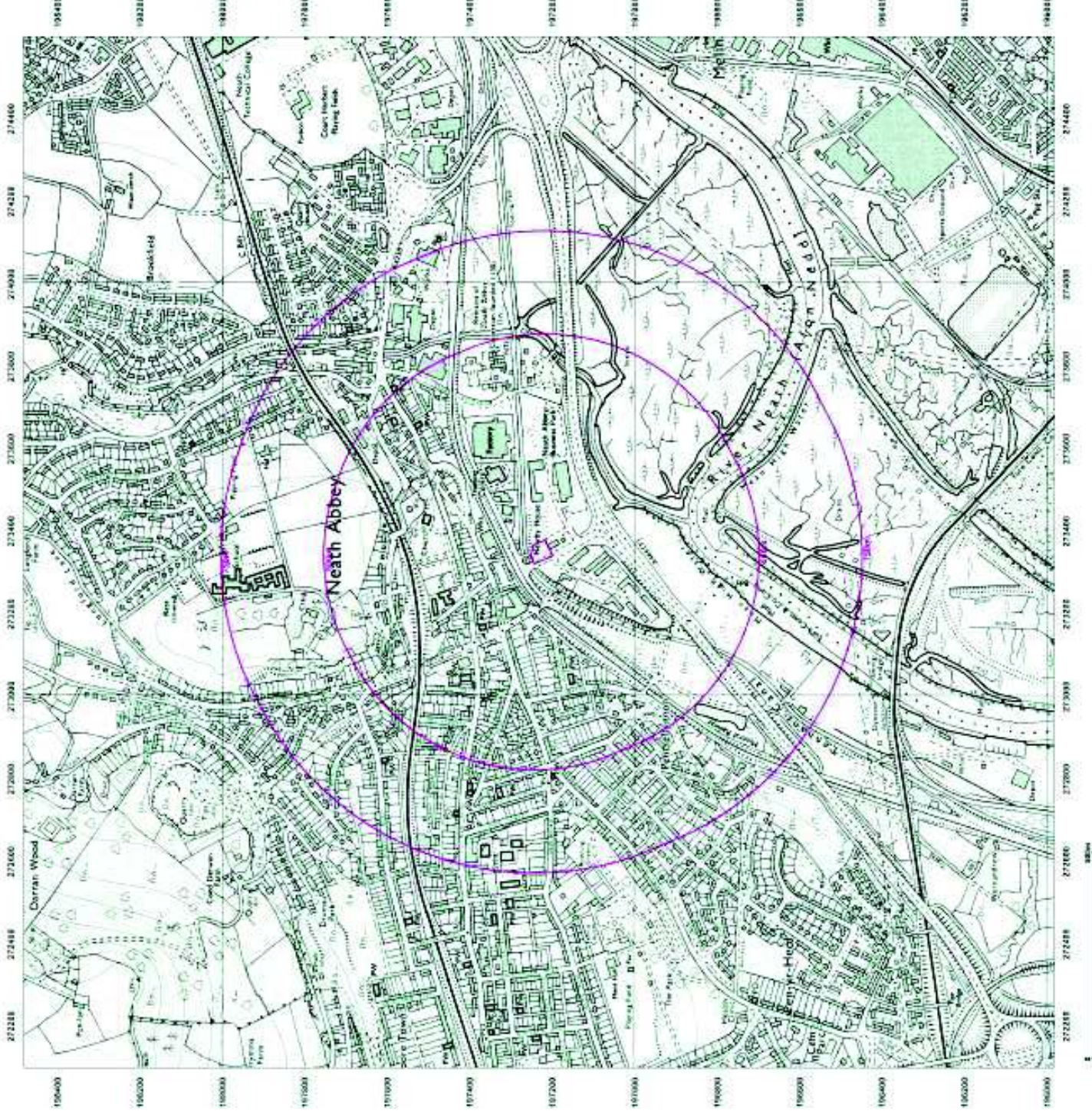


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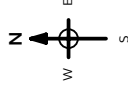
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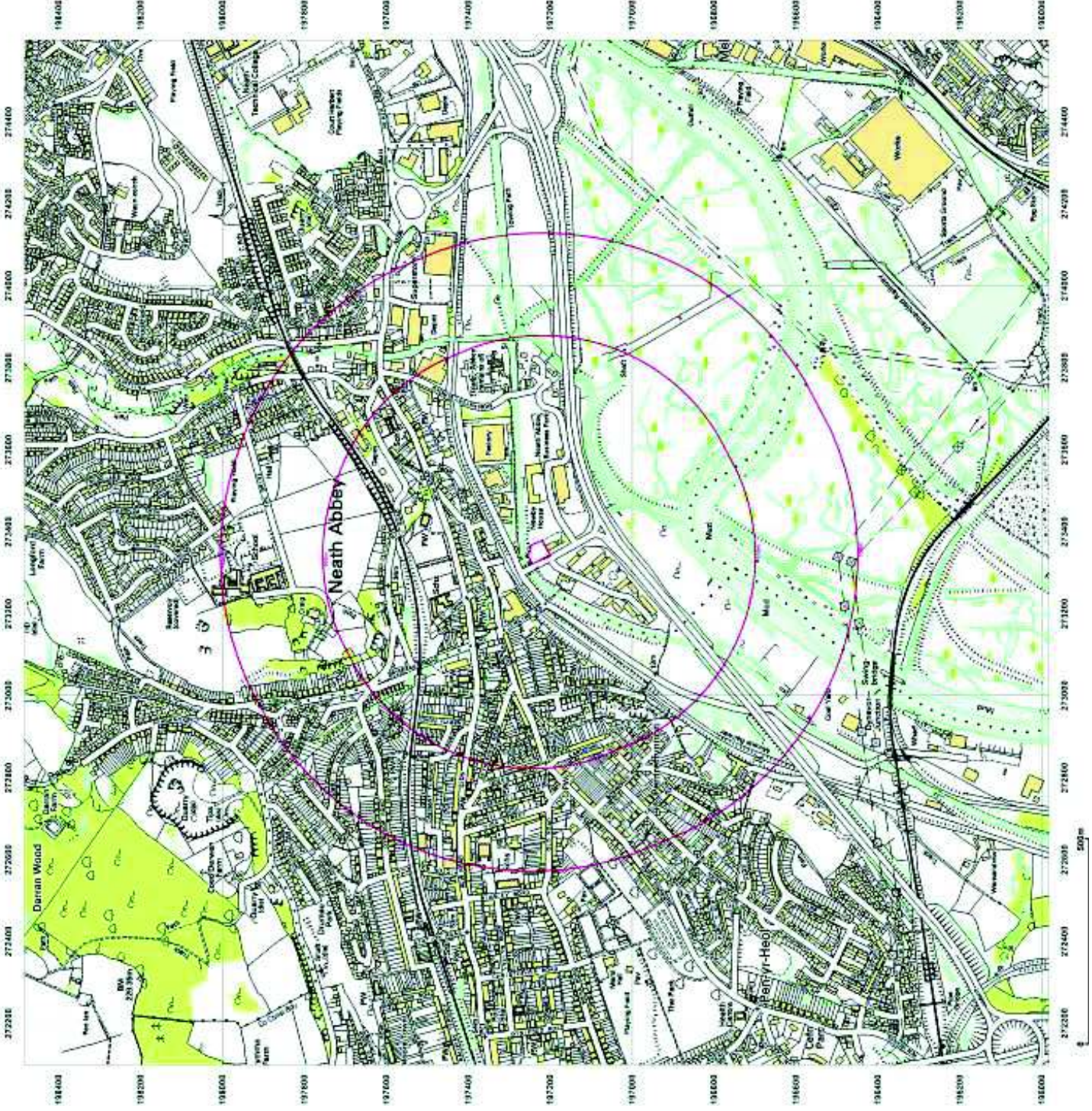


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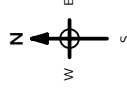
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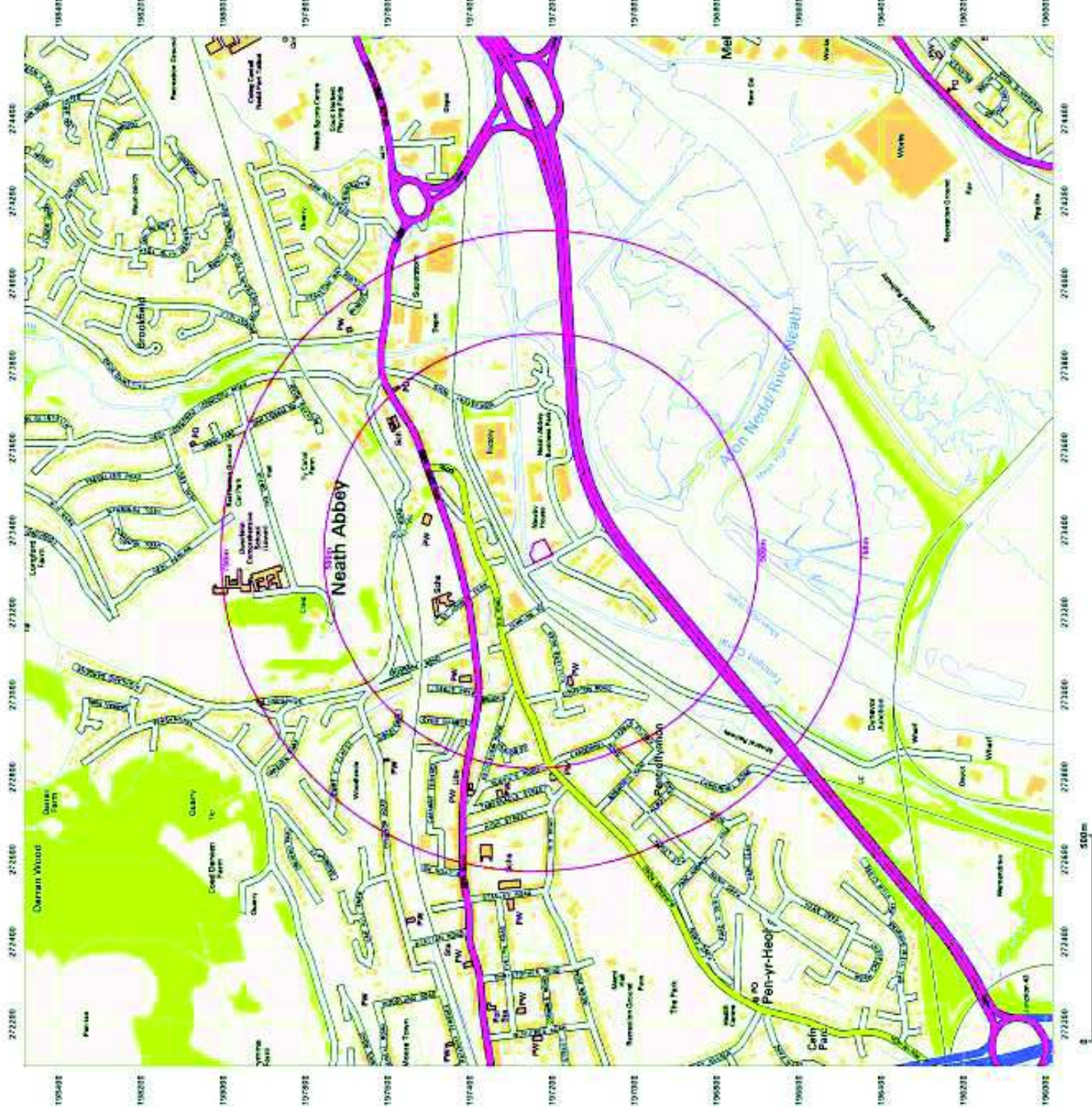


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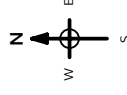
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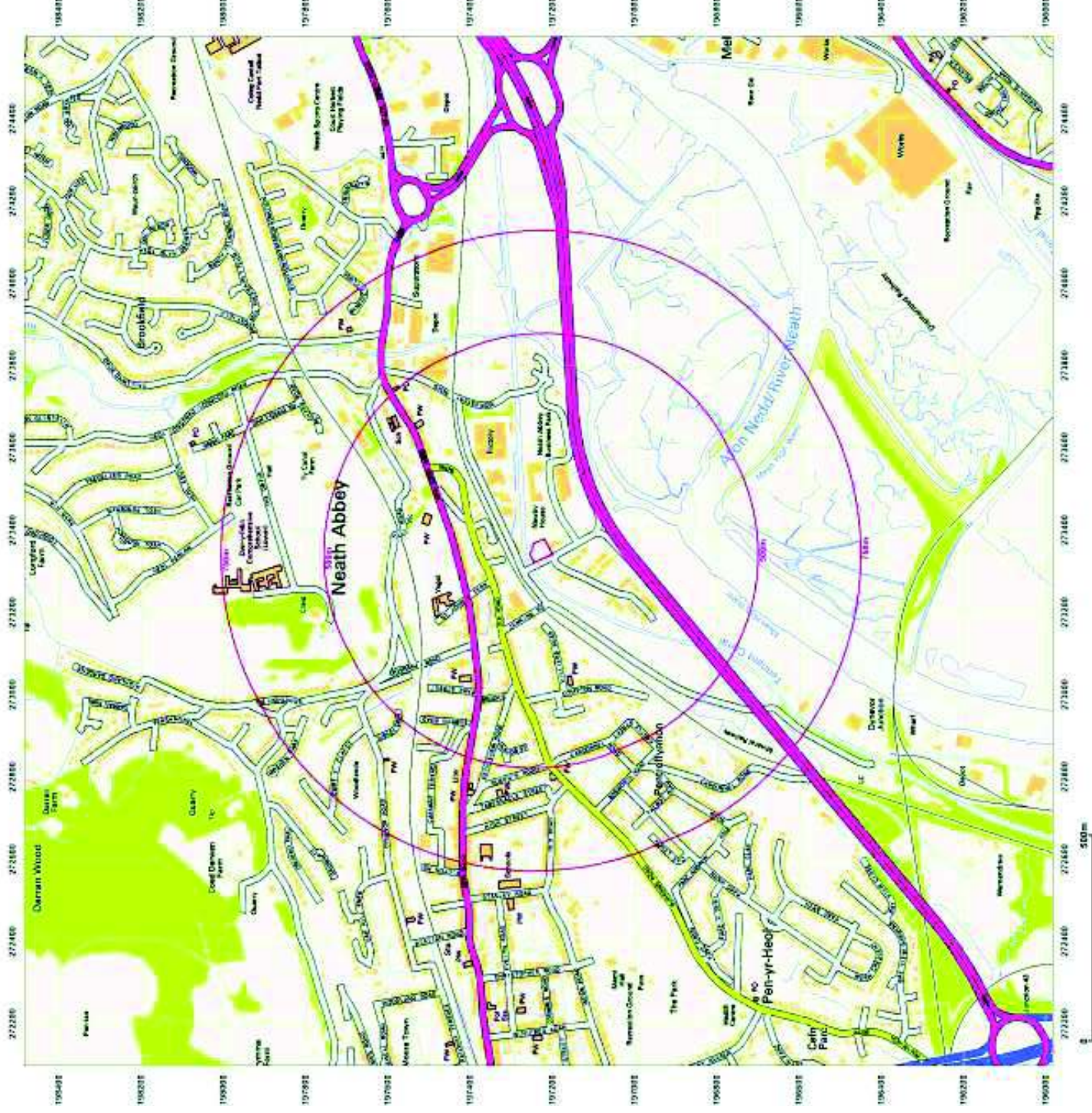


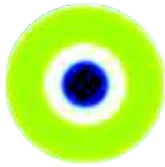
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GroundSure

Historical Map Pack Legend

County Series

1:1,250 scale



County Series & National Grid

1:2,500 scale

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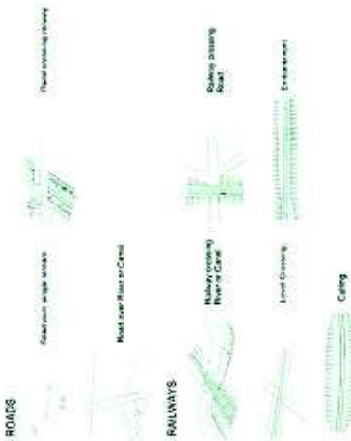
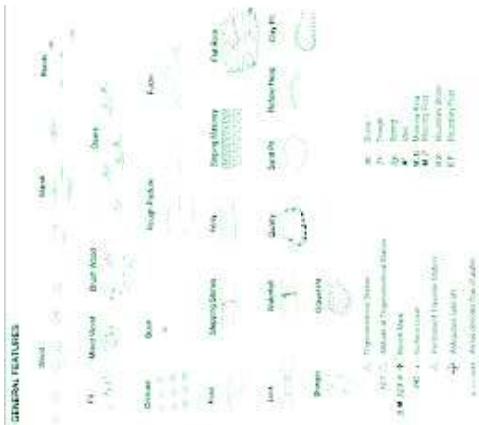
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Technical Helpline:

Tel:01273 819 700

maps&data@groundsurre.com
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National Grid 1:2,500 / 1:1,250 scale





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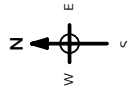
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Grid Ref: 273349, 197233

Map Name: County Series

Map date: 1876-1881

Scale: 1:2,500

Printed at: 1:2,500



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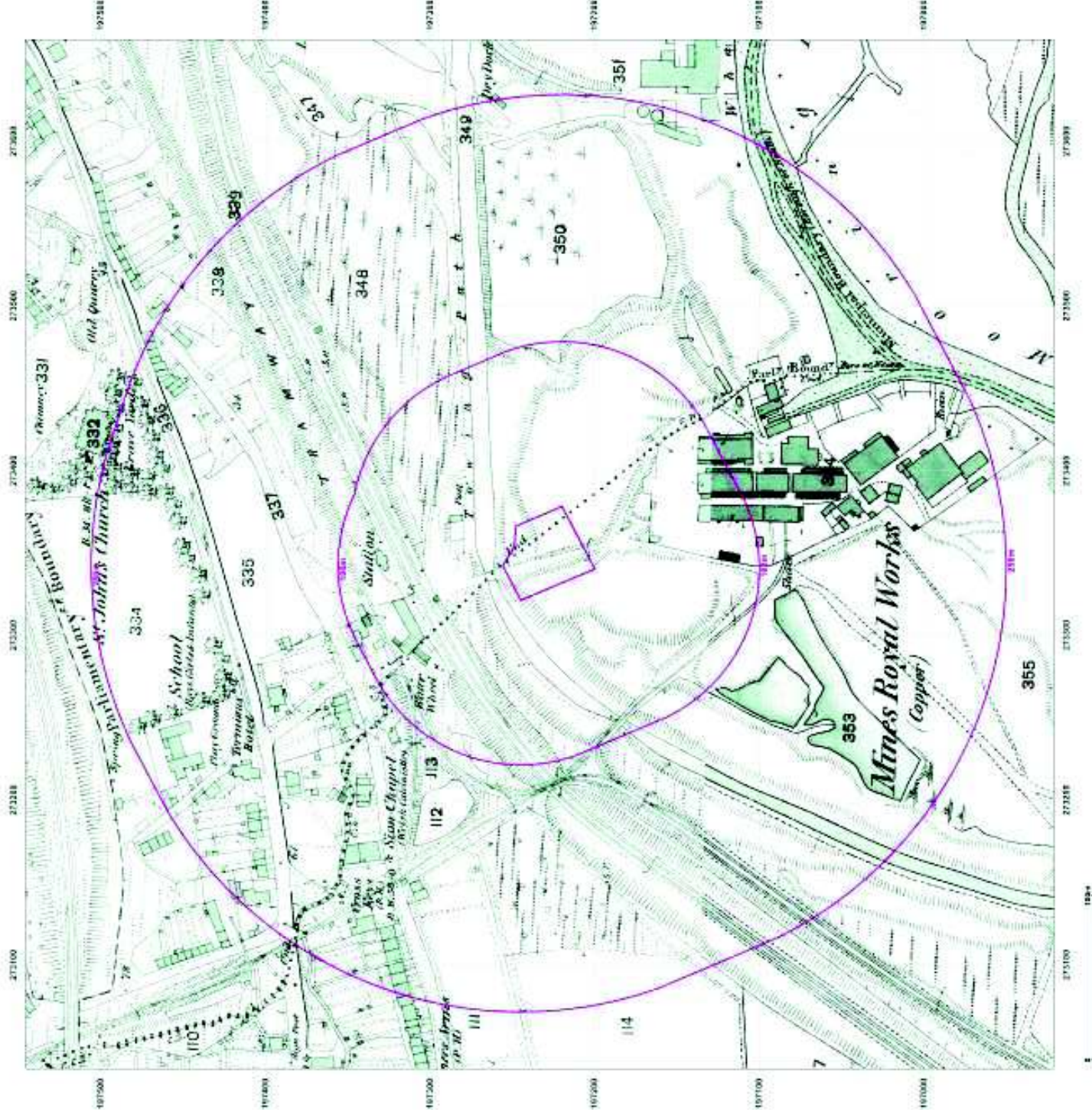


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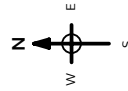
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Grid Ref: 273349, 197233

Map Name: County Series

Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



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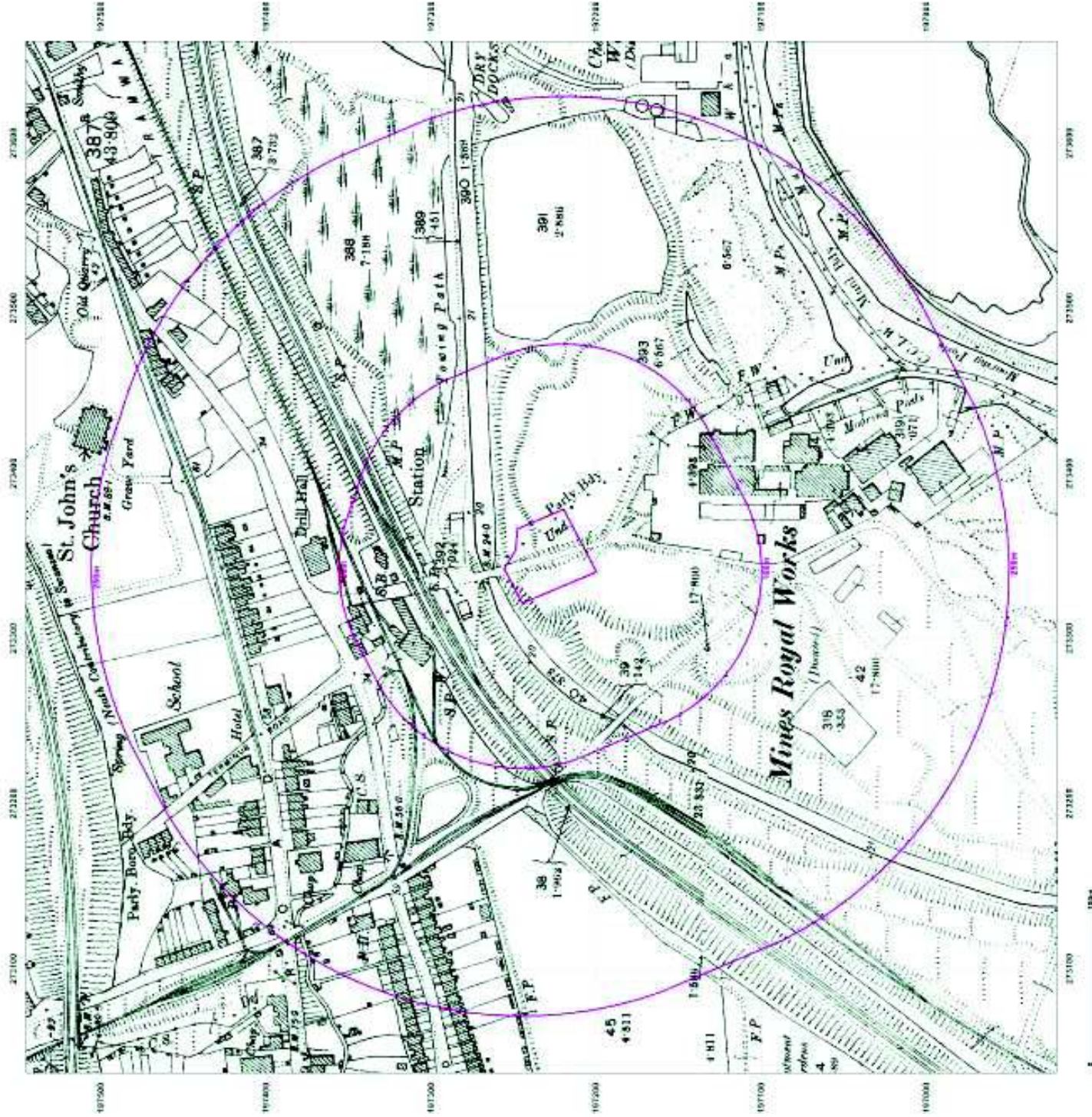


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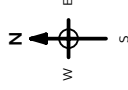
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Report Ref: HMD-213-2060609
Grid Ref: 273349, 197233

Map Name: County Series

Map date: 1918

Scale: 1:2,500

Printed at: 1:2,500



Survived 1918
Revised 1918
Edition N/A
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Landed N/A



Survived 1916
Revised 1916
Edition N/A
Copyright N/A
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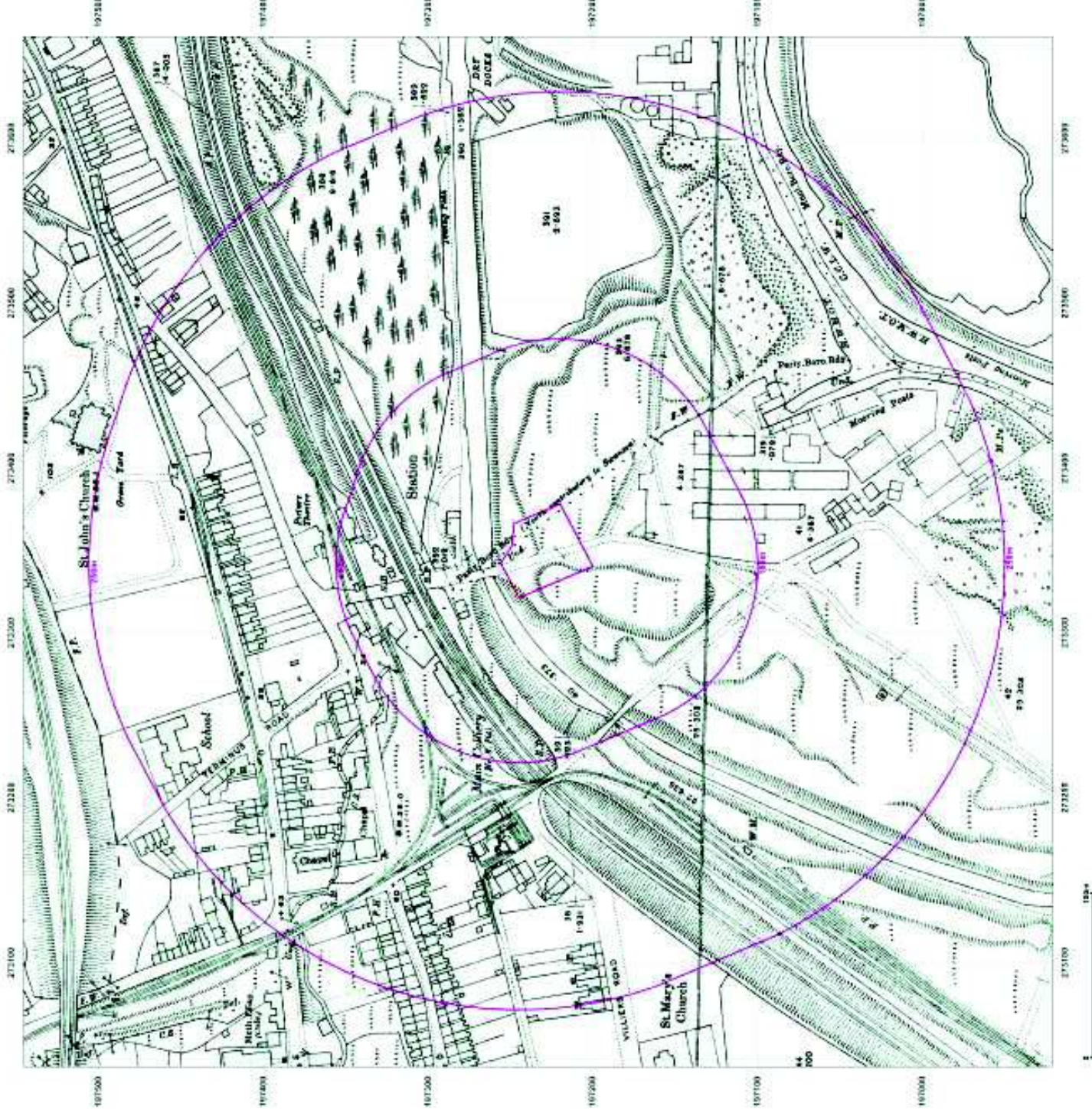


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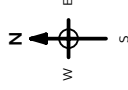
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Report Ref: HMD-213-2060609
Grid Ref: 273349, 197233

Map Name: County Series

Map date: 1940

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1940
Revised 1940
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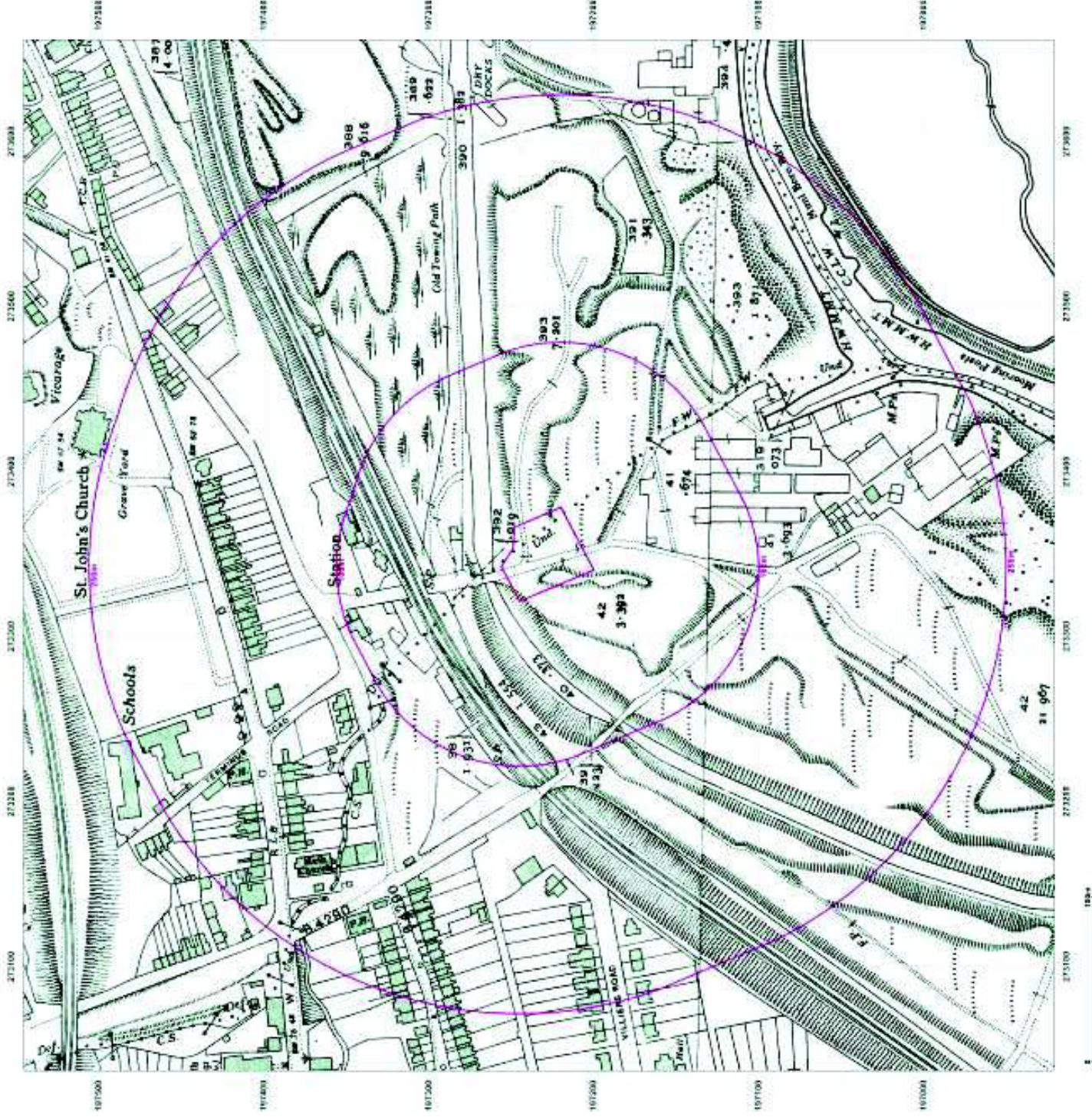


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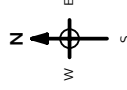
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Report Ref: HMD-213-2060609
Grid Ref: 273349, 197233

Map Name: National Grid

Map date: 1950

Scale: 1:1,250

Printed at: 1:2,000



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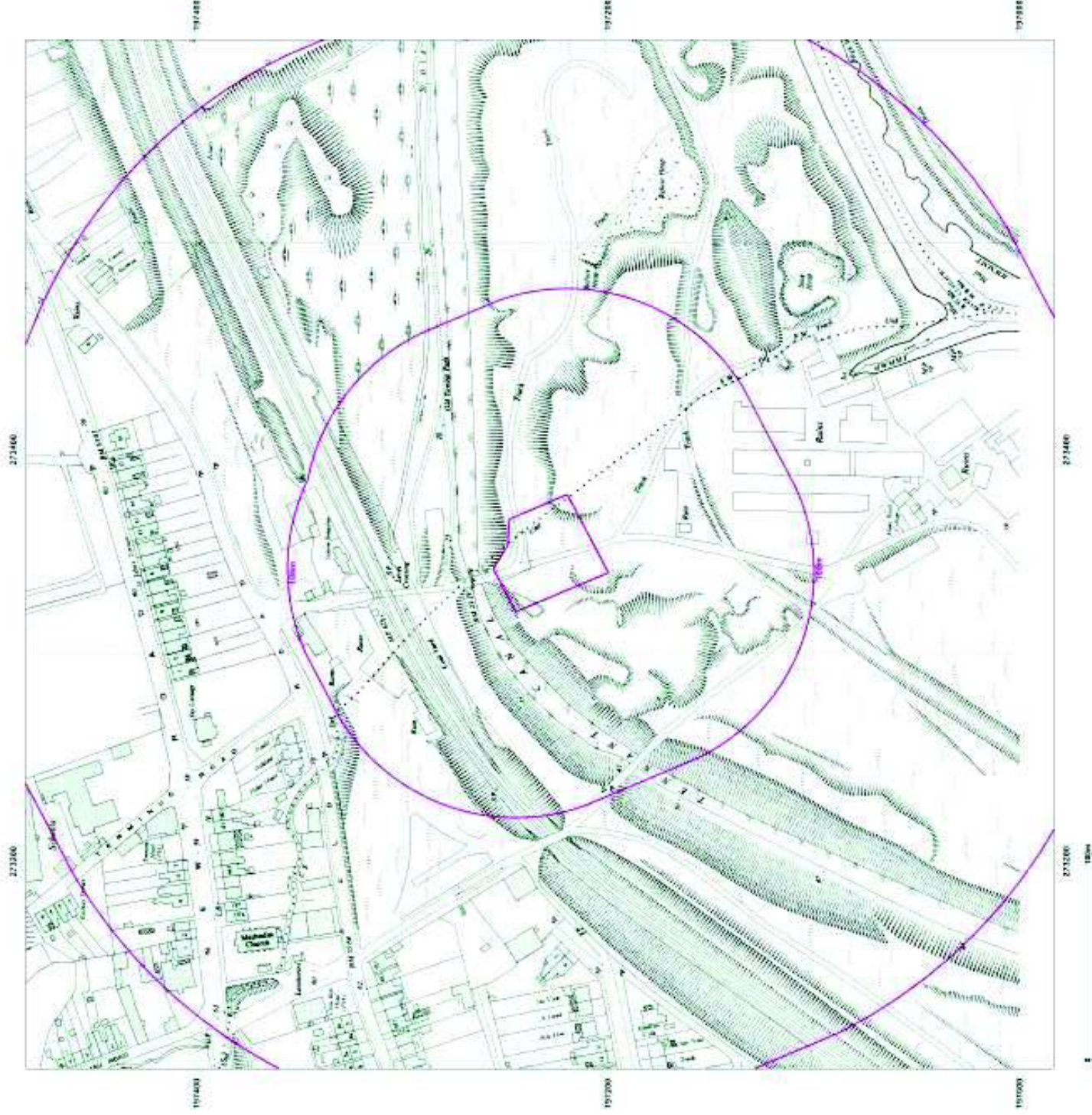


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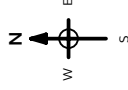
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Report Ref: HMD-213-2060609
Grid Ref: 273349, 197233

Map Name: National Grid

Map date: 1950

Scale: 1:2,500

Printed at: 1:2,500



Survived 1950
Revised 1950
ED800 N/A
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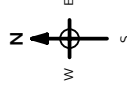
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Map Name: National Grid

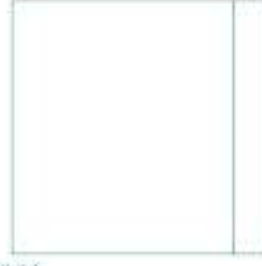
Map date: 1962

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1962
Harvested 1962
Edited 1964
Copyright 1964
Licensed 1967



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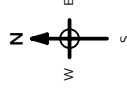
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Grid Ref: 273349, 197233

Map Name: National Grid

Map date: 1964

Scale: 1:1,250

Printed at: 1:2,000



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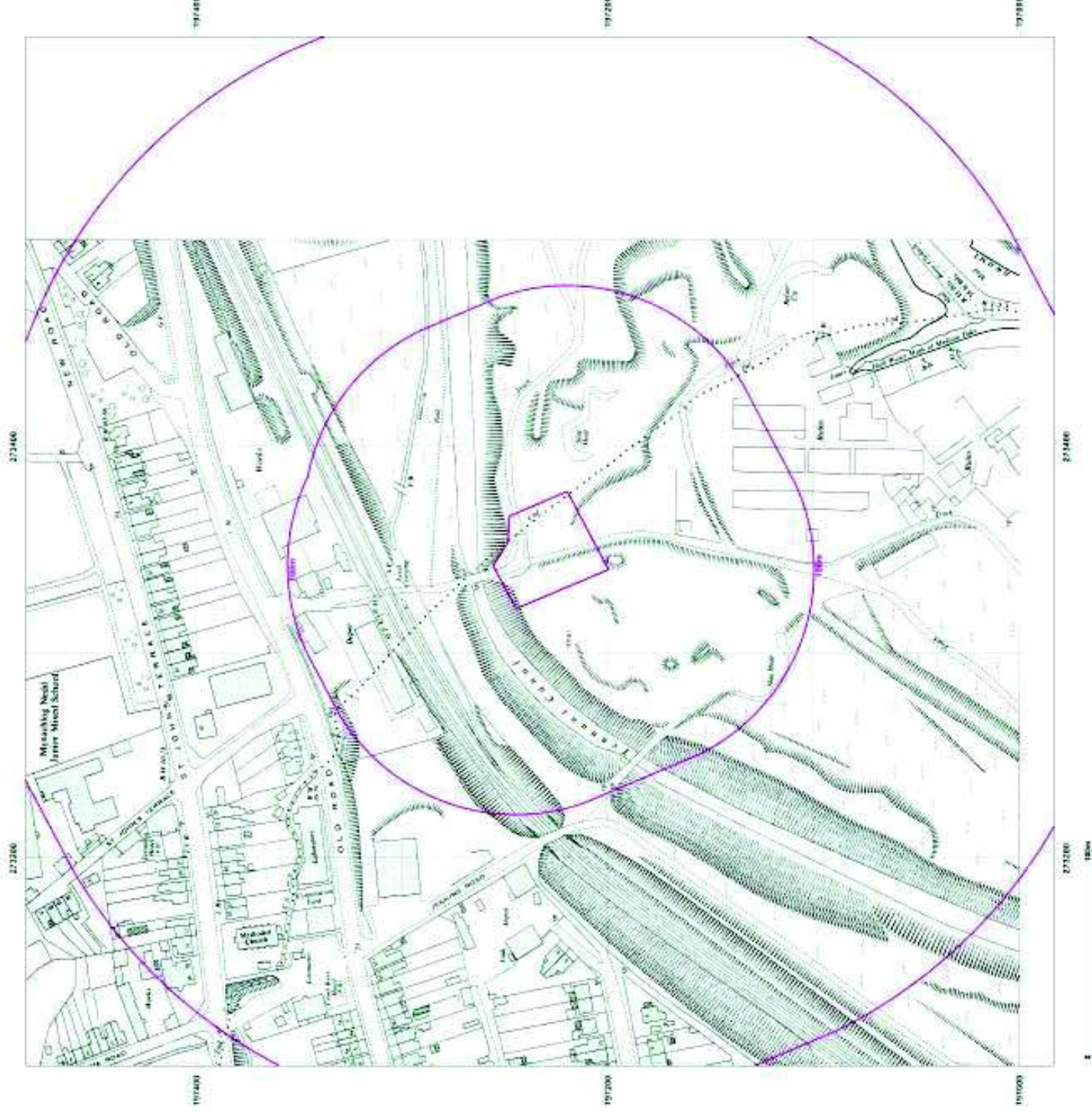


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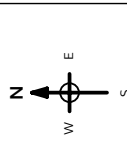
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Client Ref: G641
Report Ref: HMD-213-2060609
Grid Ref: 273349, 197233

Map Name: National Grid

Map date: 1970-1971

Scale: 1:1,250

Printed at: 1:2,000
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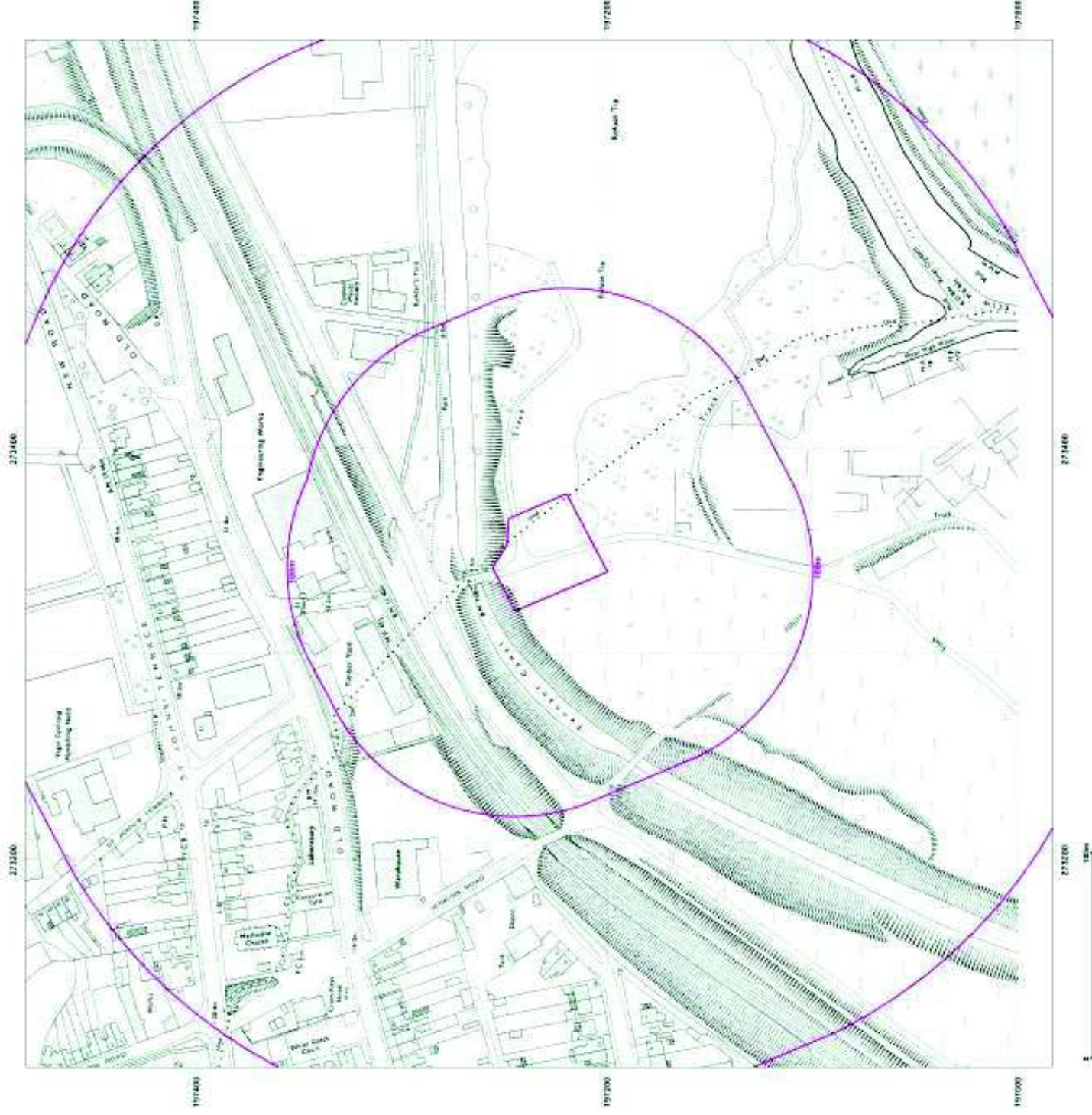
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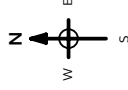
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Report Ref: HMD-213-2060609
Grid Ref: 273349, 197233

Map Name: National Grid

Map date: 1984-1986

Scale: 1:1,250

Printed at: 1:2,000



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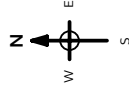
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Grid Ref: 273349, 197233

Map Name: National Grid

Map date: 1989

Scale: 1:1,250

Printed at: 1:2,000



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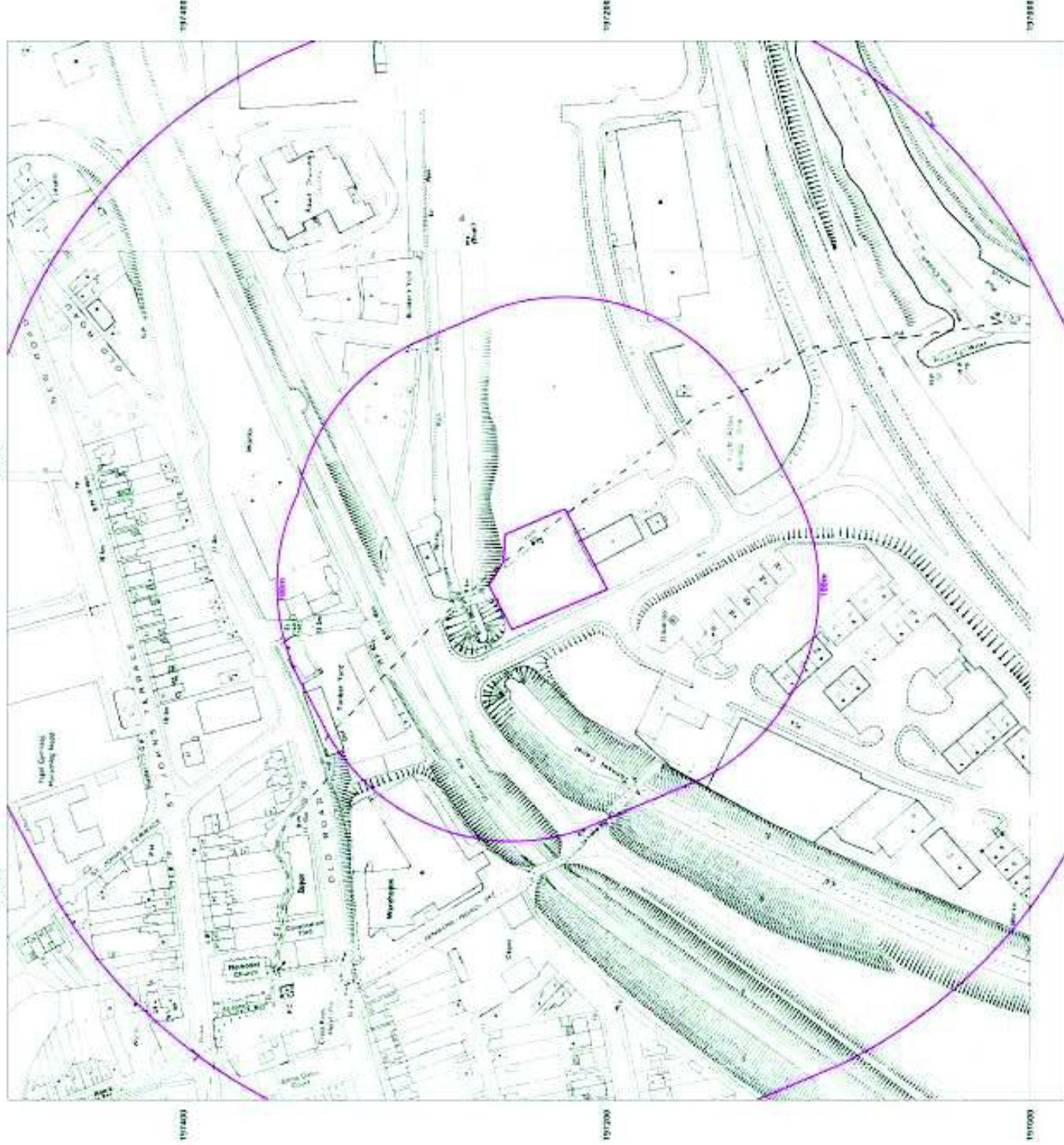


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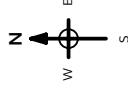
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Grid Ref: 273349, 197233

Map Name: National Grid

Map date: 1993

Scale: 1:1,250

Printed at: 1:2,000



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