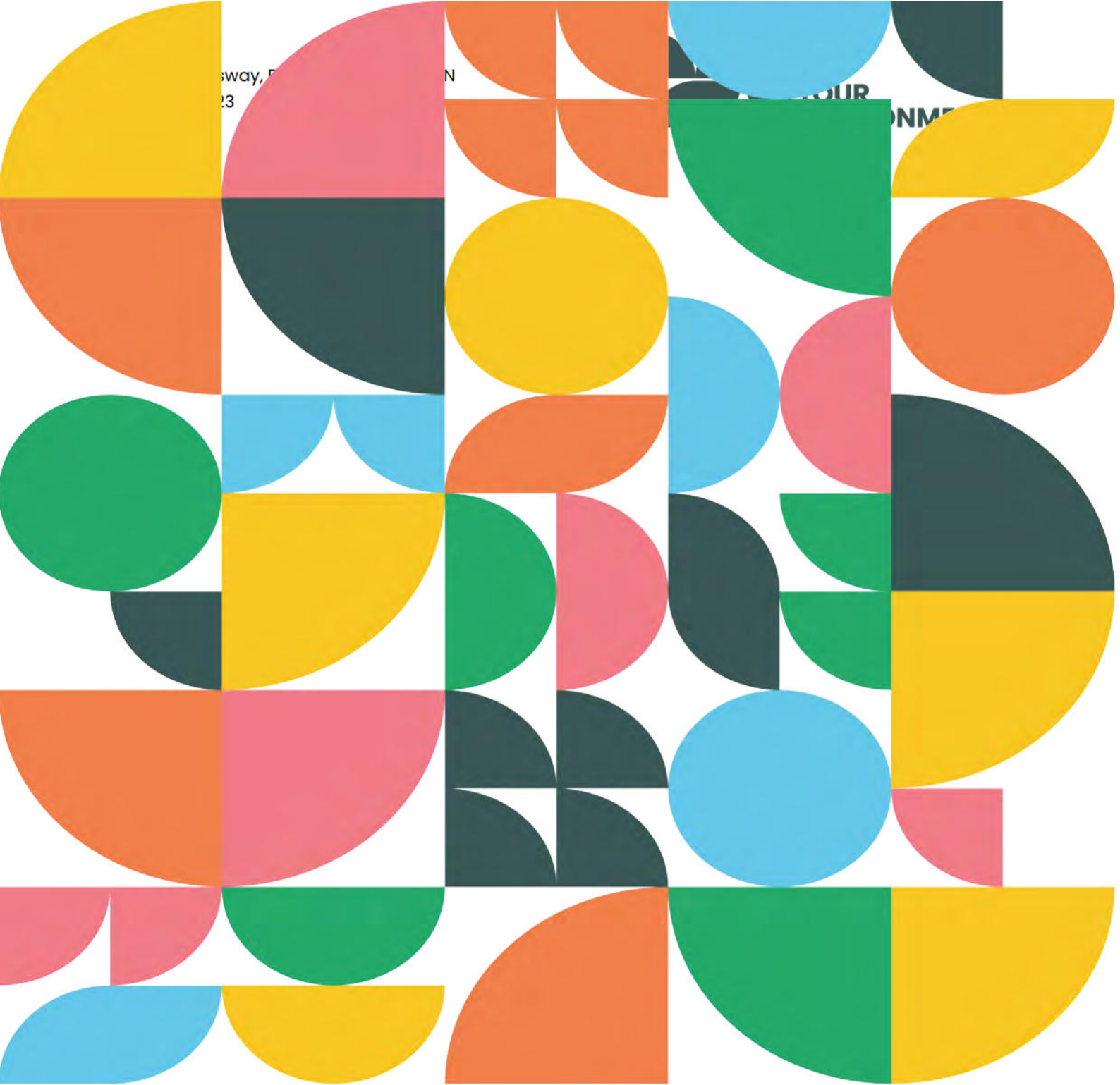




**Phase 1 and 2 Geoenvironmental and
Geotechnical Assessment**

YEX2909 – 57 Queensway, Bognor Regis

PO211QN

February 23

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Issue	Date	Description	Contributors	Responsible	Authorised
00	15 February 2023	Final Report	LB	JR	MB

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Executive Summary

The below presents a snapshot of the geotechnical and geoenvironmental recommendations for the proposed development. It is advised that the report is read in its entirety to gain a better understanding of our recommendations.

The proposed redevelopment comprises the construction of a 2 storey block of 16no. residential apartments incorporating areas of soft landscaping and car parking.

Preliminary Geotechnical Recommendations

The proposed development is likely to be capable of being constructed on conventional shallow strip or spread foundations at depths of 1.0m below finished ground levels in natural clay of at least firm consistency. It is considered that the strip or spread foundations constructed within the underlying natural firm clay could be designed assuming an allowable increase in load of the following:

Foundation Type	Strip Foundations (m)			Spread Foundations (m)		
Foundation Width	0.6	1.0	1.5	1.0	2.0	3.0
Foundation Depth (below finished levels)	1.0			1.0		
Allowable increase in stress (kN/m ²)	100	95	90	110	100	95

Foundations may need to be deepened in accordance with current guidance where within influencing distance of existing or proposed trees or mitigation measures required against volume change potential of cohesive soils. The volume change potential of the natural clays is confirmed as medium.

However, it is recommended that additional deeper geotechnical intrusive investigation is undertaken at the site to confirm the nature and strength of the underlying soils. A change to the proposed development or increase in the number of storeys may necessitate the use of a piled foundation. Site enabling works will involve the removal of the former decommissioned USTs to a significant depth and require engineered backfilling of the resultant excavation. Such circumstances may require deep pads or a piled foundation solution with spanning ground beams.

The use of a suspended floor slab is considered appropriate.

Laboratory testing can be summarised as:

	Minimum	Maximum	Design Sulphate Class	ACEC Class
Water Soluble Sulphate	<10mg/l	672mg/l	DS-1	AC-1
Total (Acid Sulphate)	0.01%	0.07%		
pH	7.2	9.4		
Total potential Sulphates	<0.01%	0.09%		

Natural Moisture Content Range	13-19%
Modified Plasticity Index Range	15-20%
NHBC Volume Change Potential	Low to Medium

Contamination Recommendations

Further Works Required

We have identified a soil contamination and ground gas/vapour risks at the study site. Given the proposed sensitive residential end use, mitigation works will be required during site redevelopment.

Contaminant Found	
Soil – Metals	X
Soil - Hydrocarbons	✓
Soil – Asbestos	X
Water – Metals	✓
Ground Gas	✓

Introduction

Your Environment (YE) was instructed by HJP Ltd to prepare a combined Phase 1 and 2 Geoenvironmental and Geotechnical Assessment at a site located at 57, Queensway, Bognor Regis PO21 1QN.

The Phase 2 intrusive investigation has been undertaken based on the information identified in the Phase 1 Desktop Study and seeks to address the potential pollutant linkages identified within this report, update the Preliminary Conceptual Site Model (CSM) together with defining geotechnical parameters to assist with design of the development, which is understood to be at pre-planning stage.

The plans for the redevelopment comprise a 2 storey block of 16no. residential apartments incorporating areas of soft landscaping and car parking. The current and proposed development plans can be viewed in Appendix A.

The objectives of this report are to:

- Establish the environmental setting, including sensitivity in relation to human health, surface water, groundwater and ecological receptors
- Review historical and recent uses to assess the potential for contamination to be present from past and current land-use
- Assess by qualitative means the potential nature and extent of contamination from those uses and the environmental risk and liabilities which may affect the site redevelopment
- Identify the prevalent source-pathway-receptor linkages present on site by means of a Tier 1 Contamination Risk Assessment which incorporates the formulation of a Conceptual Site Model (CSM)

During the production of this report the following information sources have been utilised:

- Data obtained from Groundsure
- Historical Ordnance Survey (OS) mapping
- Site walkover
- Zetica bomb risk maps
- Historic and recent planning permissions on the Arun District Council Planning Portal
- Site specific information provided by the client.

The full information from these sources can be reviewed within Appendices A, B, C and D.

The works comprised of the following:

- Four (4no.) shallow mini percussive boreholes to a maximum depth of 4.0m
- Laboratory testing for a general suite of contaminants, sulphates, pH and plasticity
- Ground gas monitoring and assessment

The study site is currently operating as a hand car wash premises with a canopy in the east and buildings in the northern part of the site. It is located in a mixed commercial and residential area.

We are content that as a result of these works, we have characterised the ground conditions and the potential for contamination to exist on the site.

The information contained in this report is intended for the sole use of the named client (or their approved contractors). Should any part of this report be relied on by a third party, that party does so wholly at its own risk and YE disclaims any liability to such parties. Should the purposes for which the report is used, or the proposed use of the site change, this report may no longer be valid and further use of, or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. YE should, in all such altered circumstances, be commissioned to review and update this report accordingly.

Planning History

A review of the available information on the Arun District Council Planning portal suggests there is a limited planning history for the postcode 'PO21 1QN' within the last decade. It is also possible that the study site may be categorised as being within 'PO21 1QW', and as such as search was conducted for this postcode as well.

Historic applications for the study site include:

- A 2011 application (ref: BR/314/11/) to change of the use of vacant offices to a car washing and valet facility (which the site currently functions as) was approved conditionally in 2012. None of the conditions related to contaminated land.
- A 2013 application (ref: BR/5/13/) for the re-location of an existing vehicular access as well as the installation of a canopy and a screen. This was approved conditionally, though none of the conditions related to contaminated land.
- A 2004 application (ref: BR/124/04/) for the change of use from offices to a glass and PVCu products merchants with an associated skip area. This was approved conditionally, though none of the conditions related to contaminated land.
- All other records were deemed irrelevant in the context of this study based on the nature of the applications being for minor property amendments including change of use and illuminated signs, as well as the age of the applications.

In addition, a search was conducted using older records pre-dating the 21st century to determine the history of the study site as a garage. An application (ref: BR/41/48/D) for a petrol filling station at 'Queensway/Crescent Road' (which likely refers to the study site as it is placed on the boundary between the two localities) was identified on the planning portal as having been granted in September of 1961. No associated documents were available. It is assumed that the following applications are associated with this development (though no documents were available to verify this information):

- An additional pump to the petrol filling station (ref: BR/41/48/AH) was approved in December of 1961 and is likely associated with the aforementioned petrol station.
- A paraffin dispenser was approved May 1965 (ref: BR/41/48/BU).
- Installation of a 600 gallon paraffin storage tank and vending machine (ref: BR/118/70), as approved in April 1970.

All other applications were deemed irrelevant in the context of this study based on the nature of the applications being for minor developments, as well as the status of the applications and their age.

Site Information

As part of a Phase 1 Desk Study or Preliminary Risk Assessment, a comprehensive review of the site together with its history and environmental setting is presented in the following sections.

A summary of the site information is provided in the table below:

Site Address	57, Queensway, Bognor Regis PO21 1QN.
Grid reference	493413 099187
Size of study site	0.03 hectare (ha).
Topography	The site is generally level.
Current Site Use	The study site is currently operating as a hand car wash premises with a canopy in the east and buildings in the northern part of the site. It is located in a mixed commercial and residential area.
Access	The site is accessible to the east of Crescent Road and northeast of Queensway.

Petroleum Licensing Officer Enquiry

An enquiry was made to West Sussex County Council Trading Standards via email. A response was received on 10th January 2023 confirming that the former Queensway Filling Station located on the site comprised 5no. underground fuel tanks (USTs), which were decommissioned in 1999 by infilling with concrete slurry. However, it is not known whether these tanks have since been removed or what volumes they held. A copy of the correspondence with West Sussex County Council Trading Standards is provided as Appendix B.

Environmental and Geological Setting

Information on the environmental and geological setting of the site is presented in Appendix C.

Site Geology

Site geology has been assessed using information from British Geological Survey (BGS) mapping and is summarised below:

Artificial/Made Ground	There are no records of artificial or Made Ground underlying the site.
Superficial Ground and Drift Deposits	The superficial ground deposits underlying the study site comprise River Terrace deposits (silt).
Bedrock Geology	Underlying the superficial drift deposits is bedrock comprised of the London Clay Formation (clay, silt and sand).
Landslips	There are no records within 50m
Linear Features	There are no records within 500m

The following hazard ratings on site are:

Shrink swell clays	Low
Running sands	Low
Compressible deposits	Negligible
Collapsible deposits	Low
Landslides	Very low
Ground dissolution	Negligible

Site Hydrogeology and Hydrology

These records are derived from Environment Agency and BGS data. Details of the source and coverage of specific records are provided in Appendix C.

Principal Aquifer	Layers with high intergranular and/or secondary permeability capable of supporting water supplies at strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Major Aquifers
Secondary (A) Aquifer	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. These are generally aquifers formerly classified as Minor Aquifers
Secondary (B) Aquifer	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water bearing parts of former Non-Aquifers
Secondary Undifferentiated Aquifer	Layers that cannot be attributed to a category A or B rock type. These layers could have previously been described as a minor or a non-aquifer due to their variable characteristics
Unproductive strata	Rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

Aquifer and geological permeability are summarised below:

Aquifer within Superficial Deposits	Due to the superficial geology on site, the River Terrace deposits are designated as a Secondary (A) Aquifer
Permeability of Superficial Deposits	The minimum permeability is recorded as being low with the maximum permeability recorded as being high.
Aquifer within Bedrock Geology	As a result of the bedrock geology on site, the London Clay Formation is designated as being Unproductive.
Water Framework Directive	There are no records within 250m of the study site.

Groundwater Bodies	
Permeability of Bedrock Deposits	The minimum permeability is recorded as being very low with the maximum permeability recorded as being low
Groundwater Vulnerability	The groundwater vulnerability in the vicinity of the site is classified as high due to the productive aquifers underlying the site.
Groundwater Abstraction Licences	There are no records of groundwater abstractions within 1000m of the study site.
Surface Water Abstraction Licences	There are no records of surface water abstractions within 1000m of the study site.
Potable Water Abstraction Licences	There are no records of potable abstraction licences within 1000m of the study site.
Source Protection Zones	There are no records within 250m of the study site.
OS Water Network	There are no records within 250m of the study site.
Surface Water Features	There are no records within 250m of the study site. However, the English Channel is approximately 500m south of the site.
Water Framework Directive Surface Water Bodies and Catchments	The study site is within the Aldingbourne Rife (GB107041011980) Water Framework Directive surface water body catchment.
Flood Risk	There are no records of river and coastal flooding within 250m of the study site. A negligible risk of surface water flooding was identified onsite and a risk of 1 in 1000 years (at 0.1-0.3m depth) was identified within a 50m radius. Moderate risk of groundwater flooding was identified onsite and within 50m of the study site. Groundwater flooding trends tend to exhibit a longer duration than surface water flooding, possible lasting for weeks, or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Environmentally Sensitive Areas

These records are derived from Environment Agency, Natural England, Historic England, English Heritage, Forestry Commission and UK Government data. Details of the source and coverage of specific records are provided in Appendices.

Environmental and Habitat Designations	The site is designated as a SSSI Impact Risk Zone.
Visual and Cultural Designations	There are three (3no) grade II listed buildings within 250m of the study site, located 166m northwest, 203m north and 224m southeast. The Bognor Regis (Railway Station) and Bognor Regis (The Steyne and Waterloo Square) Conservation Areas were identified 123m north and 156m south, respectively.

Past Land Use and Potential Contaminant Sources

Information on past land use and potential contaminant sources is presented in Appendix C.

Land Use Records

These records are derived from historical mapping and each record corresponds to a particular map revision date.

Historical land use records are summarised below:

Land Use	Distance and Direction	Sources Summary
Garage	On site (1968) 203m southeast	Y

Current land uses are summarised below:

Land Use	Distance and Direction	Sources Summary
Gas works	147m and 153m west 170m west	Y
Railway features (16)	167m and 237m north 244m northeast	Y

Land Use	Distance and Direction
Historical gasometers	Five (5no) records of gasometers located between 189m-227m west.
Historical Industrial Sites	An unspecified commercial/industrial site 151m west.
Historical and Recent Tanks	There are nineteen (19no) records of historical and recent tanks, the nearest of which are 79m south, and 93m and 105m southeast. All further records are over 190m from the study site.
Historical Energy Features	Three (3no) records of gas depots 201m-202m west (assumed to be the same depot)
Water Infrastructure	Water pumping station 127m northeast
Historical Petrol Stations	There is a single record of an historical petrol station at the study site.

Historical Garages	There is a single record of an historical garage at the study site for 1968.
Civil Engineers	Civil engineers 224m northeast.
Airline Related Industry	Airlines and airline services 232m east.

Environmental Permits, Incidents and Registers

These records are derived from local authority, Health and Safety Executive and Environment Agency data. Details of the source and coverage of specific records are provided in the Appendices.

These data are summarised below:

Sites Determined as Contaminated Land	There are two (2no) licensed pollutant release records for dry cleaning located 70m southeast and 138m north as determined as contaminated land under Part 2A of the Environmental Protection Act 1990 within 250m of the study site.
Control of Major Accident Hazards (COMAH)	There are no records within 250m of the study site.
Regulated Explosive Sites	There are no records within 250m. Note that details of some sites may be redacted for security reasons
Planning Hazardous Substances Consents	There are no records within 250m of the study site.
Historic IPC Licensed Activities	There are no records within 250m of the study site.
Part A (1) Licensed Activities	There are no records within 250m of the study site.
Part A (2)/B Licensed Activities and Pollutant Release	There are no records within 250m of the study site.
Radioactive Substance Authorisations	There are no records within 250m of the study site.
Licensed Discharges to Controlled Waters	There are three (3no) sewage discharge records for sewer storm overflow located 339m southeast of the study site.
Pollutant release to Surface Waters (Red List)	There are no records within 250m of the study site.
Pollutant Release to Public Sewer	There are no records within 250m of the study site.
List 1 and List 2 Dangerous Substances	There are no records within 250m of the study site.

Substantiated Pollution Incidents	A single pollution incident (dated 2001) for household waste was identified 156m east and was noted to have a minor impact to land. An oil pollution incident was identified 284m north which has minor impacts to water and land. Two (2no) pollution incidents were identified 311m north for incidents involving cyanides and grey water
Pollution Inventory Substances	There are no records within 250m of the study site.
Pollution Inventory Waste transfers	There are no records within 250m of the study site.
Pollution Inventory Radioactive Waste	There are no records within 250m of the study site.

Waste and Landfill

These records are derived from Environment Agency, BGS, OS and local authority data. Details of the source and coverage of specific records are provided in the Appendices.

Active or Recent Landfill	There are no records within 500m.
Historic Landfill	There are no records within 500m.
Non-Landfill Waste Records	There are no records within 250m.

Mining, Ground Workings and Natural Cavities

These records are derived by from BGS, OS, Coal Authority, Peter Brett Associates, Johnson Poole and Bloomer, Cheshire Brine Subsidence Compensation Board, British Gypsum, Mining Searches UK, Kaolin and Ball Clay Association and local authority data. Details of the source and coverage of specific records are provided in the Appendices. The data are summarised below:

Natural Cavities	There are no records within 250m of the study site.
Mining Cavities	There are no records within 250m of the study site.
BritPits Data (Surface and Underground Mineral Workings)	There are two (2no.) records within 500m of the study site. Both relate to the Bognor Regis Brick Field between 213m west and 284m southwest and now ceased.
Historic Mineral Planning Areas	There are no records within 500m of the study site.
Surface Ground Workings	Two (2no.) historic records were identified for a brick field at 197m northwest and 219m southwest both in 1896.
Underground Workings	There are no records within 250m of the study site.
Coal Mining	There are no records held by the Coal Authority or by Johnson Poole and Bloomer within 250m.
Non-Coal Mining	There are no records within 1km of the study site.

Radon and Background Soil Chemistry

These records are derived by from BGS and Public Health England data. Details of the source and coverage of specific records are provided in the Appendices.

Radon

The study site is not located within a Radon Affected Area, as between 1% and 3% of properties are above the Radon Action Level. No radon protective measures are necessary for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment.

Background Soil Chemistry (estimated by BGS)

Arsenic	15 mg/kg
Bio-accessible arsenic	No data
Lead	100 mg/kg
Bio-accessible lead	60 mg/kg
Cadmium	1.8 mg/kg
Chromium	60-90 mg/kg
Nickel	15-30 mg/kg

Unexploded Ordnance (UXO)

The site is in an area considered to be at moderate risk from wartime unexploded ordnance. The Zetica bomb risk map is reproduced in Appendix E.

As such, it is recommended that a Preliminary UXO Risk Assessment is undertaken for the site.

Historic Mapping

The object of this search is to report on the evidence of site history and redevelopment of the site and its environs from available County Series, OS Maps and aerial photography.

Year	On site	Off site
1876 to 1898	Unspecified building encroaching onto east/southeast part of the site	Gas works 250m west
1898 to 1912	Significant part of unspecified building encroaching onto east part of site	No relevant changes
1912 to 1940	No discernible changes	Smithy 75m east
1940 to 1961	No discernible features	Bus depot 175m north
1961 to 1968	Site is undeveloped.	Car park 50m east Builders yard 50m west Bus depot/station 125m southeast
1968 to 1983	Majority of the site appears as undeveloped, a 'garage' building is now present in the northern part.	Depot 100m north Car park 100m south Garage 200m southeast
1983	All site is now titled 'garage'.	Works 50m northwest
1999	Central and southern parts of the site appear to be used for parking	No relevant changes
2012 to 2022	Unspecified building in northeastern part of site adjoining 'garage' building.	No relevant changes

The Historical OS Maps are available in Appendix D.

Walkover Survey

Date	20 th June 2022.
Weather	Dry and Sunny.
Current Use	The site is currently operating as a hand car wash premises with a canopy in the east and buildings in the northern part of the site.
Access	The site is accessible to the east of Crescent Road and northeast of Queensway.
Topography	The site is generally level.
Structures	The following buildings are present on the site: A 3 bay single storey brick built garage/workshop building with rear office in the northern part of the site. A temporary modular single storey office building. A canopy structure in the east of the site.
Ground Covering	The site entirely under formal surfacing comprising concrete and macadam.
Vegetated Areas	No vegetated areas are present on the site.
Drainage	Surface drainage covers were identified on the site.
Services	As the study site is currently operating as a business, it is assumed that the site has access to all utilities.

Direction	Boundary
North	Buildings
East	No defined boundary/low wooden fence/plastic screens
South	No defined boundary/low wooden fence
West	No defined boundary/low wooden fence/plastic screens

Direction	Surrounding Land Use
North	Residential properties
East	Residential apartments and retail premises
South	Car park
West	Residential properties and hotel

Potential on site sources:

- Historical use as a garage and filling station (underground fuel tanks) – heavy metals, TPH, PAH, BTEX, MTBE, SOCs, VOCs and associated contaminants
- Made Ground – various potential contaminants including heavy metals, TPH, PAH
- Potentially asbestos containing materials in building fabric

Potential off-site sources:

- None

Sources, Pathways and Receptors

Potential Sources

Source	Identified by	Location	Description
Hydrocarbon sources including garage and petrol filling station, and railway features	Groundsure report, walkover and historical mapping	On site 4m-244m northeast 50m-232m east 50m-250m west 50m southwest 50m northwest 100m-284m north 100m-249m south 125m-203m southeast	The main contaminants associated with these sources are hydrocarbons (TPH and PAH), heavy metals, BTEX/MTBE, and volatile and semi volatile organic compounds.
Historic developments	Historical mapping and walkover	On site	Potential for Asbestos Containing Materials due to the history of onsite development
Smithy	Historical mapping	75m east	A Smithy may be associated with heavy metals, PAH and TPH.
Tanks/Water Pumping Station/sewage discharges/pollution incidents	Groundsure report	79m south 93-339m southeast 311m north	Depending on the materials stored/transported, there could be a broad range of contaminants associated.
Dry cleaning records	Groundsure report	70m southeast 138m northeast	Potential sources of vinyl chloride
Gas works	Groundsure report and historical mapping	147m and 153m west 170m west	A gas works may be associated with heavy metals, PAH, TPH, coal tar, SVOCs, VOCs and cyanide. However, the source is at a distance that

			any impact is considered as negligible.
Ground workings	Groundsure report	197m northwest 231m west 284m-293 southwest	Depending on the material used for infill, there is potential for ground gas generation

The following contaminants are potentially associated with the on-site sources:

- Heavy Metals
- Potential Asbestos Containing Material (PACM's)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Volatile and Semi-Volatile Organic Compounds
- Benzene, toluene, xylene and ethylbenzene (BTEX)
- Methyl-tert butyl ether (MTBE)
- Gas – H (Hydrogen), CH₄ (Methane), CO (Carbon Monoxide), CO₂ (Carbon Dioxide) and H₂S (Hydrogen Sulphide)

The following contaminants are potentially associated with off-site sources:

- Heavy Metals
- Potential Asbestos Containing Material (PACM's)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Gas – H (Hydrogen), CH₄ (Methane), CO (Carbon Monoxide), CO₂ (Carbon Dioxide) and H₂S (Hydrogen Sulphide)
- Volatile and Semi-Volatile Organic Compounds
- Benzene, toluene, xylene and ethylbenzene (BTEX)
- Methyl-tert butyl ether (MTBE)
- Vinyl chloride

Pathways

Pathway	Medium	Properties
Direct Contact	Dust, solid and liquid phase	There may be direct contact with potentially impacted soil and Made Ground across the site. There is a possibility of dust fumes being produced during earthworks in the construction phase. Dermal contact and ingestion of

		potentially contaminated soils during construction or operational phase of the site.
Leaching through Made Ground	Unsaturated flow	Potential for leaching and migration of potential contaminants along preferential flow paths in the ground.
Foundations and Underground Infrastructure and Obstructions	Preferential flow	Contaminants will flow the path of least resistance which can be gaps around foundations, services, and floor construction
Migration of Ground Gas and Radon, including vapours	Gaseous flow	Infilled land material is likely to be variable in composition. Migration through granular material within superficial deposits is possible.

Receptors

Category	Receptor	Properties
Humans	End users (such as residents and visitors)	Potential contact with contaminated soils in proposed soft landscaping areas. Potential contact with ground gas/vapours within enclosed buildings
	Construction workers	Reworking of contaminant impacted materials in underlying soil during construction works can expose workers to contamination.
Property	Materials and site structures	Foundations and site services may be damaged by potentially aggressive compounds present in soils.
Controlled Waters	Underlying superficial / bedrock Aquifer and surface water	The site is recorded as having a Secondary (Secondary A) aquifer within the superficial deposits and an Unproductive aquifer within the bedrock deposits.
Plant (species and uptake) and Wildlife	Various	Attributes will be influenced by factors such as relative quality, scale, rarity and substitutability.

Preliminary Conceptual Site Model (CSM)

The assessment is undertaken based on the current proposals for the site.

Proposed Land use Assessment Criteria

Residential with homegrown produce

Any change in the development proposals for the site involving a change in end use class will result in a requirement for this assessment to be revised.

On Site						
Source	Pathways	Receptor	Severity	Probability	Risk	Justification
Made Ground possibly containing metals, TPH, PAH, BTEX, MTBE, VOC's and sVOC's	Ingestion, dermal contact, inhalation of dusts and vapours	Future end users and site visitors	Medium	Very likely	Moderate to High	Due to the commercial history on site, including that of a garage and petrol filling station, contamination of onsite soils may be possible and is considered likely. In addition, contact may be possible between future end users and shallow soils in areas of proposed soft landscaping.
		Construction Workers	Medium	Very likely	Moderate to High	Construction workers are likely to come into direct contact with soils during groundworks. Safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from
	Leaching through soils and migration via groundwater or soil pore moisture	Controlled Waters	Medium	Low likelihood	Moderate	A moderate risk has been assessed due to the vulnerability of the superficial Secondary (A) aquifer as high and a high maximum permeability of superficial River Terrace deposits.
	Permeation of water pipes	Construction materials, future end users and site visitors	Medium	Likely	Moderate	Hydrocarbons, especially aromatics are known to permeate plastic pipes. Given the commercial history of the site, including a garage and petrol filling station, a moderate risk rating has been assessed.



	Uptake	Plant and Wildlife	Mild	Low likelihood	Low	Uptake may be possible in areas of proposed soft landscaping although
Asbestos at/near ground surface in Made Ground	Inhalation of fibres in airborne dust	Future end users and site visitors	Severe	Unlikely	Moderate to Low	While no asbestos was identified within the study site, the history of onsite developments as far back as 1876, means that there may fibres of asbestos containing materials within the soils or existing building structures. YE are not asbestos specialists so the risk cannot be discounted.
		Construction Workers	Severe	Unlikely	Moderate to Low	A moderate/low risk rating has been assessed. Although likelihood of contamination is considered unlikely. Construction workers are likely to come into direct contact with soils. During subsequent normal groundworks, safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from residual asbestos in soils.
Ground Gases/vapours: from Made Ground: H, CH ₄ , CO, CO ₂ and H ₂ S	Gas migration and build up within buildings (explosion/asphyxiation risk)	Future end users and building structures	Severe	Likely	Moderate	The presence of historic underground fuel tanks and associated deep Made Ground presents a moderate risk from the generation of ground gases/vapours.



Off Site						
<i>Source</i>	<i>Pathways</i>	<i>Receptor</i>	<i>Severity</i>	<i>Probability</i>	<i>Risk</i>	<i>Justification</i>
Land uses in the vicinity possibly containing metals, TPH, PAH, VOC's and sVOC's	Leaching through soils and migration via groundwater or soil pore moisture	Future end users and site visitors	Medium	Likely	Moderate	Given the variable permeability of the underlying geology and hydrogeology, there is a likelihood for the leaching and migration of contaminants. This is combined with the history of commercial land use including railway features, a garage and a smithy.
	Ingestion, dermal contact, inhalation of dusts/vapours	Future end users and site visitors	Medium	Likely	Moderate	Given the variable permeability of the underlying geology and the proposed use of soft landscaping within the development, a moderate risk rating has been assessed.
Ground Gases: from Made Ground: H, CH ₄ , CO, CO ₂ and H ₂ S	Gas migration and build up within buildings (explosion/asphyxiation risk)	Future end users and building structures	Severe	Likely	Moderate	Sources including Britpits and ground workings identified within 250m of the study site could generate ground gas with the potential to migrate onto the study site.



Site Investigation

The following SI works were completed on June 20th, 2022, under the supervision of a Geo-Environmental Engineer from YE. In summary, the investigation included:

A two-man team ascertained the routes of any below ground services in close proximity to the proposed exploratory hole positions, using a CAT scan and lifting up of any man hole covers. Following the CAT scan, hand dug starter pits were completed to a depth of 1.2 metres below ground level (mbgl).

Four (4no.) windowless sampler boreholes (WS01-WS04) were completed, by means of an Archway rig, to a maximum depth of 4.0mbgl. The location of exploratory position was selected relative to the historic land use and current proposed redevelopment plans for the site.

The windowless sampler boreholes were logged with any groundwater conditions noted and representative soil samples removed in accordance with current guidelines.

Soil samples were removed from shallow sub surface locations, with further samples taken at depth every 1.00mbgl or when the underlying stratum changed. Samples were subsequently placed in suitable containers including 1kg tubs and 250ml glass jars and placed in cool boxes with cool packs prior to storage within our *in-house* laboratory fridges and then subsequent forwarding to our designated laboratory for analysis.

The position of exploratory holes in relation to the existing site layout can be reviewed within Appendix F and the logs are located in Appendix G.

Ground Gas and Groundwater Monitoring

Six (6no) rounds of ground gas and groundwater monitoring were carried out as part of the intrusive investigation works.

Ground Gas

Ground gas monitoring was carried out in accordance with the guidelines presented in CIRIA C665 'Assessing risk posed by hazard ground gases to buildings' using a GA5000 and involved the following steps:

Flow was monitored for a period of 60 seconds and maximum flow was recorded. Ground gases, including concentrations of methane, carbon dioxide, hydrogen sulphide and carbon monoxide were monitored for up to five minutes. During monitoring, ground gas readings were logged every thirty seconds.

Groundwater

During monitoring visit 3, groundwater was sampled where sufficient volumes were encountered.

Groundwater monitoring will be completed in accordance with BS6068:2009 Water Quality Sampling: Guidance on Sampling of Groundwater. A two phase dip meter will be used to determine the presence

of Light Non Aqueous Phase Liquids (LNAPL) and Dense Non Aqueous Phase Liquids (DNAPL). The monitoring well will be purged before a sample was taken and retained in appropriate glass bottles. The samples will be placed in a cool box prior to transit to the laboratory.

Geology & Ground Conditions

The following ground conditions were encountered during the works:

Macadam

A 100mm thick surface cover of Macadam was encountered in all of the boreholes.

Made Ground – Underlying the Macadam in all of the boreholes, Made Ground was encountered extending to a maximum depth of 1.0mbgl.

The Made Ground comprised blackish grey sandy cobbly GRAVEL with brick and concrete in WS01 and WS02. In WS03, the Made Ground comprised blackish brown clayey gravelly SAND with frequent brick fragments. The Made Ground in WS04 comprised brown sandy gravelly CLAY with occasional chalk, coal, flint and brick.

Natural Cohesive Soils – Directly underlying the Made Ground, natural soils comprising firm sandy gravelly CLAY were encountered extending to at least 3.0mbgl.

No in situ Standard Penetration Tests (SPTs) were undertaken during the advancement of the mini percussive boreholes. The natural clays were described as ‘firm’ in consistence, which in the absence of either field or laboratory quantitative results, are assumed as having an undrained shear strength no greater than 40kN/m².

Natural Granular Soils – Underlying the CLAY in WS04, clayey gravelly SAND with flint gravel was proven extending to the base of the borehole to a maximum depth of at least 4.0mbgl.

As no SPTs were undertaken, the relative density of these soils cannot be determined.

Groundwater

No free groundwater was encountered during the advancement of the boreholes. Groundwater levels as recorded during the monitoring are presented below.

Exploratory Hole	Water Level (mbgl) Date: 26/09/22	Water Level (mbgl) Date: 11/10/22	Water Level (mbgl) Date: 24/10/22	Water Level (mbgl) Date: 07/11/22	Water Level (mbgl) Date: 21/11/22	Water Level (mbgl) Date: 19/01/23
WS01	1.77	1.80	1.58	1.54	NR*	1.68
WS02	1.30	1.36	1.31	1.25	1.07	1.30
WS04	1.24	1.33	0.80	0.70	NR*	NR

*NR= Not Recorded

It should be noted that groundwater levels are dependent upon seasonal variations and can change after periods of prolonged rainfall or drought.

Visual and Olfactory Observations

A hydrocarbon odour was noted in all of the boreholes, in the natural granular and cohesive soils at depths ranging between 1.0mbgl and 4.0mbgl. Black discoloration of the soils was also noted in WS02 at 1.0mbgl.

Geotechnical Laboratory Testing

Eighteen (18no.) soil samples were forwarded to a UKAS & MCERTS accredited chemical laboratory with four (4no.) samples submitted to a UKAS accredited geotechnical laboratory.

Sulphates and pH

Five (5no.) samples of the Made Ground and thirteen (13no.) samples of the natural soils were submitted for assessment of water-soluble sulphate, total sulphate, pH value and total sulphur concentrations.

	<i>Minimum</i>	<i>Maximum</i>
Water Soluble Sulphate	<10mg/l	672mg/l
Total (Acid Sulphate)	0.01%	0.07%
pH	7.2	9.4
Total potential Sulphates (Sulphur)	<0.01%	0.09%

Atterberg Limits and Natural Moisture Content

Four (4no.) samples of the natural clays were submitted for determination of their Natural Moisture Content and Plasticity Indices.

Natural Moisture Content Range	13-19%
Modified Plasticity Index Range	15-20%
NHBC Volume Change Potential	Low to Medium

The natural clays are classed as being of low to medium volume potential, in accordance with NHBC guidelines.

All geotechnical laboratory certificates can be reviewed within Appendix H.

Preliminary Foundation Recommendations

Made Ground was confirmed to a maximum depth of 1.0mbgl underlain by natural firm sandy gravelly clays proven to at least 3.0mbgl and possibly deeper. Natural clayey gravelly sand was confirmed below 3.0mbgl to at least 4.0mbgl beneath the southern part of the site. No free groundwater was encountered during the advancement of the boreholes, however, at rest groundwater levels were subsequently recorded at between 0.7m and 1.8mbgl.

It is understood that it is proposed to construct a 2 storey apartment block with car parking and associated soft landscaping. A greater number of floors would require a change to these preliminary foundation recommendations. Given that no quantitative data is available on the strength of the underlying soils, such foundation recommendations are only preliminary at this stage and would require further geotechnical intrusive investigation to derive design specific parameters.

The proposed development is likely to be capable of being constructed on conventional shallow strip or spread foundations at depths of 1.0m below finished ground levels in natural clay of at least firm consistency. It is considered that the strip or spread foundations constructed within the underlying natural firm clay could be designed assuming an allowable increase in load of the following:

Foundation Type	Strip Foundations (m)			Spread Foundations (m)		
Foundation Width	0.6	1.0	1.5	1.0	2.0	3.0
Foundation Depth (below finished levels)	1.0			1.0		
Allowable increase in stress (kN/m ²)	100	95	90	110	100	95

The allowable increase in stress given above assumes a factor of safety against general shear failure of 3, an undrained shear strength of 40kN/m² at the foundation depth and no free groundwater, providing the bearing surface has been adequately compacted. Settlements at these loading intensities should remain within tolerable limits for the type of structure proposed provided that the underlying soils are carefully inspected immediately following final trimming of the excavations.

Should any very loose, cohesive, or weak material be encountered they should be locally removed and replaced with lean-mix concrete or compacted granular soil. In addition, if the excavations are required to stand open for any period, then a blinding layer of lean-mix concrete should be placed in the excavation bases. This will reduce loosening of the sub-grade due to the ingress of surface water.

The excavator must be advanced correctly to ensure trench walls are vertical and the base horizontal as any slight inclination will result in eccentric loading of footings.

Any remnant structures and foundations should be removed and replaced with a suitable engineered granular backfill and compacted in layers.

Foundations may need to be deepened in accordance with current guidance where within influencing distance of existing or proposed trees or mitigation measures required against volume change potential of cohesive soils. The volume change potential of the natural clays is confirmed as medium.

However, it is recommended that additional deeper geotechnical intrusive investigation is undertaken at the site to confirm the nature and strength of the underlying soils. A change to the proposed development or increase in the number of storeys may necessitate the use of a piled foundation. Site

enabling works will involve the removal of the former decommissioned USTs to a significant depth and require engineered backfilling of the resultant excavation. Such circumstances may require deep pads or a piled foundation solution with spanning ground beams.

Floor Slabs

Given the presence of Made Ground to 1.0mbgl and shallow natural cohesive soils, the use of a suspended floor slab is considered as appropriate.

Sulphates and Concrete

The test results indicate that the Made Ground and natural soils fall within Design Sulphate Class DS-1 and ACEC Class AC-1. Consequently, concrete should be designed accordingly, assuming mobile groundwater conditions.

Excavations

No free groundwater was encountered during the investigation, however, longer term at rest groundwater levels were recorded at between 0.7m and 1.8bgl. However, groundwater levels are subject to seasonal variation or changes in local drainage conditions.

Groundwater may represent a particular problem to the construction. However, it should be recognised that minor water ingress may combine in any long trench excavations to create a significant volume of water which may cause local problems during construction. Any minor groundwater seepages or significant standing water within excavations may be removed by de-watering. Advice on groundwater control is given in CIRIA Report No 515 – Groundwater Control Design and Practice.

The stability of the excavation faces cannot be guaranteed and therefore temporary support to the excavation faces may become necessary unless the foundations are constructed using trench-fill techniques. In this method the foundation trenches should be excavated, inspected, and backfilled with concrete as a continuous operation. Under no circumstances should operatives be allowed to enter unsupported excavations.

Consideration should be given to installing trench support/shoring or battering to maintain excavation stability during foundation construction/services installation, given the presence of Made Ground. Due to the potential for unpredictable collapse, excavations requiring man entry should be either battered back to a safe angle or adequately shored to provide safe working conditions within excavations. Advice on excavation support is given in CIRIA Report No 97 – Trenching Practice.

Where trench support/shoring is utilised an appropriately qualified and experienced engineer should design the support system. The shoring/support will require regular inspection in accordance with published guidelines to ensure that the support/shoring is adequate for the ground conditions present.

Soil Chemical Testing

A total of twelve (12no.) samples have been analysed by Chemtech Environmental Ltd in their UKAS and MCERTS accredited laboratory. This testing comprised:

- Speciated Total Petroleum Hydrocarbons (TPH CWG Aromatic/aliphatic split)
- Heavy metals and other metalloids
- Speciated Polycyclic Aromatic Hydrocarbons (PAH)
- Asbestos presence
- Soil organic matter (SOM)
- MTBE & BTEX
- Sulphates

The results of this laboratory testing have been compared to the Soil Guideline Values (SGVs) as well as the CIEH 'LQM' guideline values for inorganic and organic contaminants in soils.

The proposed development of the site is intended to comprise a residential end use including the provision of soft landscaping and, therefore, screening has been made against a land use of 'residential with consumption of homegrown produce'.

Selection of Screening Criteria

The onsite receptors for the study site are considered to be:

- Construction workers (during redevelopment of the site only);
- Future maintenance workers (following redevelopment);
- Future end users and site visitors (following redevelopment); and
- Trespassers (during redevelopment).
- Off-site receptors for the site.

Risks to construction workers during the redevelopment process will be mitigated by adhering to appropriate health and safety legislation, and the wearing of appropriate personal protective equipment (PPE). During redevelopment, the site will be securely fenced to prevent trespassers from accessing the site, and good site management practices will be implemented to mitigate exposure to off-site receptors.

The potential pathways for contaminants within the soil to human health receptors following redevelopment are considered to be:

- Direct ingestion of soil and soil derived dust
- Dermal contact with soil outside and soil derived dust inside
- Inhalation of soil derived dust inside and outside
- Inhalation of soil derived vapours inside and outside

The potential pathways for contaminants within the soil to off-site human health receptors following redevelopment are considered to be:

- Direct ingestion of soil and soil derived dust
- Dermal contact with soil outside and soil derived dust inside
- Inhalation of soil derived dust inside and outside
- Inhalation of soil derived vapours inside and outside if contamination within soil is able to migrate across the site boundary within

In the first instance, the results of this laboratory testing have been compared to generic assessment criteria (GAC) for the commercial land use scenario. These incorporate the following pathways:

- Direct ingestion of soil and soil derived dust
- Dermal contact with soil outside and soil derived dust inside
- Inhalation of soil derived dust inside and outside
- Inhalation of soil derived vapours inside and outside

Contaminants have been screened against revised LQM/CIEH S4UL criteria¹ where available. These GAC have been designed for use under planning, using Health Criteria Values based on minimal risk, and updated exposure parameters. The S4UL are intended to replace the previous LQM/CIEH GAC. The S4UL are based on the assumption of a sandy loam soil the 1.0% soil organic matter (SOM) criteria have been used, where available and appropriate, in the first instance. All soil sample determinant concentrations were compared against 1% SOM GAC, this conservative approach is considered appropriate for initial screening purposes.

Where no S4UL are available, the EIC/ AGS/ CL:AIRE/ GAC² have been used. The toxicological criteria within these are also based on minimal risk. It is recognised that these criteria have not recently been updated, and in particular, do not incorporate the slightly higher inhalation rates that have been used within the S4UL. However, given that they incorporate additional pathways, they are considered suitable for an initial screen. The EIC/ AGS/ CL:AIRE/ GAC are also based on a sandy loam soil and the 1% SOM criteria have been used in the first instance.

There is neither an S4UL nor a EIC/ AGS/ CL:AIRE/ GAC available for lead. In the absence of a GAC based on minimal risk, the C4SL for lead has been used. It is recognised that this is based on a "low level of toxicological concern" rather than on a minimal risk level. However, it is considered appropriate for use under planning, especially for a site where there will effectively be no pathways for inorganic metals following redevelopment.

All the GAC are based on a sandy loam soil. This is considered appropriate for use for initial screening. Although it is apparent from the laboratory soil descriptions, that the Made Ground, by its very nature is heterogeneous, and often has a significant sand/gravel/clay component.

All the GAC assume unsaturated soils. However, the use of the GACs are considered to be conservative, because they assume a certain air-filled porosity and water-filled porosity.

The GAC also assume that no free phase product is present and are not intended for use in this instance. No free product was observed within soils during the site investigation.

¹ Nathanail et al. (2015) The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, 2015. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3495

² CL:AIRE (2010) The EIC/AGS/CL:AIRE Generic Assessment Criteria for Human Health Risk Assessment

Soil Testing Results & Screening

All of the soil contamination laboratory analytical results are presented within Appendix I and presented below:

Metals³

Determinant	Min (mg/kg)	Max (mg/kg)	GAC (mg/kg)	Number of exceedances
Arsenic	10	30	37*	0
Cadmium	<0.2	0.4	11*	0
Chromium (III)	33	86	910*	0
Chromium (VI)	<1	<1	6*	0
Copper	6.6	23	2400*	0
Lead	7.8	130	210**	0
Mercury	<0.5	<0.5	40*	0
Nickel	12	41	180* ^a	0
Selenium	0.5	2.3	250*	0
Zinc	27	92	3700*	0
Total Phenols	<0.5	<0.5	280*	0
Total Cyanide	<1	<1	LoD***	0

* LQM/CIEH S4UL GAC for Residential with homegrown produce land use scenario based on a sandy loam soil and 1% SOM.

** C4SLs for residential with homegrown produce, upper pC4SL limit for lead used.

*** In the absence of published criteria, LoD has been used to inform the requirement for further assessment

a) LQM issued an update to the nickel S4ULs in August 2015, and this has been considered.

There are no exceedances noted for the screening undertaken on the respective metals and metalloids.

Organics

Determinant	Min (mg/kg)	Max (mg/kg)	GAC (mg/kg)	Number of exceedances
Naphthalene	<0.02	0.06	2.3*	0
Acenaphthylene	<0.02	0.12	170*	0
Acenaphthene	<0.02	<0.02	210*	0
Fluorene	<0.02	<0.02	170*	0

*LQM/CIEH GAC for Residential with homegrown produce land use scenario based on a sandy loam soil and 1% SOM. Based on the inorganic mercury GAC as the conceptual site model does not suggest that other forms of mercury are likely to be present on site. LQM issued an update to the nickel S4ULs in August 2015 and this has been taken into account.

Phenanthrene	<0.02	0.47	95*	0
Anthracene	<0.02	0.09	2400*	0
Fluoranthene	<0.02	1.46	280*	0
Pyrene	<0.02	1.31	620*	0
Benzo(a)anthracene	<0.02	0.64	7.2*	0
Chrysene	<0.03	0.73	15*	0
Benzo(b)fluoranthene	<0.02	1.12	2.6*	0
Benzo(k)fluoranthene	<0.03	0.47	77*	0
Benzo(a)pyrene	<0.02	0.77	2.2*	0
Indeno(1,2,3-cd)pyrene	<0.02	0.72	27*	0
Dibenz(a,h)anthracene	<0.02	0.13	0.24*	0
Benzo(ghi)perylene	<0.02	0.69	320*	0

* LQM/CIEH S4UL GAC for Residential with homegrown produce land use scenario based on a sandy loam soil and 1% SOM.

There are no exceedances noted for the screening undertaken on the PAH congener bands.

Determinant	Min (mg/kg)	Max (mg/kg)	GAC (mg/kg)	Number of exceedances
Aliphatic >C5 – C6	< 0.1	< 0.1	42*	0
Aliphatic >C6 – C8	< 0.1	1.13	100*	0
Aliphatic >C8 – C10	< 0.1	3.11	27*	0
Aliphatic >C10 – C12	< 6	< 6	130*	0
Aliphatic >C12 – C16	< 6	< 6	1100*	0
Aliphatic >C16 – C35	< 15	558	65000*	0
Aromatic >C5 – C7	< 0.01	< 0.01	70*	0
Aromatic >C7 – C8	< 0.01	0.05	130*	0
Aromatic >C8 – C10	< 0.01	0.20	34*	0
Aromatic >C10 – C12	< 1	5	74*	0
Aromatic >C12 – C16	< 1	26	140*	0
Aromatic >C16 – C21	< 1	409	260*	1
Aromatic >C21 – C35	2	1788	1100*	1

* LQM/CIEH GAC Residential with Homegrown Produce land use scenario based on a sandy loam soil and 1.0% SOM. It is noted that the LQM/CIEH S4UL guidance recommends an additive approach for the TPH fraction, so that a hazard index approach is used. Based on a preliminary conservative comparison of maximum concentrations to S4ULs, no forward modelling is necessary to prove that this would still result in no exceedances at the site.

There are two (2no.) exceedances noted with respect to the screening undertaken on the respective TPH CWG bands, relating to a recorded Aromatic >C16–C21 value of 409 mg/kg compared with the GAC value of 260 mg/kg in a sample recovered from WS04 at 3.5mbgl and Aromatic >C21–C35 value of 1788 mg/kg compared with the GAC value of 1100 mg/kg recorded in a sample obtained from WS02 at 3.0mbgl.

Determinant	Min (mg/kg)	Max (mg/kg)	GAC (mg/kg)	Number of exceedances
Benzene	< 0.01	< 0.01	0.087*	0
Toluene	< 0.01	0.05	130*	0
Ethylbenzene	< 0.01	0.08	47*	0
p & m-xylene	< 0.02	0.05	56*	0
o-xylene	< 0.01	< 0.01	60*	0
MTBE	< 0.02	0.05	49**	0

* LQM/CIEH GAC Residential with Homegrown Produce land use scenario based on a sandy loam soil and 1.0% SOM.

** EIC/ AGS/ CL:AIRE/ GAC Residential with Consumption of Homegrown Produce land use scenario based on a sandy loam soil and the 1% SOM.

There were no exceedances for BTEX/MTBE congeners.

Others

The asbestos screening returned a negative result for the presence of fibrous material from all samples analysed.

The soil contamination laboratory certificates can be reviewed in Appendix I.

Groundwater Chemical Testing

2no. groundwater samples have been analysed by DETS in their UKAS and MCERTS accredited laboratory, with these samples collected from across 2no. locations, WS01 and WS04. The laboratory testing comprised:

- Speciated TPH CWG (Aromatic/aliphatic split)
- Heavy metals and other metalloids
- Speciated PAH
- MTBE and BTEX
- pH, Electrical conductivity, TOC, and Total hardness
- Phenols, Total cyanide, and Sulphate

Controlled Waters Assessment

The approach to the assessment of contaminant linkages with respect to the pollution of Controlled Waters is consistent with current UK guidance. Given the presence of a superficial Secondary (A) Aquifer that is classed as being productive and of high vulnerability and the absence of any nearby surface water features, then this aquifer is regarded as the primary environmental receptor. As such, contaminant concentrations are compared directly to both Drinking Water Standards (DWS) and Environmental Quality Standards (EQS) for freshwaters to identify the need for further consideration. This assessment utilises a variety of published standards, as follows:

- The Water Supply (Water Quality) Regulations: 2016 (WSR)⁴;
- Water Framework Directive (WFD) (Standards and Classification) Directions England and Wales 2015 (including EQS)⁵; and,
- World Health Organisation (WHO) Standards ^{6 7 8}.

The DWS used are the WSR unless specified otherwise. The GAC also assume that no free phase product is present and are not intended for use in this instance. No free product was observed within groundwater during the site investigation.

The results of the groundwater testing are shown in the following tables below where they are compared to the available Environmental Quality Standards (EQS), unless specified otherwise. All of the water laboratory analytical results are presented within Appendix J.

⁴ Water Supply (Water Quality) Regulations 2016 SI No. 614 (amended as per Water Supply (Water Quality) (Amendment) Regulations 2018 SI No. 706).

⁵ Water Framework Directive (Standards and Classification) Directions England and Wales) 2015 SI No.1623.

⁶ World Health Organization (WHO), 2008. Petroleum products in drinking-water. Background document for development of WHO guidelines for drinking water quality, WHO/SDE/WSH/05.08/123.

⁷ CL:AIRE: Petroleum Hydrocarbons in Groundwater. Guidance on Assessing Petroleum Hydrocarbons using existing Hydrogeological Risk Assessment Methodologies, Version 1.1, dated March 2017.

⁸ WHO Guidelines for Drinking Water Quality, Fourth Edition, dated 2011

Water Quality Indicators

Determinant	Min µg/l	Max µg/l	EQS GAC µg/l	Number of exceedances	DWS GAC µg/l	Number of exceedances
pH	6.9	7.3	6-9	0	6.5-9.5	0
Electrical Conductivity	1060	1070	-	N/A	2500	0
Sulphate as SO₄	17	115	400.0	0	250.0	0
TOC	17.9	18.7	-	N/A	-	N/A
Hardness - Total	310	339	-	N/A	-	N/A

No exceedances of the EQS and DWS criteria were recorded in either of monitoring locations, for water quality indicators.

Metalloids

Determinant	Min µg/l	Max µg/l	EQS GAC µg/l	Number of exceedances	DWS GAC µg/l	Number of exceedances
Arsenic (dissolved)	<5	<5	50.0	0	10.0	0
Barium (dissolved)	54	124	-	N/A	0.7*	2
Beryllium (dissolved)	<3	<3	-	N/A	-	N/A
Boron (dissolved)	113	340	-	N/A	1000.0	0
Cadmium (dissolved)	<0.4	<0.4	0.25	0	5.0	0
Chromium (dissolved)	<5	<5	3.4	0	50.0	0
Copper (dissolved)	<5	<5	1.0	0	2000.0	0
Lead (dissolved)	<5	<5	1.2	0	10.0	0
Mercury (dissolved)	<0.05	0.12	0.07	1	1.0	0
Nickel (dissolved)	18	157	4.0	2	20.0	1
Selenium (dissolved)	<5	<5	-	N/A	10.0	0
Vanadium (dissolved)	<5	<5	-	N/A	-	N/A
Zinc (dissolved)	8	23	12.9	1	-	N/A
Total Cyanide	<5	<5	1.0 ^a	0	50	0
Total Phenols	<10	<10	-	N/A	-	N/A

* WHO standards have been used for Barium as no WSR exists

a) Free cyanide criteria used.

Exceedances of both the EQS and DWS criteria were recorded in the samples obtained. Barium DWS (WHO GAC) exceedances were recorded at both monitoring locations. Of the exceedances identified, the highest concentrations were recorded at WS04 (mercury) and WS01 (nickel and zinc).

- Barium in WS01 and WS04 at between 54µg/l and 124µg/l – both concentrations significantly exceeded the DWS (WHO GAC)
- Mercury in WS04 at 0.12µg/l – marginal exceedance of the EQS
- Nickel in WS01 at 157µg/l and WS04 at 18µg/l – WS01 concentration significantly exceeded the EQS with WS01 also significantly exceeding the DWS
- Zinc in WS01 at 23µg/l – marginal exceedance of the EQS.

Organics (PAH)

Determinant	Min µg/l	Max µg/l	EQS GAC µg/l	Number of exceedances	DWS GAC µg/l	Number of exceedances
Naphthalene	<0.01	<0.01	2.00	0	-	N/A
Acenaphthylene	<0.01	<0.01	-	N/A	-	N/A
Acenaphthene	<0.01	<0.01	-	N/A	-	N/A
Fluorene	<0.01	<0.01	-	N/A	-	N/A
Phenanthrene	<0.01	<0.01	-	N/A	-	N/A
Anthracene	<0.01	<0.01	0.10	0	-	N/A
Fluoranthene	<0.01	<0.01	0.0063	0	-	N/A
Pyrene	<0.01	<0.01	-	N/A	-	N/A
Benzo(a)anthracene	<0.01	<0.01	-	N/A	-	N/A
Chrysene	<0.01	<0.01	-	N/A	-	N/A
Benzo(b)fluoranthene	<0.01	<0.01	0.017	0	-	N/A
Benzo(k)fluoranthene	<0.01	<0.01	0.017	0	-	N/A
Benzo(a)pyrene	<0.01	<0.01	0.00017	0	0.01	0
Indeno(123cd)pyrene	<0.01	<0.01	-	N/A	-	N/A
Dibenz(ah)anthracene	<0.01	<0.01	-	N/A	-	N/A
Benzo(ghi)perylene	<0.008	<0.008	0.0082	0	-	N/A

There were no EQS or DWS exceedances noted from the screening undertaken on the respective PAH bands.

Organics (TPH)

Determinant	Min µg/l	Max µg/l	EQS GAC µg/l	Number of exceedances	DWS GAC µg/l	Number of exceedances
Aliphatic >C5 – C6	<10	<10	–	N/A	15000*	0
Aliphatic >C6 – C8	<10	<10	–	N/A	15000*	0
Aliphatic >C8 – C10	<10	<10	–	N/A	3000*	0
Aliphatic >C10 – C12	<10	<10	–	N/A	3000*	0
Aliphatic >C12 – C16	<10	<10	–	N/A	3000*	0
Aliphatic >C16 – C21	<10	<10	–	N/A	–	N/A
Aliphatic >C21 – C34	<10	<10	–	N/A	–	N/A
Aromatic >C5 – C7	<10	<10	–	N/A	10*	0
Aromatic >C7 – C8	<10	<10	–	N/A	700*	0
Aromatic >C8 – C10	<10	<10	–	N/A	300*	0
Aromatic >C10 – C12	<10	<10	–	N/A	90*	0
Aromatic >C12 – C16	<10	<10	–	N/A	90*	0
Aromatic >C16 – C21	<10	<10	–	N/A	90*	0
Aromatic >C21 – C35	<10	<10	–	N/A	90*	0

* WHO standards have been used for the respective TPH CWG bands as no WSR exists.

There were no EQS or DWS exceedances noted from the screening undertaken on the respective TPH CWG bands.

Determinant	Min µg/l	Max µg/l	EQS GAC µg/l	Number of exceedances	DWS GAC µg/l	Number of exceedances
Benzene	<1	<1	10	0	1	0
Toluene	<5	<5	74	0	-	N/A
Ethylbenzene	<5	<5	610	0	-	N/A
p & m-xylene	<10	<10	20	0	-	N/A
o-xylene	<5	<5	30	0	-	N/A
MTBE	<10	<10	30	0	-	N/A

There were no EQS or DWS exceedances with all concentrations recorded below the level of detection (LoD).

The groundwater contamination laboratory certificates are provided within Appendix J.

Summary of Groundwater Results

A total of 2no. samples were analysed for a range of determinands from the intrusive investigation across 2no. borehole positions (WS01 and WS04).

Of the 2no. samples analysed, there were no exceedances recorded (for both the EQS and DWS criteria) for water quality indicators or any of the organics tested for (including PAH, TPH, BTEX and MTBE).

The only exceedances recorded were for barium (WS01 & WS04), mercury (WS04), nickel and zinc (WS01).

A review of the water levels, ground conditions and water quality have been completed and presented below.

Monitoring Location	Water Levels (m bgl)	Key Observations	Groundwater Quality	Comment
WS01	1.54-1.8	Dark granular Made Ground with brick and concrete to 1.0mbgl.	Exceedances of barium, nickel and zinc.	Likely mobilisation of metals from upper Made Ground within perched groundwater.

		Hydrocarbon odour noted below 2.0mbgl in natural clay.		
WS04	0.7-1.33	cohesive Made Ground with chalk, coal, flint and brick to 1.0mbgl. Hydrocarbon odour noted below 2.0mbgl in natural clay and sand.	Exceedances of barium, mercury and nickel.	Likely mobilisation of metals from upper Made Ground within perched groundwater.

Based on the information presented in the above table and taking cognisance of the groundwater chemical results at the site, groundwater conditions are comparatively similar and is likely due to the consistency in ground conditions present across the site. Groundwater sampled is relatively high and considered likely to be perched within the Made Ground and natural strata interface.

Secondary (A) Aquifer

The superficial River Terrace deposits (silt) are designated as a Secondary (A) Aquifer. These are proven to be predominantly cohesive in nature and overlain by some 1.0m of historic Made Ground materials. No groundwater strikes were recorded during the advancement of the boreholes. The groundwater chemistry records the presence of elevated concentrations of metals and metalloids within perched groundwater beneath the site. The presence of elevated concentrations of TPH aromatic >C16-C21 and >C21-C35 within the soils is not reflected in the groundwater chemistry. Exceedances of the DWS in concentrations of dissolved barium and nickel are not considered significant due to the conservative nature of these GAC and that no licensed groundwater or potable abstractions are present nearby.

Based on the contaminants observed, the unlikely presence of a continuous water body and that the natural strata are essentially cohesive, it is unlikely that contaminants are migrating laterally offsite.

Surface Water

WS04 is the closest monitoring location to the principal surface water receptor, the English Channel, itself approximately 500m south of the site. No other nearby surface watercourses are recorded. Marginal exceedances of the EQS were recorded in groundwater at WS04 (mercury and nickel) during the single monitoring round.

Given the likely presence of a non-continuous perched waterbody within cohesive strata and that enabling works associated with the proposed development, including UST tank removal and stripping of historic Made Ground, are likely to improve the site's condition together with the construction of formal drainage infrastructure, it is considered unlikely that the site represents a significant risk to surface water receptors.

Gas Monitoring Results

Gas monitoring was carried out on six (6no) separate occasions using a portable gas monitor (GA5000). Readings were taken from the installed window sampler boreholes WS01, WS02 and WS04 between 26th September 2022 and 19th January 2023.

The standpipe was tested for the presence of methane, oxygen, carbon dioxide and hydrogen sulphide. The flow rates of the gas and barometric pressure will also be recorded.

The ground condition was noted to be dry during most rounds, with the exception of round 1 and 5. Significant winds were present during round 1 and 5. Variable atmospheric pressure conditions were identified across the monitoring period ranging from 983mb to 1029mb. Falling and low atmospheric pressure conditions were met during round 5.

Methane was recorded at a maximum peak concentration of 1.8% v/v during the final monitoring round. Oxygen concentrations ranged from a minimum of 6.4% v/v obtained during the 4th monitoring round to a maximum of 21% v/v obtained during the final round. The maximum peak concentration of carbon dioxide of 7.4% v/v was obtained during the final round of monitoring.

Flow rates were recorded during each round of monitoring, ranging from a minimum of <0.1 l/hr during the majority of visits to a maximum of 0.2 l/hr during the final round. Concentrations of hydrogen sulphide were returned as 0.0ppm from all the rounds of monitoring undertaken. Maximum concentrations of carbon monoxide were recorded to be 5ppm from installation WS02 during the 1st monitoring visit.

The recorded concentrations of methane and carbon dioxide will be used to calculate a Gas Screening Value (GSV) for the gassing regime at this site. This value will be subsequently compared against CIRIA values supplied within CIRIA Document C665 *Assessing risks posed by hazardous ground gases to buildings* (2007) using Situation B for carbon dioxide and methane.

The values used represent the worst case CO₂ and CH₄ concentrations across all installations.

The maximum recorded flow rate was 0.2 l/hr.

The GSV is calculated as:

(Worst case CO₂ and CH₄ concentration / 100) x worst case flow rate = GSV

Peak Flow Rate (l/hr)	Worst Case CO ₂	CO ₂ GSV	Worst Case CH ₄	CH ₄ GSV
0.2	7.4%	0.0148 l/hr CO ₂	1.8%	0.0036 l/hr CH ₄

This GSV is a conservative estimate based on the maximum concentrations and flow rate.

Based on the maximum calculated GSV of 0.0148 l/hr with respect to carbon dioxide, the site is below the threshold given by CIRIA C665 for a Type B building (BS8485:2015+A1:2019 – *Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings*)

and is characterised as Characteristic Situation CS1. However, in accordance with C665 guidance, where carbon dioxide concentrations are $>5\%v/v$ the classification needs to be increased to CS2. Hence, based on the monitoring data to date, the indication is that there is a Low gas risk identified for the site.

As a consequence, the incorporation of gas protection measures is considered necessary appropriate for gas regime CS2 for any proposed new development at the site. The monitoring sheets can be viewed as Appendix K.

Additionally, the presence of potential hydrocarbon vapours needs to be considered. Although recorded at concentrations below the GAC, the presence of toluene, ethylbenzene, xylenes, MTBE, naphthalene and lighter end TPH bands were all detected within soils. The historic use of the site as a garage and petrol filling station is significant and that hydrocarbon odours were noted in the soils during the advancement of the boreholes. Concentrations of dissolved BTEX, MTBE, TPH bands and naphthalene were all below the level of detection of the laboratory. Therefore, provision of a gas resistant membrane should additionally include hydrocarbon vapour resistance.

Site Investigation Findings

Risks to Human Health

Historic Made Ground up to 1.0m thick was identified and within the underlying natural soils both visual and olfactory evidence of hydrocarbon impact was noted.

TPH aromatic bands >C16-C21 and >C21-C35 recorded concentrations in excess of the GAC in the natural soils at approximately 3.0mbgl. The source of this is considered likely to be the onsite historic decommissioned USTs.

As such, the soils are considered as potentially presenting a human health risk to the proposed development, however, this risk is significantly reduced due to the depth at which the contamination is present.

Risks to Controlled Waters

During the intrusive investigation no free groundwater was encountered and during the subsequent groundwater sampling of the monitoring wells, no visual or olfactory evidence of potential contamination was noted within the shallow groundwater. Exceedances of the EQS criteria were recorded for mercury, nickel and zinc during the analysis of the shallow perched groundwater.

The superficial Secondary (A) Aquifer is not considered to be at risk as the perched shallow groundwater is assessed as non-continuous being contained within impermeable cohesive natural strata that would act by retarding any potential movement off site. There are no nearby significant watercourses that could potentially be at risk. Hence, the site is not considered as presenting a significant risk to controlled waters.

Risks to Plants and Wildlife

A negligible risk has been attributed given the concentrations of phytotoxic contaminants below elevated concentrations.

Risks to Site Workers

Despite the presence of elevated concentrations of determinants within the soils analysed, precautions should be taken to minimise exposure of site workers during ground works through the implementation of site safety procedures and the use of suitable personal protective equipment (PPE). Such precautions should include, but not be limited to:

- Personal hygiene, washing and changing procedures;
- Availability of site welfare;
- Provision of PPE appropriate to the task; and
- Daily safety briefings and tool box talks.
- All site works will be undertaken in accordance with the guidelines prepared by the Health and Safety Executive (1991) and all work will be carried out in accordance with the Principal Contractor's Health and Safety Plan.

Risks to Proposed Structures

The site's ground gas regime is classified as Characteristic 2 (CS2) which presents a Low risk to end users and warrants a requirement for the incorporation of gas protection measures during construction. In addition, incorporation of protective measures against hydrocarbon vapours should be allowed for.

Water supply pipes will be required to be installed in the new development. Prior to installation, contact should be made with the local water supplier to determine if upgraded water supply pipes are required.

Updated Conceptual Site Model and Risk Assessment

The Conceptual Site Model has been re-formulated based upon the results from the SI in accordance with BS10175:2015 and Annex 4 of the R&D publication 66, Guidance for the Safe Development of Housing on Land Affected by Contamination (NHBC/EA/CIEH, 2008).

On Site						
Source	Pathways	Receptor	Severity	Probability	Risk	Justification
Made Ground and deeper natural soils containing TPH	Ingestion, dermal contact, inhalation of dusts and vapours	Future end users and site visitors	Medium	Likely	Moderate	A moderate risk rating has been assessed as no exceedances of potential contaminants are recorded within the shallow Made Ground, only in the deeper natural soils. Contact is precluded between future occupiers/visitors and potential contaminants in the shallow soils in areas of proposed soft landscaping. However, the potential for vapour intrusion within buildings remains due to the historic use of the site as a filling station and identified concentrations of volatile hydrocarbons within the deeper soils.
		Construction Workers	Medium	Likely	Moderate	Construction workers are likely to come into direct contact with soils during groundworks. Safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from contact with soils and shallow/perched groundwater.
	Leaching through soils and migration via	Controlled Waters	Medium	Low Likelihood	Low	Concentrations of several metals above the EQS criteria have been recorded within the shallow groundwater. However, the perched groundwater is non-consistent and confined within natural cohesive strata, thus not

	groundwater or soil pore moisture					presenting a credible risk to the superficial Secondary (A) Aquifer. There are no nearby significant surface watercourses. As such, a low risk to controlled waters is assessed.
	Permeation of water pipes	Construction materials, future end users and site visitors	Low	Low Likelihood	Low to Moderate	A low to moderate risk is assessed with respect to installation of new water supply pipes. However, it is recommended that the results of the laboratory analyses are forwarded to the water authority for comment and the requirement for the use of barrier pipework.
	Uptake	Plant and Wildlife	Low	Unlikely	Low	Risks to vegetation are assessed as low due to low concentrations of phytotoxic contaminants.
Asbestos at/near ground surface in Made Ground	Inhalation of fibres in airborne dust	Future end users and site visitors	Medium	Unlikely	Low	Soil sample screening for asbestos returned a negative result with the presence of asbestos considered as unlikely.
		Construction Workers	Medium	Unlikely	Low	Soil sample screening for asbestos returned a negative result with the presence of asbestos considered as unlikely. However, the presence of asbestos cannot be totally discounted. Construction workers are likely to come into direct contact with soils and during subsequent groundworks, safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from residual asbestos in soils.

YEX2909

57 Queensway, Bognor Regis PO21 1QN

February 23



Ground Gases/vapours: from Made Ground: CH ₄ , CO, CO ₂ and H ₂ S	Gas migration within buildings (explosion/asphyxiation risk)	Future end users and building structures	Medium	Low Likelihood	Moderate to High	Monitoring at the site has classified it as Characteristic Situation CS2 with incorporation of protective measures necessary during development. Incorporation of protective measures against hydrocarbon vapours are considered necessary.
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Contamination Recommendations

The following recommendations made do not constitute a formal remediation strategy and/or validation report. A remediation strategy should be agreed with the relevant local authority prior to such works commencing and/or the production of a validation report.

Soils

As there were no exceedances of potential contaminants identified within the shallow Made Ground soils analysed at the site, no further remedial works with respect to areas of proposed soft landscaping need to be undertaken to facilitate development.

Exceedances of TPH bands >C16-C21 and >C21-C35 however were identified within the deeper natural soils at around 3.0m depth. Potentially, it is considered that these contamination sources could present a risk to human health of future end users through associated hydrocarbon vapours within buildings. As part of the enabling works for any development at the site, the former decommissioned 5no. USTs, as confirmed by West Sussex County Council Trading Standards, should be located and removed together with any locally hydrocarbon impacted soils. Subsequent validation of the excavation base and sides will be required. Mitigation of any associated residual hydrocarbon contamination and associated vapours is addressed below.

As construction workers are likely to come into contact with contaminated soils during subsequent groundworks, safe working practices should be implemented and appropriate PPE should be used to mitigate the risks of contact with contaminated soils.

Ground Gas

Ground gas monitoring classifies the site as Characteristic Situation CS2. As such, there is a requirement for the incorporation of ground gas protection measures during redevelopment. Several mitigation methods are possible during construction and specific reference should be made to BS8485:2015+A1:2019, assuming a Type B building.

In addition, the incorporation of a hydrocarbon vapour resistant membrane should be allowed for during redevelopment of the site to mitigate against any residual hydrocarbon impact of soils beneath the site.

No radon protection measures are necessary.

Risks to Controlled Waters

Several elevated dissolved metal concentrations in excess of the EQS assessment criteria have been confirmed within the shallow groundwater beneath the site. However, given the absence of any nearby significant surface watercourses and a non-consistent confined perched water body bounded by natural cohesive soils, the risk to controlled waters including the superficial Secondary (A) Aquifer is assessed as low.

The incorporation of formal surface water drainage as part of the proposed development will mitigate any potential risk to controlled waters.

Watching Brief and Discovery Strategy

A watching brief should be maintained by the Main Contractor at all times during the groundworks stage. Should any unforeseen contamination, such as oils or soils/groundwater with an unusual colour or odour, be encountered during groundworks then the following procedure should be implemented:

- Work to cease in that area to prevent exposure to ground workers and potential contaminants being spread about the site;
- Notify a Geo-Environmental Consultant, to attend site and sample material;
- Notify the Environmental Health Department / Contaminated Land Officer(s) of the Local Planning Authority.

If the nature and extent of the contamination is unmanageable under the procedure set out above, then a suitable management, mitigation or remediation procedure will be agreed with the CLO.

Asbestos

Although screening has revealed no asbestos to be present within the samples analysed from exploratory holes undertaken, it cannot be guaranteed that asbestos is not present within the soils across the remainder of the site. Consequently, we would recommend that a watching brief be adopted with regards to the site for the potential of finding any Asbestos Containing Materials (ACMs). If any ACMs are identified these need to be dealt with accordingly in relation to the Hazardous Waste Regulations 2005.

Services

If new services will be installed as part of the redevelopment of the site, we would recommend the local water authority be contacted to determine their specification for the type of pipework which should be used on this site.

All services and in particular potable water supply pipework should comprise of material that is resistant to attack and degradation to chemical attack.

Material Disposal

Soils to be removed off site should be managed in accordance with The Environmental Protection (Duty of Care) Regulations 1991.

It may be prudent to undertake Waste Acceptance Criteria (WAC) analyses on the soils to be removed in addition to the basic characterisation testing that has been carried out to date.

Surface Water Drainage

It should be noted that the Environment Agency does not recommend that soakaways be placed within Made Ground, potentially contaminative land or in ground previously identified as contaminated.

Verification Reporting

It is recommended that you confirm with the relevant environmental consultees whether they require a Validation and/or Closure Report providing documentation/audit trail for the completion of any remediation/mitigation works completed on site.

If a Verification Report is required it should include, but not be limited to, the following:

- Site visit records and photographic records from the watching brief
- Site visit records and photos from visits completed by a Geo-Environmental Consultant
- Duty of care records for disposal of waste material including the landfill site(s) or disposal facility where the material has been disposed and a copy of the Contractor's current waste carrier's licence (to be provided by Contractor)
- Records and test certificates relating to the management and disposal or unforeseen contaminants and/or ACMs (if any)
- Details of source and chemical test results for imported materials
- Confirmation of water supply pipe materials installed

Report Submission

This report should be submitted to the Local Planning Authority at the earliest opportunity to seek their acceptance of the findings of this report.

Notes and Limitations

YE have prepared this report with all reasonable skill, care and diligence. The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources.

The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned.

Information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data with respect to site conditions. Should additional information become available which may influence the opinion expressed in this report, YE reserves the right to review such information and, if warranted, to alter the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed.

The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices at this time and as such is not a guarantee that the study site is free of hazardous conditions.

This report has been prepared solely for the use of the named client, and may not be relied upon by other parties without written consent from YE. YE disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

The information contained in this report is intended for the use of our client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and YE disclaims any liability to such parties. Should the purposes for which the report is used, or the proposed use of the site change, this report may no longer be valid and further use of, or reliance upon the report in those circumstances shall be at the client's sole and own risk. Your Environment should be contacted to amend the report should the proposed development change in any way.

Appendix A – Plans





REVISIONS

All dimensions and particulars are to be checked on site before work commences and any discrepancy to be reported to HUGHES JAY & PANTER
DO NOT SCALE from this drawing, use written dimensions only

hjp

Grove House, 64 Sutton Grove
Sutton, Surrey, SM1 4LP
Tel: 020 8661 2228
Fax: 020 8661 7551
mail@hjsurveyors.com

72 Aldwick Road, Bognor Regis
West Sussex, PO21 2PE
Tel: 01243 821732

hughes jay & panter
chartered surveyors & property consultants

e-mail: mail@hjsurveyors.com website: www.hjsurveyors.com

Project
Queensway House
The Queensway
Bognor Regis
West Sussex
PO21

Drawing
57 the queensway, (filling station)
block layout

Job Number	Drawing Number :	Revision
2489B	104:	-

Drawn AW	Computer Reference -
Date Aug 2011	Scale

Metropolitan Property
Realisation Ltd



Appendix B – Correspondence with PLO



This message is private and confidential. If you have received this message in error, please notify us and remove it from your system. Your Environment Ltd may monitor email traffic data and also the content of email for the purposes of security and staff training. Your Environmental Company Ltd, trading as Your Environment, registered in England and Wales No: 07717486. Registered address: Unit 2, Woodhorn Business Centre, Oving, Chichester, PO20 2BX.

From: Jackie Richmond [REDACTED] >
Sent: 10 January 2023 13:46
To: Liam Barton <[REDACTED]>
Subject: RE: Petroleum Search - Liam Barton - 57 Queensway Phase 2 Contamination report
Importance: High

Hello Liam,

Thank you for the payment.

Please see information below

PR202301-4482 Licence number **454029**

Health and Safety at Work etc Act 1974
The Petroleum (Consolidation) Regulations 2014
Dangerous Substances and Explosive Atmospheres Regulations 2002
Public Health Act 1961

History Enquiry at 57 Queensway Phase 2 (Queensway Filling Station)

Further to your recent enquiry relating to the history of the above filling station I hope the following information is of assistance.

Details of the tanks:

Licence number 454029

There were 5 tanks, they were made safe in 16/09/1999 by concrete slurry.

We have no information that they have been removed.

Please note that although West Sussex County Council makes every effort to ensure that the information provided is accurate, we cannot be held responsible for any error or omission in the data provided.

If I can be of any further assistance please do not hesitate to contact me.

Jackie Richmond

Operational Support Officer, Trading Standards
West Sussex County Council
Parkside, Chart Way, Horsham
West Sussex, RH12 1XH
Phone : [REDACTED]

[REDACTED]

Web: www.westsussex.gov.uk

Please note my working days are Monday, Tuesday & Wednesday

From: Liam Barton <[REDACTED]>
Sent: 10 January 2023 11:20
To: Jackie Richmond <[REDACTED]>
Cc: Cathleen Cox <[REDACTED]> Jonny Roberts <[REDACTED]>
Subject: RE: Petroleum Search - Liam Barton - 57 Queensway Phase 2 Contamination report

****EXTERNAL****

Regards,

Liam Barton
Geo-Environmental Engineer
[REDACTED]
[REDACTED]
yourenvironment.org



Appendix C – Enviro Insight and Geo Insight Reports



QUEENSWAY HOUSE, QUEENSWAY, BOGNOR REGIS, PO21 1QT

Order Details

Date: 30/05/2022

Your ref: YEX2909

Our Ref: GS-8787532

Site Details

Location: 493413 099187

Area: 0.03 ha

Authority: [Arun District Council](#)



Summary of findings

p. 2 **Aerial image**

p. 8

OS MasterMap site plan

p.13 groundsure.com/insightuserguide

Contact us with any questions at:



Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	<u>Historical industrial land uses</u>	0	0	31	28	-
17	1.2	<u>Historical tanks</u>	0	0	23	2	-
18	1.3	<u>Historical energy features</u>	0	0	22	16	-
20	1.4	Historical petrol stations	0	0	0	0	-
20	1.5	<u>Historical garages</u>	1	3	5	14	-
21	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
22	2.1	<u>Historical industrial land uses</u>	0	0	45	33	-
25	2.2	<u>Historical tanks</u>	0	0	33	2	-
27	2.3	<u>Historical energy features</u>	0	0	57	38	-
31	2.4	Historical petrol stations	0	0	0	0	-
31	2.5	<u>Historical garages</u>	1	5	11	22	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
33	3.1	Active or recent landfill	0	0	0	0	-
33	3.2	Historical landfill (BGS records)	0	0	0	0	-
34	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
34	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
34	3.5	Historical waste sites	0	0	0	0	-
34	3.6	Licensed waste sites	0	0	0	0	-
34	3.7	<u>Waste exemptions</u>	0	0	2	0	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
36	4.1	<u>Recent industrial land uses</u>	1	0	30	-	-
38	4.2	<u>Current or recent petrol stations</u>	0	0	0	1	-
39	4.3	Electricity cables	0	0	0	0	-
39	4.4	Gas pipelines	0	0	0	0	-
39	4.5	Sites determined as Contaminated Land	0	0	0	0	-



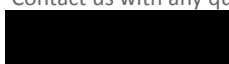
39	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
40	4.7	Regulated explosive sites	0	0	0	0	-
40	4.8	Hazardous substance storage/usage	0	0	0	0	-
40	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
40	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
40	4.11	<u>Licensed pollutant release (Part A(2)/B)</u>	0	0	2	2	-
41	4.12	Radioactive Substance Authorisations	0	0	0	0	-
41	4.13	<u>Licensed Discharges to controlled waters</u>	0	0	0	3	-
42	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
42	4.15	Pollutant release to public sewer	0	0	0	0	-
43	4.16	List 1 Dangerous Substances	0	0	0	0	-
43	4.17	List 2 Dangerous Substances	0	0	0	0	-
43	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	1	7	-
44	4.19	Pollution inventory substances	0	0	0	0	-
44	4.20	Pollution inventory waste transfers	0	0	0	0	-
45	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
46	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
48	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
49	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
50	5.4	<u>Groundwater vulnerability- soluble rock risk</u>	Identified (within 0m)				
50	5.5	Groundwater vulnerability- local information	None (within 0m)				
51	5.6	Groundwater abstractions	0	0	0	0	0
52	5.7	<u>Surface water abstractions</u>	0	0	0	0	2
52	5.8	Potable abstractions	0	0	0	0	0
53	5.9	Source Protection Zones	0	0	0	0	-
53	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
54	6.1	Water Network (OS MasterMap)	0	0	0	-	-



54	6.2	Surface water features	0	0	0	-	-
55	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
55	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
55	6.5	WFD Groundwater bodies	0	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
57	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
57	7.2	Historical Flood Events	0	0	0	-	-
57	7.3	Flood Defences	0	0	0	-	-
58	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
58	7.5	Flood Storage Areas	0	0	0	-	-
59	7.6	Flood Zone 2	None (within 50m)				
59	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
60	8.1	<u>Surface water flooding</u>	1 in 1000 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
62	9.1	<u>Groundwater flooding</u>	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
63	10.1	<u>Sites of Special Scientific Interest (SSSI)</u>	0	0	0	1	2
64	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
64	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
64	10.4	<u>Special Protection Areas (SPA)</u>	0	0	0	1	1
65	10.5	National Nature Reserves (NNR)	0	0	0	0	0
65	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
65	10.7	Designated Ancient Woodland	0	0	0	0	0
66	10.8	Biosphere Reserves	0	0	0	0	0
66	10.9	Forest Parks	0	0	0	0	0
66	10.10	Marine Conservation Zones	0	0	0	0	0
66	10.11	Green Belt	0	0	0	0	0
66	10.12	Proposed Ramsar sites	0	0	0	0	0



67	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
67	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
67	10.15	Nitrate Sensitive Areas	0	0	0	0	0
67	10.16	<u>Nitrate Vulnerable Zones</u>	0	0	0	0	2
69	10.17	<u>SSSI Impact Risk Zones</u>	1	-	-	-	-
70	10.18	<u>SSSI Units</u>	0	0	0	1	3
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
72	11.1	World Heritage Sites	0	0	0	-	-
73	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
73	11.3	National Parks	0	0	0	-	-
73	11.4	<u>Listed Buildings</u>	0	0	3	-	-
74	11.5	<u>Conservation Areas</u>	0	0	2	-	-
74	11.6	Scheduled Ancient Monuments	0	0	0	-	-
74	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
75	12.1	<u>Agricultural Land Classification</u>	Urban (within 250m)				
76	12.2	Open Access Land	0	0	0	-	-
76	12.3	Tree Felling Licences	0	0	0	-	-
76	12.4	Environmental Stewardship Schemes	0	0	0	-	-
76	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
77	13.1	Priority Habitat Inventory	0	0	0	-	-
77	13.2	Habitat Networks	0	0	0	-	-
77	13.3	Open Mosaic Habitat	0	0	0	-	-
77	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
78	14.1	<u>10k Availability</u>	Identified (within 500m)				
79	14.2	Artificial and made ground (10k)	0	0	0	0	-
80	14.3	<u>Superficial geology (10k)</u>	1	0	0	2	-

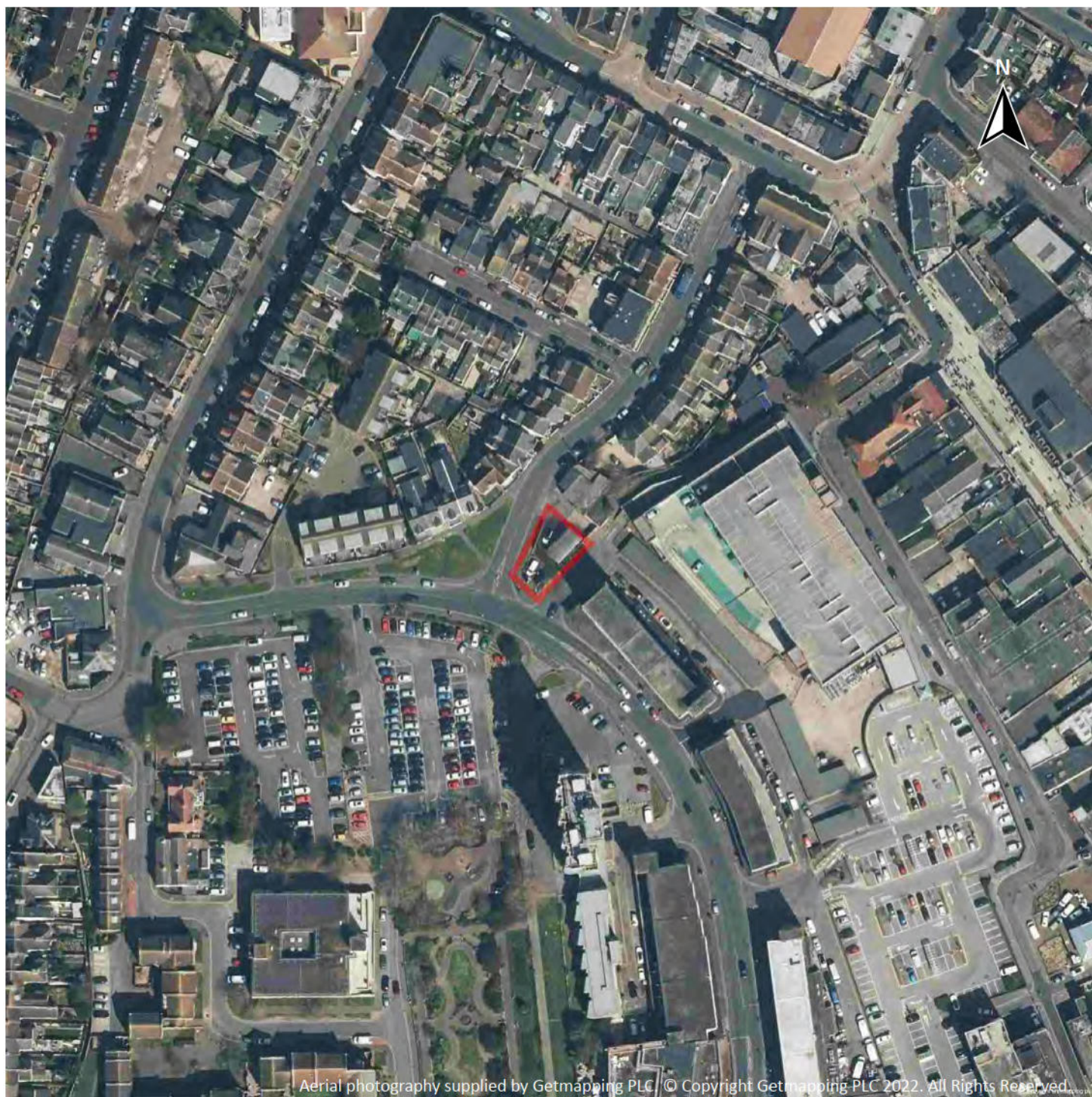


81	14.4	Landslip (10k)	0	0	0	0	-
82	14.5	<u>Bedrock geology (10k)</u>	1	0	1	0	-
83	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
84	15.1	<u>50k Availability</u>	Identified (within 500m)				
85	15.2	Artificial and made ground (50k)	0	0	0	0	-
85	15.3	Artificial ground permeability (50k)	0	0	-	-	-
86	15.4	<u>Superficial geology (50k)</u>	1	0	0	2	-
87	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
87	15.6	Landslip (50k)	0	0	0	0	-
87	15.7	Landslip permeability (50k)	None (within 50m)				
88	15.8	<u>Bedrock geology (50k)</u>	1	0	1	0	-
89	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
89	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
90	16.1	<u>BGS Boreholes</u>	0	2	5	-	-
Page	Section	Natural ground subsidence					
92	17.1	<u>Shrink swell clays</u>	Low (within 50m)				
93	17.2	<u>Running sands</u>	Low (within 50m)				
94	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
95	17.4	<u>Collapsible deposits</u>	Low (within 50m)				
96	17.5	<u>Landslides</u>	Very low (within 50m)				
97	17.6	<u>Ground dissolution of soluble rocks</u>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
98	18.1	Natural cavities	0	0	0	0	-
99	18.2	<u>BritPits</u>	0	0	1	1	-
99	18.3	<u>Surface ground workings</u>	0	0	2	-	-
100	18.4	Underground workings	0	0	0	0	0
100	18.5	Historical Mineral Planning Areas	0	0	0	0	-



100	18.6	Non-coal mining	0	0	0	0	0
100	18.7	Mining cavities	0	0	0	0	0
100	18.8	JPB mining areas	None (within 0m)				
101	18.9	Coal mining	None (within 0m)				
101	18.10	Brine areas	None (within 0m)				
101	18.11	Gypsum areas	None (within 0m)				
101	18.12	Tin mining	None (within 0m)				
101	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
<u>102</u>	<u>19.1</u>	<u>Radon</u>	Between 1% and 3% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
<u>103</u>	<u>20.1</u>	<u>BGS Estimated Background Soil Chemistry</u>	1	0	-	-	-
103	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
103	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
104	21.1	Underground railways (London)	0	0	0	-	-
104	21.2	Underground railways (Non-London)	0	0	0	-	-
105	21.3	Railway tunnels	0	0	0	-	-
<u>105</u>	<u>21.4</u>	<u>Historical railway and tunnel features</u>	0	0	36	-	-
106	21.5	Royal Mail tunnels	0	0	0	-	-
107	21.6	Historical railways	0	0	0	-	-
<u>107</u>	<u>21.7</u>	<u>Railways</u>	0	0	8	-	-
107	21.8	Crossrail 1	0	0	0	0	-
108	21.9	Crossrail 2	0	0	0	0	-
108	21.10	HS2	0	0	0	0	-

Recent aerial photograph

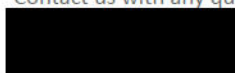


Capture Date: 20/04/2021

Site Area: 0.03ha

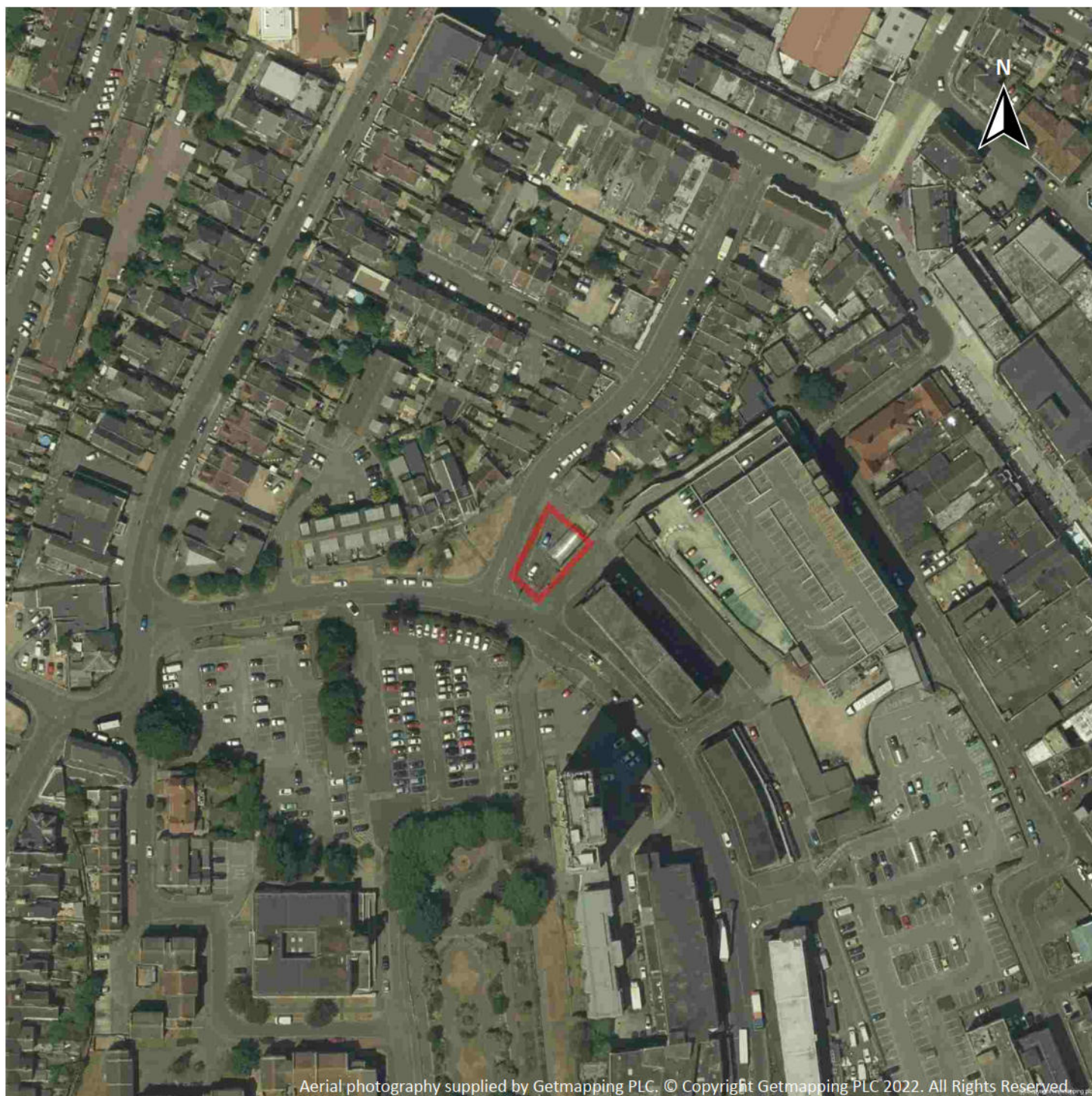


Contact us with any questions at:



Date: 30 May 2022

Recent site history - 2018 aerial photograph



Capture Date: 28/06/2018

Site Area: 0.03ha

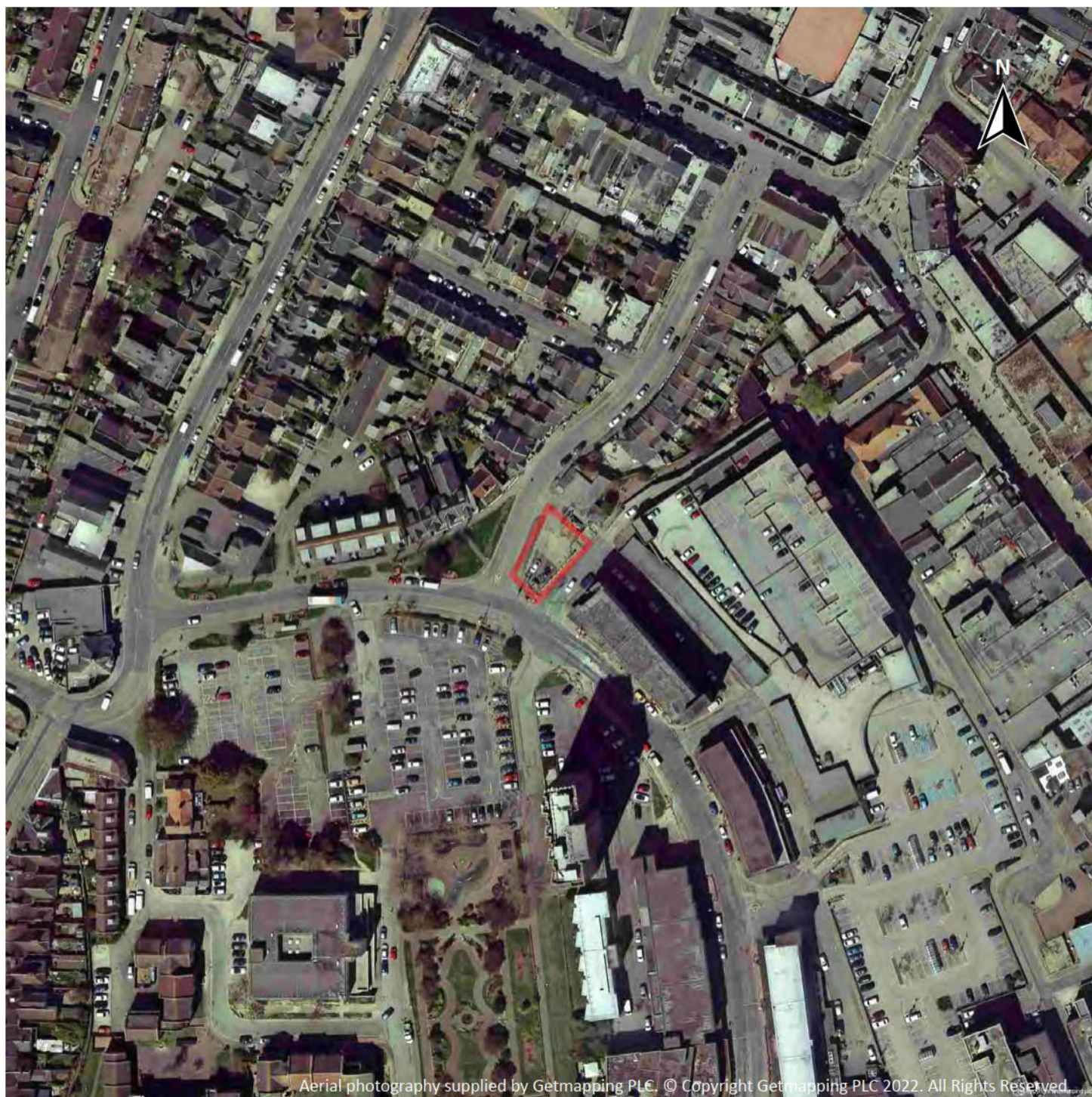


Contact us with any questions at:



Date: 30 May 2022

Recent site history - 2013 aerial photograph



Capture Date: 03/05/2013

Site Area: 0.03ha



Contact us with any questions at:



Date: 30 May 2022

Recent site history - 2012 aerial photograph



Capture Date: 13/09/2012

Site Area: 0.03ha

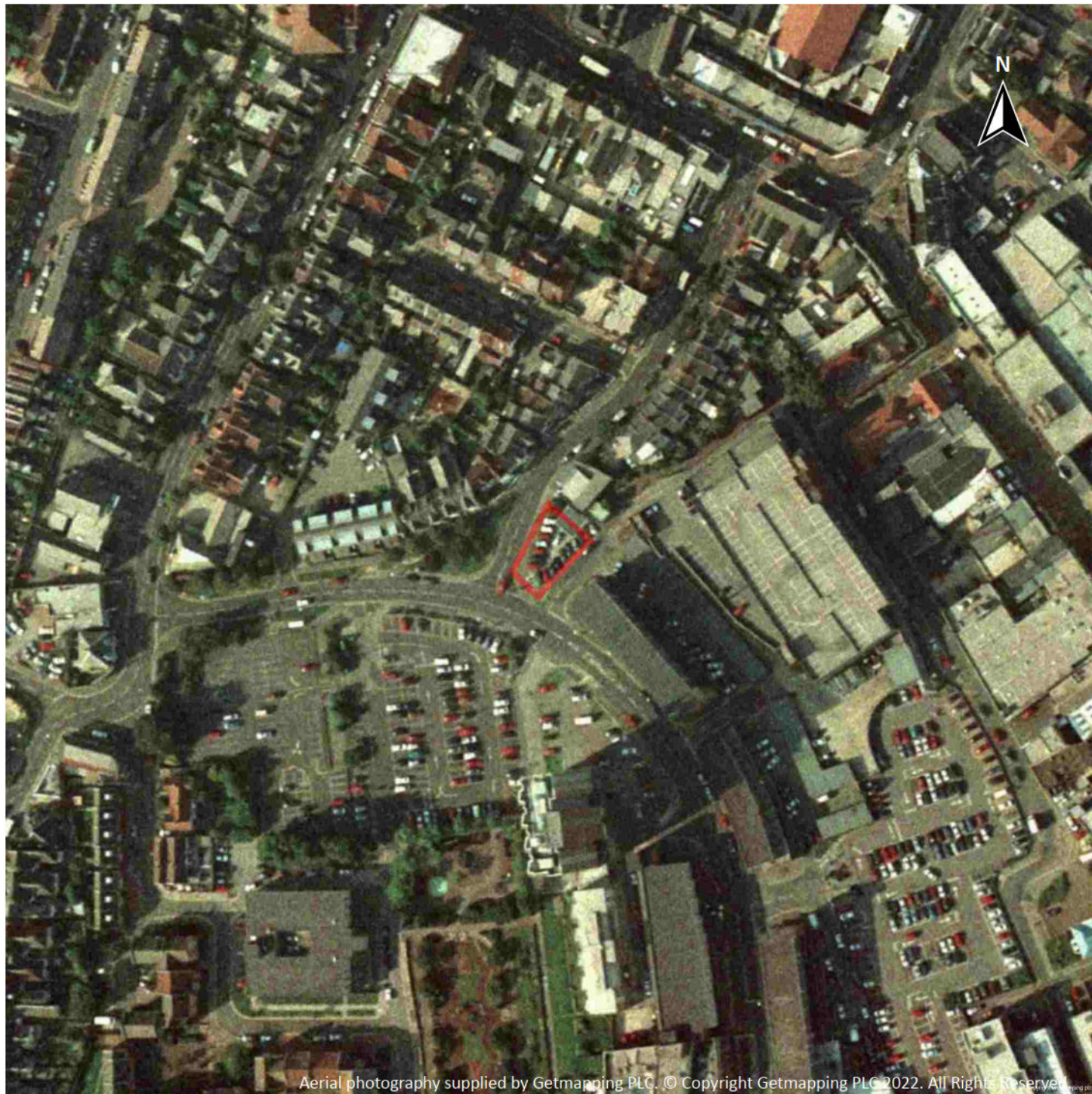


Contact us with any questions at:



Date: 30 May 2022

Recent site history - 1999 aerial photograph



Capture Date: 06/09/1999

Site Area: 0.03ha



Contact us with any questions at:



Date: 30 May 2022

OS MasterMap site plan



Site Area: 0.03ha

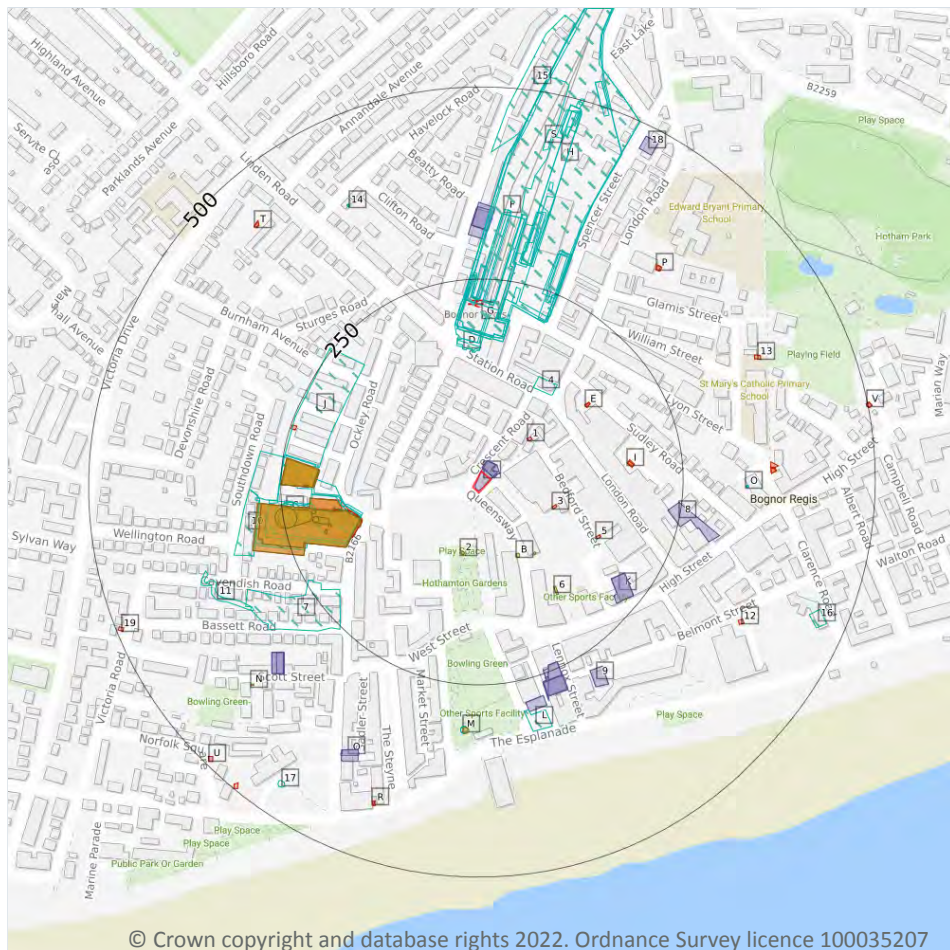


Contact us with any questions at:



Date: 30 May 2022

1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

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1.1 Historical industrial land uses

Records within 500m

59

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
4	128m NE	Police Station	1876	1973026



ID	Location	Land use	Dates present	Group ID
C	147m W	Gas Works	1910	1975306
C	150m W	Gas Works	1896	1977863
C	151m W	Unspecified Commercial/Industrial	1934 - 1940	1977141
D	155m N	Railway Station	1876	1979524
D	157m N	Railway Station	1896	1981791
C	161m W	Unspecified Works	1967	1970775
F	167m N	Railway Sidings	1876 - 1896	1978747
C	170m W	Gas Works	1876	1978885
G	171m N	Railway Station	1910	1976964
H	171m N	Railway Sidings	1910	2367853
G	172m N	Railway Station	1989	1975972
G	172m N	Railway Station	1957 - 1973	1977055
G	174m N	Railway Station	1934 - 1940	1977437
H	174m N	Railway Sidings	1940 - 1973	1975358
H	174m N	Railway Sidings	1934	1982726
C	189m W	Gasometers	1876 - 1896	1980105
H	195m N	Railway Sidings	1989	1984322
J	197m NW	Brick Field	1896	1971576
C	197m W	Gasometer	1910	1971692
C	207m W	Gasometer	1910	1971691
G	211m NE	Railway Buildings	1967 - 1973	1984185
7	219m SW	Brick Field	1896	1971577
G	223m N	Railway Buildings	1934 - 1940	1974620
G	223m N	Railway Buildings	1876 - 1896	1983847
C	227m W	Gasometer	1910	1971690
C	227m W	Unspecified Tank	1934 - 1940	1982837
C	232m W	Unspecified Tank	1957	1983502
G	236m N	Railway Building	1934 - 1940	1981523



ID	Location	Land use	Dates present	Group ID
G	237m N	Railway Building	1910	1984242
G	244m NE	Railway Building	1957	1980871
G	272m N	Railway Building	1957	1975468
G	275m N	Railway Building	1967	1978653
G	275m N	Railway Buildings	1934	1971601
G	275m N	Railway Building	1940	1981225
H	276m N	Railway Building	1973	1975405
H	276m N	Railway Building	1989	1984567
10	278m W	Nursery	1910	1970890
L	290m S	Fire Engine Station	1896	1971187
M	305m S	Unspecified Tank	1967 - 1973	1982747
M	305m S	Unspecified Tank	1989	1984601
11	327m SW	Unspecified Ground Workings	1910	1969348
O	332m E	Unspecified Tank	1876	1970595
H	375m N	Railway Building	1910	1976042
14	385m NW	Unspecified Tank	1876	1970588
15	416m N	Brick Field	1896	1971575
S	425m N	Railway Building	1876 - 1896	1976228
S	446m N	Railway Building	1957	1979547
S	450m N	Railway Building	1910	1977565
S	450m N	Railway Building	1934	1979756
S	450m N	Railway Building	1940	1981748
16	450m SE	Fire Station	1967 - 1973	1976414
17	454m SW	Unspecified Pit	1876	1973279
S	458m N	Railway Building	1967	1978039
S	489m N	Railway Building	1957	1971761
S	489m N	Railway Building	1957	1979012
S	494m N	Railway Building	1934 - 1940	1984688



ID	Location	Land use	Dates present	Group ID
S	497m N	Railway Buildings	1967 - 1973	1974238
S	497m N	Railway Buildings	1989	1977104

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

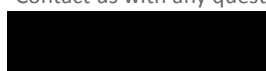
Records within 500m

25

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
2	79m S	Unspecified Tank	1961	328886
B	93m SE	Unspecified Tank	1876 - 1912	330931
B	105m SE	Unspecified Tank	1898 - 1912	329738
C	152m W	Gas Works	1876	331398
C	153m W	Gas Works	1898	330194
C	153m W	Gas Works	1912	330623
6	157m SE	Tanks	1982 - 1989	330026
C	191m W	Unspecified Tank	1912	328889
C	192m W	Gasometers	1876 - 1898	329807
C	198m W	Tanks	1940	329487
C	201m W	Gas Board Depot	1979 - 1992	330736
C	202m W	Gas Board Depot	1969	331572
C	202m W	Gas Board Depot	1968	330047
C	205m W	Unspecified Tank	1912	328888
C	207m W	Unspecified Tank	1932 - 1940	329821
C	212m W	Gasometers	1898 - 1912	330340



ID	Location	Land use	Dates present	Group ID
C	215m W	Unspecified Tank	1979	330723
C	215m W	Unspecified Tank	1983	331318
C	215m W	Unspecified Tank	1992	331527
C	215m W	Unspecified Tank	1983	331737
C	216m W	Unspecified Tank	1969	330747
C	216m W	Unspecified Tank	1968	330748
C	232m W	Unspecified Tank	1932 - 1940	329818
M	306m S	Unspecified Tank	1970	328901
N	383m SW	Unspecified Tank	1898	328900

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m

38

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	71m NE	Electricity Substation	1983 - 1992	215661
3	87m SE	Electricity Substation	1989	212955
C	150m W	Electricity Board Depot	1979 - 1992	216040
C	151m W	Electricity Board Depot	1969	214905
C	152m W	Gas Works	1876 - 1898	214318
C	152m W	Electricity Board Depot	1968	216715
C	153m W	Gas Works	1912	215387
5	156m SE	Electricity Substation	1968 - 1994	216509
E	156m NE	Electricity Substation	1968 - 1994	213508



ID	Location	Land use	Dates present	Group ID
E	157m NE	Electricity Substation	1979 - 1989	216995
C	163m W	Electricity Substation	1979 - 1992	216405
C	164m W	Electricity Substation	1968	216186
C	166m W	Electricity Substation	1979 - 1992	216958
I	179m E	Electricity Substation	1989 - 1994	216956
I	179m E	Electricity Substation	1982	215673
C	187m W	Electricity Substation	1979 - 1992	216662
C	192m W	Gasometers	1876 - 1898	214070
C	201m W	Gas Board Depot	1979 - 1992	214139
C	202m W	Gas Board Depot	1969	216030
C	202m W	Gas Board Depot	1968	214064
C	212m W	Gasometers	1898 - 1912	214572
J	242m W	Electricity Substation	1968 - 1992	216441
P	347m NE	Electricity Substation	1968 - 1989	215742
P	347m NE	Electricity Substation	1994	215187
O	364m E	Electricity Substation	1968 - 1982	215297
O	364m E	Electricity Substation	1979 - 1994	216434
O	365m E	Electricity Substation	1969	216668
12	370m SE	Electricity Substation	1979 - 1994	215479
13	377m NE	Electricity Substation	1979 - 1994	217339
R	422m S	Electricity Substation	1970	217151
R	424m S	Electricity Substation	1979 - 1992	216469
T	431m NW	Electricity Substation	1979	215343
T	432m NW	Electricity Substation	1969 - 1970	215922
U	487m SW	Electricity Substation	1979 - 1992	213722
19	490m W	Electricity Substation	1969 - 1991	215114
U	490m SW	Electricity Substation	1970 - 1992	217334
V	498m E	Electricity Substation	1979 - 1994	216609



ID	Location	Land use	Dates present	Group ID
V	498m E	Electricity Substation	1982	216308

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0
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Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	23
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Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	On site	Garage	1968	65745
A	4m NE	Garage	1969	66066
A	4m NE	Garage	1979	66081
A	5m NE	Garage	1983 - 1992	66395
K	203m SE	Garage	1961 - 1968	66506
K	203m SE	Garage	1961 - 1979	66651
8	234m E	Garage	1961	66318
L	242m S	Garage	1970	66371
L	242m S	Garage	1980 - 1994	66504
L	255m S	Garage	1979 - 1992	66577



ID	Location	Land use	Dates present	Group ID
L	260m S	Garage	1962	66120
L	261m S	Garage	1961	65803
9	273m SE	Garage	1970 - 1980	66403
L	277m S	Garage	1961	65506
F	301m N	Garage	1996	65795
F	313m N	Garage	1970 - 1979	66623
F	314m N	Garage	1969	65660
N	326m SW	Garage	1961	65968
N	327m SW	Garage	1970	66005
N	327m SW	Garage	1979 - 1992	66340
Q	369m SW	Garage	1961 - 1992	66263
Q	369m SW	Garage	1970	65857
18	467m NE	Garage	1968 - 1969	66202

This data is sourced from Ordnance Survey / Groundsure.

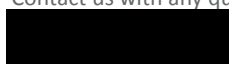
1.6 Historical military land

Records within 500m

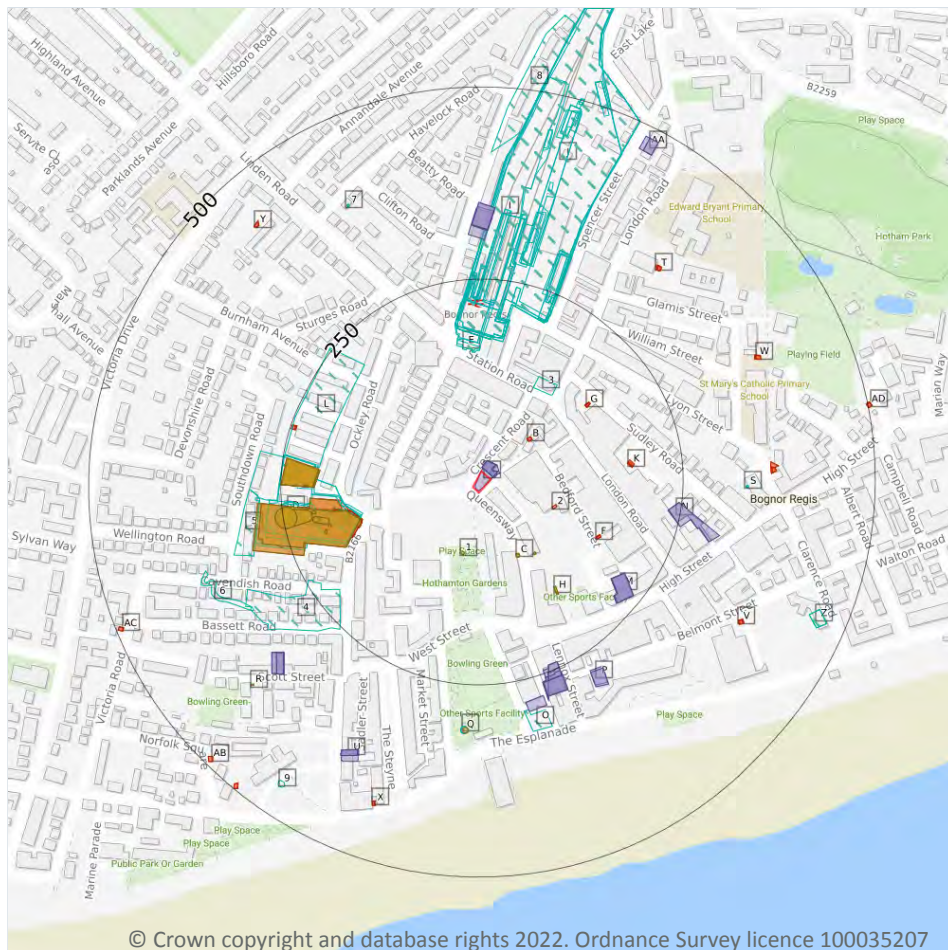
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Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.



2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

2.1 Historical industrial land uses

Records within 500m

78

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 22**

ID	Location	Land Use	Date	Group ID
3	128m NE	Police Station	1876	1973026
D	147m W	Gas Works	1910	1975306
D	150m W	Gas Works	1896	1977863



ID	Location	Land Use	Date	Group ID
D	151m W	Unspecified Commercial/Industrial	1934	1977141
D	151m W	Unspecified Commercial/Industrial	1940	1977141
E	155m N	Railway Station	1876	1979524
E	157m N	Railway Station	1896	1981791
D	161m W	Unspecified Works	1967	1970775
I	167m N	Railway Sidings	1876	1978747
I	167m N	Railway Sidings	1896	1978747
D	170m W	Gas Works	1876	1978885
I	171m N	Railway Station	1910	1976964
J	171m N	Railway Sidings	1910	2367853
I	172m N	Railway Station	1989	1975972
I	172m N	Railway Station	1967	1977055
I	172m N	Railway Station	1973	1977055
I	172m N	Railway Station	1957	1977055
I	174m N	Railway Station	1934	1977437
I	174m N	Railway Station	1940	1977437
J	174m N	Railway Sidings	1934	1982726
J	174m N	Railway Sidings	1940	1975358
D	189m W	Gasometers	1896	1980105
J	195m N	Railway Sidings	1989	1984322
J	195m N	Railway Sidings	1967	1975358
J	195m N	Railway Sidings	1973	1975358
J	195m N	Railway Sidings	1957	1975358
D	196m W	Gasometers	1876	1980105
L	197m NW	Brick Field	1896	1971576
D	197m W	Gasometer	1910	1971692
D	207m W	Gasometer	1910	1971691
I	211m NE	Railway Buildings	1967	1984185



ID	Location	Land Use	Date	Group ID
I	211m NE	Railway Buildings	1973	1984185
4	219m SW	Brick Field	1896	1971577
I	223m N	Railway Buildings	1934	1974620
I	223m N	Railway Buildings	1940	1974620
I	223m N	Railway Buildings	1876	1983847
I	226m N	Railway Buildings	1896	1983847
D	227m W	Unspecified Tank	1934	1982837
D	227m W	Gasometer	1910	1971690
D	227m W	Unspecified Tank	1940	1982837
D	232m W	Unspecified Tank	1957	1983502
I	236m N	Railway Building	1934	1981523
I	236m N	Railway Building	1940	1981523
I	237m N	Railway Building	1910	1984242
I	244m NE	Railway Building	1957	1980871
I	272m N	Railway Building	1957	1975468
I	275m N	Railway Building	1967	1978653
I	275m N	Railway Buildings	1934	1971601
I	275m N	Railway Building	1940	1981225
J	276m N	Railway Building	1989	1984567
J	276m N	Railway Building	1973	1975405
5	278m W	Nursery	1910	1970890
O	290m S	Fire Engine Station	1896	1971187
Q	305m S	Unspecified Tank	1989	1984601
Q	305m S	Unspecified Tank	1967	1982747
Q	305m S	Unspecified Tank	1973	1982747
6	327m SW	Unspecified Ground Workings	1910	1969348
S	332m E	Unspecified Tank	1876	1970595
J	375m N	Railway Building	1910	1976042



ID	Location	Land Use	Date	Group ID
7	385m NW	Unspecified Tank	1876	1970588
8	416m N	Brick Field	1896	1971575
J	425m N	Railway Building	1876	1976228
J	429m N	Railway Building	1896	1976228
J	446m N	Railway Building	1957	1979547
J	450m N	Railway Building	1934	1979756
J	450m N	Railway Building	1910	1977565
J	450m N	Railway Building	1940	1981748
Z	450m SE	Fire Station	1967	1976414
Z	450m SE	Fire Station	1973	1976414
9	454m SW	Unspecified Pit	1876	1973279
J	458m N	Railway Building	1967	1978039
J	489m N	Railway Building	1957	1979012
J	489m N	Railway Building	1957	1971761
J	494m N	Railway Building	1934	1984688
J	494m N	Railway Building	1940	1984688
J	497m N	Railway Buildings	1989	1977104
J	497m N	Railway Buildings	1967	1974238
J	497m N	Railway Buildings	1973	1974238

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m

35

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 22**

ID	Location	Land Use	Date	Group ID
1	79m S	Unspecified Tank	1961	328886



ID	Location	Land Use	Date	Group ID
C	93m SE	Unspecified Tank	1876	330931
C	94m SE	Unspecified Tank	1912	330931
C	105m SE	Unspecified Tank	1898	329738
C	105m SE	Unspecified Tank	1912	329738
D	152m W	Gas Works	1876	331398
D	153m W	Gas Works	1898	330194
D	153m W	Gas Works	1912	330623
H	157m SE	Tanks	1982	330026
H	157m SE	Tanks	1989	330026
D	191m W	Unspecified Tank	1912	328889
D	192m W	Gasometers	1876	329807
D	192m W	Gasometers	1898	329807
D	198m W	Tanks	1940	329487
D	201m W	Gas Board Depot	1979	330736
D	201m W	Gas Board Depot	1983	330736
D	201m W	Gas Board Depot	1983	330736
D	201m W	Gas Board Depot	1992	330736
D	202m W	Gas Board Depot	1969	331572
D	202m W	Gas Board Depot	1968	330047
D	205m W	Unspecified Tank	1912	328888
D	207m W	Unspecified Tank	1932	329821
D	207m W	Unspecified Tank	1940	329821
D	212m W	Gasometers	1898	330340
D	212m W	Gasometers	1912	330340
D	215m W	Unspecified Tank	1979	330723
D	215m W	Unspecified Tank	1983	331737
D	215m W	Unspecified Tank	1983	331318
D	215m W	Unspecified Tank	1992	331527



ID	Location	Land Use	Date	Group ID
D	216m W	Unspecified Tank	1969	330747
D	216m W	Unspecified Tank	1968	330748
D	232m W	Unspecified Tank	1932	329818
D	232m W	Unspecified Tank	1940	329818
Q	306m S	Unspecified Tank	1970	328901
R	383m SW	Unspecified Tank	1898	328900

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

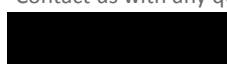
Records within 500m

95

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 22**

ID	Location	Land Use	Date	Group ID
B	71m NE	Electricity Substation	1983	215661
B	71m NE	Electricity Substation	1983	215661
B	71m NE	Electricity Substation	1992	215661
2	87m SE	Electricity Substation	1989	212955
D	150m W	Electricity Board Depot	1979	216040
D	150m W	Electricity Board Depot	1983	216040
D	150m W	Electricity Board Depot	1983	216040
D	150m W	Electricity Board Depot	1992	216040
D	151m W	Electricity Board Depot	1969	214905
D	152m W	Gas Works	1876	214318
D	152m W	Electricity Board Depot	1968	216715
D	153m W	Gas Works	1898	214318
D	153m W	Gas Works	1912	215387
F	156m SE	Electricity Substation	1968	216509



ID	Location	Land Use	Date	Group ID
F	156m SE	Electricity Substation	1982	216509
F	156m SE	Electricity Substation	1994	216509
G	156m NE	Electricity Substation	1969	213508
G	156m NE	Electricity Substation	1968	213508
G	156m NE	Electricity Substation	1982	213508
F	156m SE	Electricity Substation	1969	216509
G	156m NE	Electricity Substation	1994	213508
F	156m SE	Electricity Substation	1979	216509
F	156m SE	Electricity Substation	1989	216509
G	157m NE	Electricity Substation	1979	216995
G	157m NE	Electricity Substation	1989	216995
D	163m W	Electricity Substation	1979	216405
D	163m W	Electricity Substation	1983	216405
D	163m W	Electricity Substation	1983	216405
D	163m W	Electricity Substation	1992	216405
D	164m W	Electricity Substation	1968	216186
D	166m W	Electricity Substation	1979	216958
D	166m W	Electricity Substation	1983	216958
D	166m W	Electricity Substation	1983	216958
D	166m W	Electricity Substation	1992	216958
K	179m E	Electricity Substation	1989	216956
K	179m E	Electricity Substation	1982	215673
K	180m E	Electricity Substation	1994	216956
D	187m W	Electricity Substation	1979	216662
D	187m W	Electricity Substation	1983	216662
D	187m W	Electricity Substation	1983	216662
D	187m W	Electricity Substation	1992	216662
D	192m W	Gasometers	1876	214070

ID	Location	Land Use	Date	Group ID
D	192m W	Gasometers	1898	214070
D	201m W	Gas Board Depot	1979	214139
D	201m W	Gas Board Depot	1983	214139
D	201m W	Gas Board Depot	1983	214139
D	201m W	Gas Board Depot	1992	214139
D	202m W	Gas Board Depot	1969	216030
D	202m W	Gas Board Depot	1968	214064
D	212m W	Gasometers	1898	214572
D	212m W	Gasometers	1912	214572
L	242m W	Electricity Substation	1979	216441
L	242m W	Electricity Substation	1983	216441
L	242m W	Electricity Substation	1983	216441
L	242m W	Electricity Substation	1992	216441
L	243m W	Electricity Substation	1969	216441
L	243m W	Electricity Substation	1968	216441
T	347m NE	Electricity Substation	1968	215742
T	347m NE	Electricity Substation	1982	215742
T	347m NE	Electricity Substation	1994	215187
T	347m NE	Electricity Substation	1969	215742
T	348m NE	Electricity Substation	1979	215742
T	348m NE	Electricity Substation	1989	215742
S	364m E	Electricity Substation	1968	215297
S	364m E	Electricity Substation	1982	215297
S	364m E	Electricity Substation	1994	216434
S	365m E	Electricity Substation	1969	216668
S	366m E	Electricity Substation	1979	216434
S	366m E	Electricity Substation	1989	216434
V	370m SE	Electricity Substation	1982	215479



ID	Location	Land Use	Date	Group ID
V	371m SE	Electricity Substation	1979	215479
V	371m SE	Electricity Substation	1989	215479
V	371m SE	Electricity Substation	1994	215479
W	377m NE	Electricity Substation	1994	217339
W	377m NE	Electricity Substation	1982	217339
W	379m NE	Electricity Substation	1979	217339
W	379m NE	Electricity Substation	1989	217339
X	422m S	Electricity Substation	1970	217151
X	424m S	Electricity Substation	1979	216469
X	424m S	Electricity Substation	1992	216469
Y	431m NW	Electricity Substation	1979	215343
Y	432m NW	Electricity Substation	1970	215922
Y	432m NW	Electricity Substation	1969	215922
AB	487m SW	Electricity Substation	1979	213722
AB	487m SW	Electricity Substation	1992	213722
AC	490m W	Electricity Substation	1969	215114
AB	490m SW	Electricity Substation	1970	217334
AC	491m W	Electricity Substation	1979	215114
AC	491m W	Electricity Substation	1991	215114
AB	491m SW	Electricity Substation	1979	217334
AB	491m SW	Electricity Substation	1992	217334
AD	498m E	Electricity Substation	1994	216609
AD	498m E	Electricity Substation	1979	216609
AD	498m E	Electricity Substation	1989	216609
AD	498m E	Electricity Substation	1982	216308

This data is sourced from Ordnance Survey / Groundsure.



2.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m

39

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 22**

ID	Location	Land Use	Date	Group ID
A	On site	Garage	1968	65745
A	4m NE	Garage	1969	66066
A	4m NE	Garage	1979	66081
A	5m NE	Garage	1983	66395
A	5m NE	Garage	1983	66395
A	5m NE	Garage	1992	66395
M	203m SE	Garage	1961	66506
M	203m SE	Garage	1968	66506
M	203m SE	Garage	1961	66651
M	203m SE	Garage	1969	66651
M	203m SE	Garage	1979	66651
N	234m E	Garage	1961	66318
N	235m E	Garage	1961	66318
O	242m S	Garage	1970	66371
O	242m S	Garage	1984	66504
O	245m S	Garage	1970	66371

ID	Location	Land Use	Date	Group ID
O	250m SE	Garage	1980	66504
O	254m SE	Garage	1994	66504
O	255m S	Garage	1992	66577
O	255m S	Garage	1979	66577
O	260m S	Garage	1962	66120
O	261m S	Garage	1961	65803
P	273m SE	Garage	1980	66403
P	275m SE	Garage	1970	66403
O	277m S	Garage	1961	65506
I	301m N	Garage	1996	65795
I	313m N	Garage	1970	66623
I	314m N	Garage	1969	65660
I	315m N	Garage	1979	66623
R	326m SW	Garage	1961	65968
R	327m SW	Garage	1970	66005
R	327m SW	Garage	1992	66340
R	327m SW	Garage	1979	66340
U	369m SW	Garage	1961	66263
U	369m SW	Garage	1970	65857
U	370m SW	Garage	1992	66263
U	370m SW	Garage	1979	66263
AA	467m NE	Garage	1968	66202
AA	467m NE	Garage	1969	66202

This data is sourced from Ordnance Survey / Groundsure.



3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.



3.3 Historical landfill (LA/mapping records)

Records within 500m

0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m

0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m

0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m

2

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 33**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	125m NW	51, CANADA GROVE, BOGNOR REGIS, PO21 1DW	WEX221030	Storing waste exemption	Not on a farm	Storage of waste in a secure place

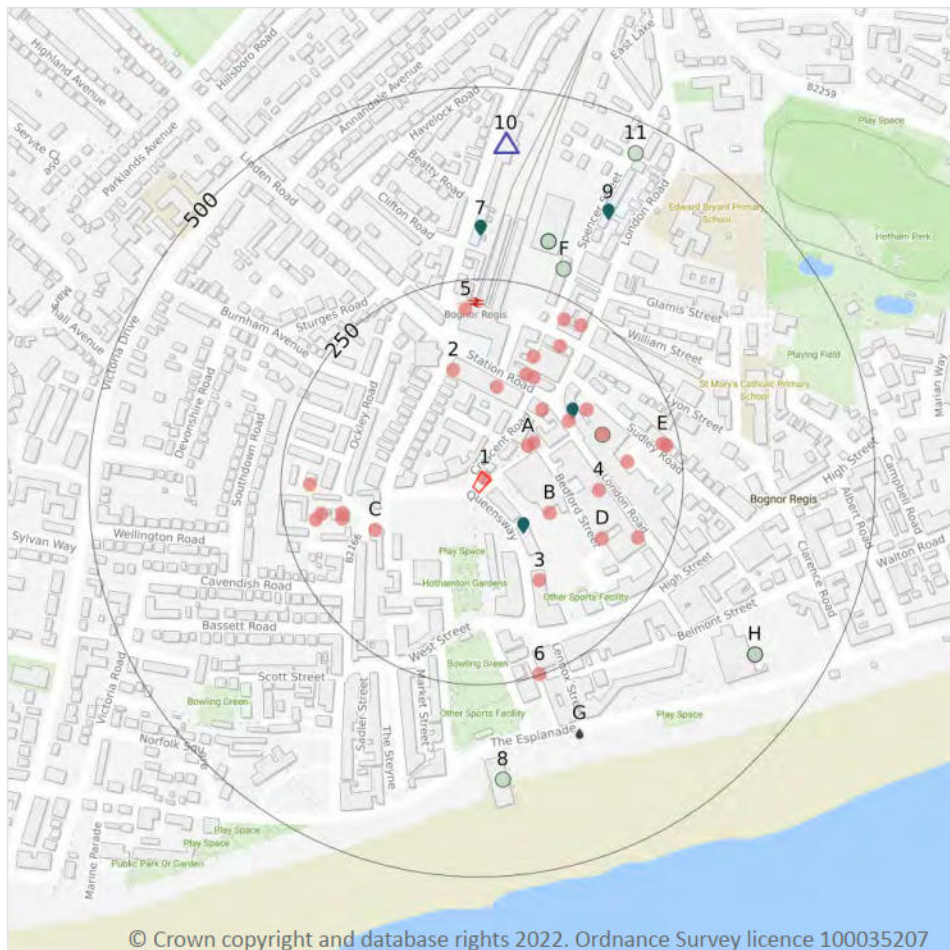


ID	Location	Site	Reference	Category	Sub-Category	Description
2	147m N	26 Station Road Bognor Regis West Sussex PO21 1QF	EPR/SE5347Z M/A001	Treating waste exemption	Non- Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)

This data is sourced from the Environment Agency and Natural Resources Wales.



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- ▲ Current or recent petrol stations
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m

31

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on [page 36](#)

ID	Location	Company	Address	Activity	Category
1	On site	Queensway Hand Car Wash	Crescent Road, Town Centre, Bognor Regis, West Sussex, PO21 1QG	Vehicle Cleaning Services	Personal, Consumer and Other Services
A	65m NE	Stock Blinds	38, Bedford Street, Bognor Regis, West Sussex, PO21 1RP	Curtains and Blinds	Consumer Products



ID	Location	Company	Address	Activity	Category
A	73m NE	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
B	87m SE	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
A	112m N	Cryolab Ltd	Commercial House 19, Station Road, Bognor Regis, West Sussex, PO21 1QD	Measurement and Inspection Equipment	Industrial Products
A	113m NE	A 1 Compusolve	1, Station Road, Bognor Regis, West Sussex, PO21 1QB	Electrical Equipment Repair and Servicing	Repair and Servicing
A	127m NE	Water Tower Buildings	West Sussex, PO21	Water Pumping Stations	Industrial Features
2	137m N	Reynolds Storage	Flat 15, Station Road, Bognor Regis, West Sussex, PO21 1QD	Container and Storage	Transport, Storage and Delivery
3	139m SE	Mobility & Comfort Ltd	19, Queensway, Bognor Regis, West Sussex, PO21 1QN	Disability and Mobility Equipment	Consumer Products
A	139m NE	Mattress Masters	16, Station Road, Bognor Regis, West Sussex, PO21 1QE	Beds and Bedding	Consumer Products
C	139m SW	Southern Fire Alarms Ltd	2, Argyle Circus, Bognor Regis, West Sussex, PO21 1DS	Electronic Equipment	Industrial Products
A	140m NE	Mattress Masters	12, Station Road, Bognor Regis, West Sussex, PO21 1QE	Beds and Bedding	Consumer Products
4	141m E	Specsavers Hearcare	22, London Road, Bognor Regis, West Sussex, PO21 1PY	Disability and Mobility Equipment	Consumer Products
A	155m NE	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
A	156m E	Boots Hearing Care	47, London Road, Bognor Regis, West Sussex, PO21 1PQ	Disability and Mobility Equipment	Consumer Products
D	163m SE	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
A	164m NE	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
C	174m W	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
C	175m W	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities



ID	Location	Company	Address	Activity	Category
A	180m E	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
A	192m NE	The Monumental Company	1, Lyon Street West, Bognor Regis, West Sussex, PO21 1JG	Stone Quarrying and Preparation	Extractive Industries
C	201m W	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
D	205m E	Cell Repair	4b, London Road, Bognor Regis, West Sussex, PO21 1PY	Electrical Equipment Repair and Servicing	Repair and Servicing
C	209m W	Electricity Sub Station	West Sussex, PO21	Electrical Features	Infrastructure and Facilities
5	212m N	Bognor Regis Rail Station	West Sussex, PO21	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure
C	213m W	Tank	West Sussex, PO21	Tanks (Generic)	Industrial Features
A	224m NE	Thompson Civil Engineering	1, Spencer Street, Bognor Regis, West Sussex, PO21 1AP	Civil Engineers	Engineering Services
E	228m E	Capital Compactors	Capital House 26, Sudley Road, Bognor Regis, West Sussex, PO21 1ER	Waste Storage, Processing and Disposal	Infrastructure and Facilities
A	230m NE	Graham Press	80, London Road, Bognor Regis, West Sussex, PO21 1DD	Published Goods	Industrial Products
E	232m E	Helen's Airport Cars Ltd West Sussex	24, Sudley Road, Bognor Regis, West Sussex, PO21 1ER	Airlines and Airline Services	Transport, Storage and Delivery
6	249m S	Works	West Sussex, PO21	Unspecified Works Or Factories	Industrial Features

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m

1

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 36**



ID	Location	Company	Address	LPG	Status
10	428m N	TEXACO	12-28, Longford Road, Bognor Regis, West Sussex, PO21 1AQ	Not Applicable	Obsolete

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0
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High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0
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High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0
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Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0
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Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m**0**

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m**0**

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m**0**

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m**0**

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m**4**

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 36**

ID	Location	Address	Details	
B	70m SE	Colshaz Limited, 39a Queensway, Bognor Regis, PO21 1QN	Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
A	138m NE	Johnson Cleaners UK Ltd, 2 Central Buildings, London Road, Bognor Regis, PO21 1PW	Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
7	316m N	Bognor Motors Ltd, Longford Rd, PO21 1AQ	Process: Waste Oil Burner 0.4 MW; Unloading of Petrol into Storage at Service Stations Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
9	374m NE	Chris Clarke Cars, Spencer Street, Bognor Regis, West Sussex, PO22 1AN	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

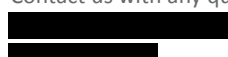
4.13 Licensed Discharges to controlled waters

Records within 500m

3

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 36**



ID	Location	Address	Details	
G	339m SE	ESPLANADE BOGNOR CSO, THE ESPLANADE, BOGNOR REGIS, WEST SUSSEX, PO21 1NA	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: A01403 Permit Version: 1 Receiving Water: ENGLISH CHANNEL VIA SWS	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 19/12/2006 Effective Date: 19/12/2006 Revocation Date: 31/03/2008
G	339m SE	ESPLANADE BOGNOR CSO, THE ESPLANADE, BOGNOR REGIS, WEST SUSSEX, PO21 1NA	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: A01403 Permit Version: 2 Receiving Water: ENGLISH CHANNEL VIA SWS	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 19/12/2006 Effective Date: 01/04/2008 Revocation Date: 30/03/2019
G	339m SE	ESPLANADE BOGNOR CSO, THE ESPLANADE, BOGNOR REGIS, WEST SUSSEX, PO21 1NA	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: A01403 Permit Version: 3 Receiving Water: ENGLISH CHANNEL VIA SWS	Status: SURRENDERED UNDER EPR 2010 Issue date: 06/02/2019 Effective Date: 31/03/2019 Revocation Date: 15/01/2021

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.16 List 1 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

8

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 36**

ID	Location	Details	
A	156m E	Incident Date: 24/10/2001 Incident Identification: 38801 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
F	284m N	Incident Date: 05/02/2002 Incident Identification: 56545 Pollutant: Oils and Fuel Pollutant Description: Other Oil or Fuel	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
F	311m N	Incident Date: 11/09/2001 Incident Identification: 30179 Pollutant: Inorganic Chemicals/Products Pollutant Description: Cyanides	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
F	311m N	Incident Date: 22/11/2001 Incident Identification: 44407 Pollutant: Sewage Materials Pollutant Description: Grey Water	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Location	Details	
8	374m S	Incident Date: 17/03/2003 Incident Identification: 143560 Pollutant: Sewage Materials Pollutant Description: Grey Water	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
H	411m SE	Incident Date: 08/11/2001 Incident Identification: 41787 Pollutant: Oils and Fuel Pollutant Description: Other Oil or Fuel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	411m SE	Incident Date: 08/11/2001 Incident Identification: 41787 Pollutant: Oils and Fuel Pollutant Description: Other Oil or Fuel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
11	459m NE	Incident Date: 25/03/2003 Incident Identification: 146549 Pollutant: Contaminated Water Pollutant Description: Vehicle and Plant Washings	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0
----------------------------	----------

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

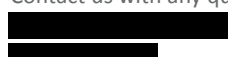
This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0
----------------------------	----------

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.



4.21 Pollution inventory radioactive waste

Records within 500m

0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

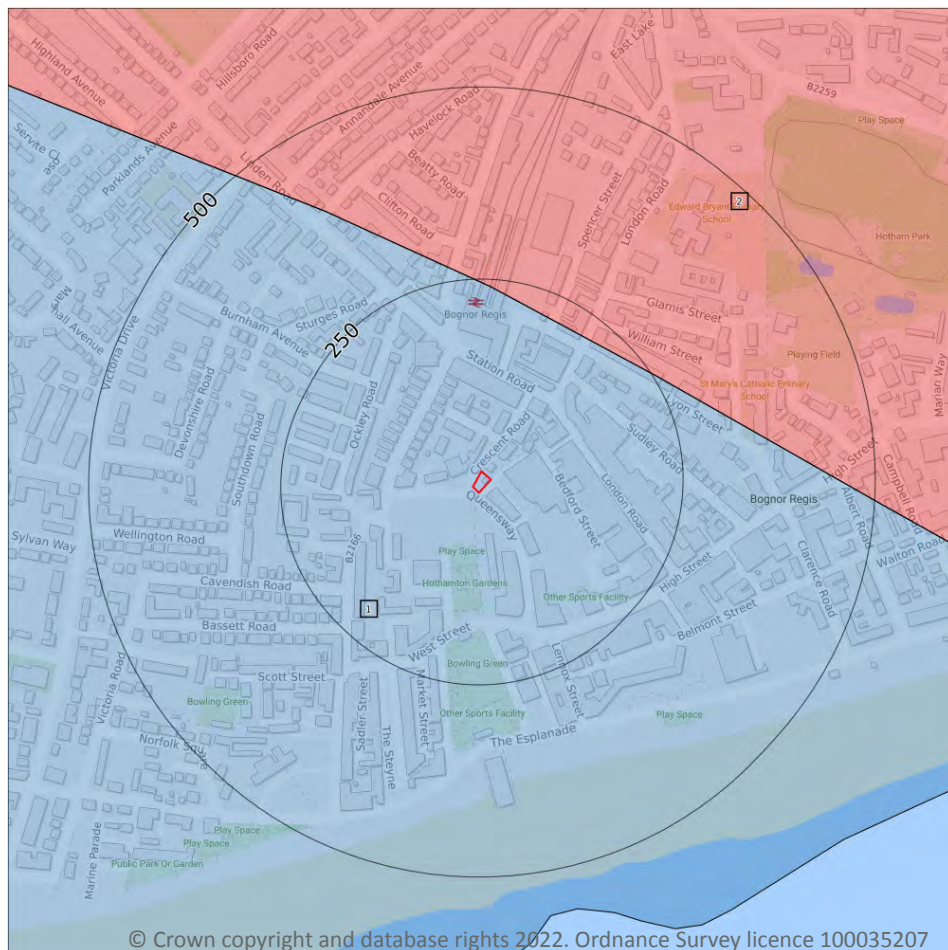
This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.



This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Bedrock aquifer



- Site Outline**
- Search buffers in metres (m)**
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

2

Aquifer status of groundwater held within bedrock geology.

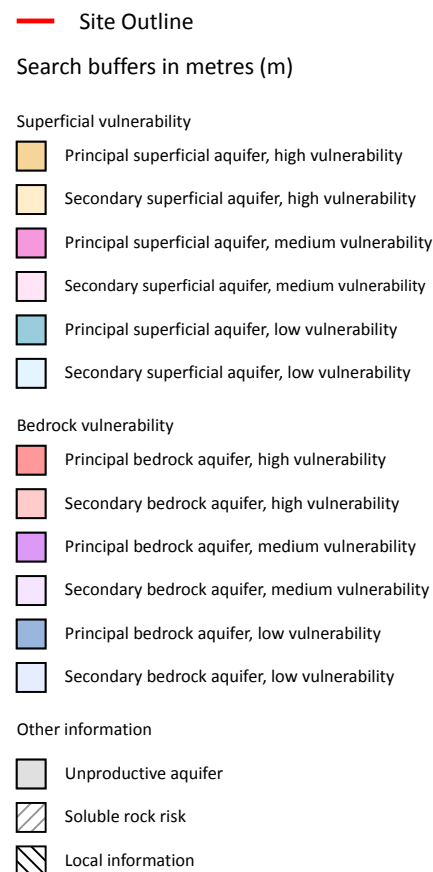
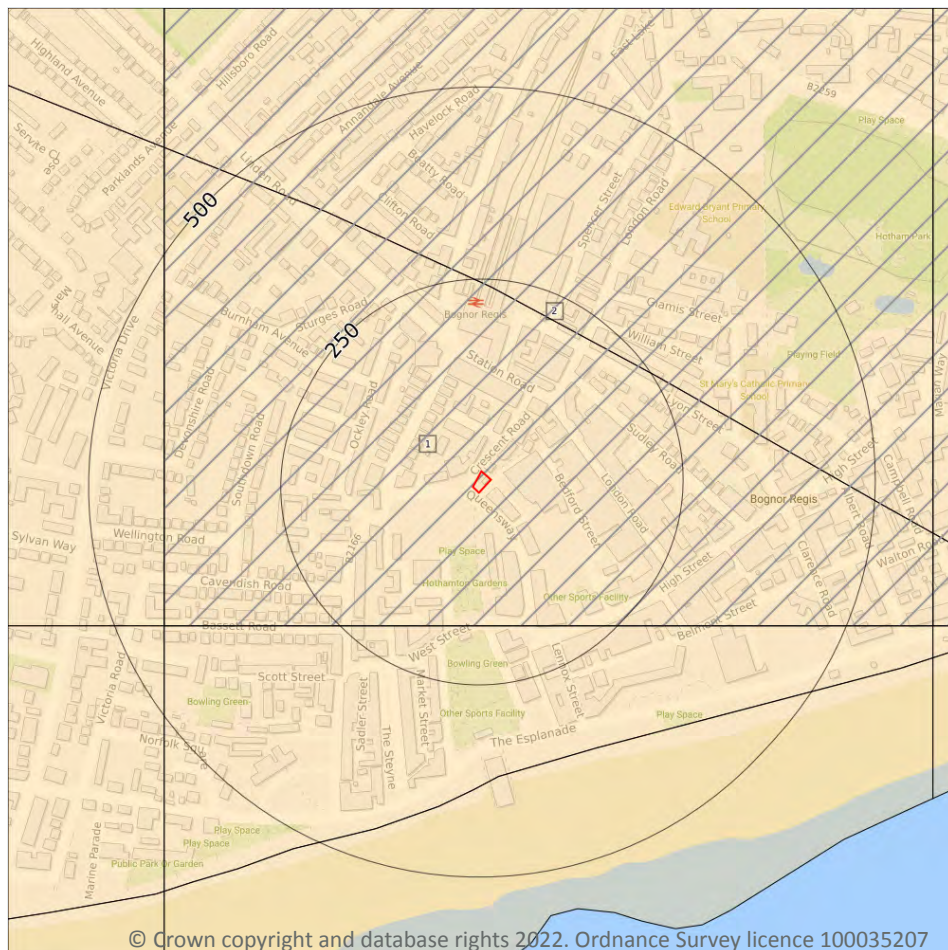
Features are displayed on the Bedrock aquifer map on **page 48**

ID	Location	Designation	Description
1	On site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	217m NE	Secondary A	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. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 49**



ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: High Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: High	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	1
------------------------	----------

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
2	Significant soluble rocks are likely to be present. Problems unlikely except with considerable surface or subsurface water flow.	2.0%

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	0
------------------------	----------

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



- Site Outline
- Search buffers in metres (m)**
- Source Protection Zone 1
Inner catchment
- Source Protection Zone 2
Outer catchment
- Source Protection Zone 3
Total catchment
- Source Protection Zone 4
Zone of Special Interest
- Source Protection Zone 1c
Inner catchment - confined aquifer
- Source Protection Zone 2c
Outer catchment - confined aquifer
- Source Protection Zone 3c
Total catchment - confined aquifer
- Drinking water abstraction licences
Polygon features
- Drinking water abstraction licences
Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m

0

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m

2

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 51**

ID	Location	Details	
-	1156m E	Status: Historical Licence No: 27/201 Details: Make-Up Or Top Up Water Direct Source: Southern Region Surface Waters Point: ALDINGBOURNE RIFE AT BUTLINS HOLIDAY VILLAGE, POINT 'A' Data Type: Point Name: Butlins Skyline Ltd Easting: 494560 Northing: 99410	Annual Volume (m ³): 40000 Max Daily Volume (m ³): 360 Original Application No: - Original Start Date: 23/12/2002 Expiry Date: 31/03/2016 Issue No: 1 Version Start Date: 23/12/2002 Version End Date: -
-	1924m NE	Status: Active Licence No: 10/41/542102/R01 Details: Spray Irrigation - Direct Direct Source: Southern Region Surface Waters Point: BETWEEN POINTS C&D AT LIDSEY,BERSTED Data Type: Line Name: Ashmarden Limited Easting: 494931 Northing: 102749	Annual Volume (m ³): 24,548 Max Daily Volume (m ³): 909 Original Application No: NPS/WR/030681 Original Start Date: 01/04/2016 Expiry Date: 31/03/2028 Issue No: 2 Version Start Date: 13/12/2018 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m

0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.



5.9 Source Protection Zones

Records within 500m

0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

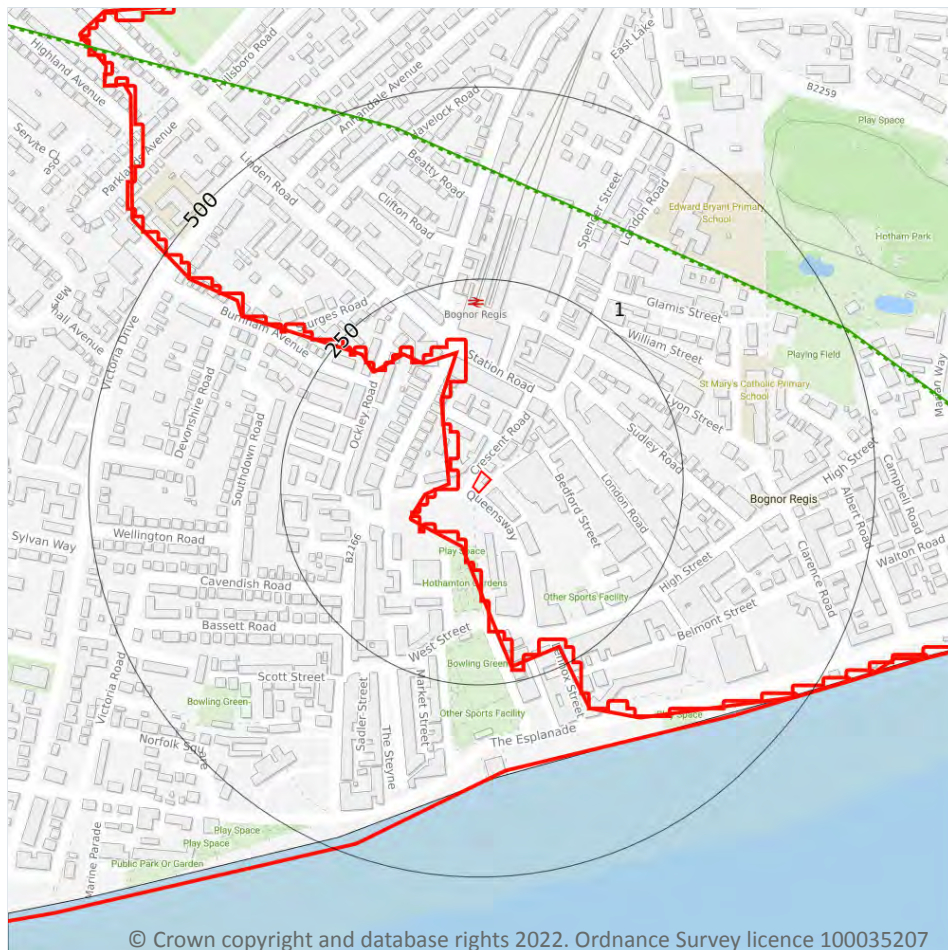
Records within 500m

0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

0

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

0

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.



This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site

1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 54**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	On site	River	Aldingbourne Rife	GB107041011980	Western Streams	Arun and Western Streams

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified

1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 54**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	1177m E	River	Aldingbourne Rife	GB107041011980	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site

0

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

This data is sourced from the Environment Agency and Natural Resources Wales.



7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m

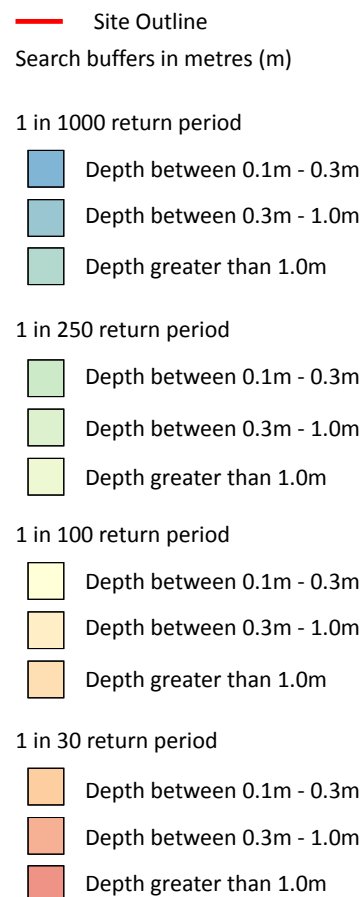
0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

Negligible

Highest risk within 50m

1 in 1000 year, 0.1m - 0.3m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 60**

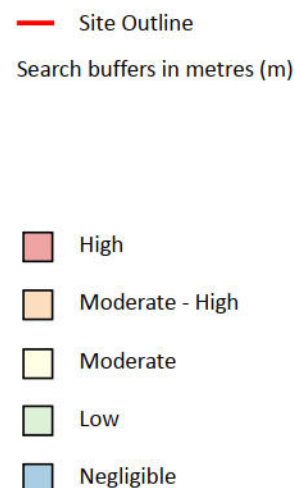
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Moderate

Highest risk within 50m

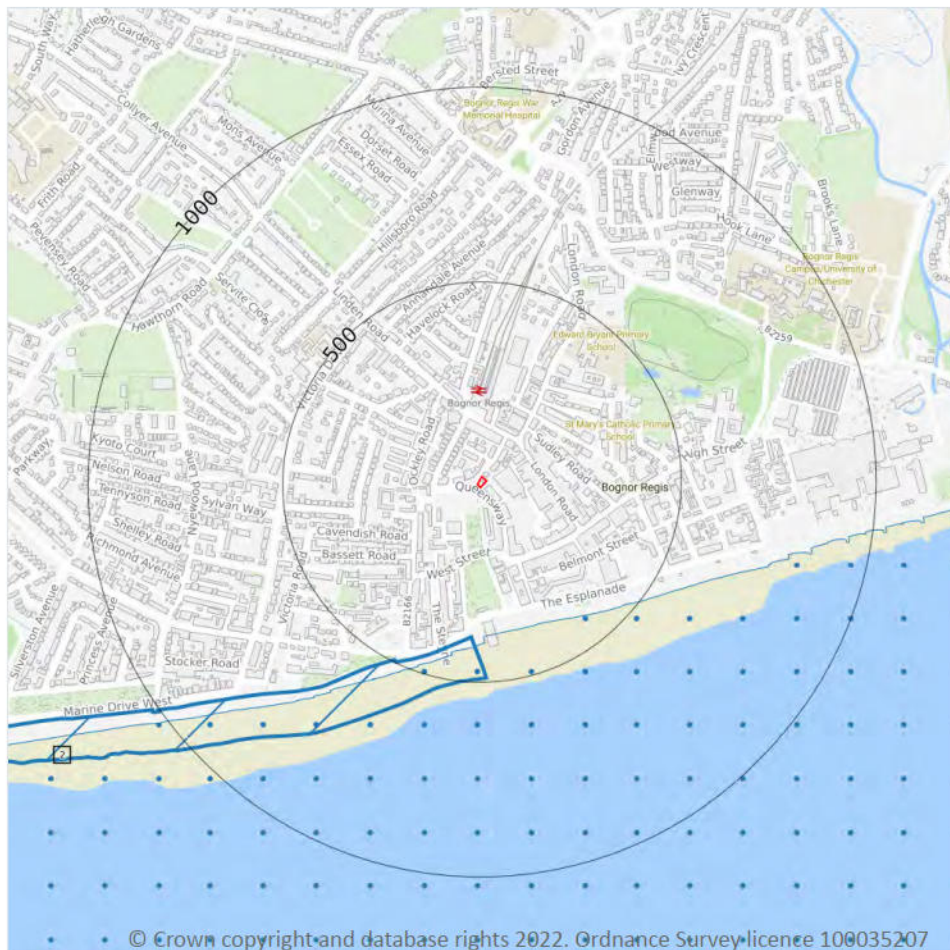
Moderate

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on [page 62](#)

This data is sourced from Ambiantal Risk Analytics.

10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Sites of Special Scientific Interest (SSSI)
- Special Protection Areas (SPA)

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

3

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on [page 63](#)

ID	Location	Name	Data source
2	385m S	Bognor Reef	Natural England

ID	Location	Name	Data source
-	1383m E	Felpham	Natural England
-	1531m E	Felpham	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

2

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

Features are displayed on the Environmental designations map on [page 63](#)

ID	Location	Name	Species of interest	Habitat description	Data source
1	376m S	Solent and Dorset Coast	Sandwich tern; Common tern; Little tern	Marine areas, Sea inlets; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Salt marshes, Salt pastures, Salt steppes; Shingle, Sea cliffs, Islets; Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	Natural England

ID	Location	Name	Species of interest	Habitat description	Data source
-	1575m E	Solent and Dorset Coast	Sandwich tern; Common tern; Little tern	Marine areas, Sea inlets; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Salt marshes, Salt pastures, Salt steppes; Shingle, Sea cliffs, Islets; Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0
-----------------------------	----------

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0
-----------------------------	----------

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0
-----------------------------	----------

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m

0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m

0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m

0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m

0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

2

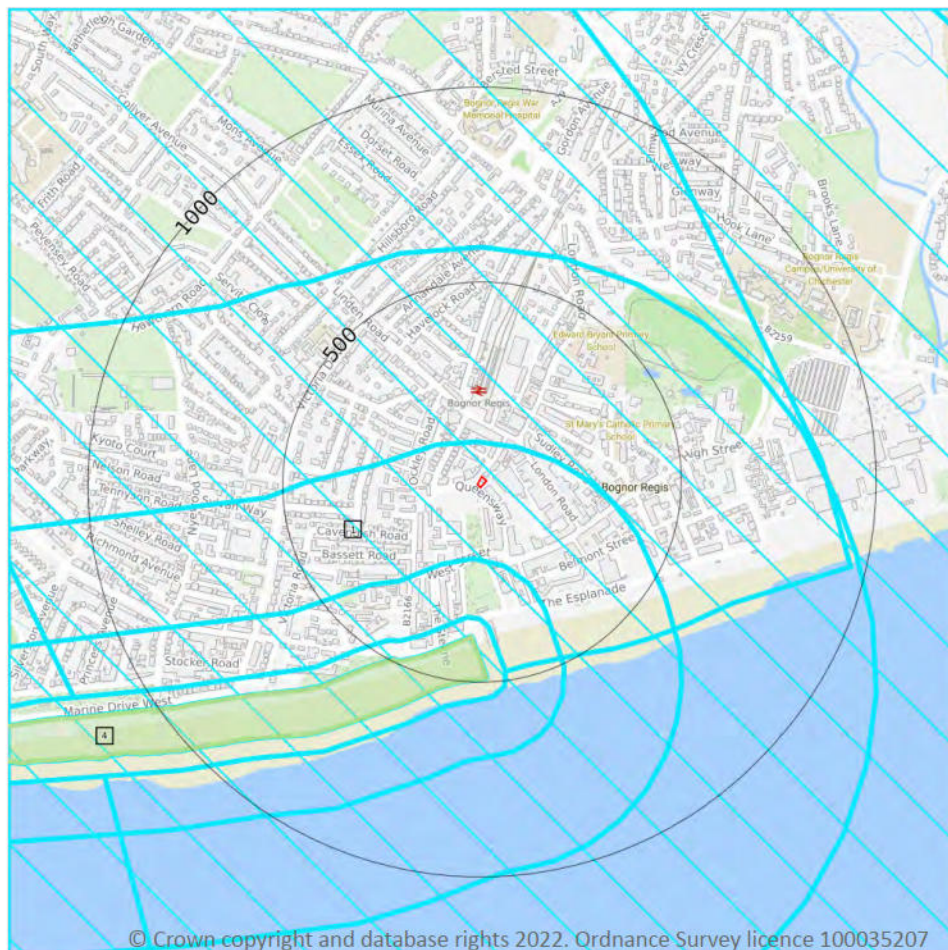
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
914m N	Aldingbourne Rife NVZ	Surface Water	517	Existing

Location	Name	Type	NVZ ID	Status
996m NE	Aldingbourne Rife NVZ	Surface Water	517	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



- Site Outline
- Search buffers in metres (m)
- SSSI Impact Risk Zones
- SSSI Units
- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site

1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 69**

ID	Location	Type of developments requiring consultation
1	On site	Infrastructure - Airports, helipads and other aviation proposals. Minerals, Oil and Gas - Oil & gas exploration/extraction. Residential - Any residential developments with a total net gain in residential units. Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units. Air pollution - Any development that could cause air pollution (incl: industrial/commercial processes, livestock & poultry units, slurry lagoons & digestate stores, manure stores). Combustion - All general combustion processes. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management. Composting - Any composting proposal. incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	4
----------------------	---

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 69**

ID: 4
 Location: 385m S
 SSSI name: Bognor Reef
 Unit name: 3 Foreshore
 Broad habitat: Earth Heritage
 Condition: Favourable
 Reportable features:

Feature name	Feature condition	Date of assessment
EC - Aves	Favourable	20/07/2012
EC - Palaeoentomology	Favourable	20/07/2012
EC - Tertiary Palaeobotany	Favourable	20/07/2012

ID: -
 Location: 1383m E
 SSSI name: Felpham
 Unit name: 2
 Broad habitat: Earth Heritage
 Condition: Favourable
 Reportable features:

Feature name	Feature condition	Date of assessment
EC - Tertiary Palaeobotany	Favourable	15/03/2006

ID: -
 Location: 1522m E
 SSSI name: Felpham
 Unit name: 1
 Broad habitat: Earth Heritage
 Condition: Favourable
 Reportable features:

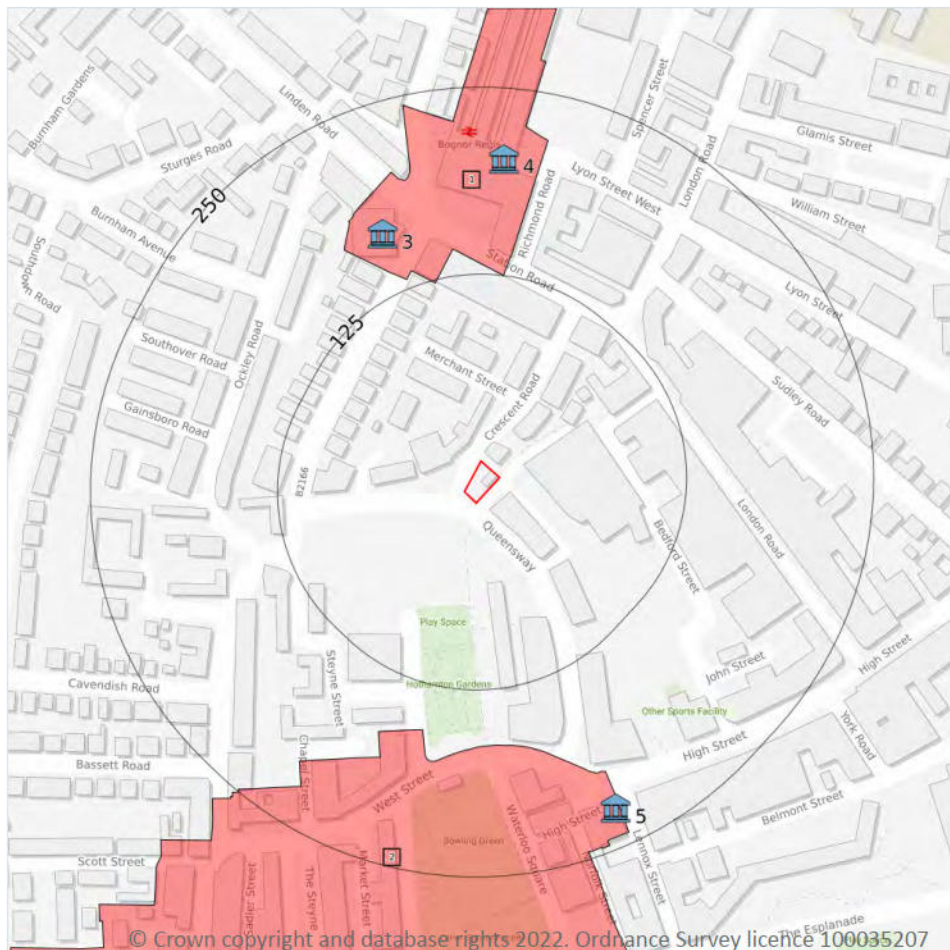
Feature name	Feature condition	Date of assessment
EC - Tertiary Palaeobotany	Favourable	15/03/2006

ID: -
 Location: 1531m E
 SSSI name: Felpham
 Unit name: 1
 Broad habitat: Earth Heritage
 Condition: Favourable
 Reportable features:

Feature name	Feature condition	Date of assessment
EC - Tertiary Palaeobotany	Favourable	15/03/2006

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

3

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on [page 72](#)

ID	Location	Name	Grade	Reference Number	Listed date
3	166m NW	Picturedrome, Bognor Regis, Arun, West Sussex, PO21	II	1393383	15/07/2009
4	203m N	Railway Station, Bognor Regis, Arun, West Sussex, PO21	II	1027734	08/08/1989
5	224m SE	61-65, High Street, Bognor Regis, Arun, West Sussex, PO21	II	1027749	07/11/1975

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m**2**

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

Features are displayed on the Visual and cultural designations map on **page 72**

ID	Location	Name	District	Date of designation
1	123m N	Bognor Regis (Railway Station)	Arun	16/11/1994
2	156m S	Bognor Regis (The Steyne and Waterloo Square)	Arun	27/07/1994

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m**0**

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

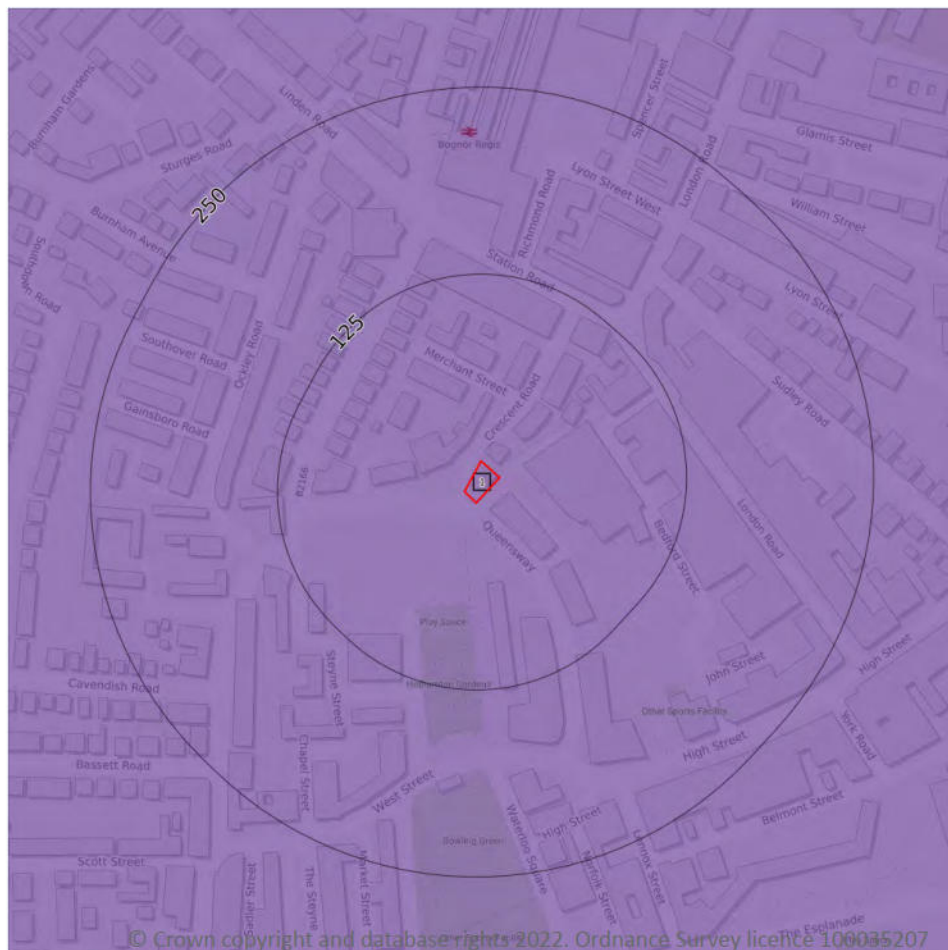
11.7 Registered Parks and Gardens

Records within 250m**0**

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m

1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 75**

ID	Location	Classification	Description
1	On site	Urban	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m

0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m

0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m

0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m

0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



— Site Outline
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

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14.1 10k Availability

Records within 500m

1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on [page 78](#)

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	SZ99NW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

14.2 Artificial and made ground (10k)

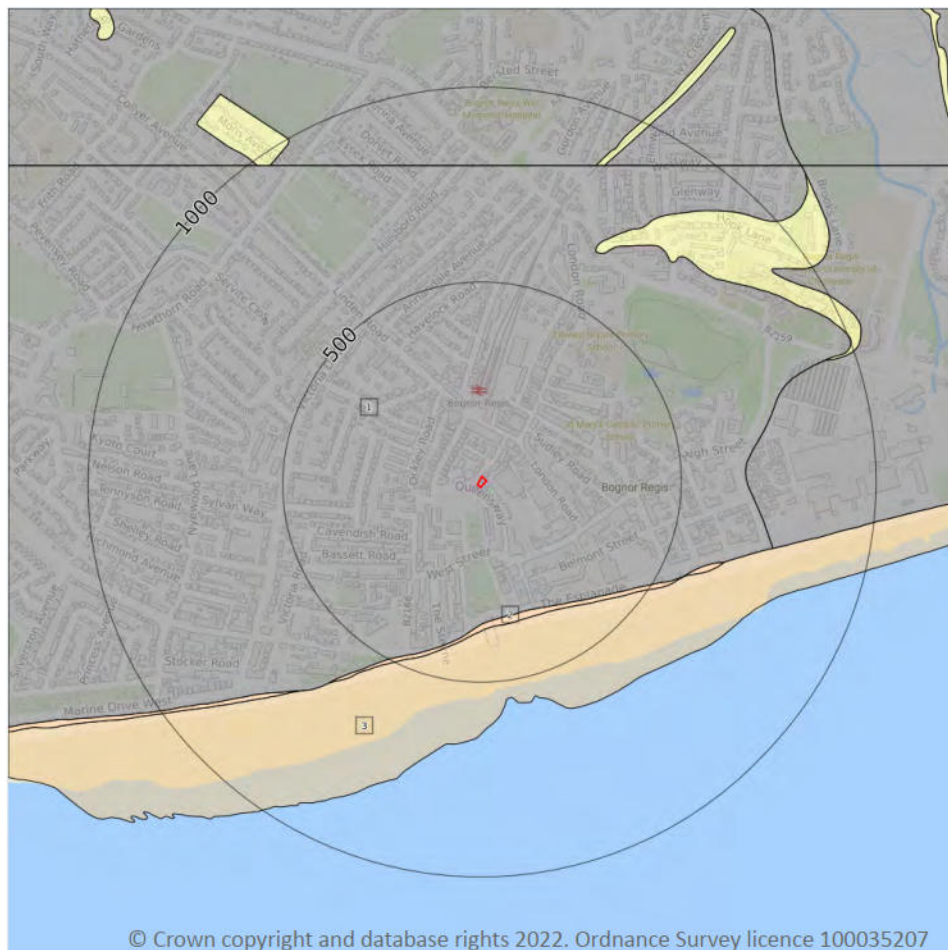
Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



— Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m

3

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 80**

ID	Location	LEX Code	Description	Rock description
1	On site	RTDU-Z	River Terrace Deposits (undifferentiated) - Silt (unlithified Deposits Coding Scheme)	Silt
2	336m S	STOB-XSV	Storm Beach Deposits - Sand And Gravel	Sand And Gravel
3	355m S	BTFU-XCZSV	Beach And Tidal Flat Deposits (undifferentiated) - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

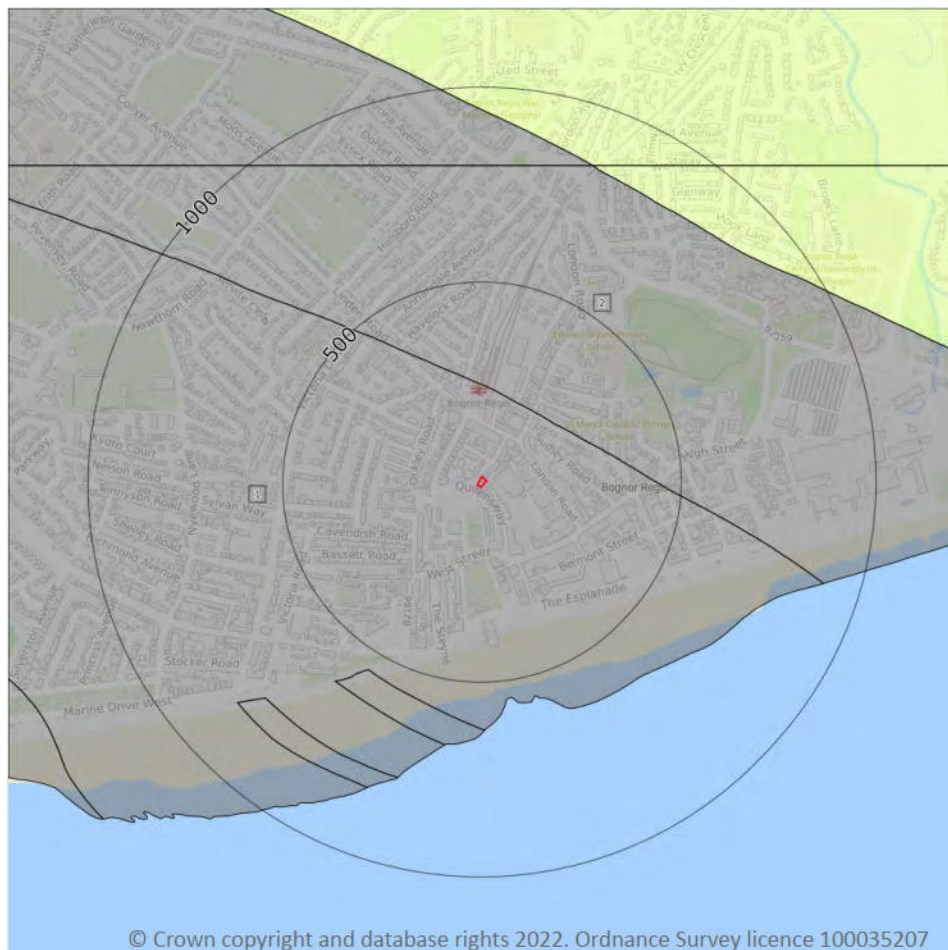
Records within 500m

0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



— Site Outline

Search buffers in metres (m)

.... Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

2

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 82**

ID	Location	LEX Code	Description	Rock age
1	On site	LC-CLSISA	London Clay Formation - Clay, Silt And Sand	Eocene Epoch
2	210m NE	LMBE-CLAY	Lambeth Group - Clay	Paleocene Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



— Site Outline
Search buffers in metres (m)

☐ Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on [page 84](#)

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	EW317_332_chichester_and_

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

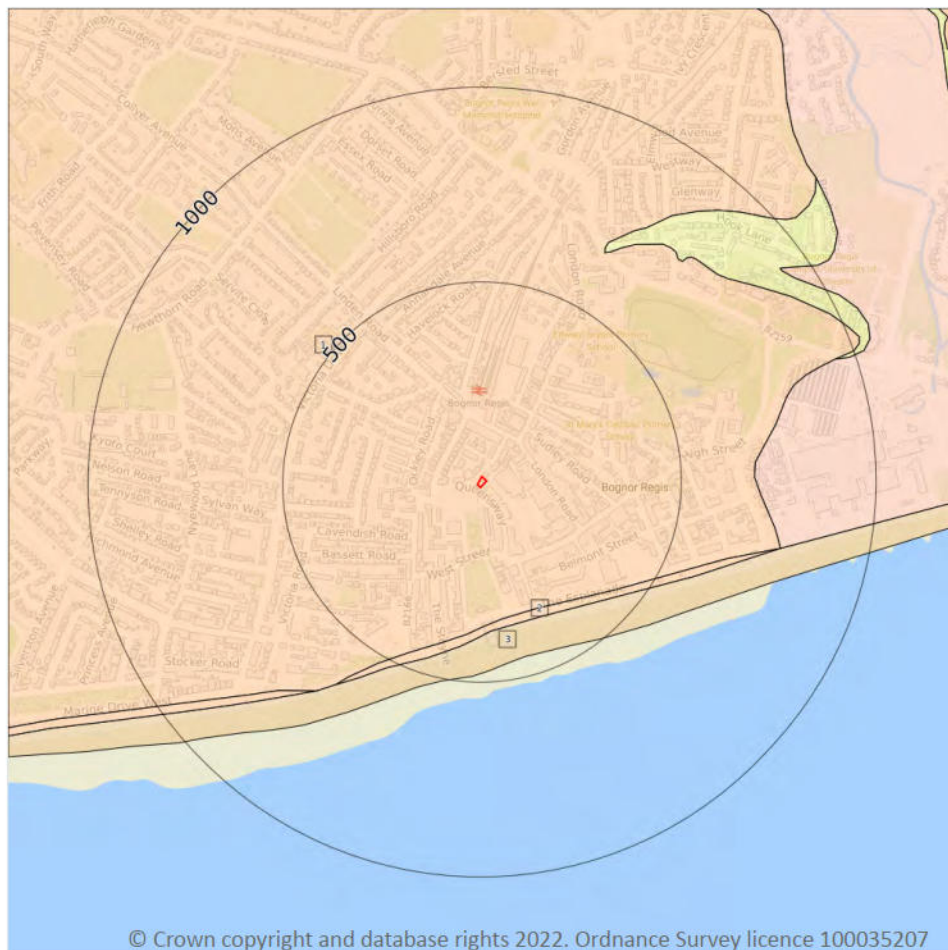
Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



— Site Outline

Search buffers in metres (m)

▨ Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

3

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on [page 86](#)

ID	Location	LEX Code	Description	Rock description
1	On site	RTDU-XSZC	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND, SILT AND CLAY
2	339m S	STOB-V	STORM BEACH DEPOSITS	GRAVEL
3	362m S	BTFU-XCZSV	BEACH AND TIDAL FLAT DEPOSITS (UNDIFFERENTIATED)	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m

1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Intergranular	High	Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

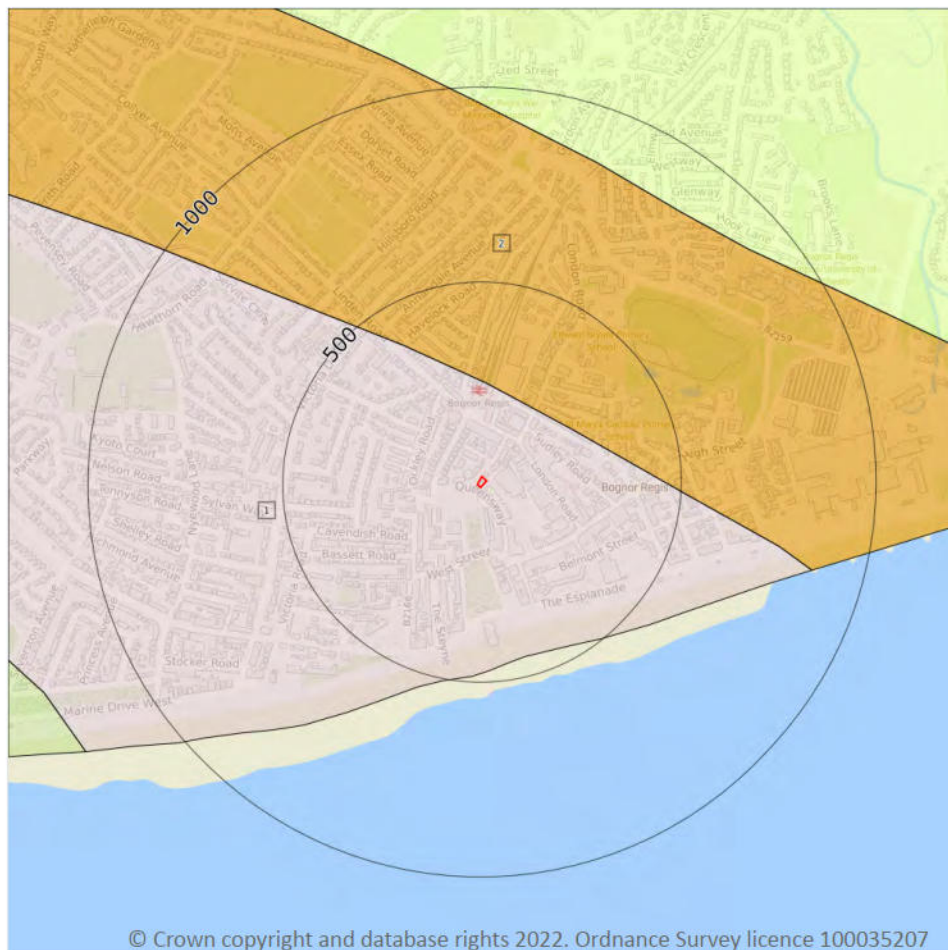
Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

.... Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

2

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 88**

ID	Location	LEX Code	Description	Rock age
1	On site	LC-XCZS	LONDON CLAY FORMATION - CLAY, SILT AND SAND	YPRESIAN
2	217m NE	LMBE-XCZS	LAMBETH GROUP - CLAY, SILT AND SAND	THANETIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m

1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	Moderate	Very Low

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

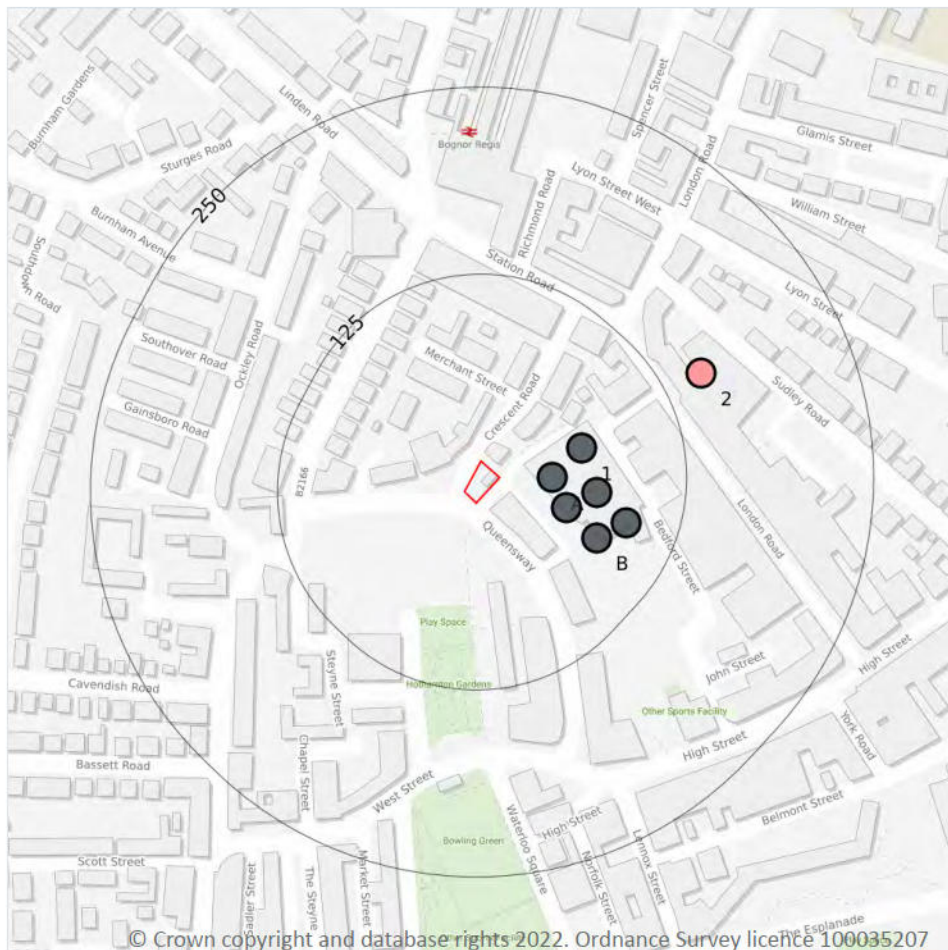
Records within 500m

0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



- Site Outline
- Search buffers in metres (m)
- Confidential
 - 0 - 10m
 - 10 - 30m
 - 30m+
 - Unknown

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16.1 BGS Boreholes

Records within 250m

7

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

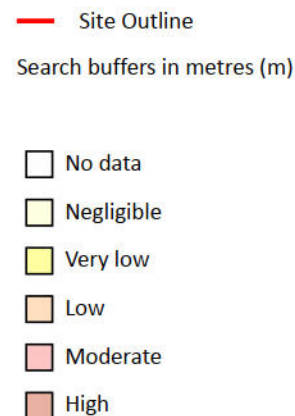
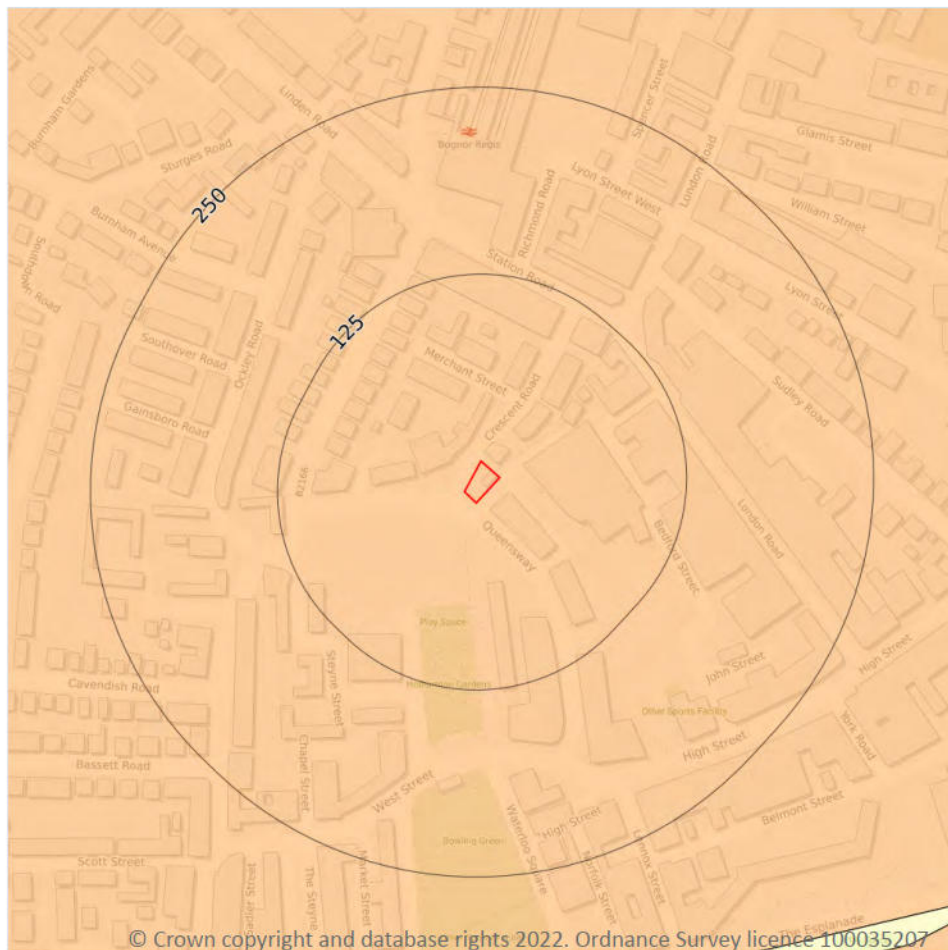
Features are displayed on the Boreholes map on **page 90**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	35m E	493460 99190	FITZLEET CAR PARK BOGNOR REGIS 1	-	Y	N/A
A	49m SE	493470 99170	FITZLEET CAR PARK BOGNOR REGIS 3	-	Y	N/A
1	58m E	493480 99210	FITZLEET CAR PARK BOGNOR REGIS 2	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	66m E	493490 99180	FITZLEET CAR PARK BOGNOR REGIS 4	-	Y	N/A
B	76m SE	493490 99150	FITZLEET CAR PARK BOGNOR REGIS 5	-	Y	N/A
B	90m E	493510 99160	FITZLEET CAR PARK BOGNOR REGIS 6	-	Y	N/A
2	152m NE	493560 99260	OLD WATERWORKS BOGNOR REGIS	100.58	N	456129

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



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17.1 Shrink swell clays

Records within 50m

1

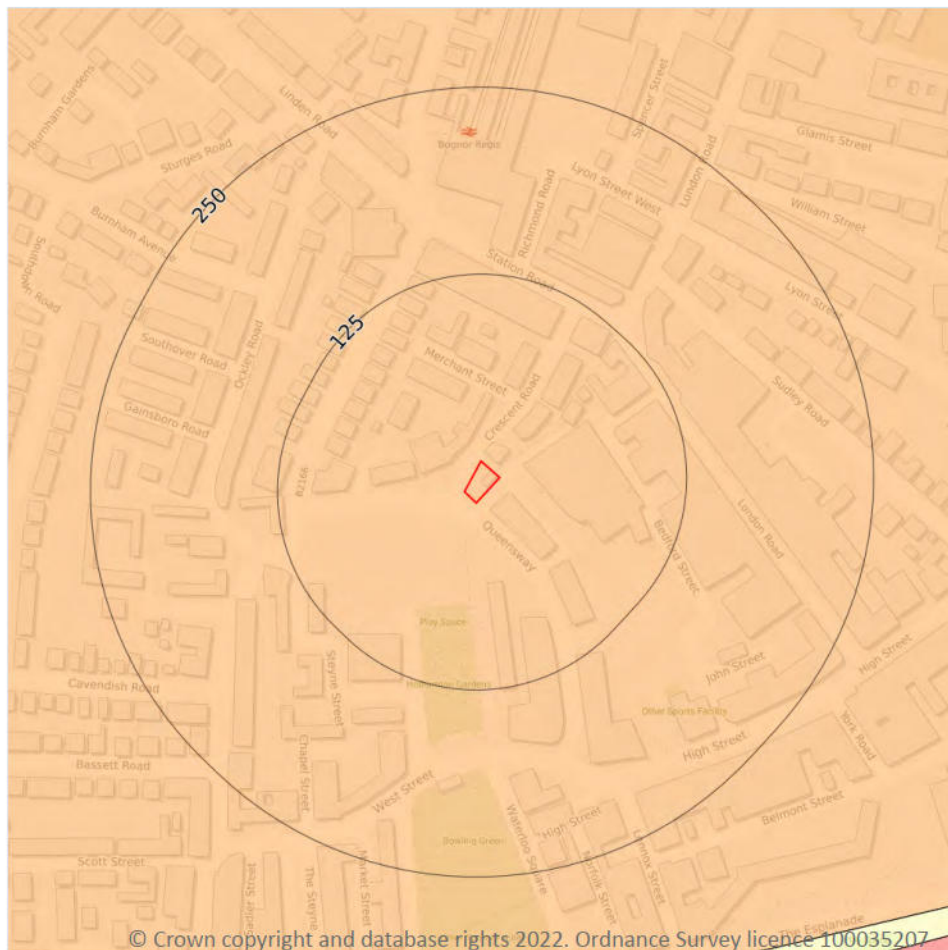
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on [page 92](#)

Location	Hazard rating	Details
On site	Low	Ground conditions predominantly medium plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



17.2 Running sands

Records within 50m

1

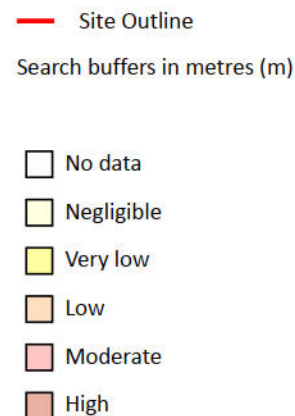
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on [page 93](#)

Location	Hazard rating	Details
On site	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

1

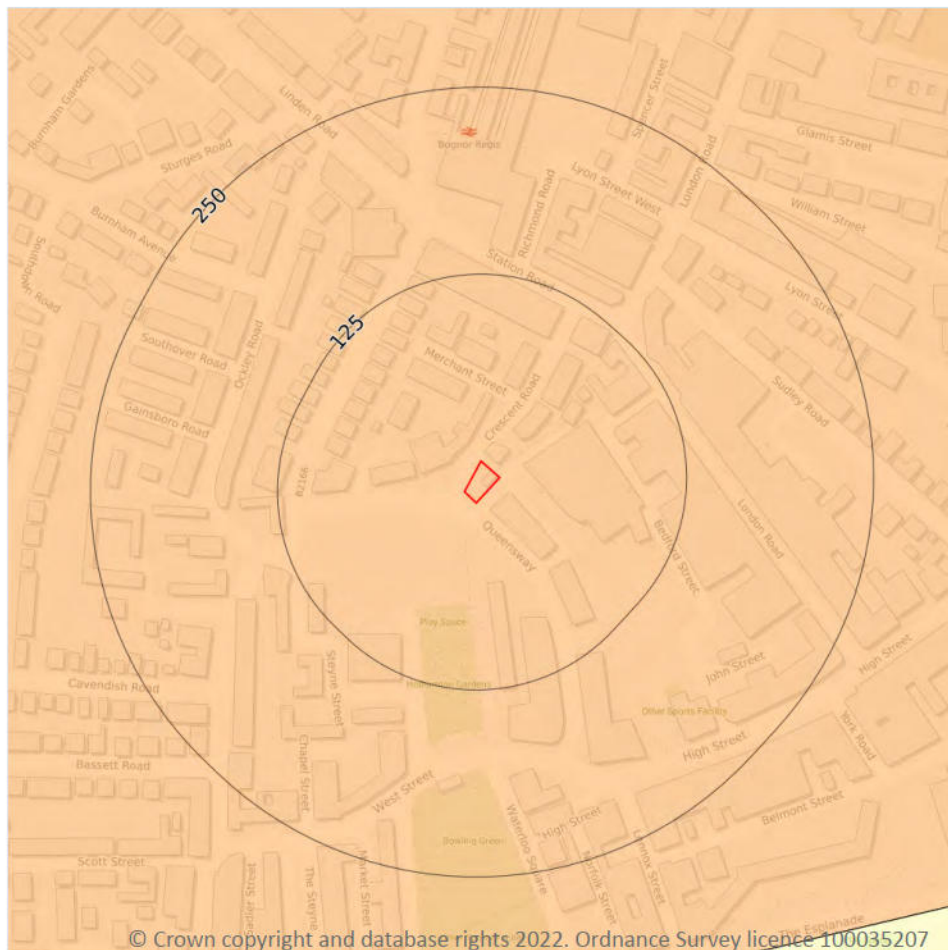
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on [page 94](#)

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



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17.4 Collapsible deposits

Records within 50m

1

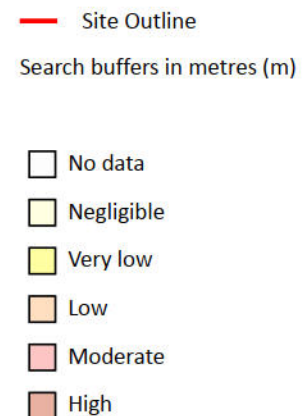
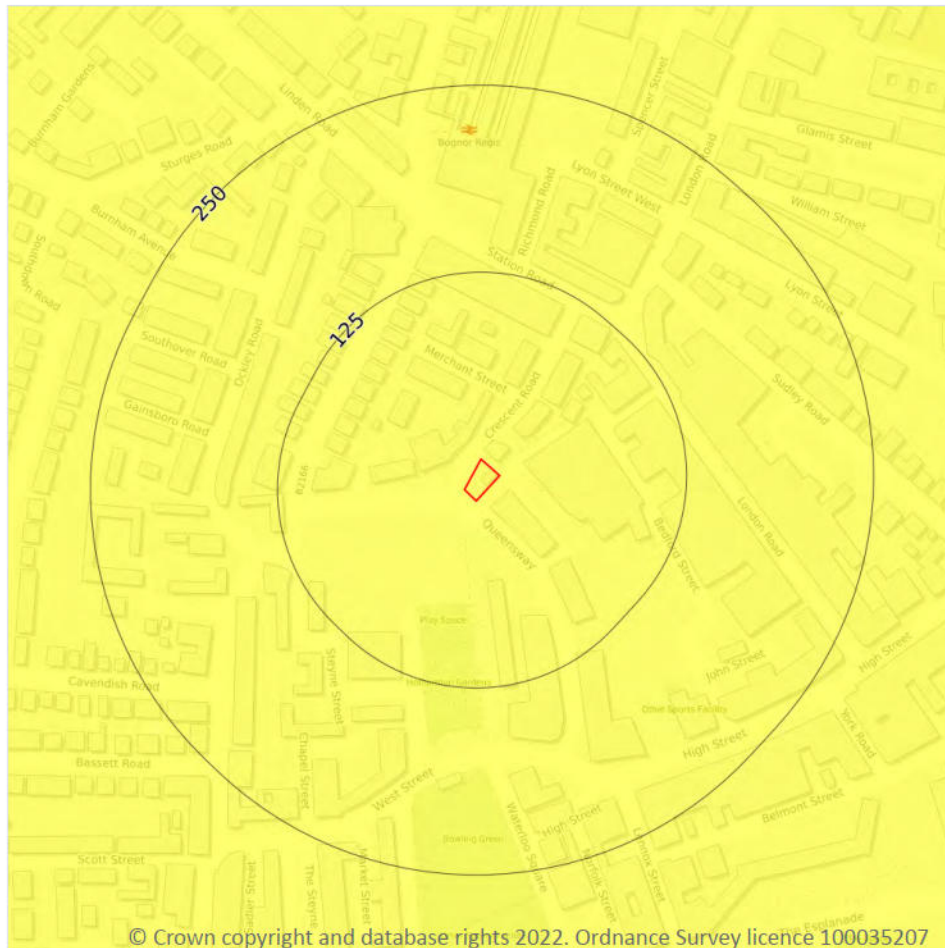
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on [page 95](#)

Location	Hazard rating	Details
On site	Low	Deposits with potential to collapse when loaded and saturated are possibly present in places.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



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17.5 Landslides

Records within 50m

1

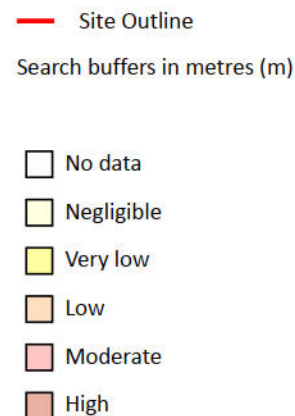
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on [page 96](#)

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m

1

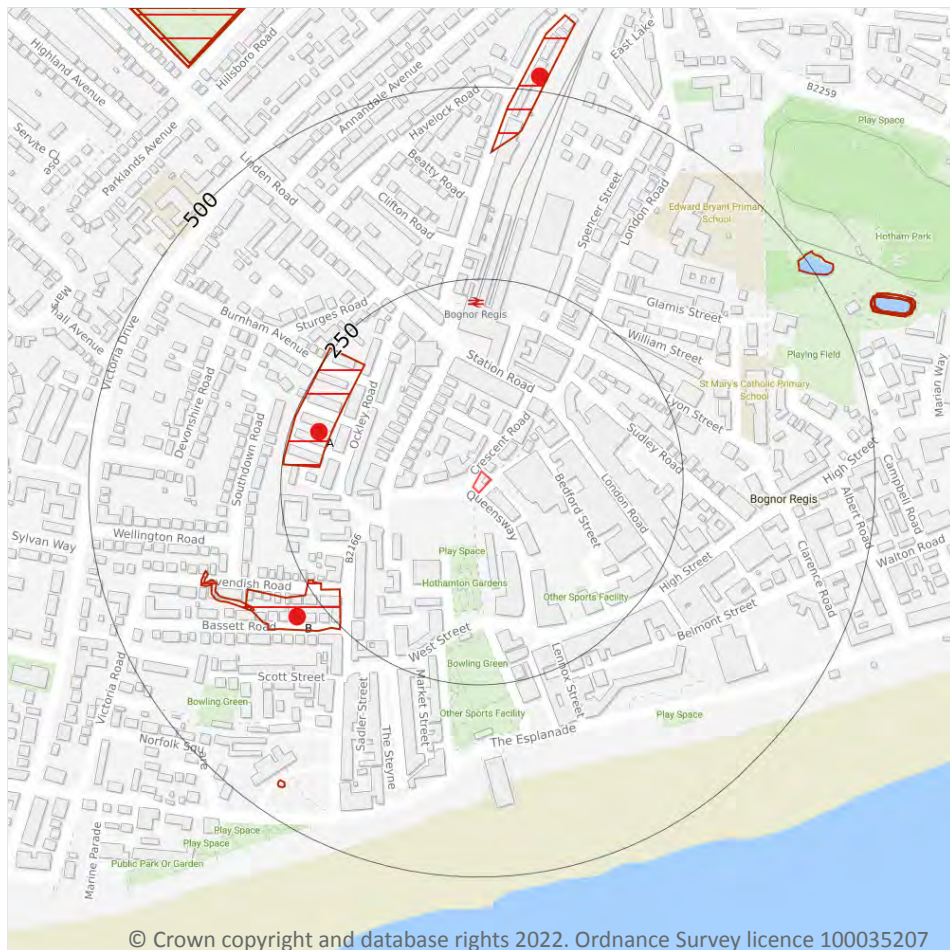
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on [page 97](#)

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m

2

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 98**

ID	Location	Details	Description
A	213m W	Name: Bognor Regis Brick Field Address: BOGNOR REGIS, West Sussex Commodity: Clay & Shale Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
B	284m SW	Name: Bognor Regis Brick Field Address: BOGNOR REGIS, West Sussex Commodity: Clay & Shale Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

2

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 98**

ID	Location	Land Use	Year of mapping	Mapping scale
A	197m NW	Brick Field	1896	1:10560
B	219m SW	Brick Field	1896	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m

0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site

0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0
-----------------	---

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0
-----------------	---

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.13 Clay mining

Records on site	0
-----------------	---

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



- Site Outline
- Search buffers in metres (m)
- Greater than 30%
 - Between 10% and 30%
 - Between 5% and 10%
 - Between 3% and 5%
 - Between 1% and 3%
 - Less than 1%

19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on [page 102](#)

Location	Estimated properties affected	Radon Protection Measures required
On site	Between 1% and 3%	None

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

1

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

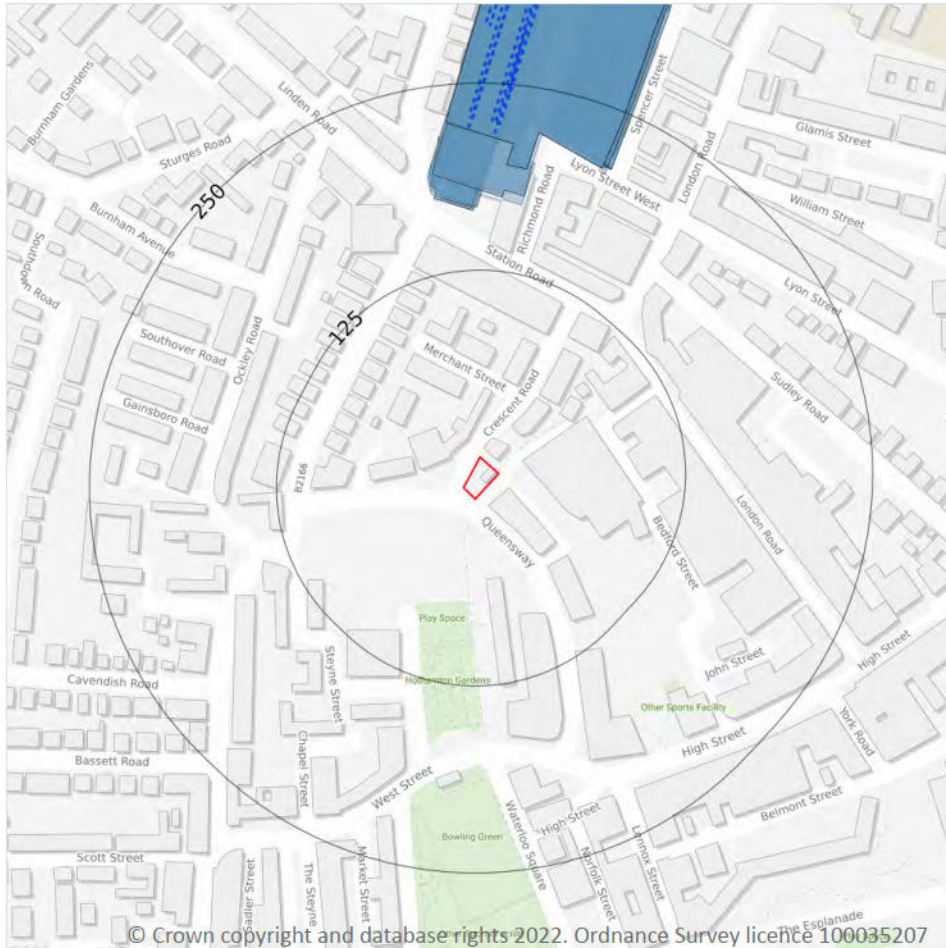
Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)**
- C1 Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 1 Worksites
- C2 Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- ... Active railways
- ... Active tunnels
- ... Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

21.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m

36

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 104**

Location	Land Use	Year of mapping	Mapping scale
165m N	Railway Sidings	1876	2500
165m N	Railway Sidings	1898	2500
166m N	Railway	0	-
167m N	Railway Sidings	1876	10560
167m N	Railway Sidings	1896	10560
168m N	Railway	0	-
171m N	Railway Sidings	1910	10560
174m N	Railway Sidings	1934	10560
174m N	Railway Sidings	1940	10560
195m N	Railway Sidings	1989	10000
195m N	Railway Sidings	1967	10560
195m N	Railway Sidings	1973	10000
195m N	Railway Sidings	1957	10560
207m NE	Railway Sidings	1932	2500
211m N	Railway Sidings	1912	2500
211m NE	Railway Sidings	1968	1250
211m NE	Railway Sidings	1961	1250

Location	Land Use	Year of mapping	Mapping scale
211m N	Railway Sidings	1940	2500
212m NE	Railway Sidings	1961	2500
212m NE	Railway Sidings	1969	2500
212m NE	Railway	0	-
213m N	Railway Sidings	1968	1250
213m N	Railway Sidings	1961	1250
214m N	Railway Sidings	1979	1250
214m N	Railway Sidings	1983	1250
214m N	Railway Sidings	1992	1250
215m N	Railway	0	-
219m N	Railway Sidings	1968	1250
219m N	Railway Sidings	1961	1250
219m N	Railway Sidings	1979	1250
219m N	Railway Sidings	1983	1250
219m N	Railway Sidings	1992	1250
228m N	Railway Sidings	1968	1250
228m N	Railway Sidings	1961	1250
228m N	Railway Sidings	1968	1250
228m N	Railway Sidings	1961	1250

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m

0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m**0**

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m**8**

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways. Features are displayed on the Railway infrastructure and projects map on **page 104**

Location	Name	Type
217m N	Not given	Multi Track
220m N	Not given	Multi Track
223m N	West Coastway Line	rail
224m N		rail
224m N	West Coastway Line	rail
227m N		rail
228m N		rail
240m N		rail

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m**0**

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m

0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 Ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference>.

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Appendix D – Historical Mapping



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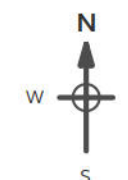
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Map Name: County Series

Map date: 1876

Scale: 1:2,500

Printed at: 1:2,500



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Revised 1876
Edition N/A
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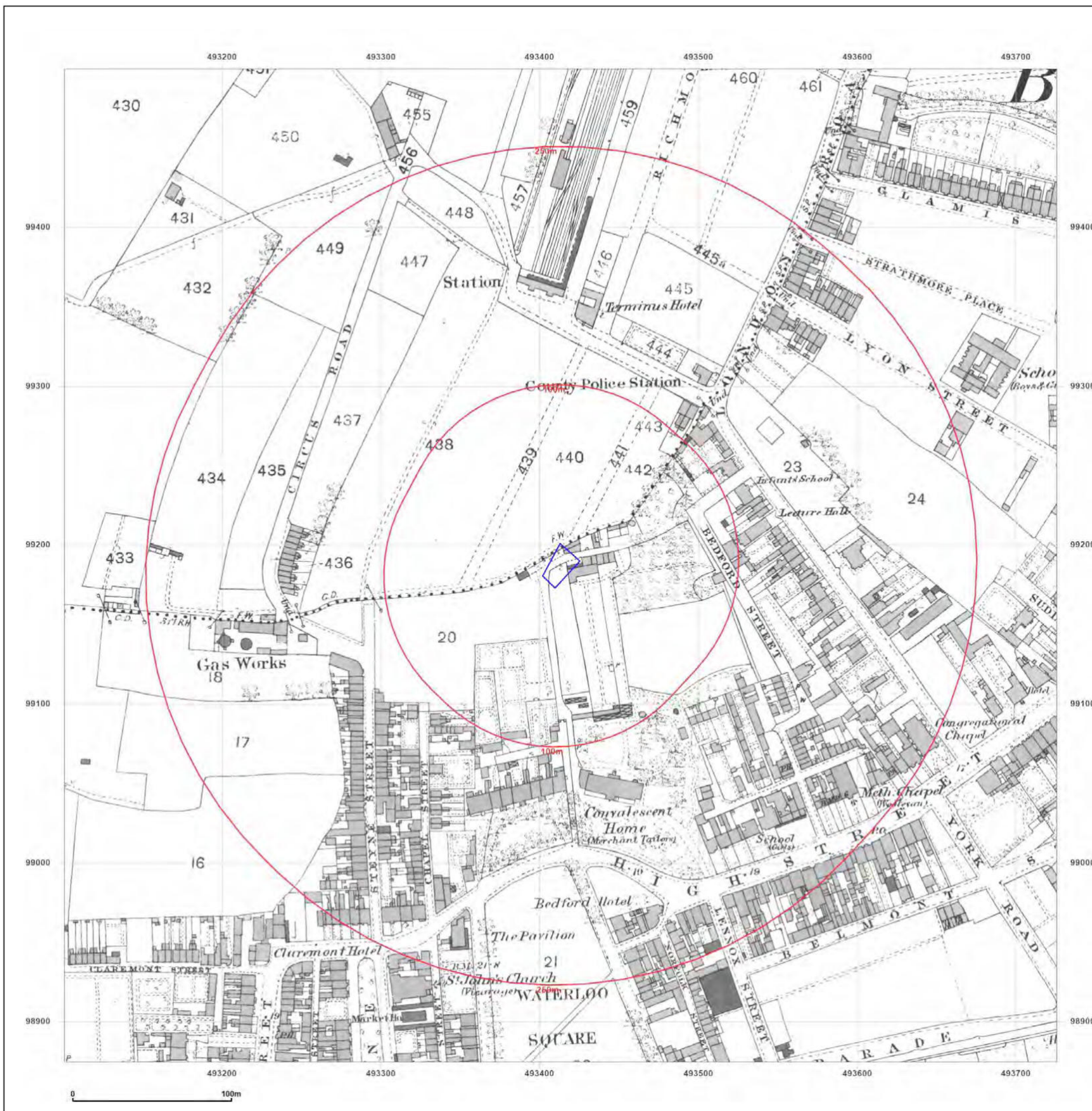


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Map date: 1898

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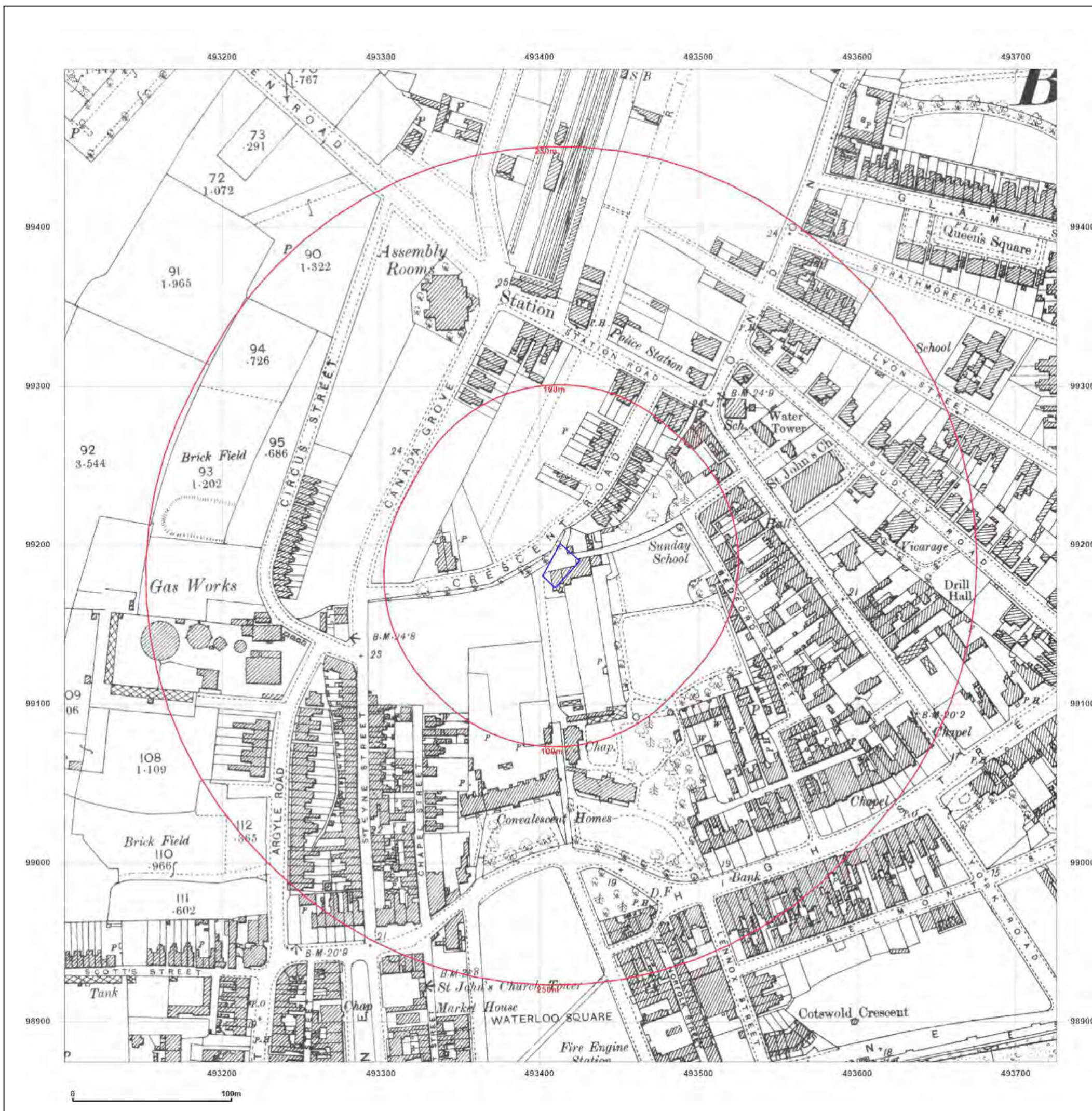


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Map Name: County Series

Map date: 1912

Scale: 1:2,500

Printed at: 1:2,500



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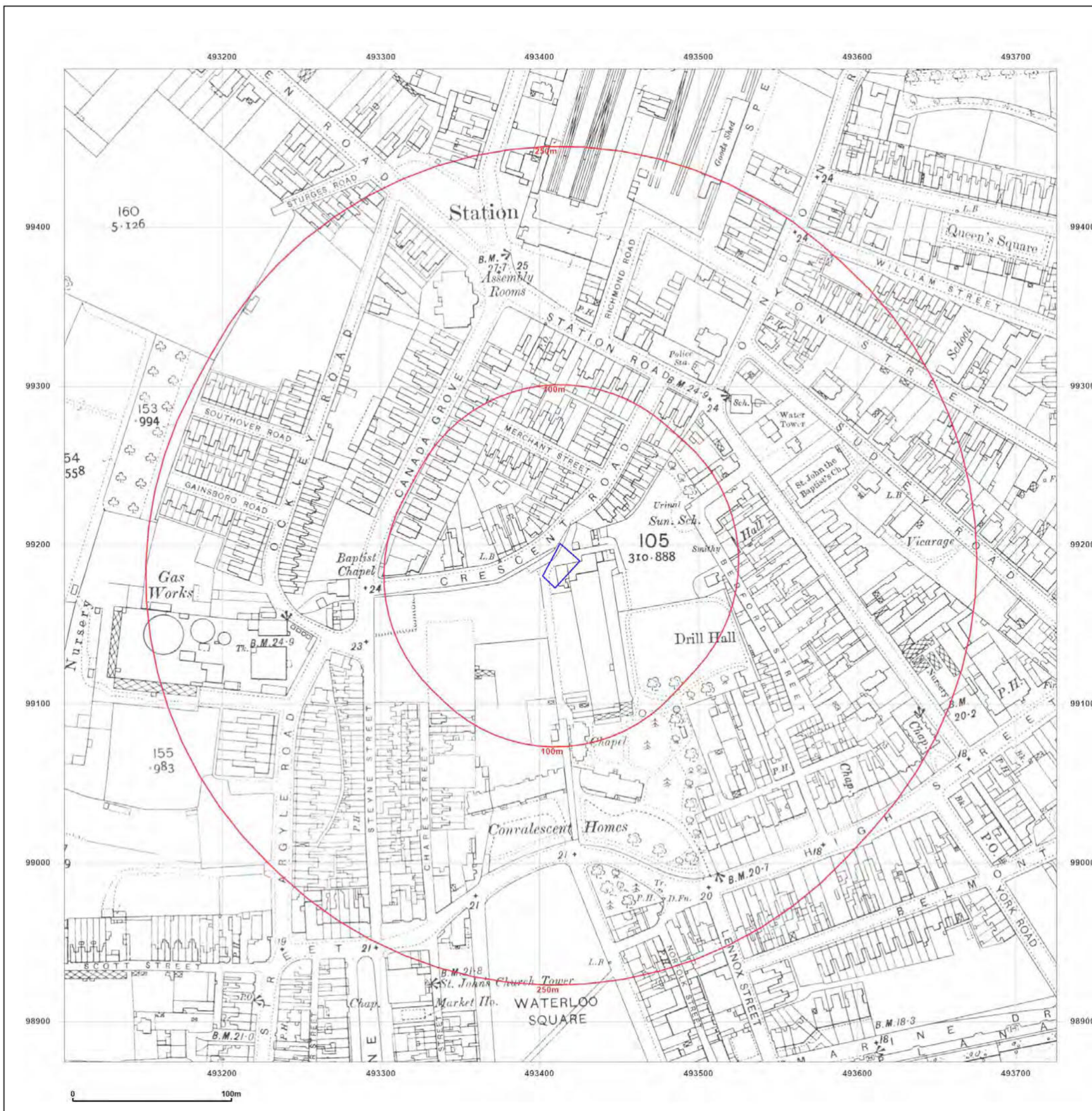


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Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: County Series

Map date: 1932

Scale: 1:2,500

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Report Ref: GS-8787531
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Map Name: County Series

Map date: 1940

Scale: 1:2,500

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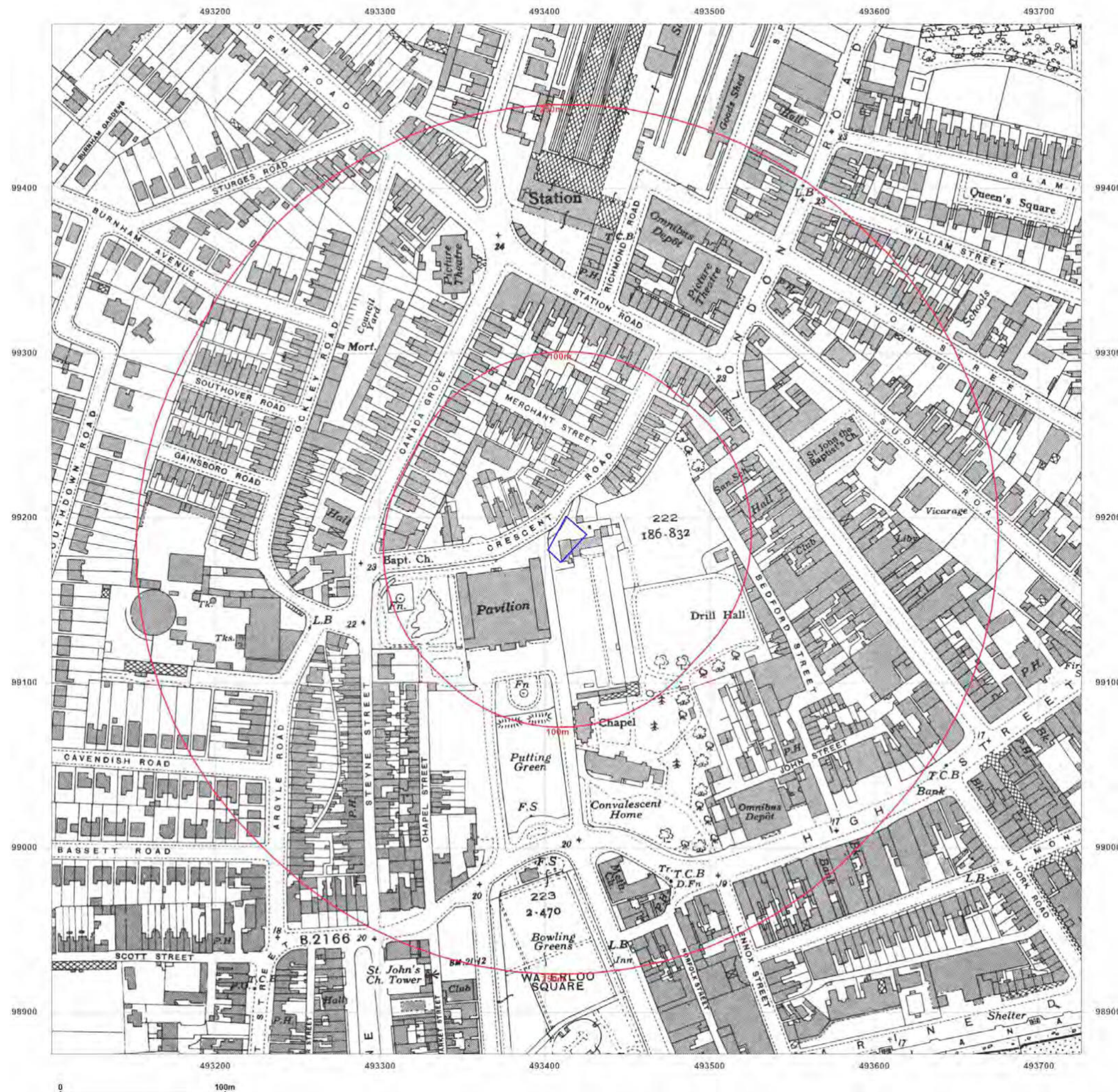


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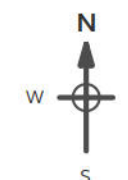
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Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1961-1962

Scale: 1:1,250

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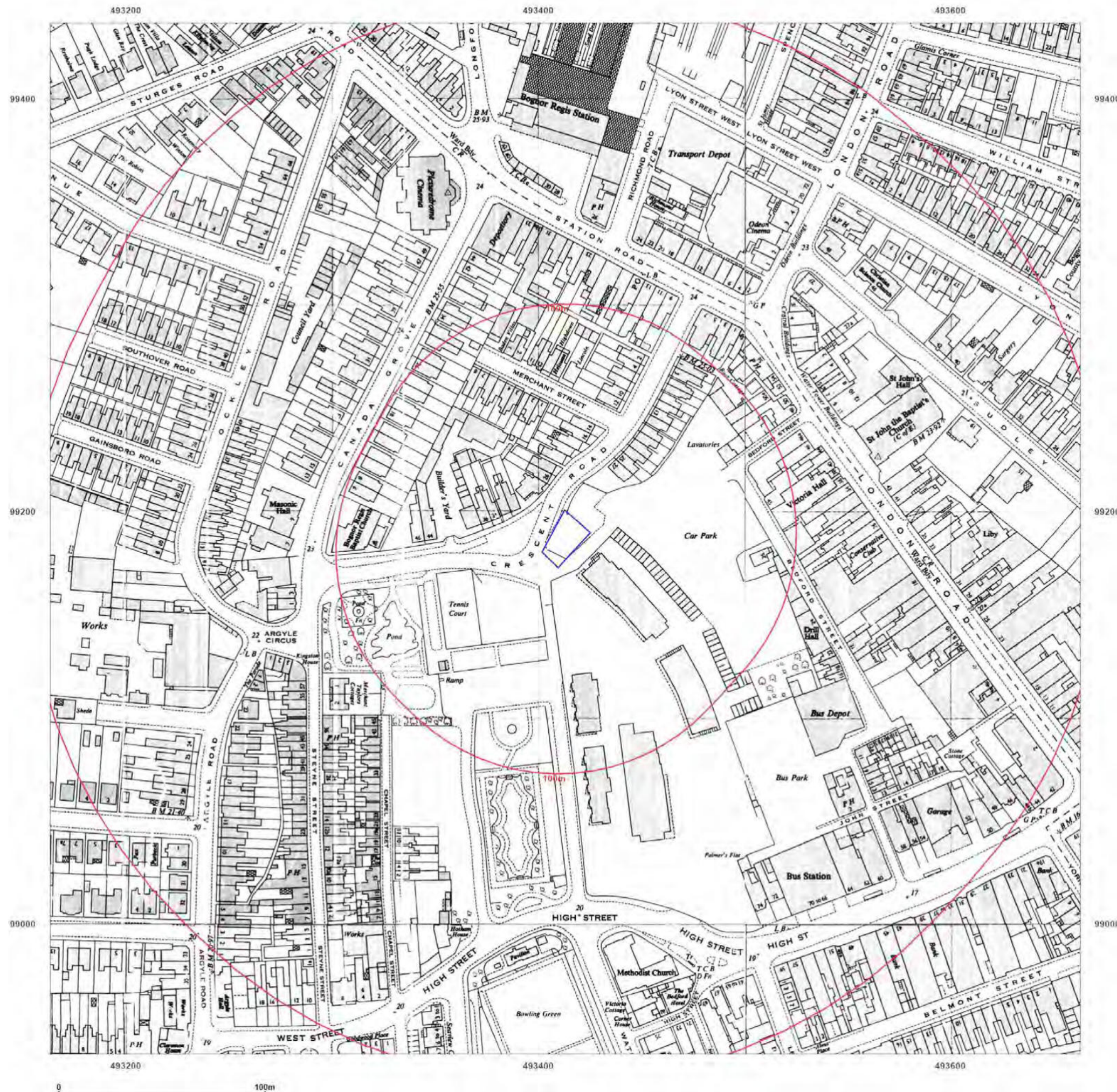


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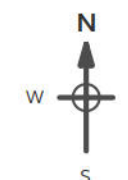
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Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1961-1962

Scale: 1:1,250

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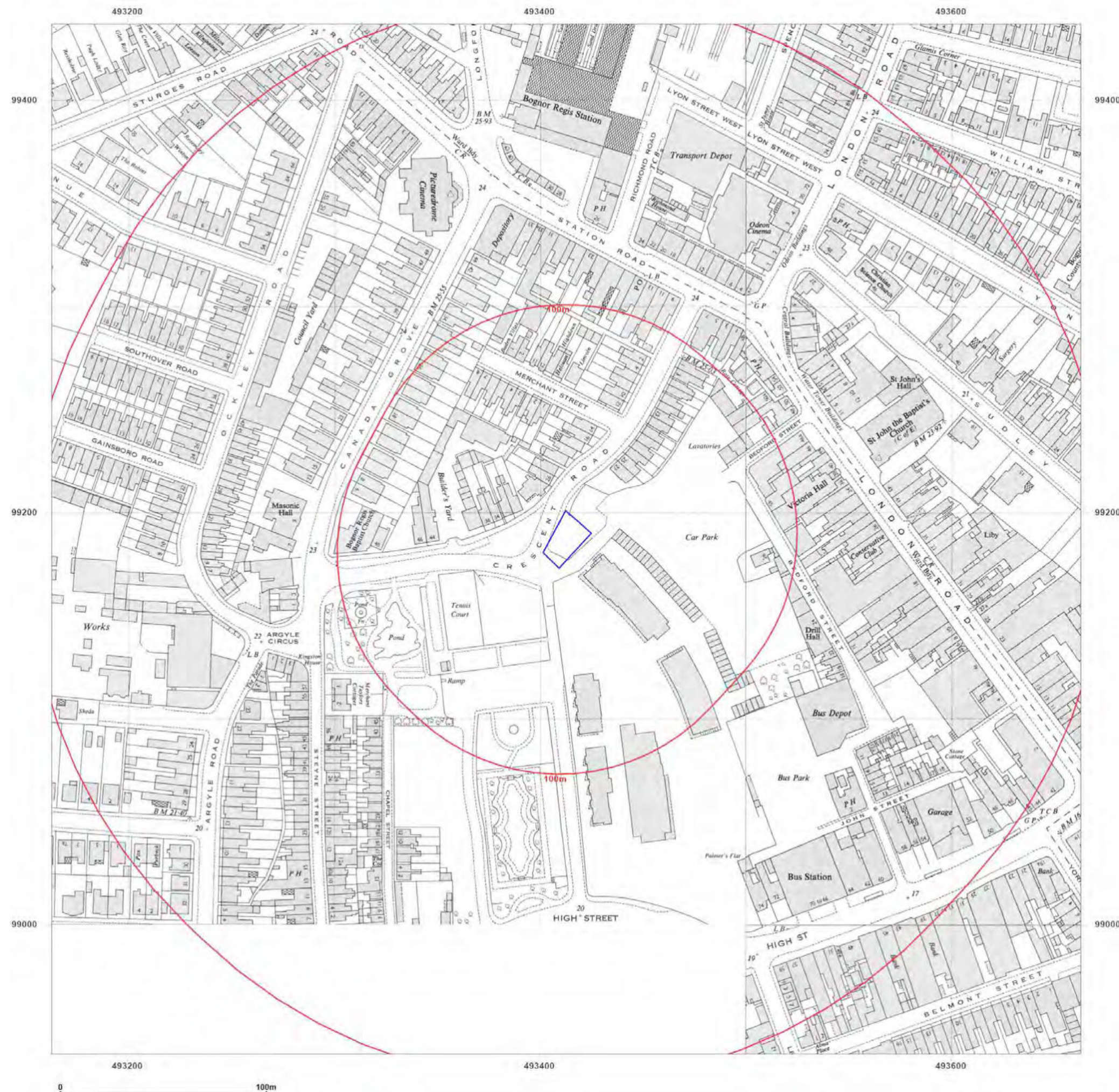


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Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1963

Scale: 1:2,500

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Edition 1963
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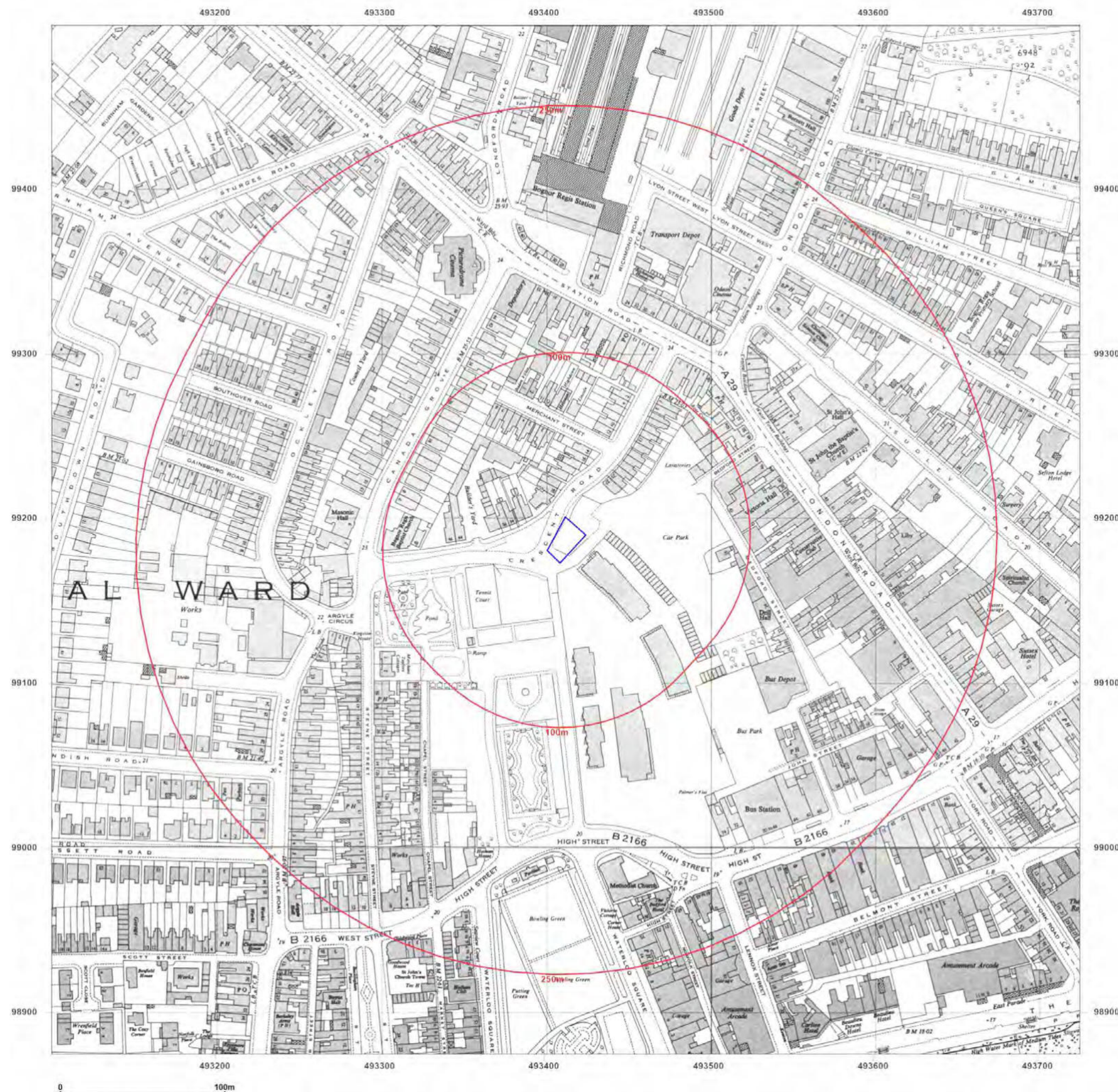


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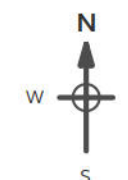
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Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1968-1969

Scale: 1:1,250

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Map Name: National Grid

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Revised 1969
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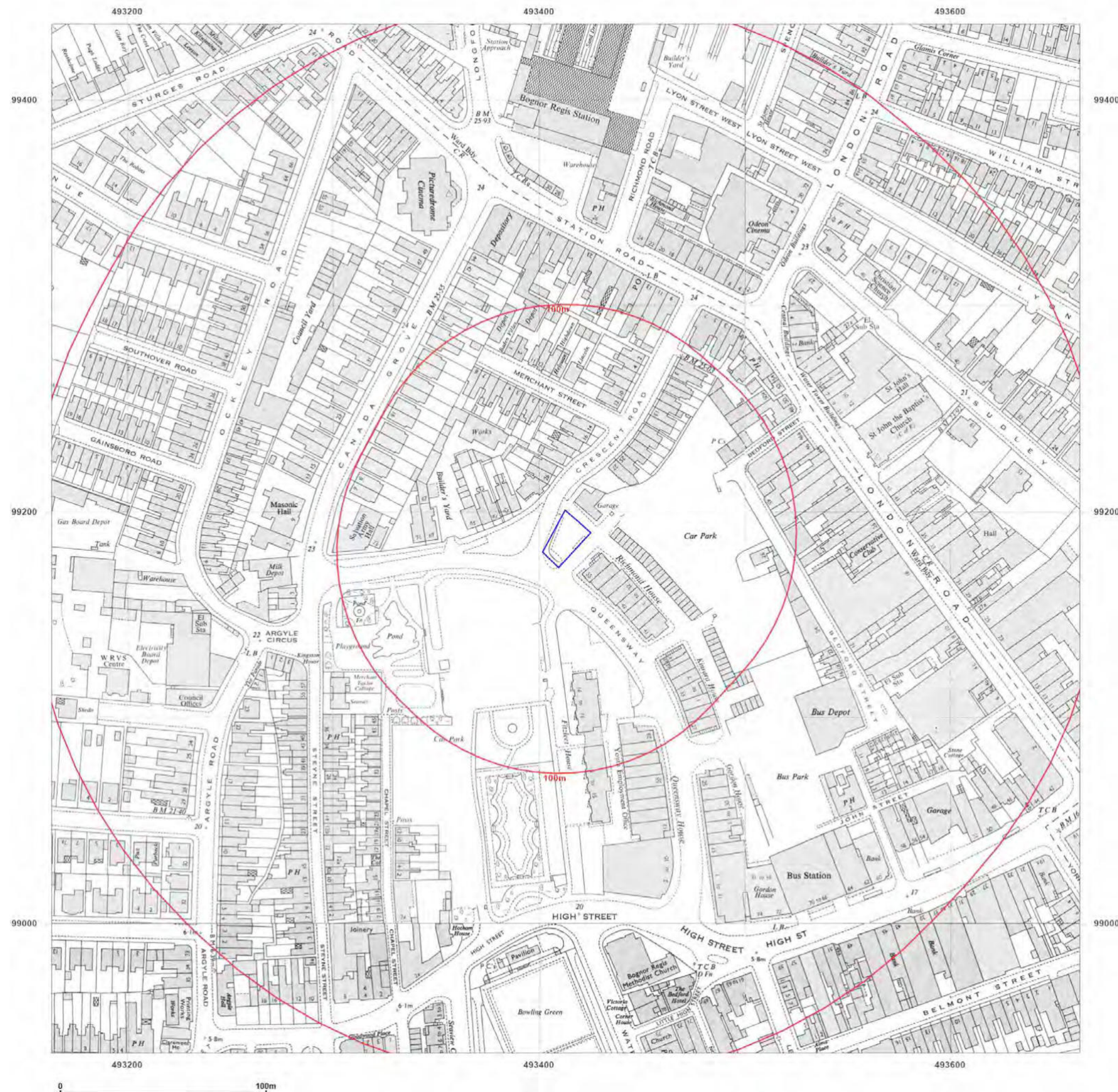


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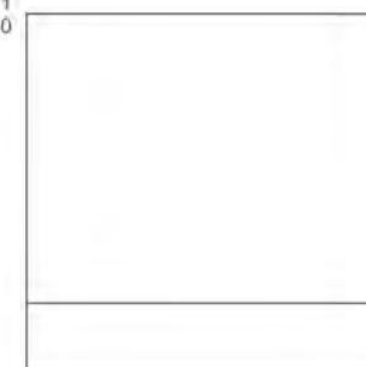
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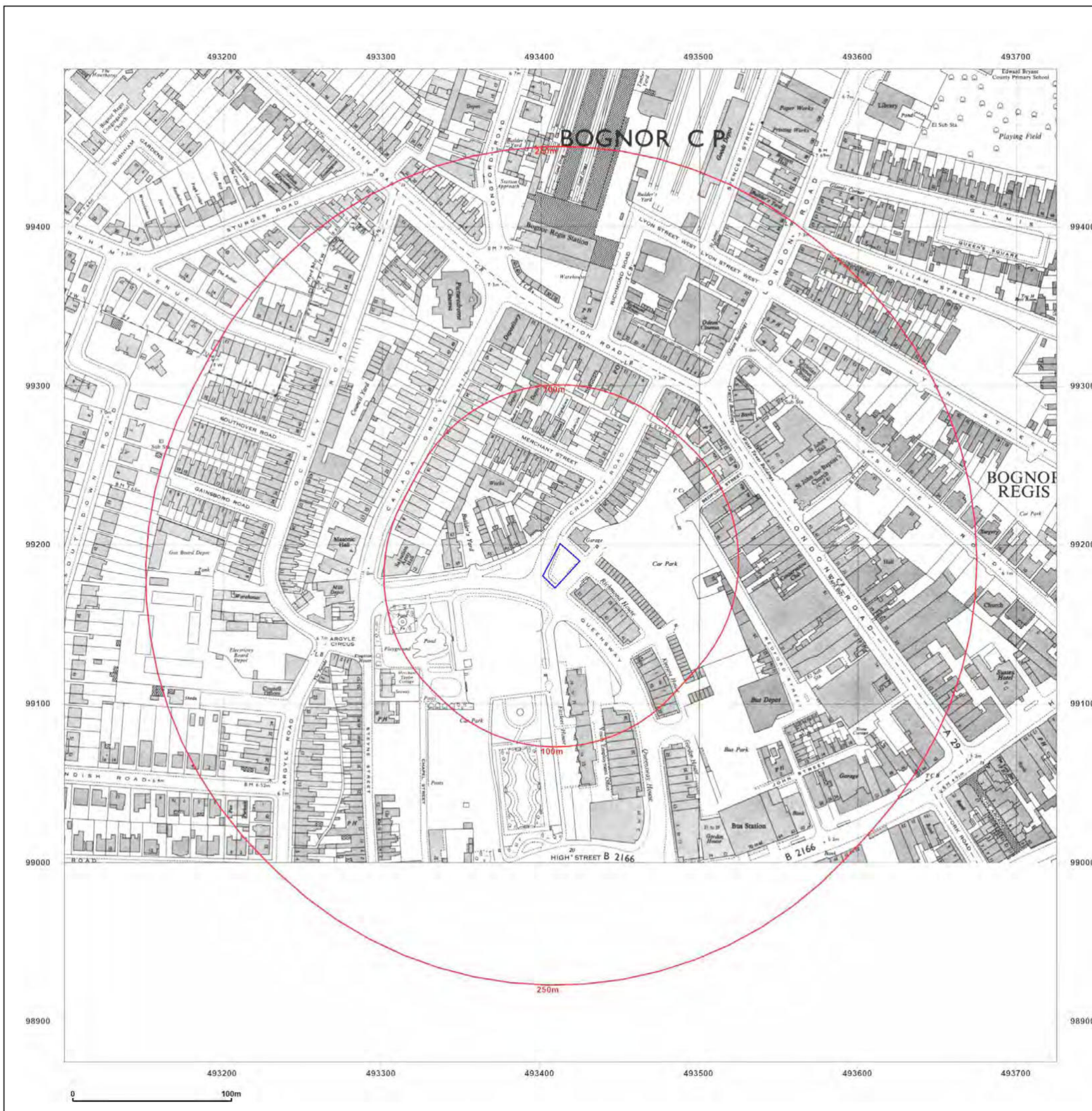


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Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1973-1975

Scale: 1:1,250

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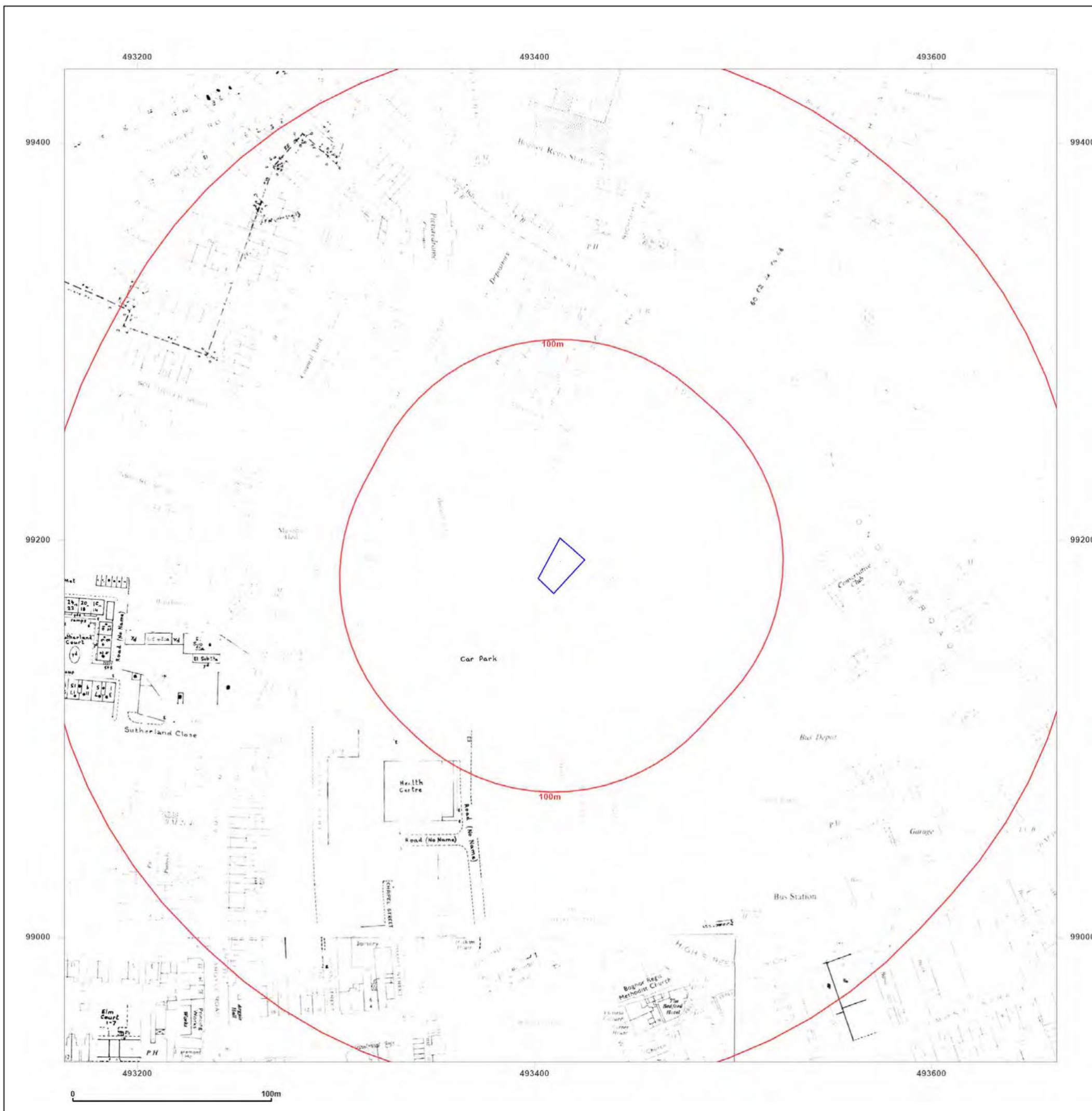


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Client Ref: YEX2909
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Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1975-1980

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
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Edition N/A
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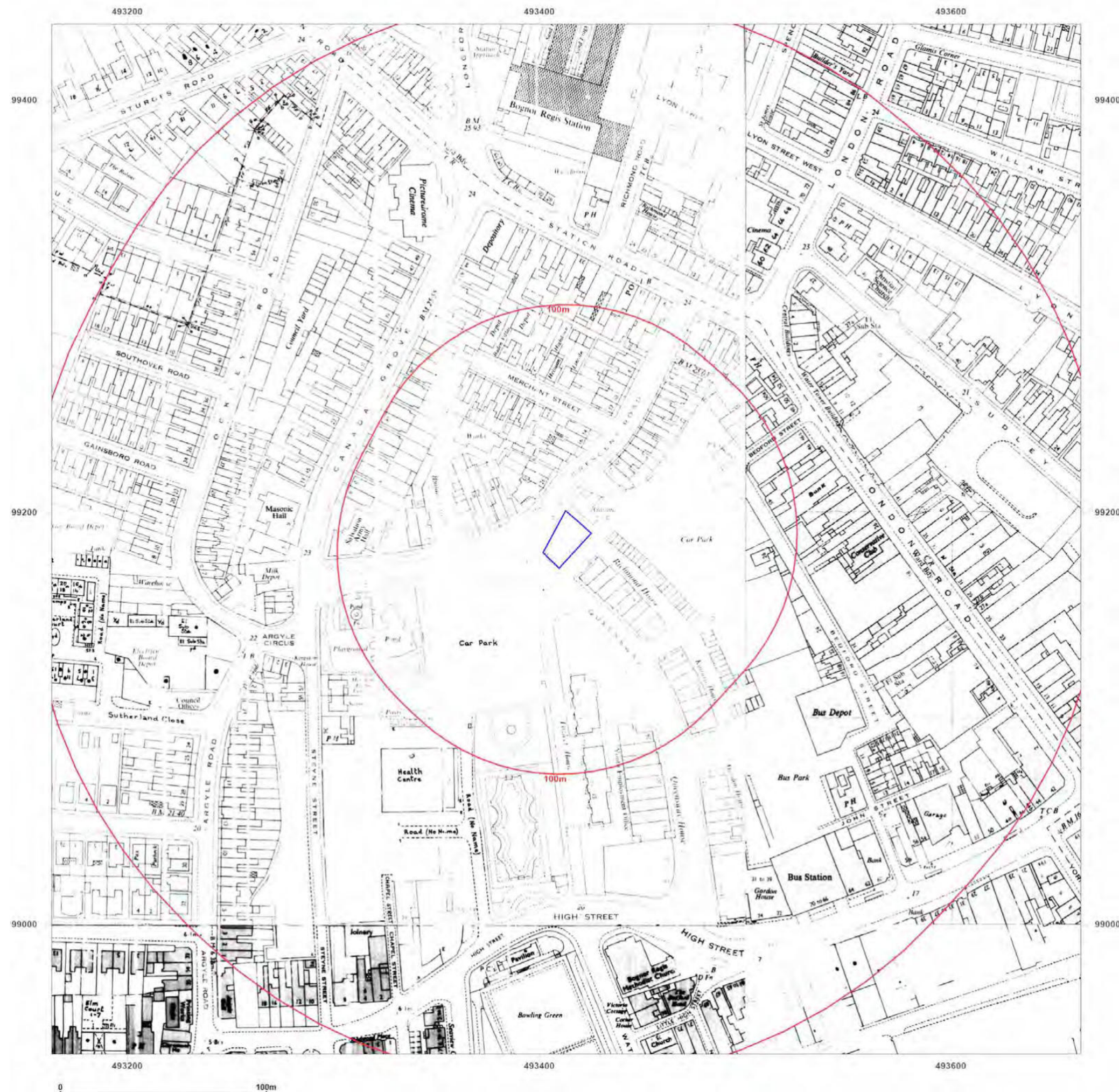


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Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1979-1980

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
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Surveyed N/A
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Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1983

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1975
Revised 1983
Edition N/A
Copyright 1983
Levelled 1975

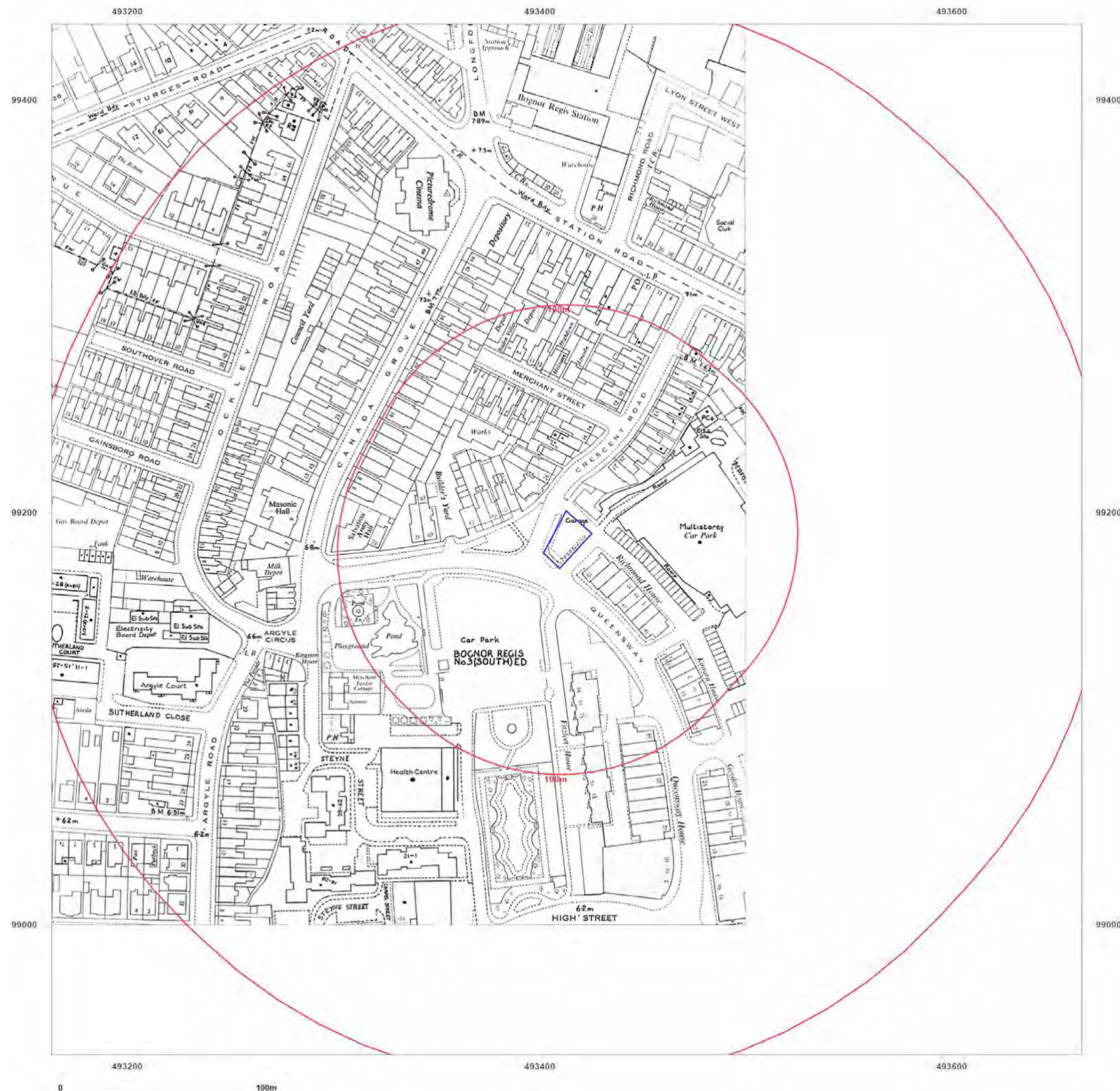


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Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1983

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1975
Revised 1983
Edition N/A
Copyright 1983
Levelled 1975

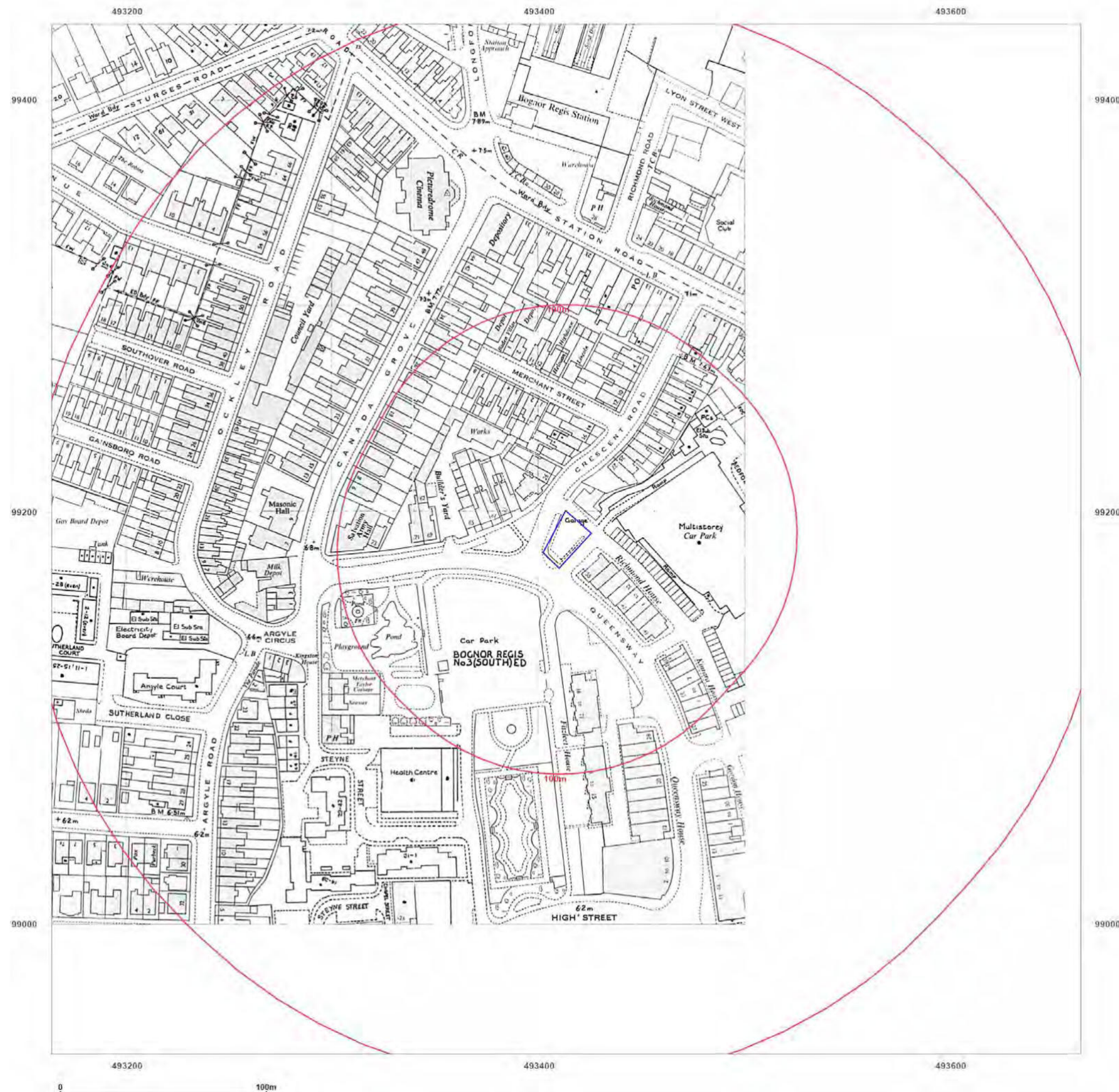


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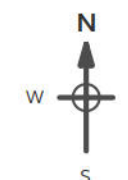
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Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1979-1984

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1979
Revised 1979
Edition N/A
Copyright 1979
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Revised N/A
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Copyright N/A
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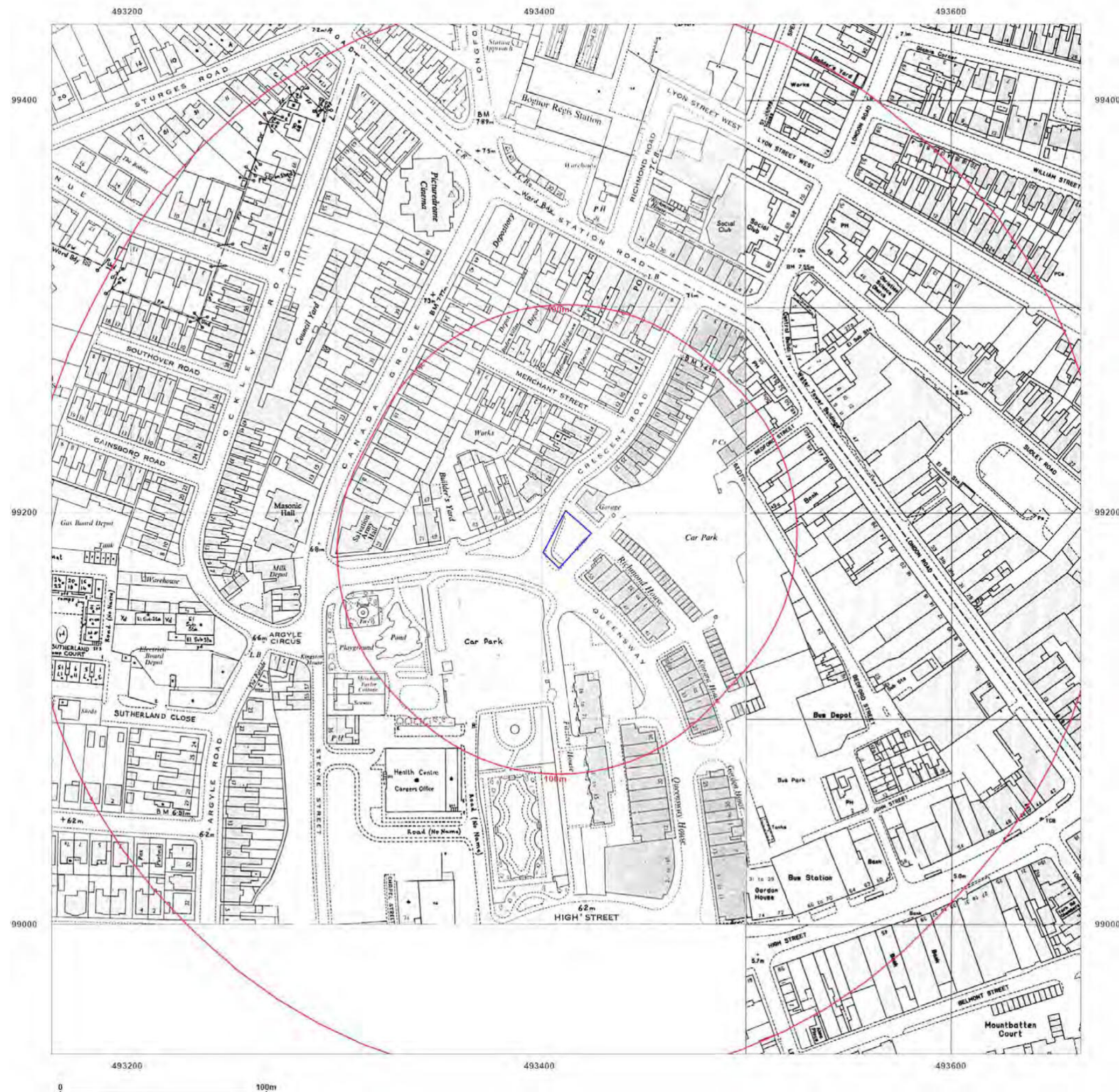


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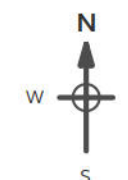
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Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1982-1984

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1961
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Copyright 1982
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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1989-1992

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1992
Levelled 1975

Surveyed 1975
Revised 1989
Edition N/A
Copyright 1989
Levelled 1975

Surveyed 1975
Revised 1992
Edition N/A
Copyright 1992
Levelled 1975

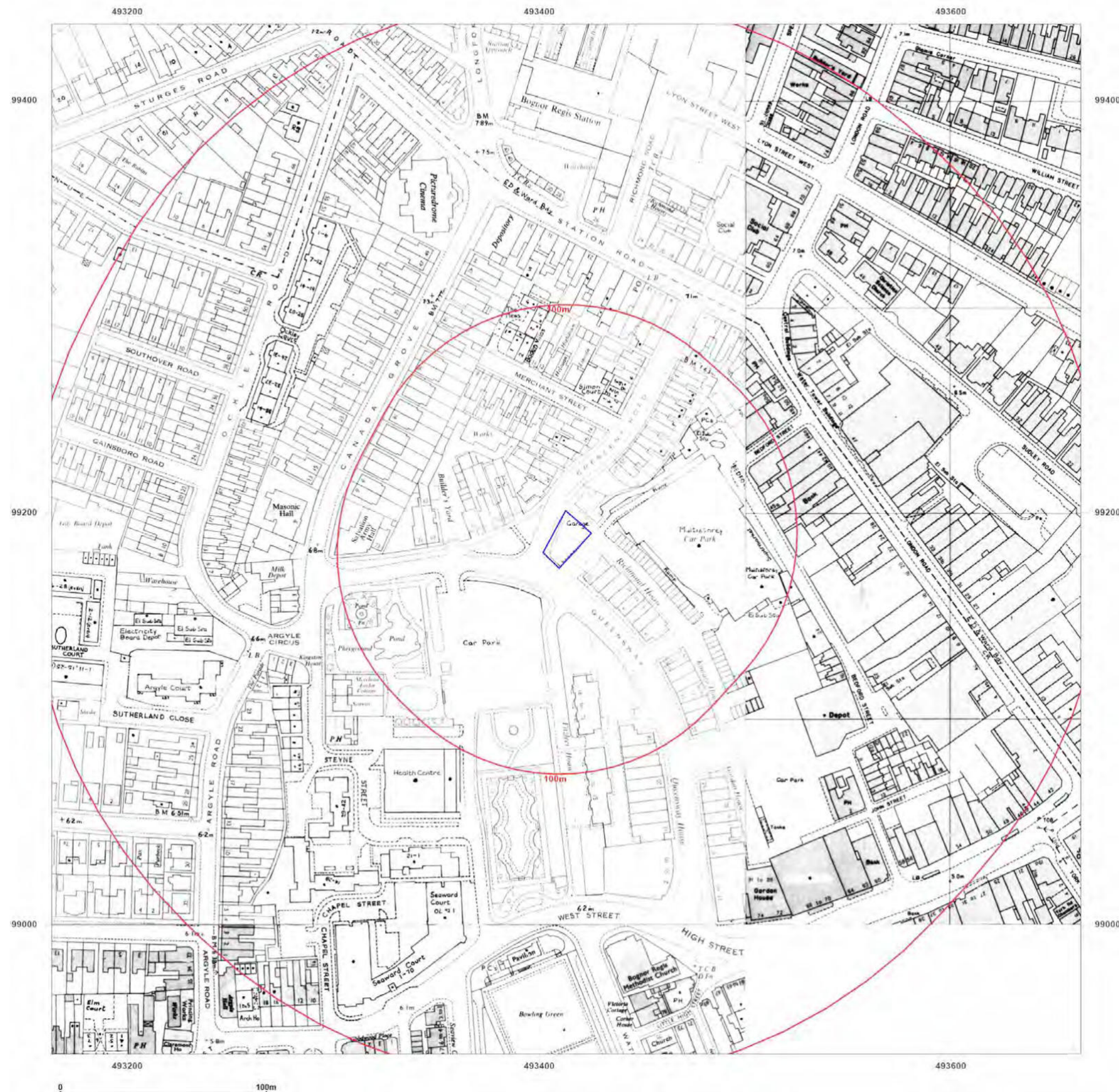


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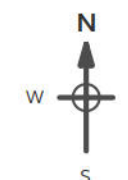
Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1989-1994

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1989
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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Levelled N/A

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

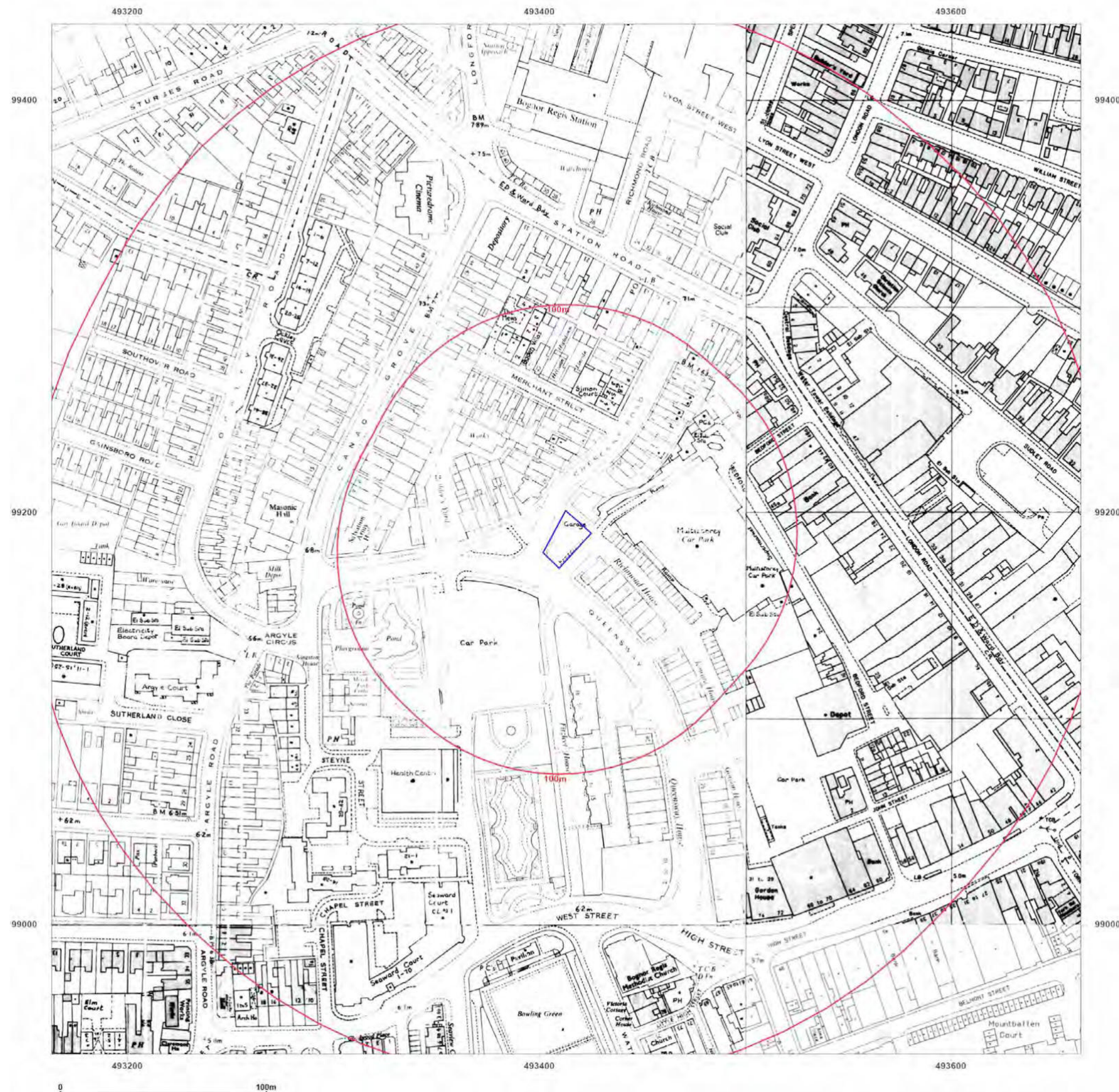


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Site Details:

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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

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Edition N/A
Copyright 1994
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Site Details:

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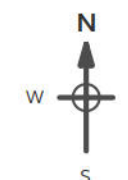
Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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Site Details:

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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: County Series

Map date: 1876

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1876
Revised 1876
Edition N/A
Copyright N/A
Levelled N/A

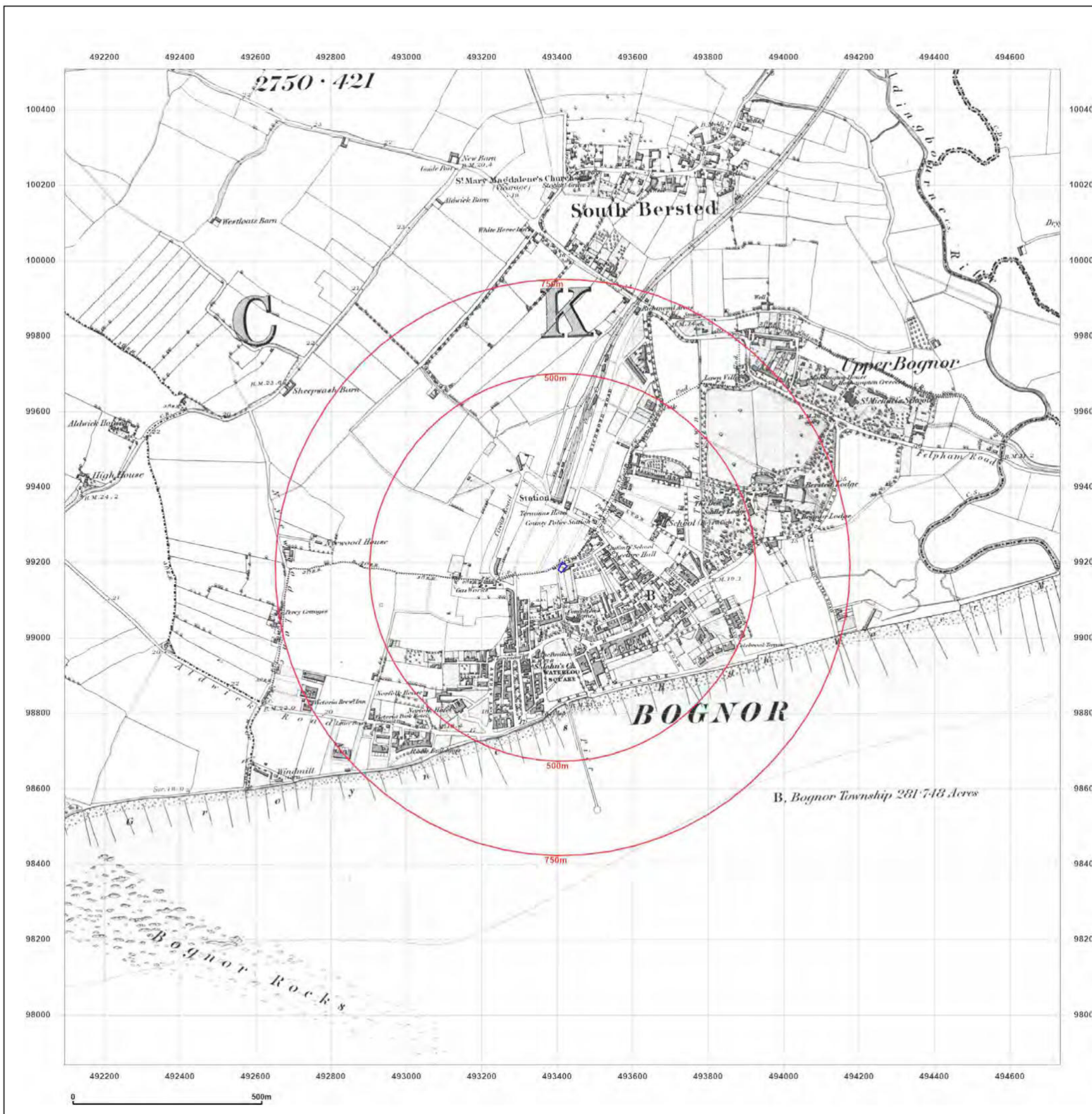


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Site Details:

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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: County Series

Map date: 1896

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1875
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

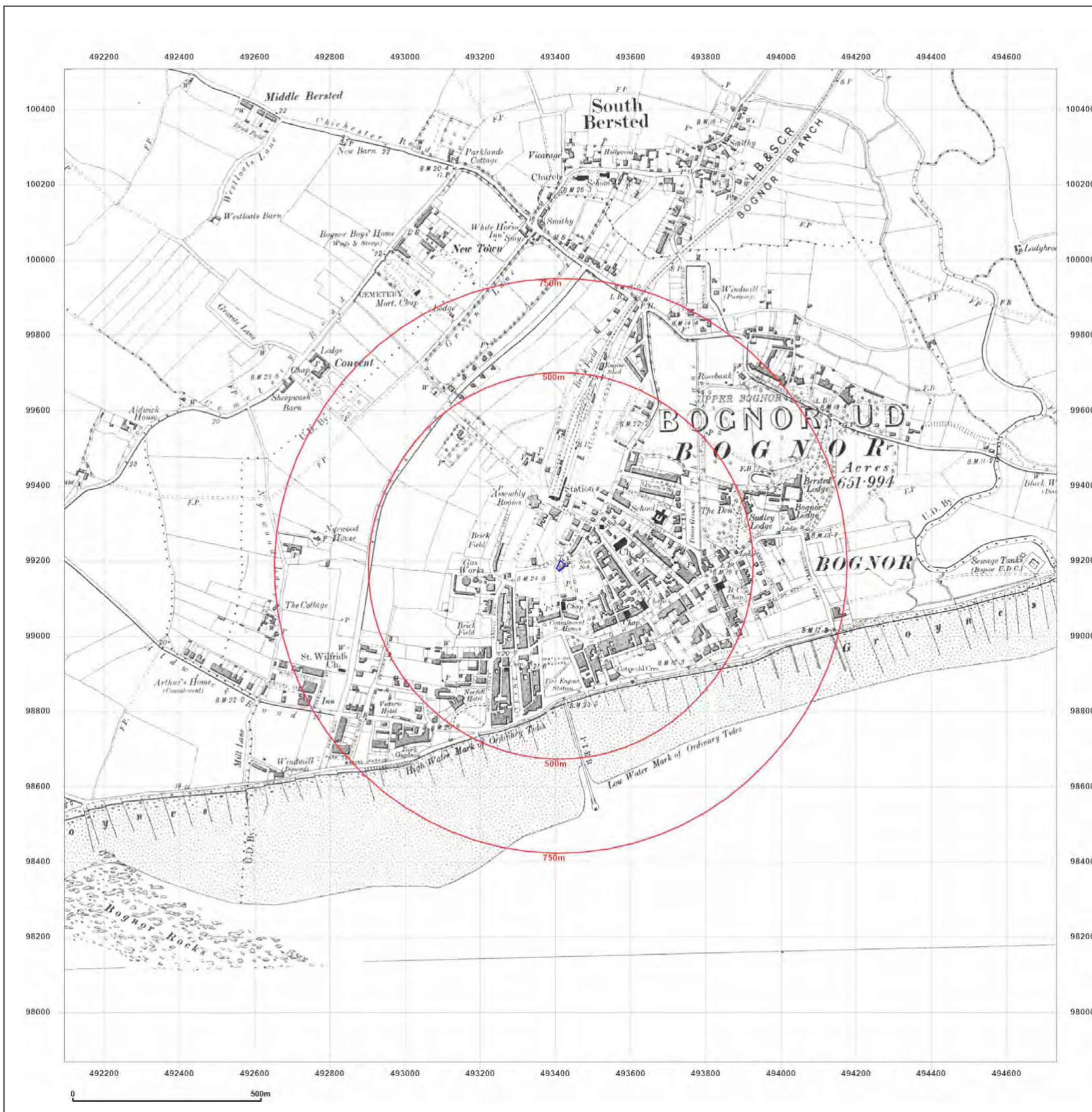


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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: County Series

Map date: 1910

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1875
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

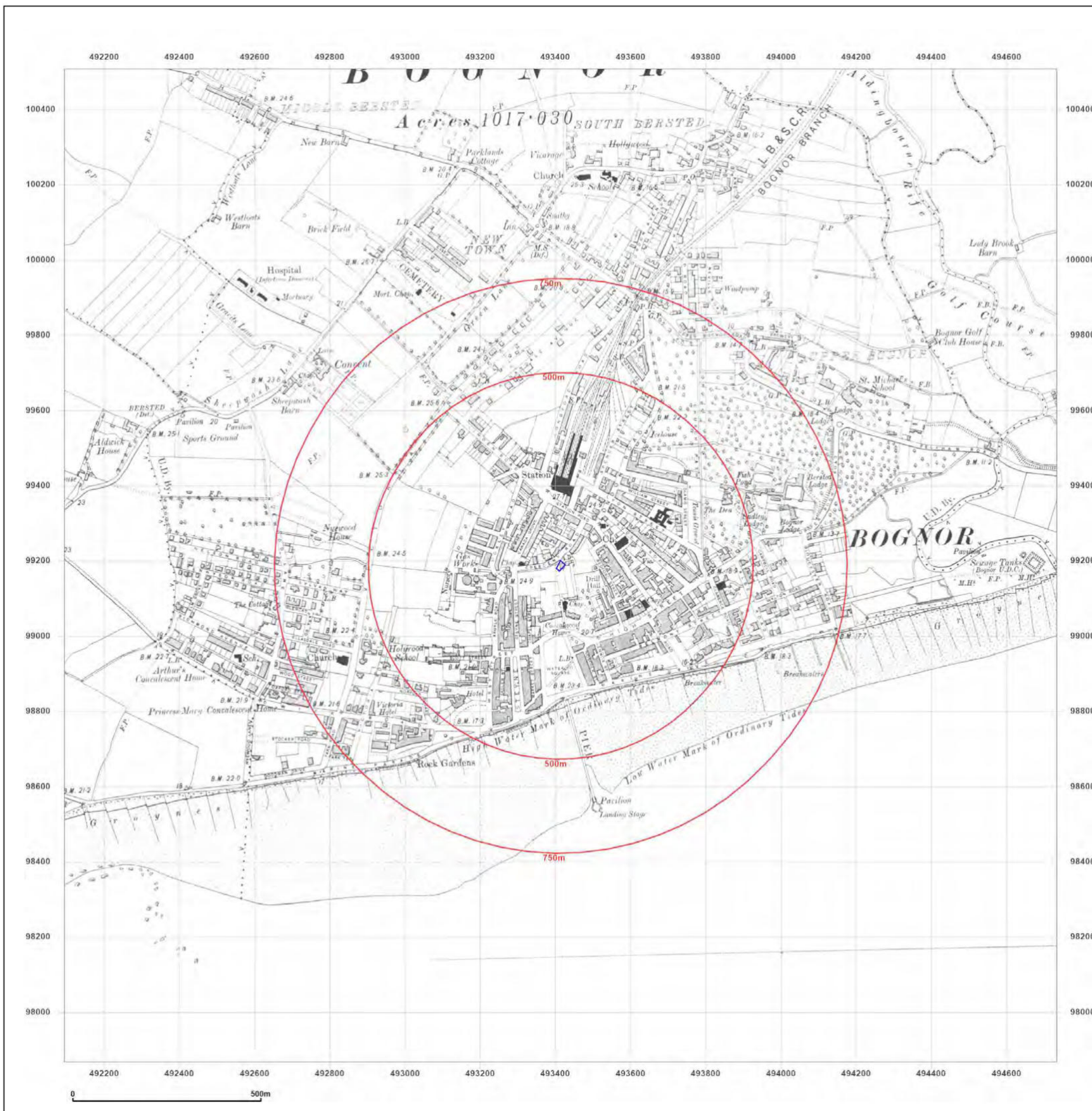


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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: County Series

Map date: 1934

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1875
Revised 1934
Edition N/A
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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: County Series

Map date: 1940

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1875
Revised 1940
Edition N/A
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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: Provisional

Map date: 1957-1961

Scale: 1:10,560

Printed at: 1:10,560



Surveyed N/A
Revised 1961
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1875
Revised 1957
Edition N/A
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Levelled N/A



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PO21 1QT

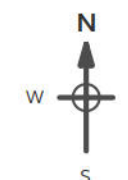
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Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: Provisional

Map date: 1967

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1967
Revised 1967
Edition N/A
Copyright N/A
Levelled N/A

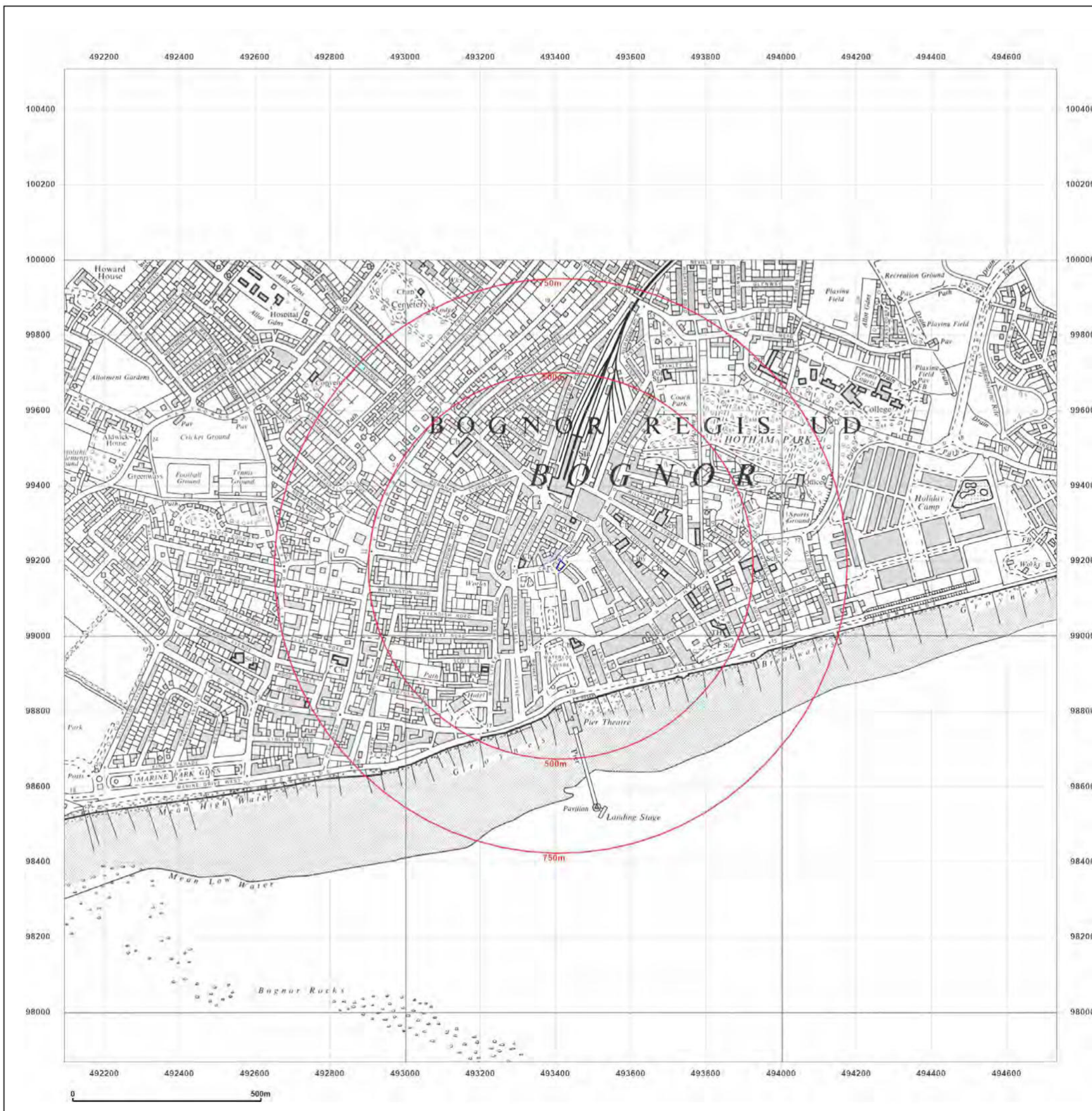


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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 1975-1979

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1975
Revised 1979
Edition N/A
Copyright 1979
Levelled 1975

Surveyed 1972
Revised 1973
Edition N/A
Copyright 1975
Levelled 1966

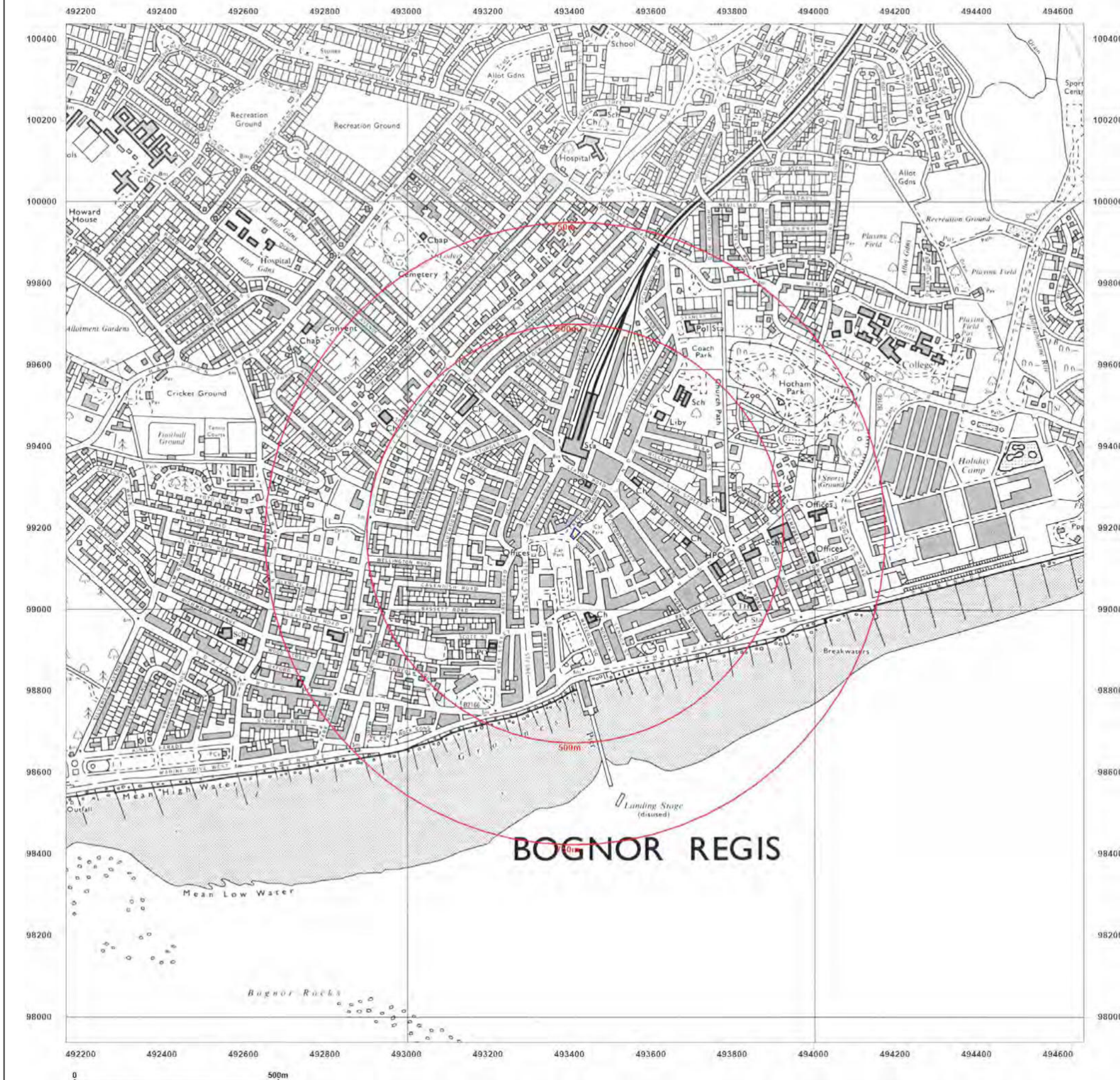


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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000

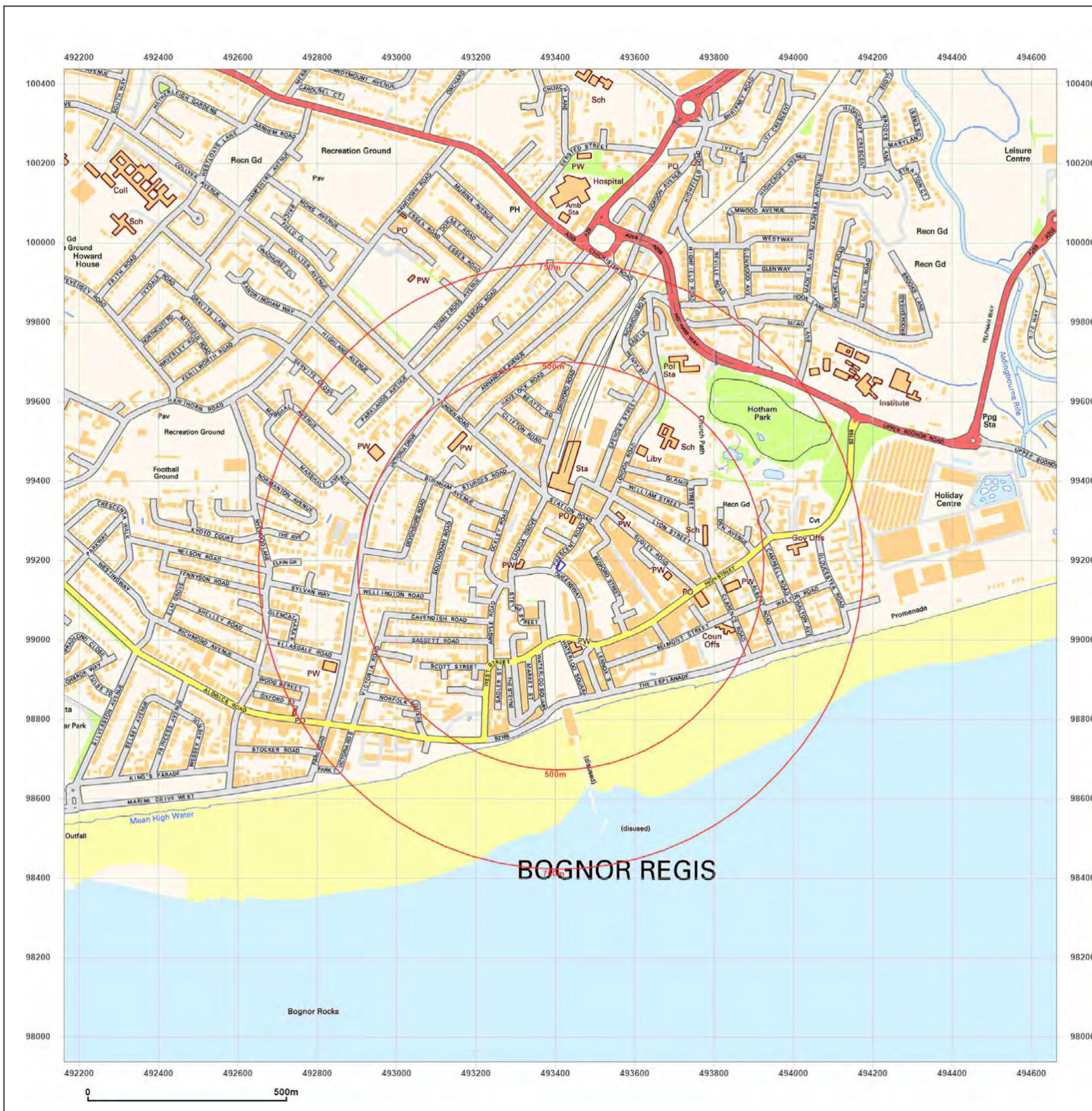


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PO21 1QT

Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

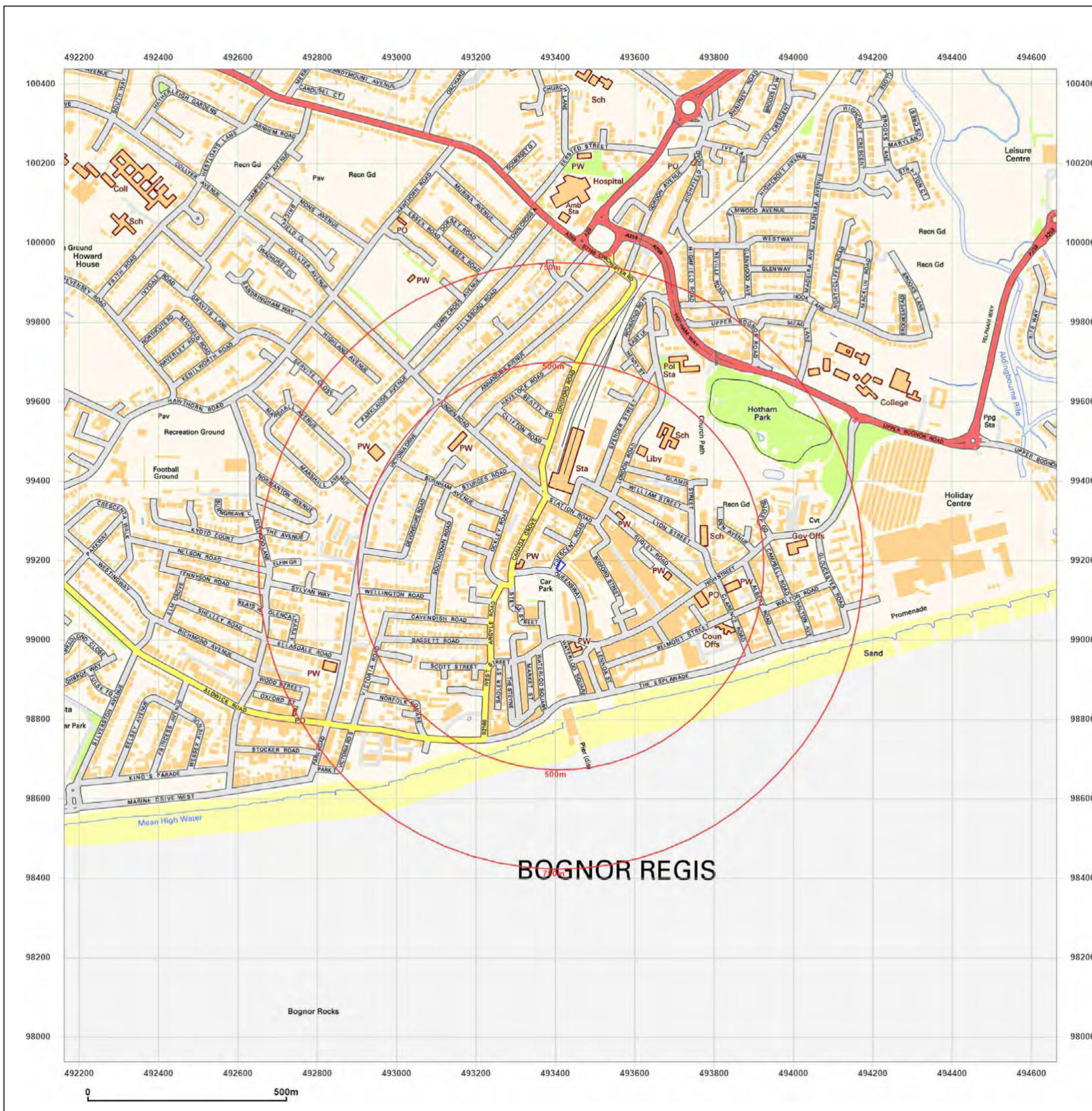


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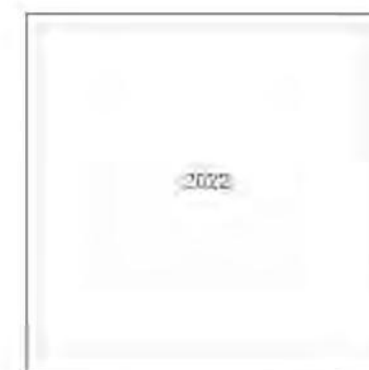
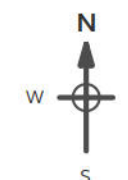
Client Ref: YEX2909
Report Ref: GS-8787531
Grid Ref: 493413, 99187

Map Name: National Grid

Map date: 2022

Scale: 1:10,000

Printed at: 1:10,000

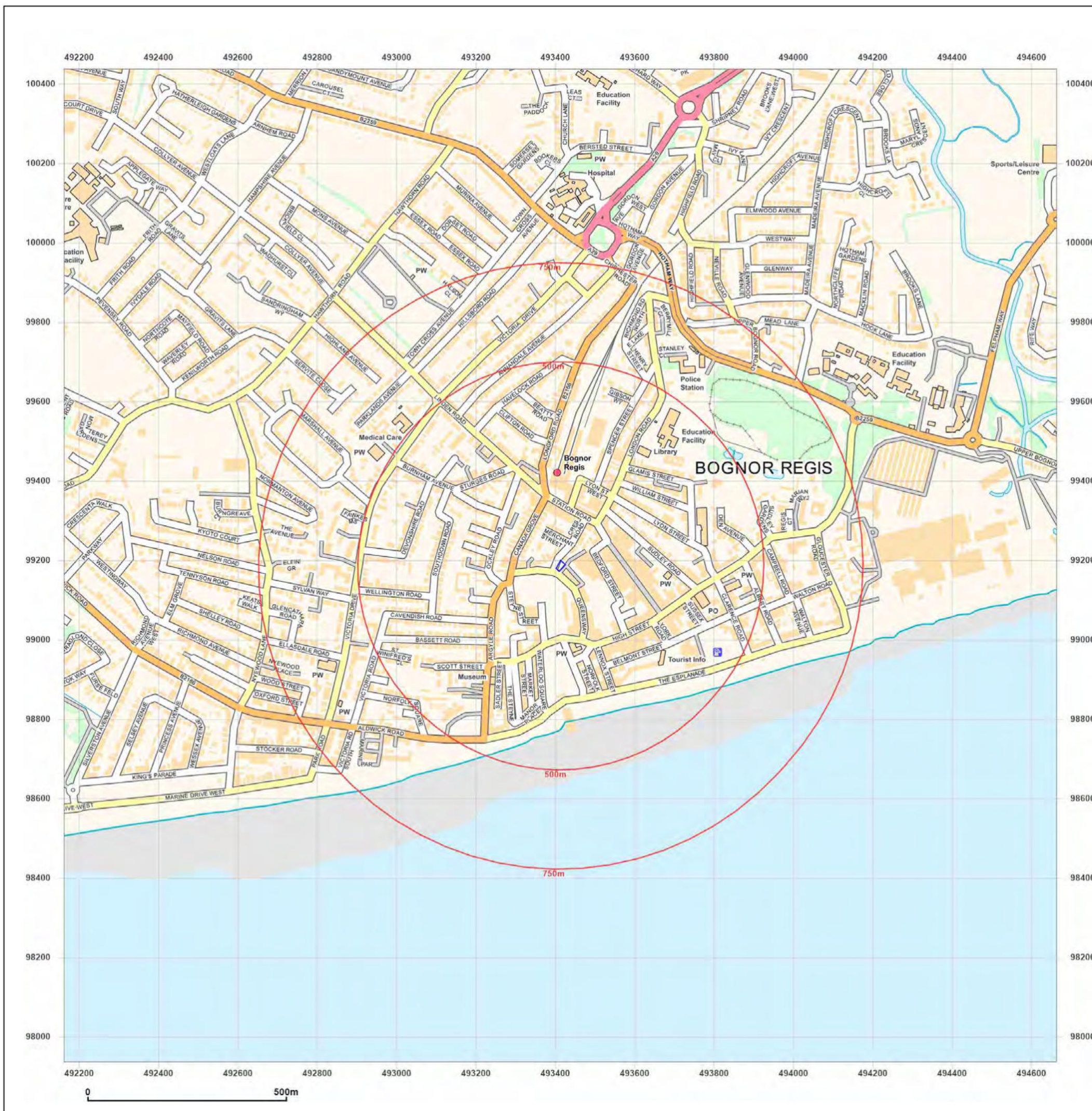


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Appendix E – UXO Bomb Risk Mapping



UNEXPLODED BOMB RISK MAP



SITE LOCATION

Location: Bognor Regis, West Sussex
Map Centre: 493500,99500



LEGEND

- High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- Low:** Areas indicated as having 15 bombs per 1000acre or less.

- military
- industry
- UXO find
- transport
- dock
- Luftwaffe targets
- utilities
- Bombing decoy
- other



How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: +44 (0)1243 811111

web: www.zeticauxo.com

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: (<https://zeticauxo.com/downloads-and-resources/risk-maps/>)

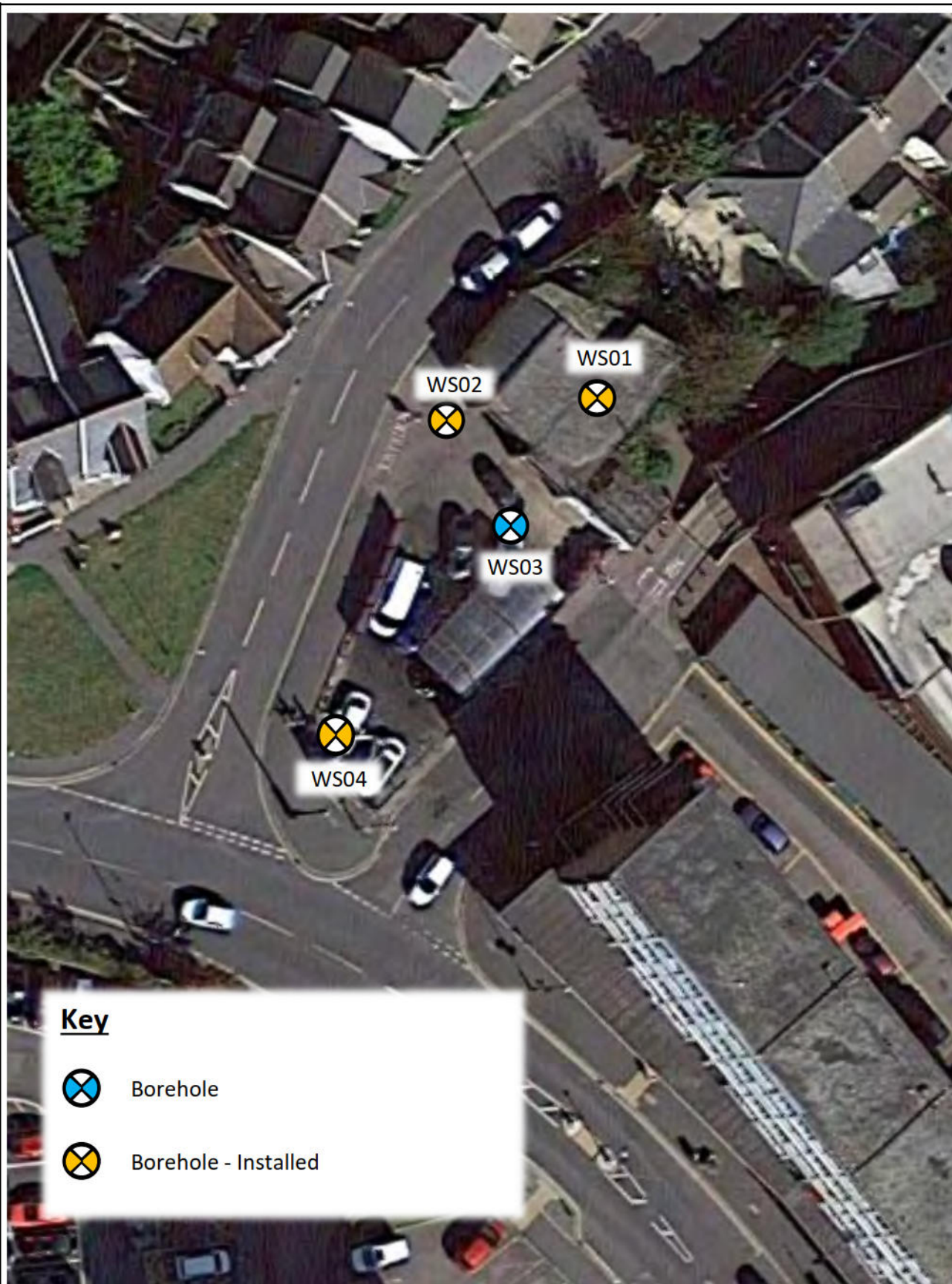
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It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

Appendix F – Site Investigation Plan





Title: Investigation Location Plan



Site Name:
57 Queensway, Bognor Regis
Site Investigation

Job No:
YEX2909

Appendix G – Borehole Logs





Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: 57 Queensway

Project No.
YEX2909

Co-ords:

Hole Type
WLS

Location: Bognor Regis PO21 1QN

Level:

Scale
1:50

Client: HJP Ltd

Dates: 20/06/2022

Logged By
LB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND. MACADAM MADE GROUND. Blackish grey slightly cobbly sandy GRAVEL with frequent brick and concrete	
					1.00			Firm brown sandy CLAY. Sand is fine	1
								<u>Hydrocarbon odour noted between 2.0m and 3.0m</u>	2
					3.00			End of Borehole at 3.00m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

No groundwater encountered. Monitoring well installed at 3.0m.





Borehole Log

Borehole No.

WS02

Sheet 1 of 1

Project Name: 57 Queensway

Project No.
YEX2909

Co-ords:

Hole Type
WLS

Location: Bognor Regis PO21 1QN

Level:

Scale
1:50

Client: HJP Ltd

Dates: 20/06/2022

Logged By
LB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND. MACADAM MADE GROUND. Brown sandy coarse angular GRAVEL of flint with occasional brick	
					1.00			Firm brown slightly gravelly sandy CLAY. Sand is fine. Gravel is fine to medium subrounded to subangular of flint <i>Black discolouration at 1.0m and hydrocarbon odour noted between 1.0m and 3.0m</i>	1
					3.00			End of Borehole at 3.00m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

No groundwater encountered. Monitoring well installed at 3.0m.





Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: 57 Queensway

Project No.
YEX2909

Co-ords:

Hole Type
WLS

Location: Bognor Regis PO21 1QN

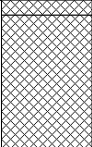
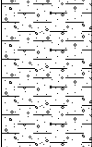
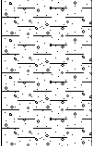
Level:

Scale
1:50

Client: HJP Ltd

Dates: 20/06/2022

Logged By
LB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND. MACADAM MADE GROUND. Blackish brown slightly gravelly clayey fine to coarse SAND with frequent brick	
					1.00			Firm brown slightly gravelly sandy CLAY. Sand is fine. Gravel is fine to medium subrounded to subangular of flint	1
								<i>Hydrocarbon odour noted between 2.0m and 3.0m</i>	2
					3.00			End of Borehole at 3.00m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

No groundwater encountered. Borehole backfilled on completion.





Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: 57 Queensway

Project No.
YEX2909

Co-ords:

Hole Type
WLS

Location: Bognor Regis PO21 1QN

Level:

Scale
1:50

Client: HJP Ltd

Dates: 20/06/2022

Logged By
LB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND. MACADAM MADE GROUND. Brown slightly gravelly sandy CLAY with occasional chalk, coal, flint and brick	
					1.00			Firm brown slightly gravelly sandy CLAY. Sand is fine. Gravel is fine to medium subrounded to subangular of flint	1
								<u>Hydrocarbon odour noted between 2.0m and 4.0m</u>	2
					3.00			Brown slightly clayey gravelly fine to coarse SAND. Gravel is fine to coarse rounded to subangular of flint	3
					4.00			End of Borehole at 4.00m	4
									5
									6
									7
									8
									9
									10

Remarks

No groundwater encountered. Monitoring well installed at 4.0m.



Appendix H – Geotechnical Laboratory Results



TEST REPORT: **DETERMINATION OF THE MOISTURE CONTENT OF SOILS**
 BS 1377:Part 2:1990 clause 3.2 - oven drying method

REPORT NUMBER: C1061538 / 195628.1.1.1

SAMPLE NUMBER: See Below **CLIENT:** Your Environment Ltd

CLIENT REF: See Below **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site

DATE RECEIVED: 05/07/2022 **SOURCE:** Ex-Site

DATE COMPLETED: 14/07/2022 **MATERIAL:** See Below

TESTED BY: Lewis Stockton **LOCATION:** See Below

TYPE OF SAMPLE: Disturbed **PREPARATION METHOD:** BS 1377-1: 2016 clause 7

SAMPLING PLAN: Client Provided **METHOD OF SAMPLING:** Unknown

ENVIRONMENTAL CONDITIONS: Unknown

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
303534	DN4837/1	WS01 1.60	Yellow/Brown CLAY	15	NA	NA

Remarks:

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For and on behalf of CTS
 Reece Walker - Senior Technician



Approved Signatory
 Report date 11-Aug-22

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TEST REPORT: **DETERMINATION OF THE PLASTICITY INDEX OF SOIL**
BS 1377:Part 2:1990 clause 5.4

REPORT NUMBER: C1061538 / 195628.2.1.1

SAMPLE NUMBER: 303534 **CLIENT:** Your Environment Ltd

CLIENT REF: DN4837/1 **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site, Ex-Site

DATE RECEIVED: 05/07/2022 **MATERIAL:** Yellow/Brown CLAY

DATE COMPLETED: 09/08/2022 **LOCATION:** WS01 1.60

TESTED BY: Danielle Wilkinson **PREPARATION METHOD:** BS 1377:Part 1:2016 cl 8.3 & 8.4.3

TYPE OF SAMPLE: Disturbed **VARIATIONS:** None

WITHIN ORIGINAL SAMPLE: N/A **SAMPLING PLAN:** Client Specification

RESULTS: Test Location: CTS Doncaster

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	29%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	14%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	15%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	97%		
Sample History:	The material was tested in the natural state		

Remarks:
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TEST REPORT: **DETERMINATION OF THE MOISTURE CONTENT OF SOILS**
BS 1377:Part 2:1990 clause 3.2 - oven drying method

REPORT NUMBER: C1061538 / 195628.3.1.1

SAMPLE NUMBER: See Below **CLIENT:** Your Environment Ltd

CLIENT REF: See Below **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site

DATE RECEIVED: 05/07/2022 **SOURCE:** Ex-Site

DATE COMPLETED: 14/07/2022 **MATERIAL:** See Below

TESTED BY: Lewis Stockton **LOCATION:** See Below

TYPE OF SAMPLE: Disturbed **PREPARATION METHOD:** BS 1377-1: 2016 clause 7

SAMPLING PLAN: Client Provided **METHOD OF SAMPLING:** Unknown

ENVIRONMENTAL CONDITIONS: Unknown

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
303537	DN4837/2	WS02 2.50	Light Brown CLAY	19	NA	NA

Remarks:

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TEST REPORT: **DETERMINATION OF THE PLASTICITY INDEX OF SOIL**
 BS 1377:Part 2:1990 clause 5.4

REPORT NUMBER: C1061538 / 195628.4.1.1

SAMPLE NUMBER: 303537 **CLIENT:** Your Environment Ltd

CLIENT REF: DN4837/2 **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site, Ex-Site

DATE RECEIVED: 05/07/2022 **MATERIAL:** Light Brown CLAY

DATE COMPLETED: 09/08/2022 **LOCATION:** WS02 2.50

TESTED BY: Danielle Wilkinson **PREPARATION METHOD:** BS 1377:Part 1:2016 cl 8.3 & 8.4.3

TYPE OF SAMPLE: Disturbed **VARIATIONS:** None

WITHIN ORIGINAL SAMPLE: N/A **SAMPLING PLAN:** Client Specification

RESULTS: Test Location: CTS Doncaster

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	37%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	17%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	20%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	87%		
Sample History:	The material was tested after washing through a 425µm test sieve		

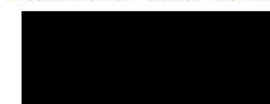
Remarks:
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TEST REPORT: **DETERMINATION OF THE MOISTURE CONTENT OF SOILS**
BS 1377:Part 2:1990 clause 3.2 - oven drying method

REPORT NUMBER: C1061538 / 195628.5.1.1

SAMPLE NUMBER: See Below **CLIENT:** Your Environment Ltd

CLIENT REF: See Below **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site

DATE RECEIVED: 05/07/2022 **SOURCE:** Ex-Site

DATE COMPLETED: 14/07/2022 **MATERIAL:** See Below

TESTED BY: Lewis Stockton **LOCATION:** See Below

TYPE OF SAMPLE: Disturbed **PREPARATION METHOD:** BS 1377-1: 2016 clause 7

SAMPLING PLAN: Client Provided **METHOD OF SAMPLING:** Unknown

ENVIRONMENTAL CONDITIONS: Unknown

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
303539	DN4837/3	WS03 1.20	Light Brown CLAY	19	NA	NA

Remarks:

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TEST REPORT: **DETERMINATION OF THE PLASTICITY INDEX OF SOIL**
 BS 1377:Part 2:1990 clause 5.4

REPORT NUMBER: C1061538 / 195628.6.1.1

SAMPLE NUMBER: 303539 **CLIENT:** Your Environment Ltd

CLIENT REF: DN4837/3 **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site, Ex-Site

DATE RECEIVED: 05/07/2022 **MATERIAL:** Light Brown CLAY

DATE COMPLETED: 09/08/2022 **LOCATION:** WS03 1.20

TESTED BY: Danielle Wilkinson **PREPARATION METHOD:** BS 1377:Part 1:2016 cl 8.3 & 8.4.3

TYPE OF SAMPLE: Disturbed **VARIATIONS:** None

WITHIN ORIGINAL SAMPLE: N/A **SAMPLING PLAN:** Client Specification

RESULTS: Test Location: CTS Doncaster

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	39%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	19%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	20%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	97%		
Sample History:	The material was tested in the natural state		

Remarks:
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TEST REPORT: **DETERMINATION OF THE MOISTURE CONTENT OF SOILS**
BS 1377:Part 2:1990 clause 3.2 - oven drying method

REPORT NUMBER: C1061538 / 195628.7.1.1

SAMPLE NUMBER: See Below **CLIENT:** Your Environment Ltd

CLIENT REF: See Below **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site

DATE RECEIVED: 05/07/2022 **SOURCE:** Ex-Site

DATE COMPLETED: 14/07/2022 **MATERIAL:** See Below

TESTED BY: Lewis Stockton **LOCATION:** See Below

TYPE OF SAMPLE: Disturbed **PREPARATION METHOD:** BS 1377-1: 2016 clause 7

SAMPLING PLAN: Client Provided **METHOD OF SAMPLING:** Unknown

ENVIRONMENTAL CONDITIONS: Unknown

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
303540	DN4837/4	WS04 3.0	Grey CLAY	13	NA	NA

Remarks:
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TEST REPORT: **DETERMINATION OF THE PLASTICITY INDEX OF SOIL**
BS 1377:Part 2:1990 clause 5.4

REPORT NUMBER: C1061538 / 195628.8.1.1

SAMPLE NUMBER: 303540 **CLIENT:** Your Environment Ltd

CLIENT REF: DN4837/4 **ADDRESS:** 8-10 Brockholes Business Park, New Mill Road, Brockholes, Holmfirth, HD9 7BN

DATE SAMPLED: 20/06/2022 **SITE:** YEX2909 - Queensway - LAB

SAMPLED BY: Client **SUPPLIER:** Ex-Site, Ex-Site

DATE RECEIVED: 05/07/2022 **MATERIAL:** Grey CLAY

DATE COMPLETED: 09/08/2022 **LOCATION:** WS04 3.0

TESTED BY: Danielle Wilkinson **PREPARATION METHOD:** BS 1377:Part 1:2016 cl 8.3 & 8.4.3

TYPE OF SAMPLE: Disturbed **VARIATIONS:** None

WITHIN ORIGINAL SAMPLE: N/A **SAMPLING PLAN:** Client Specification

RESULTS: Test Location: CTS Doncaster

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	31%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	13%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	18%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	96%		
Sample History:	The material was tested in the natural state		

Remarks:
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Appendix I – Soil Chemical Laboratory Results





ANALYTICAL TEST REPORT

Contract no: 111081(1)

Contract name: 57 Queensway

Client reference: YEX2909

Clients name: YourEnvironment

Clients address: Unit 2, Woodhorn Business Centre
Chichester
West Sussex
PO20 2BX

Samples received: 04 July 2022

Analysis started: 04 July 2022

Analysis completed: 11 July 2022

Report issued: 19 December 2022

This is a supplementary report to report number 111081 issued 11 July 2022.

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by:



Megan Harris

Senior Reporting Administrator

Unit 6 Parkhead, Greencroft Industrial Park, Stanley, County Durham, DH9 7YB



Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
111081-1	WS01	0.20	Sand with Gravel	-	-	9.9
111081-2	WS01	0.50	Sand with Gravel	-	-	13.4
111081-3	WS01	1.00	Sand with Gravel	-	-	11.4
111081-4	WS01	1.50	Sand with Gravel	-	-	13.3
111081-5	WS01	2.50	Sand with Gravel	-	-	10.8
111081-6	WS02	1.00	Sand with Gravel	-	-	13.1
111081-7	WS02	2.00	Sand with Gravel	-	-	9.8
111081-8	WS02	3.00	Sand with Gravel	-	-	16.7
111081-9	WS03	0.30	Sand with Gravel	-	-	10.0
111081-10	WS03	0.70	Sand with Gravel	-	-	13.1
111081-11	WS03	1.00	Sand with Gravel	-	-	13.7
111081-12	WS03	1.20	Sand with Gravel	-	-	12.9
111081-13	WS03	1.80	Sand with Gravel	-	-	14.9
111081-14	WS04	0.20	Sand with Gravel	-	-	16.5
111081-15	WS04	1.50	Sand with Gravel	-	-	17.0
111081-16	WS04	2.50	Sand with Gravel	-	-	11.0
111081-17	WS04	3.50	Sand with Gravel	-	-	8.3
111081-18	WS04	4.00	Sand with Gravel	-	-	13.8

Chemtech Environmental Limited

SOILS

Lab number Sample id Depth (m) Date sampled			111081-1 WS01 0.20 20/06/2022	111081-2 WS01 0.50 20/06/2022	111081-3 WS01 1.00 20/06/2022	111081-4 WS01 1.50 20/06/2022	111081-5 WS01 2.50 20/06/2022	111081-6 WS02 1.00 20/06/2022
Test	Method	Units						
Arsenic (total)	CE127 ^M	mg/kg As	15	-	20	-	15	13
Cadmium (total)	CE127 ^M	mg/kg Cd	<0.2	-	<0.2	-	0.3	<0.2
Chromium (total)	CE127 ^M	mg/kg Cr	70	-	86	-	33	52
Chromium (VI)	CE146	mg/kg CrVI	<1	-	<1	-	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	23	-	20	-	7.0	13
Lead (total)	CE127 ^M	mg/kg Pb	34	-	64	-	8.4	18
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	-	<0.5	-	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	14	-	18	-	14	31
Selenium (total)	CE127 ^M	mg/kg Se	0.5	-	1.3	-	0.8	1.6
Zinc (total)	CE127 ^M	mg/kg Zn	40	-	51	-	28	58
pH	CE004 ^M	units	9.4	8.5	8.2	8.2	8.5	8.1
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	672	166	179	66	17	20
Sulphate (2:1 water soluble)	CE061 ^U	g/l SO ₄	-	0.17	-	0.07	-	0.02
Sulphate (total)	CE062 ^M	mg/kg SO ₄	-	658	-	265	-	193
Sulphate (total)	CE062 ^M	% w/w SO ₄	-	0.07	-	0.03	-	0.02
Sulphur (total)	CE119	% w/w S	-	0.03	-	0.01	-	0.01
Cyanide (total)	CE077	mg/kg CN	<1	-	<1	-	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	-	<0.5	-	<0.5	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	0.8	-	0.9	-	0.4	0.3
Estimate of OMC (calculated from TOC)	CE197	% w/w	1.4	-	1.6	-	0.7	0.6
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
Acenaphthylene	CE087 ^M	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
Acenaphthene	CE087 ^M	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
Fluorene	CE087 ^U	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
Phenanthrene	CE087 ^M	mg/kg	0.08	-	<0.02	-	<0.02	<0.02
Anthracene	CE087 ^U	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
Fluoranthene	CE087 ^M	mg/kg	0.46	-	<0.02	-	<0.02	<0.02
Pyrene	CE087 ^M	mg/kg	0.40	-	<0.02	-	<0.02	<0.02
Benzo(a)anthracene	CE087 ^U	mg/kg	0.15	-	<0.02	-	<0.02	<0.02
Chrysene	CE087 ^M	mg/kg	0.13	-	<0.03	-	<0.03	<0.03
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.33	-	<0.02	-	<0.02	<0.02
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.03	-	<0.03	-	<0.03	<0.03
Benzo(a)pyrene	CE087 ^U	mg/kg	0.17	-	<0.02	-	<0.02	<0.02
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.21	-	<0.02	-	<0.02	<0.02
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.13	-	<0.02	-	<0.02	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	2.10	-	<0.34	-	<0.34	<0.34

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SOILS

Lab number			111081-1	111081-2	111081-3	111081-4	111081-5	111081-6
Sample id			WS01	WS01	WS01	WS01	WS01	WS02
Depth (m)			0.20	0.50	1.00	1.50	2.50	1.00
Date sampled			20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Test	Method	Units						
BTEX & TPH								
MTBE	CE192 ^U	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
Benzene	CE192 ^U	mg/kg	<0.01	-	<0.01	-	<0.01	<0.01
Toluene	CE192 ^U	mg/kg	<0.01	-	<0.01	-	<0.01	<0.01
Ethylbenzene	CE192 ^U	mg/kg	<0.01	-	<0.01	-	<0.01	<0.01
m & p-Xylene	CE192 ^U	mg/kg	<0.02	-	<0.02	-	<0.02	<0.02
o-Xylene	CE192 ^U	mg/kg	<0.01	-	<0.01	-	<0.01	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	-	<0.01	-	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	-	<0.01	-	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	-	<0.01	-	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<1	-	2	-	3	3
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<1	-	5	-	15	7
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1	-	12	-	63	21
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	2	-	75	-	275	201
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1	-	34	-	101	75
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	-	<0.1	-	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	-	<0.1	-	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	-	<0.1	-	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	-	<6	-	<6	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	-	<6	-	<6	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<15	-	89	-	222	106
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	-	38	-	104	37
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	-	NAD	-	NAD	NAD

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SOILS

Lab number Sample id Depth (m) Date sampled			111081-7 WS02 2.00 20/06/2022	111081-8 WS02 3.00 20/06/2022	111081-9 WS03 0.30 20/06/2022	111081-10 WS03 0.70 20/06/2022	111081-11 WS03 1.00 20/06/2022	111081-12 WS03 1.20 20/06/2022
Test	Method	Units						
Arsenic (total)	CE127 ^M	mg/kg As	12	22	30	-	23	-
Cadmium (total)	CE127 ^M	mg/kg Cd	0.4	<0.2	0.3	-	0.3	-
Chromium (total)	CE127 ^M	mg/kg Cr	39	48	47	-	63	-
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	-	<1	-
Copper (total)	CE127 ^M	mg/kg Cu	9.8	17	7.9	-	18	-
Lead (total)	CE127 ^M	mg/kg Pb	15	39	11	-	41	-
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5	-	<0.5	-
Nickel (total)	CE127 ^M	mg/kg Ni	21	26	15	-	41	-
Selenium (total)	CE127 ^M	mg/kg Se	1.1	1.8	0.8	-	2.2	-
Zinc (total)	CE127 ^M	mg/kg Zn	50	62	33	-	82	-
pH	CE004 ^M	units	8.4	8.5	8.5	8.4	8.4	8.1
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	<10	21	<10	44	13	10
Sulphate (2:1 water soluble)	CE061 ^U	g/l SO ₄	<0.01	-	-	0.04	-	0.01
Sulphate (total)	CE062 ^M	mg/kg SO ₄	265	-	-	505	-	105
Sulphate (total)	CE062 ^M	% w/w SO ₄	0.03	-	-	0.05	-	0.01
Sulphur (total)	CE119	% w/w S	0.01	-	-	0.02	-	<0.01
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	-	<1	-
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	-	<0.5	-
Total Organic Carbon (TOC)	CE197	% w/w C	0.4	0.7	0.5	-	0.2	-
Estimate of OMC (calculated from TOC)	CE197	% w/w	0.7	1.2	0.9	-	0.4	-
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	<0.02	0.06	-	<0.02	-
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	0.12	-	<0.02	-
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Fluorene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Phenanthrene	CE087 ^M	mg/kg	<0.02	<0.02	0.47	-	<0.02	-
Anthracene	CE087 ^U	mg/kg	<0.02	<0.02	0.09	-	<0.02	-
Fluoranthene	CE087 ^M	mg/kg	<0.02	<0.02	1.46	-	<0.02	-
Pyrene	CE087 ^M	mg/kg	<0.02	<0.02	1.31	-	<0.02	-
Benzo(a)anthracene	CE087 ^U	mg/kg	<0.02	<0.02	0.64	-	<0.02	-
Chrysene	CE087 ^M	mg/kg	<0.03	<0.03	0.73	-	<0.03	-
Benzo(b)fluoranthene	CE087 ^M	mg/kg	<0.02	<0.02	1.12	-	<0.02	-
Benzo(k)fluoranthene	CE087 ^M	mg/kg	<0.03	<0.03	0.47	-	<0.03	-
Benzo(a)pyrene	CE087 ^U	mg/kg	<0.02	<0.02	0.77	-	<0.02	-
Indeno(123cd)pyrene	CE087 ^M	mg/kg	<0.02	<0.02	0.72	-	<0.02	-
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02	<0.02	0.13	-	<0.02	-
Benzo(ghi)perylene	CE087 ^M	mg/kg	<0.02	<0.02	0.69	-	<0.02	-
PAH (total of USEPA 16)	CE087	mg/kg	<0.34	<0.34	8.79	-	<0.34	-

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SOILS

Lab number			111081-7	111081-8	111081-9	111081-10	111081-11	111081-12
Sample id			WS02	WS02	WS03	WS03	WS03	WS03
Depth (m)			2.00	3.00	0.30	0.70	1.00	1.20
Date sampled			20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Test	Method	Units						
BTEX & TPH								
MTBE	CE192 ^U	mg/kg	0.05	<0.02	<0.02	-	<0.02	-
Benzene	CE192 ^U	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
Toluene	CE192 ^U	mg/kg	0.05	<0.01	<0.01	-	<0.01	-
Ethylbenzene	CE192 ^U	mg/kg	0.08	<0.01	<0.01	-	<0.01	-
m & p-Xylene	CE192 ^U	mg/kg	0.05	<0.02	<0.02	-	<0.02	-
o-Xylene	CE192 ^U	mg/kg	0.06	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	0.05	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	0.20	<0.01	<0.01	-	<0.01	-
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	3	5	2	-	1	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	5	20	11	-	2	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	15	139	19	-	5	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	132	1788	121	-	39	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	39	402	28	-	8	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	-	<0.1	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	1.13	<0.1	<0.1	-	<0.1	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	3.11	<0.1	<0.1	-	<0.1	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6	-	<6	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6	<6	-	<6	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	38	127	49	-	<15	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	25	<10	-	<10	-
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	-	NAD	-

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SOILS

Lab number Sample id Depth (m) Date sampled			111081-13 WS03 1.80 20/06/2022	111081-14 WS04 0.20 20/06/2022	111081-15 WS04 1.50 20/06/2022	111081-16 WS04 2.50 20/06/2022	111081-17 WS04 3.50 20/06/2022	111081-18 WS04 4.00 20/06/2022
Test	Method	Units						
Arsenic (total)	CE127 ^M	mg/kg As	14	15	14	-	10	-
Cadmium (total)	CE127 ^M	mg/kg Cd	0.2	<0.2	0.3	-	<0.2	-
Chromium (total)	CE127 ^M	mg/kg Cr	64	67	70	-	79	-
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	-	<1	-
Copper (total)	CE127 ^M	mg/kg Cu	21	21	18	-	6.6	-
Lead (total)	CE127 ^M	mg/kg Pb	19	130	38	-	7.8	-
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5	-	<0.5	-
Nickel (total)	CE127 ^M	mg/kg Ni	38	23	40	-	12	-
Selenium (total)	CE127 ^M	mg/kg Se	2.3	1.5	2.2	-	0.5	-
Zinc (total)	CE127 ^M	mg/kg Zn	66	72	92	-	27	-
pH	CE004 ^M	units	8.0	7.5	7.2	8.0	8.5	8.6
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	<10	17	12	15	<10	<10
Sulphate (2:1 water soluble)	CE061 ^U	g/l SO ₄	-	-	-	0.02	-	<0.01
Sulphate (total)	CE062 ^M	mg/kg SO ₄	-	-	-	515	-	140
Sulphate (total)	CE062 ^M	% w/w SO ₄	-	-	-	0.05	-	0.01
Sulphur (total)	CE119	% w/w S	-	-	-	0.02	-	<0.01
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	-	<1	-
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	-	<0.5	-
Total Organic Carbon (TOC)	CE197	% w/w C	0.3	1.7	0.4	-	0.3	-
Estimate of OMC (calculated from TOC)	CE197	% w/w	0.5	2.9	0.7	-	0.4	-
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Fluorene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Phenanthrene	CE087 ^M	mg/kg	<0.02	0.04	<0.02	-	<0.02	-
Anthracene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Fluoranthene	CE087 ^M	mg/kg	<0.02	0.12	<0.02	-	<0.02	-
Pyrene	CE087 ^M	mg/kg	<0.02	0.10	<0.02	-	<0.02	-
Benzo(a)anthracene	CE087 ^U	mg/kg	<0.02	0.07	<0.02	-	<0.02	-
Chrysene	CE087 ^M	mg/kg	<0.03	0.10	<0.03	-	<0.03	-
Benzo(b)fluoranthene	CE087 ^M	mg/kg	<0.02	0.18	<0.02	-	0.02	-
Benzo(k)fluoranthene	CE087 ^M	mg/kg	<0.03	0.07	<0.03	-	<0.03	-
Benzo(a)pyrene	CE087 ^U	mg/kg	<0.02	0.11	<0.02	-	<0.02	-
Indeno(123cd)pyrene	CE087 ^M	mg/kg	<0.02	0.12	<0.02	-	<0.02	-
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Benzo(ghi)perylene	CE087 ^M	mg/kg	<0.02	0.11	<0.02	-	<0.02	-
PAH (total of USEPA 16)	CE087	mg/kg	<0.34	1.01	<0.34	-	<0.34	-

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SOILS

Lab number			111081-13	111081-14	111081-15	111081-16	111081-17	111081-18
Sample id			WS03	WS04	WS04	WS04	WS04	WS04
Depth (m)			1.80	0.20	1.50	2.50	3.50	4.00
Date sampled			20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Test	Method	Units						
BTEX & TPH								
MTBE	CE192 ^U	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
Benzene	CE192 ^U	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
Toluene	CE192 ^U	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
Ethylbenzene	CE192 ^U	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
m & p-Xylene	CE192 ^U	mg/kg	<0.02	<0.02	<0.02	-	<0.02	-
o-Xylene	CE192 ^U	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	-	<0.01	-
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	2	1	4	-	3	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	3	3	11	-	26	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	8	6	46	-	409	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	61	53	685	-	1024	-
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	16	12	382	-	83	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	-	<0.1	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	-	<0.1	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	-	<0.1	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6	-	<6	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6	<6	-	<6	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	35	16	558	-	21	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	<10	142	-	29	-
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	-	NAD	-

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	0.01	g/l SO ₄
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry	M	100	mg/kg SO ₄
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry	M	0.01	% w/w SO ₄
CE119	Sulphur (total)	Acid extraction, ICP-OES	Dry		0.01	% w/w S
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE192	MTBE	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	Benzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Toluene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Ethylbenzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	m & p-Xylene	Headspace GC-FID	As received	U	0.02	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE192	o-Xylene	Headspace GC-FID	As received	U	0.01	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		6	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		15	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
111081-1	WS01	0.20	N	
111081-2	WS01	0.50	N	
111081-3	WS01	1.00	N	
111081-4	WS01	1.50	N	
111081-5	WS01	2.50	N	
111081-6	WS02	1.00	N	
111081-7	WS02	2.00	N	
111081-8	WS02	3.00	N	
111081-9	WS03	0.30	N	
111081-10	WS03	0.70	N	
111081-11	WS03	1.00	N	
111081-12	WS03	1.20	N	
111081-13	WS03	1.80	N	
111081-14	WS04	0.20	N	
111081-15	WS04	1.50	N	
111081-16	WS04	2.50	N	
111081-17	WS04	3.50	N	
111081-18	WS04	4.00	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Chemtech Environmental Limited

TEST REPORT REVISIONS

The table below identifies amendments that have been made to this test report for each revision.

Test Report Reference	Details of amendments to test report	Issue Date
111081	Original report issued	11 July 2022
111081(1)	Sampling date amended	19 December 2022

Appendix J – Groundwater Chemical Laboratory Results





Cathleen Cox
Your Environment
Unit 2
Woodhorn Business Centre
Chichester
West Sussex
PO20 2BX



Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: [REDACTED]

DETS Report No: 22-09046

Site Reference: 57 Queensway, Bognor
Project / Job Ref: YEX2909
Order No: None Supplied
Sample Receipt Date: 31/10/2022
Sample Scheduled Date: 31/10/2022
Report Issue Number: 1
Reporting Date: 04/11/2022

Authorised by:



Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : [REDACTED]



Water Analysis Certificate						
DETS Report No: 22-09046	Date Sampled	24/10/22	24/10/22			
Your Environment	Time Sampled	None Supplied	None Supplied			
Site Reference: 57 Queensway, Bognor	TP / BH No	WS01.1	WS04.4			
Project / Job Ref: YEX2909	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	None Supplied	None Supplied			
Reporting Date: 04/11/2022	DETS Sample No	618343	618344			

Determinand	Unit	RL	Accreditation	(hs hg)	(hs hg)			
pH	pH Units	N/a	ISO17025	6.9	7.3			
Electrical Conductivity	uS/cm	< 5	NONE	1070	1060			
Total Cyanide	ug/l	< 5	ISO17025	< 5	< 5			
Sulphate as SO ₄	mg/l	< 1	ISO17025	17	115			
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE	17.9	18.7			
Hardness - Total	mgCaCO ₃ /l	< 1	NONE	339	310			
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Barium (dissolved)	ug/l	< 5	ISO17025	124	54			
Beryllium (dissolved)	ug/l	< 3	ISO17025	< 3	< 3			
Boron (dissolved)	ug/l	< 5	ISO17025	113	340			
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4	< 0.4			
Chromium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Copper (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Lead (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Mercury (dissolved)	ug/l	< 0.05	ISO17025	< 0.05	0.12			
Nickel (dissolved)	ug/l	< 5	ISO17025	157	18			
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Vanadium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Zinc (dissolved)	ug/l	< 2	ISO17025	23	8			
Total Phenols (monohydric)	ug/l	< 10	ISO17025	< 10	< 10			

Subcontracted analysis ^(S)

Insufficient sample ^{I/S}

Unsuitable Sample ^{U/S}

(hs) Please note deviating sample due to head space in container

(hg) Please note deviating sample for Mercury due to inappropriate container



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Water Analysis Certificate - Speciated PAH						
DETS Report No: 22-09046	Date Sampled	24/10/22	24/10/22			
Your Environment	Time Sampled	None Supplied	None Supplied			
Site Reference: 57 Queensway, Bognor	TP / BH No	WS01.1	WS04.4			
Project / Job Ref: YEX2909	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	None Supplied	None Supplied			
Reporting Date: 04/11/2022	DETS Sample No	618343	618344			

Determinand	Unit	RL	Accreditation	(hs)	(hs)			
Naphthalene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01			
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008			
Total EPA-16 PAHs	ug/l	< 0.16	NONE	< 0.16	< 0.16			



DETS Ltd
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Rose Lane
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Maidstone
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Tel : [REDACTED]

Water Analysis Certificate - TPH CWG Banded						
DETS Report No: 22-09046	Date Sampled	24/10/22	24/10/22			
Your Environment	Time Sampled	None Supplied	None Supplied			
Site Reference: 57 Queensway, Bognor	TP / BH No	WS01.1	WS04.4			
Project / Job Ref: YEX2909	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	None Supplied	None Supplied			
Reporting Date: 04/11/2022	DETS Sample No	618343	618344			

Determinand	Unit	RL	Accreditation	(hs)	(hs)			
Aliphatic >C5 - C6	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C6 - C8	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10			
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10	< 10			
Aliphatic (C5 - C34)	ug/l	< 70	NONE	< 70	< 70			
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10			
Aromatic >C21 - C35	ug/l	< 10	NONE	< 10	< 10			
Aromatic (C5 - C35)	ug/l	< 70	NONE	< 70	< 70			
Total >C5 - C35	ug/l	< 140	NONE	< 140	< 140			

(hs) Please note deviating sample due to head space in container



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : [REDACTED] 0



Water Analysis Certificate - BTEX / MTBE						
DETS Report No: 22-09046	Date Sampled	24/10/22	24/10/22			
Your Environment	Time Sampled	None Supplied	None Supplied			
Site Reference: 57 Queensway, Bognor	TP / BH No	WS01.1	WS04.4			
Project / Job Ref: YEX2909	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	None Supplied	None Supplied			
Reporting Date: 04/11/2022	DETS Sample No	618343	618344			

Determinand	Unit	RL	Accreditation	(hs)	(hs)			
Benzene	ug/l	< 1	ISO17025	< 1	< 1			
Toluene	ug/l	< 5	ISO17025	< 5	< 5			
Ethylbenzene	ug/l	< 5	ISO17025	< 5	< 5			
p & m-xylene	ug/l	< 10	ISO17025	< 10	< 10			
o-xylene	ug/l	< 5	ISO17025	< 5	< 5			
MTBE	ug/l	< 10	ISO17025	< 10	< 10			

(hs) Please note deviating sample due to head space in container



DETS Ltd
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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : [REDACTED]



Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 22-09046

Your Environment

Site Reference: 57 Queensway, Bognor

Project / Job Ref: YEX2909

Order No: None Supplied

Reporting Date: 04/11/2022

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazine followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Appendix K – Ground Gas Monitoring Results



Gas and Groundwater Monitoring Sheet



Client:	HJP Surveyors	Job No:	YEX2909
Site:	57 Queensway, Bognor Regis	Visit No:	1 of 6
Date:	26th September 2022	Operator:	CC
Project Manager:	JR		

					Gas and Vapours												Flow			Pressure						Water				Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone					
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady														
	0.1	0.1	2.0	2.0	2.3	2.3	0.0	0.0	0.0	0.0	18.7	18.7	NR	NR	<0.1	<0.1	0	60			1.77	2.53								
WS01	0.1	0.1	2.0	2.0	0.6	0.6	5.0	0.0	0.0	0.0	19.9	19.9	NR	NR	0.1	0.1	-14	60			1.30	1.61								
WS02	0.1	0.1	2.0	2.0	0.6	0.6	5.0	0.0	0.0	0.0	19.9	19.9	NR	NR	0.1	0.1	-14	60			1.30	1.61								
WS04	0.1	0.0	2.0	0.0	1.9	0.3	0.0	0.0	0.0	0.0	18.3	20.4	NR	NR	0.1	0.1	-2	60			1.24	2.59								
												</																		

Ground Conditions	Moist	
Wind	0-33mph SW	
Cloud	Cloudy	
Precipitation	None	
Time	12:00-14:00	
Barometric pressure (mbar)	1002-1003	
Pressure trend	Rising	
Temperature (degrees Celcius)	17.2	

Worst-possible
0.0001 0.0023

Gas and Groundwater Monitoring Sheet



Client:	HJP Surveyors	Job No:	YEX2909
Site:	57 Queensway, Bognor Regis	Visit No:	2 of 6
Date:	11th October 2022	Operator:	CC
Project Manager:	JR		

					Gas and Vapours												Flow			Pressure						Water				Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone					
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady														
WS01	0.1	0.0	2.0	0.0	1.7	1.2	0.0	0.0	0.0	0.0	19.2	19.5	NR	NR	0.1	<0.1	-7	60			1.80	2.53								
WS02	0.1	0.1	2.0	2.0	0.3	0.3	0.0	0.0	0.0	0.0	20.6	20.6	NR	NR	0.1	0.1	-7	60			1.36	1.60								
WS04	1.0	0.0	2.0	0.0	1.4	0.5	0.0	0.0	0.0	0.0	19.5	20.9	NR	NR	0.1	0.1	-5	60			1.33	2.58								
Max	1.0	0.1	2.0	2.0	1.7	1.2	0	0	0	0	20.6	20.9	ND	ND	0.1	0.1	-5.0	60	NA	NA	1.80	2.58	NR	NR						
Min	0.1	0.0	2.0	0.0	0.3	0.3	0	0	0	0	19.2	19.5	0.0	0.0	0.1	0.1	-7.2	60	0.0000	0.0000	1.33	1.60	0.00	0.00						

Ground Conditions	Dry	
Wind	Calm 0mp	
Cloud	None	
Precipitation	None	
Time	09:00	
Barometric pressure (mbar)	1028-1029	
Pressure trend	Falling	
Temperature	7.8-12.2	

Worst-possible
0.001 0.0017

Gas and Groundwater Monitoring Sheet



Client:	HJP Surveyors	Job No:	YEX2909
Site:	57 Queensway, Bognor Regis	Visit No:	3 of 6
Date:	24th October 2022	Operator:	CC
Project Manager:	JR		

					Gas and Vapours										Flow			Pressure						Water				Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone			
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady												
WS01	0.1	0.1	2.0	0.0	1.3	1.3	0.0	0.0	0.0	0.0	20.0	20.0	NR	NR	<0.1	<0.1	0	60			1.58	2.53						
WS02	0.1	0.1	2.0	2.0	0.2	0.2	0.0	0.0	0.0	0.0	20.7	20.7	NR	NR	<0.1	<0.1	-8	60			1.31	1.31						
WS04	0.3	0.1	6.0	2.0	1.3	0.2	1.0	0.0	0.0	0.0	17.1	20.4	NR	NR	0.1	0.1	-6	60			0.80	2.53						
Max	0.3	0.1	6.0	2.0	1.3	1.3	1	0	0	0	20.7	20.7	ND	ND	0.1	0.1	0.0	60	NA	NA	1.58	2.53	NR	NR				
Min	0.1	0.1	2.0	0.0	0.2	0.2	0	0	0	0	17.1	20.0	0.0	0.0	0.1	0.1	-7.7	60	0.0000	0.0000	0.80	1.31	0.00	0.00				

Ground Conditions	Dry	
Wind	6mph SW	
Cloud	Cloudy	
Precipitation	None	
Time	09:00	
Barometric pressure (mbar)	1005	
Pressure trend	Rising	
Temperature	13.9	

Worst-possible
0.0003 0.0013

Gas and Groundwater Monitoring Sheet



Client:	HJP Surveyors	Job No:	YEX2909
Site:	57 Queensway, Bognor Regis	Visit No:	4 of 6
Date:	7th November 2022	Operator:	CC
Project Manager:	JR		

					Gas and Vapours												Flow			Pressure						Water				Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone					
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady														
WS01	0.1	0.1	2.0	2.0	0.8	0.8	0.0	0.0	0.0	0.0	20.2	20.2	NR	NR	0.1	0.1	-4	60			1.54	2.56								
WS02	0.1	0.1	2.0	2.0	0.4	0.2	0.0	0.0	0.0	0.0	20.4	20.4	NR	NR	<0.1	<0.1	-14	60			1.25	1.25								
WS04	0.1	0.1	2.0	2.0	4.5	0.7	0.0	0.0	0.0	0.0	6.4	18.4	NR	NR	<0.1	<0.1	-6	60			0.70	2.48					Did not steady after 9 mins			
Max	0.1	0.1	2.0	2.0	4.5	0.8	0	0	0	0	20.4	20.4	ND	ND	0.1	1.0	-4.0	60	NA	NA	1.54	2.56	NR	NR						
Min	0.1	0.1	2.0	2.0	0.4	0.2	0	0	0	0	6.4	18.4	0.0	0.0	0.1	1.0	-14.0	60	0.0000	0.0000	0.70	1.25	0.00	0.00						

Ground Conditions	Dry
Wind	14-16mph SSW
Cloud	Mild
Precipitation	Light
Time	09:00
Barometric pressure (mbar)	1005
Pressure trend	Steady
Temperature	15

Worst-possible
0.0001 0.0045

Gas and Groundwater Monitoring Sheet



Client:		Job No:	YEX2909
Site:	57 Queensway, Bognor Regis	Visit No:	5 of 6
Date:	21st November 2022	Operator:	CC
Project Manager:	JR		

					Gas and Vapours												Flow			Pressure					Water				Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone				
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady													
WS01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	No access		
WS02	1.2	1.0	24.0	4.0	0.7	0.2	0.0	0.0	0.0	0.0	20.7	20.7	NR	NR	0.1	0.1	-5	60	NR	NR	1.07	1.61	NR	NR	NR	NR			
WS04	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Borehole flooded		
Max	1.2	2.0	24.0	4.0	0.7	2.0	0	0	0	0	20.7	20.7	ND	ND	0.1	0.1	-5.0	60	NA	NA	1.07	1.61	NR	NR					
Min	1.2	2.0	24.0	4.0	0.7	2.0	0	0	0	0	20.7	20.7	0.0	0.0	0.1	0.1	-5.0	60	0.0000	0.0000	1.07	1.61	0.00	0.00					

Ground Conditions		Very wet
Wind		26mph ESE
Cloud		Moderate
Precipitation		Significant
Time		14:00
Barometric pressure (mbar)		983
Pressure trend		Falling
Temperature		10

Worst-possible
0.0012 0.0007

Gas and Groundwater Monitoring Sheet



Client:		Job No:	YEX2909
Site:	57 Queensway, Bognor Regis	Visit No:	6 of 6
Date:	19th January 2023	Operator:	CC
Project Manager:	JR		

					Gas and Vapours										Flow			Pressure						Water				Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone			
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady												
WS01	0.4	0.3	8.0	6.0	0.6	0.3	0.0	0.0	0.0	0.0	20.8	21.0	NR	NR	0.2	0.2	-2	60			1.68	2.53						
WS02	0.3	0.0	6.0	6.0	0.2	0.2	0.0	0.0	0.0	0.0	20.5	20.5	NR	NR	0.1	<0.1	-32	60			1.30	1.61						
WS04	1.8	0.6	32.0	12.0	7.4	2.1	1.0	0.0	0.0	0.0	9.2	17.2	NR	NR	0.1	0.1	-3	60			NR	NR				Did not steady after 5mins		
																										WS04 bailer trapped in borehole, water could not be dipped		
Max	1.8	0.6	32.0	12.0	7.4	2.1	1	0	0	0	20.8	21.0	ND	ND	0.2	0.2	-2.0	60	NA	NA	1.68	2.53	NR	NR				
Min	0.3	0.0	6.0	6.0	0.2	0.2	0	0	0	0	9.2	17.2	0.0	0.0	0.1	0.1	-32.0	60	0.0000	0.0000	1.30	1.61	0.00	0.00				

Worst-possible GSVs
0.0036 0.0148

Ground Conditions		Dry
Wind		2-7mph variable-NW
Cloud		Fair
Precipitation		None
Time		14:00
Barometric pressure (mbar)		1007
Pressure trend		Rising
Temperature		6.1