Appendix B
Britannia Refined Metals Ltd, E-Scrap Sampling Plant: Area 4, Phase 1 Geo-Environmental Desk Study

Britannia Refined Metals Ltd.

E-Scrap Sampling Plant: Area 4

Phase 1

Geo-Environmental Desk Study

Wood Group UK Limited – February 2022

Report for

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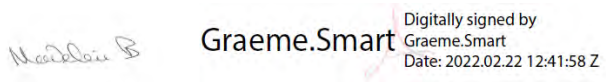

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P01	Draft	Jan 2022
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Executive Summary

Background	Britannia Refined Metals (BRM) requires an assessment (land quality and geotechnical aspects) of a portion of their Northfleet site known as 'Area 4' ('the site') to support the redevelopment of the site for use as an e-scrap sampling facility.
Site description and activities	The site is leased from BRM by WB services in the northern area for use as a transport yard and CMP Thames in the south for marine piling operations and plant storage. The site comprises one main permanent building (an office space) and two out-buildings as well as a number of temporary containers for a variety of uses. There are two caravans situated on site: the client has confirmed that these are stored on site and rarely occupied when drivers are required to rest under tachometer restrictions. There is a 2m high flood defence wall and wharf access gate in the east and a ditch in the south. The site comprises a mix of grassed (rough and landscaped), hardcore and concrete cover. There is a variety of plant, equipment, general debris, tanks and materials across the site.
Site history	The site was marshland at the edge of river Thames until the 1970s whence it was reclaimed by land raising and filling. The site appears to have been associated with the cement works to the north and later separated in the early 1990s. Carilion leased the site from 1999 to 2009 for use as a marine engineering wharf.
Site sensitivity	Groundwater Sensitivity: Moderately High Surface Water (within SSSI): Moderate Ecology: High
Previous investigations	None on site.
Potential sources of contamination	S1 - Current Fuel Storage tanks S2 - Current waste oil storage tanks S3 - Workshop activities / Stores / COSHH and vehicle washdown S4 - Sub stations (not taken forward to risk assessment) S5.1 - Soakaways S5.2 - Septic tanks and drainage S6 - Made Ground S7 - Waste storage/transfer S8 - Demolished buildings (not taken forward to risk assessment as covered by S6) S9 - Burning grounds / waste pit

Summary of risk assessment

		R1 Future site users (ongoing use scenario)	R2 Future commercial site users (redevelopment scenario)	R3 Groundwater (Secondary and Principal Aquifer)	R4 Surface Water (Swanscombe SSSI inland rivers)	R5 Services (Water pipes)	R6 Buildings
Current Fuel Storage Tanks (S1) and current waste oil storage tanks (S2)	Hydrocarbons (diesel and oil)	Moderate/ Low	Moderate	Moderate/ Low	Low	Negligible	
Workshop activities / Stores COSHH and vehicle washdown (S3) and Waste storage/transfer (S7)	Hydrocarbons, diesel, oils, lubricants, solvents, detergents, paints (TBT), antifreeze, asbestos	Moderate/ Low	Moderate	Moderate	Low	Negligible	

Soakaways (S5.1), septic tanks and drainage (S5.2)	Oils, hydrocarbons, organics, metals, pathogens			Moderate	Moderate		
Made Ground (S6)	Metals, PAHs, TPH, asbestos	Moderate	Moderate	Moderate	Moderate/ Low	Negligible	
	Ground gas	Moderate/ Low	Moderate				Moderate
Burning grounds / waste pit (S9)	Metals, PAHs, TPH, dioxins and furans, asbestos,	Low	Moderate	Moderate	Moderate/ Low	Negligible	
	Ground-gas	Moderate/ Low	Moderate				Moderate
The risks to below ground and maintenance workers have not been individually assessed.							

Conclusions	Moderate risks have been identified to future commercial/industrial site users, groundwater, surface water and future buildings associated with areas of potential sources of contamination at the site. There is uncertainty regarding the nature of the historic made ground at the site which was used to raise/reclaim the land for construction of the site – given the date of deposition and the likely lack of controls at that time, there may be a range of contamination present. There is also uncertainty regarding shallow soils due to use of chemicals and vehicle/plant maintenance/storage and temporary waste deposition prior to transfer off site in areas no hardstanding is present. Redevelopment of the site is likely to include a concrete slab over much of the site which could mitigate risks to human health as well as reducing infiltration of rainwater. However, no ground investigation has thus far been carried out to quantify the risks. Moreover, redevelopment is also likely to require soil relocation and possibly disposal. Soil disposal can represent a significant cost to redevelopment; ground investigation could provide an indication of the waste classification of the soils which would facilitate any remediation strategy. The drainage system could represent ongoing environmental risks and as such liability. If the site is redeveloped, BRM are likely to require a new environmental permit or a variation to an existing one. Environmental permits require a Site Condition Report (SCR) which needs to include baseline soil and groundwater data. This data would be collected during any ground investigation carried out.
Recommendations	The majority of the site area is unlikely to be affected by gross or significant contamination. However, no ground investigation has been caried out at the site to quantify the risks and there are a number of sensitive receptors at, under or adjacent to the site. A geo-environmental ground investigation is recommended to: • confirm the presence and nature of the identified potential sources of contamination which present potential risks to receptors is likely to be required. • quantify / characterise the geotechnical risks that have been identified and to inform the design.

- Support planning permission: redevelopment of the site will require planning permission and is likely that a condition thereof is that an interpretative ground investigation report is submitted.
- provide greater cost certainty and reduce project risk: ground investigation will provide quantitative data to assess the need for / suitability and provide more cost certainty in relation to:
    - remediation (should it be required);
    - soil re-use on site; and
    - disposal off-site of soils.
- provide baseline soil and groundwater data which is likely to be required to support any environmental permit.

As the drainage on the site represents a potential ongoing and acute environmental risk, it is recommended that the drainage system, any soak-aways and septic tanks are investigated for integrity.

Should contamination be confirmed to be present, further detailed risk assessment or mitigation measures may be required. Such mitigation actions could include (but not be limited to):

- Placement of a hardstanding / buildings over much of the site which could mitigate risks to human health but limiting exposure to contaminants in the shallow soils
- Placement of hardstanding / buildings would also reduce infiltration of rainwater.
- Remediation of soils and groundwater including activities such as source removal and off-site disposal of soils. Soil disposal can represent a significant cost to redevelopment; ground investigation could provide an indication of the waste classification of the soils which would facilitate any remediation strategy.
- Risks to buildings and people from ground gas could be mitigated by assessing the gas regime and design of structures and service corridors to mitigate any identified soil gas risk.

Site-specific contamination data should be included in the pre-construction information for any proposed below ground works, to enable any contractors to address as necessary in their risk assessments and method statements.

Contents

1. Introduction

Terms of Reference	**Britannia Refined Metals (BRM) requires an assessment (land quality and geotechnical aspects) of a portion of their Northfleet site known as 'Area 4' ('the site') to support the redevelopment for use as an e-scrap sampling facility and/or continued use of the site. Wood Group UK Limited (Wood) was commissioned by BRM to undertake this Phase One[1] Geo-Environmental Assessment of the site[2].**
Purpose of the Report	The purpose of the report is to assess the geotechnical information and land quality of the site and incorporates two future use scenarios; these are redevelopment into a metals testing facility or a continued/on-going use of the site similar to at present. Both scenarios are commercial/industrial uses. For the redevelopment scenario, the design of the facility is not yet finalised; however, it is assumed that the majority or all of the site will include hardstanding or building. As well as providing a geo-environmental assessment, and recommended next steps in the assessment, the recommendations within the report also consider wider aspects of soil and groundwater quality for a redevelopment scenario.
Aims and Methodology	The scope of works for this report comprised: • acquisition and interpretation of factual information from the site and public domain sources; • a site visit on 8th December 2021; and • preparation of a report to present information gathered, interpret the implications for land quality and geotechnical risks and provide advice on further works if appropriate. The findings of the study are based on the information made available to Wood by the BRM site personnel, together with information obtained from public domain sources. The aims of the report were to collate and review desk study information on the likely ground and contamination conditions and geotechnical risks at the site and provide a risk assessment for redevelopment for a new commercial/industrial land use.
Limitations	The conclusions reached and advice given in this report are based in part upon information and/or documents that have been prepared by third parties. In view of this, we accept no responsibility or liability of any kind in relation to such third-party information and no representation, warranty or undertaking of any kind, expressed or implied, is made with respect to the completeness, accuracy or adequacy of such third-party information. In preparing this report we have assumed that all information provided by the Client is complete, accurate and not misleading.

[1] Phase One's are commonly also referred to as 'Desk Studies'.
[2] Proposal reference: 807346-WOOD-XX-XX-CP-V-00004_S2_P01 - Variation Request #04 - Geo-Environmental Desk Study

2. Site details and activities

2.1 Site details

Site Location	The site is located off Botany Road, Northfleet; it is situated on the Swanscombe Peninsular approximately 1.2km north of Swanscombe. The site lies in a heavily industrialised area although land to the west is marshland that has been designated a SSSI. The site location and layout is shown in Figure 1 in Appendix A.		
Site Address	BRM Area 4, Botany Road, Northfleet, DA11 9BG		
National Grid Reference	The site is centred on approximate NGR 561209 175806		
Boundaries (Land uses and relevant features)		**Adjacent**	**Beyond (within 200 m)**
	North	Cemex cement works	Cemex cement works
	East	Riverside BRM land (not proposed for redevelopment). Thames flood wall/gate.	River Thames
	South	BRM main site	BRM main site
	West	Manor Road	Swanscombe Peninsular SSSI
Site Description and Context	Area 4 comprises BRM land situated to the north of the main BRM site and to the south of the Cemex cement works. The land is currently leased to two third parties. The northern portion is utilised as a transport yard by WB Services and the southern portion is utilised by CMP Thames who operate as a marine construction/piling company who also provide plant hire services. The eastern boundary of site is formed by a flood defence wall and gate. BRM land ownership extends eastwards beyond the flood defence wall to the river edge and CMP use land on either side of the flood wall. CMP gain vehicle access to the riverside via a gate in the northeast corner of the site. Currently the majority of the chemical storage and maintenance work that CMP carry out appears to take place on the strip of land at the river's edge (i.e. off-site) but there is nothing to suggest that these activities do not take place on the rest of the site. Aerial photography shows that the rest of the southern area of the site has been used for storage of a range of equipment and possible chemical containers (drums/IBCs). Thus, during the walkover, Wood has taken account of CPM's activities on both sides of the flood defence wall albeit the riverside portion of the site is not included in this assessment. The west, north and south boundaries have chain link or wooden fences. Along the southern edge of the site, there is a drainage ditch which is overgrown with rough vegetation. There are four buildings on the northern portion of land. The largest building is a single-storey brick office building. There is a lightweight steel clad/framed storage building and a precast concrete walled, steel roof garage that was used for storing road cones and signs at the time of the visit. There is also a small brick structure for BRM's telemetry. There are no permanent buildings on the southern portion of the site but there are a number of temporary portacabins utilised for offices and welfare, which have concrete pads/footings. The main use of the north of the site is the storage and maintenance of lorries which occurs to the east of this portion of the site and there is a range of equipment related to this. In the centre of the lorry parking area there were waterlogged wooden beams at ground level which site personnel have confirmed to be used to prevent material loss during vehicle manoeuvres. The north-west of the site comprises an access road, carpark and landscaping. The central west of the site comprises a gravelled		

	area occupied by two caravans. The caravans are stored on site and rarely occupied when drivers are required to rest under tachometer restrictions. The southern portion of the site is used for the storage and maintenance of equipment related to marine piling. This comprised a range of mechanical marine apparatus, plant, boats, hydraulic cables, tanks, drums, a fuel tank and waste oil tanks. A sketch site location plan and aerial photo is included as Figure 2.1 below. The site layout and key features are shown in Figure 1 (Appendix A). Figure 2.1 Site Location Plan 
Surface Covering	Except for the northern access road and apron and paths on the site, the groundcover is a mixture of gravel, compacted hardcore, scrub and rough vegetation in the south of the site and landscaped (grassed), gravel and compacted hardcore in the north, (it is not known if there is any substantial thickness of concrete underneath the compacted hardcore surface). Approximately 20% of the site comprises hardstanding and buildings.
Site Topography	The site is generally flat and level and is at an elevation of approximately 3-4m Above Ordnance Datum (AOD). The rough grassed area in the south of the site was hummocky and overgrown with dense vegetation in places.
Site Walkover	A site walkover was carried out by a Wood geo-environmental consultant on 8th December 2021 to obtain information on site activities. The site walkover aimed to identify potential sources of contamination at the site. Potential sources of contamination identified in this study are shown on Figure 2 in Appendix A. Each potential source area has been referenced using unique number (e.g. S1).

Current Fuel Storage (S1)	Bulk fuel is stored in a an above ground storage tank in the northeast corner of the site. The tank is a metal 'Fuel Proof' tank of 4,500 litres capacity containing red-diesel and is situated on top of a substantial walk-on, drip tray/bund. This type of tank appears (albeit is not confirmed) to be of double tank construction. The filling point/hose/pump was not visible and is likely to be at the rear, inaccessible side of the tank. These are usually self-contained behind a hinged door to the outer tank. There was no evidence of significant surface staining observed during the site walkover, or anecdotal or other evidence obtained regarding spillage or fuel loss incidents related to this storage tank. **Plate 2.1 Above Ground Diesel Tank (Source S1)**  Mobile diesel bowsers were also present on the site, however, these were either the trailer mounted type or 'liftable' and as such cannot be assigned to a particular location. These appear to be used for CMP's operations on and off the site as well as being for hire. Mobile sources of contamination are discussed further (see source S3) below as a grouped source of contamination associated with the upper soils.
Waste Oil Storage (Source S2)	Waste oil is stored in two 500-litre high density plastic storage tanks comprising an inner tank and outer 110% capacity bund tank in the northeast corner of the site. The tanks are situated on top of the same walk-on, drip tray/bund as the diesel tank (Source S1). The fill point for the is situated at the top of the tank and it is likely the tanks need to be emptied by pumping from the fill point. There was no evidence of significant surface staining observed during the site walkover, or anecdotal or other evidence obtained regarding spillage or loss incidents related to these storage tanks. **Plate 2.2 Above Ground Waste Oil Tanks (Source S2)**  There were also multiple containers (25-litre containers, 205-litre drums and 1000-litre IBCs) of oil in various locations across the site. These are discussed further under mobile sources of contamination below (See Source 3).

Workshops / Stores / COSHH / Vehicle washdown (Source S3)	Heavy vehicle and equipment maintenance occurs at the site but there are no dedicated /permanent workshop buildings. Equipment and chemicals related to maintenance are visible across the site and within shipping containers. The majority of the current maintenance activities undertake by CMP Thames occurs to the east of the site at the water's edge. There are a number of COSHH lockers and containers, however, these are movable and so there appears to be no fixed location for the majority of chemicals. Chemicals are stored in a variety of containers and sizes from 5-litres to 1000-litre IBCs. As with the maintenance activities, most but not all chemicals from the CMP site were stored to the east of the flood wall. Chemicals observed included marine paints, engine and heavy lubricating oils and greases, fibre-glass resin, ad-blue, hydraulic oil, fuel (20-litre jerry cans), and anti-freeze. There was an ad-blue tank contained within a shipping container, outside which there were two un-bunded 205-litrs oil drums on the east side of the northern gate to the transport yard and a number of empty containers (IBCs and containers) stored to the west side of the gate. **Plate 2.3 Aerial photo providing an example of storage at the southern portion of the site (Google Earth June 2020).**  As a result of the observations of multiple mobile sources of chemicals in a variety of locations and in a variety of containers across the site, there is the potential for minor contamination to be present in all areas of the site. Thus, shallow soils, gravels and crushed hardcore (i.e. more permeable cover materials) in all locations where hardstanding or buildings are not present have the potential to have been impacted and are considered as a single source. In the carpark area in the northwest of the site there were two channels directing surface water from the roads to a chamber. Theses may be soakaways as no other formal drainage features were identified.

Plate 2.4 Lorry parking area where wash down takes place (Source S3)

Plate 2.5 Ad-blue tank and oil drums (Source S3)

Electrical Equipment (Source S4)

There is a substation (S4) on the northern portion of the site adjacent to the flood wall. There was no evidence of significant surface staining in this area and no further information is available regarding spillages or leakages of transformer/substation oils at these locations.

Plate 2.6 Electrical Transformer/Switch gear (Source S4)

Soakaways (S5.1), drainage and septic tanks (5.2)	Exact details of drainage features have not been provided. Two drainage features (that appear to be soakaways) are present in the north-west of the site (S5.1). Previous reports indicate there is a septic tank on site (the location of which has not been confirmed) as well as a drainage system that may have been compromised (S5.2). The previous report also states that the feedpipe connection is poor and the tank is largely full from groundwater and rainwater and there is the potential for the contents to flood out. **Plate 2.7 One of two potential soakaways features (Source S5.1)** 
Made Ground/ Infilled Ground (Source S6)	The site has been reclaimed from the mudbanks and saltmarshes of the River Thames. From historic mapping available this occurred between 1966 and 1970. The land raising will have required the import of materials from elsewhere and these likely comprised demolition rubble but may also have included wastes (although it is noted the Groundsure report (Appendix B) does not list the site as a historic landfill). Thus, there is the potential for circa 4m of made ground including waste materials. No further information is available as to the fill material or made ground. In the south of the site, the ground is hummocky and there is evidence of concrete and brick at the surface in the vegetated areas suggesting made ground is present. Anecdotal evidence from site personnel suggests that the southern portion of the site has been used for deposition of materials and they noted there was likely to be a variety of sub-surface materials. Given the date of the infilling, there is the potential for there to be asbestos present in soils as well as a variety of other organic and inorganic chemicals.
Waste Storage (S7)	Anecdotal information from CRM personnel indicated that they have a waste transfer licence[3] for the purpose of storage of construction wastes on site prior to wastes being transferred to other waste facilities. Public records indicate that CRM is registered as a waste 'Carrier, Broker, Dealer - upper tier (their registration number is CBDU106960). Key examples of the activities of the upper tier business are if a business: transports other people's waste, such as a skip company; carries construction and demolition waste, arranges for waste from other businesses' to be transported, recovered or disposed of (broker) buys or sells waste, or uses an agent to do so (dealer). At the time of the site visit there was some metal and wood being stored on the eastern side of the site and adjacent to the site boundary/flood defence wall there was approximately 100 cubic metres of soil. Whilst this was off-site, it is an indication of the types of waste that may be stored on the site at times. This activity and the observation of soils being stored off-site albeit by a site user, gives rise to the potential for asbestos to be present.

[3] The Groundsure report does not include any reference to the waste transfer licence, however, records are shown at https://www.gov.uk/

	In the north of the site, there were used, empty IBC containers and used tyres which appeared to be waste. Whilst other areas of waste were identified there were a significant number of objects and containers that appeared to have been discarded and both areas were generally untidy. Other wastes at the site are contained within domestic bins, or commercial skips. No surface staining or significant loss of wastes to the ground or site surface were observed during the site walkover however, much of the ground is covered in debris or is grassed over. **Plate 2.8 Storage of waste soils (off-site to east of flood wall)** **Plate 2.9 Storage of waste in the south of the site (also see Plate 2.3)**
Demolished Buildings and Asbestos (Source S8)	A register of ACMs is held by BRM for the site in accordance with the Control of Asbestos Regulations, 2012. Information provided by BRM indicates that asbestos surveys at the site have encountered ACMs in the buildings at the site. Given the presence of ACMs in current buildings, it is reasonable to infer that ACMs may have been present in former buildings and structures which have been demolished, however, there is no indication in historic mapping that building demolition had occurred at the site. For asbestos, also see, S6 and S7.
Burning Grounds and incinerators	There are no known current or historical burning grounds or incinerators on the site and none were observed during the walkover. Refer to Source S9 in the 'Site History' section for potential historic burning ground.
Utilities Services	The site is served by electricity, mains water supply and communications cables. Surface water appears to drain to ground/soakaways and there is a septic tank in the south-east of the site serving the southern area. Foul drainage from the northern area is reported to run to septic tanks that, according to Section 7 of the previous report for the site, may be leaking into drainage The septic tank is reported

	to be in the grassed area, in the western corner of the site although no drawings have been provided to confirm the exact location. Anecdotal evidence provided by BRM suggest that surface water gullies that should drain water from the west part of the site towards the marsh area to the west, are blocked and as such cause surface flooding adjacent to the building during heavy rain.
Radon	A review of the radon maps[4] indicates that the site lies within an area assessed as lowest band of radon potential i.e. <1% of domestic properties are above the threshold and as such no protection measures are required.
Historic Landfill Sites	A review of Environment Agency data for historic landfills[5] indicates that there are three historic landfills located within 1km of the site. These are as follows: A BRM landfill is registered 53m south of the site. The licence was for disposal of 'Inert, Industrial and Special' wastes. The licence was surrendered in September 2000. Between the site and the BRM site to the north, there is a vegetated strip of land that is likely to act as a breaker to migration pathways of gas, moreover, the site is at a higher level than the surrounding land and anecdotal evidence suggest there is a very high water table which makes gas migration unlikely. Additionally, the landfill record is concurrent with the development of the BRM site, making it probable that it comprises inert materials for land raising and the use of putrescible materials is unlikely. Blue Circle Industries held two licences for 'Inert, Industrial' wastes from 1977. One licence expired in 1992; the second has not registered as surrender date. These licences are registered at locations 149m and 417m west of the site. Blue Circle Industries was a cement manufacturing company. It is probably that these licences were granted for land raising. Mapping indicates that the landfills are vegetated but do not appear to be managed. As a result of the age of the landfills and vegetative cover it is unlikely that landfill gases would migrate laterally to the site. As such landfills are not considered further as a source of contamination.

[4] Groundsure Report reference GS-8390085, dated December 2021
[5] https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/HistoricLandfill&Mode=spatial

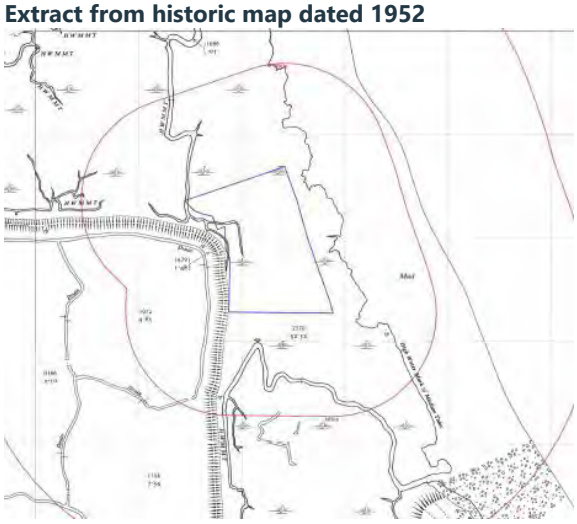
3. Site history

An historical review of the development of the site and surrounding area has been undertaken based on the following sources:

- Historical Maps from 1865 to 2021 sourced from a Groundsure report[6];
- Historical Maps and data in previous site reports (See section 4)
- UXO Preliminary Risk Assessment (January 2022)[7]; and
- Anecdotal information from site walkover.

The information below describes the significant historical activities on the site.

Extract from historic map dated 1952



1952 Map

Prior to development of the site, the land was saltmarsh at the edge of the River Thames. There was a channel where the high-water mark for medium tides enters the site on the western side. The surrounding land is undeveloped saltmarsh and there is an embankment at the western boundary.

Extract from Groundsure historic map dated 1971

Ordnance Survey Mapping 1971

On-site:

The first development is shown. The footprint of the main building, the turning circle and access road is shown. Access to the building is from the east. A drain is shown crossing the south-east corner of the site.

Off-site:

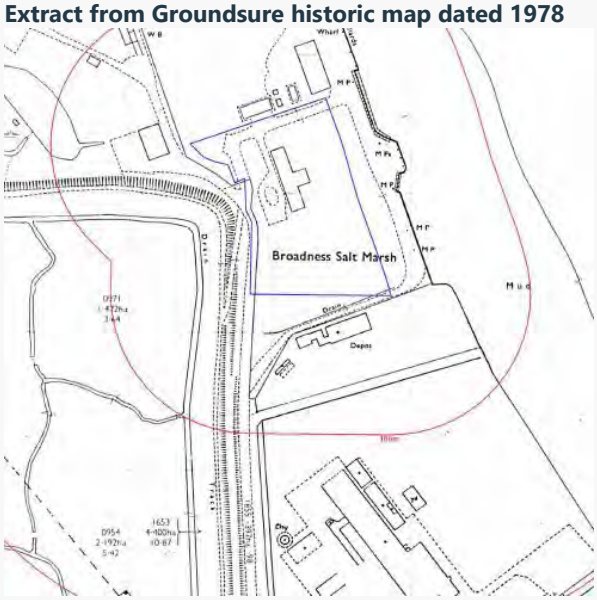
What is now the Cemex cement works to the north of the site was developed concurrently with the northern portion of the subject site including the main building. The boundaries and road layout suggests the subject site was part of the works to the north. A tank is depicted approximately 150m north of the site boundary. None of the buildings are labelled but the site immediately north

[6] Groundsure report reference GS-8390085, dated December 2021
[7] UXO Desk Study and Risks Assessment, Zetica (Report Ref: P11363-21-R1) January 2021

appears to have boundary walls separating it from the Cemex works which at this time lie further to the north. Ash, slag and contaminated aggregates represent a potential source of contamination at the site if they have been used for landfilling or road and hard standing construction (considered within **Source S6.**

The BRM site to the south has not been developed at this time. The wharf and river wall has been constructed. A small depot is located 30m beyond the southern boundary.

Extract from Groundsure historic map dated 1978



1978

On-site:

No change is shown.

Off-site:

The depot to the south of the site is significantly larger and the development of the BRM site to the south is now evident. This comprises a chimney, this may be a source of bottom ash or slag (considered within **Source S6**).

Extract from Groundsure historic map dated 1993

1993

On-site

There is an additional building in the north of the site and the road layout has been adapted: this indicates the site has been separated from the site to the north. Additions to the existing site building are now shown; these appear to be walls and potentially an extension to the existing building. Although not described on the map, the drain in the south of the site has been re-aligned to correspond to the line of the southern boundary of the site.

Off-Site

One of the small buildings on the boundary to the north of the site is no longer present and the depot adjacent to the southern boundary is also no longer present.

Extract from Groundsure map dated 1995

1995

On-site

An additional structure is depicted in the north of the site.

Off-site

There are two additional buildings adjacent to the northwest corner of the site. There is a large additional building depicted in the north of the main BRM site.

Extract from Groundsure aerial photo dated 1999

Getmapping Plc Aerial Photography 1999

On-site

The southern portion of site appears unused except for a track to the south-east corner of the site where there is some disturbed ground. There are some structures along the eastern boundary in the northern portion of the site that are not clear enough to distinguish; these could be temporary cabins. The long building shown on mapping in the north of the site adjacent to the garages/storage building is not visible in the aerial photo.

Off-site

The site to the north appears to be separate to the Cemex works which are further to the north. The site use is unknown, however, the 2003 map labels the site as a depot. Access to the site to the north is apparently via the north of the site. The wharf to the east of the site is used but not extensively; the southern half of this area is still grassed over at this time.

Extract from Groundsure aerial photo dated 2004

Getmapping Plc Aerial Photography 2004

On-site

The steel storage building is now present in the north of the site. The area where the caravans are situated has been constructed. More activity in the southern portion of the site along the eastern boundary; this appears to amount to storage.

The track in the east of the site is more prominent and there appears to be a pit in the south-east corner. This has the appearance of a waste or burning pit (**Source S9**).

Off-site

The site to the north has been extensively redeveloped.

Extract from Groundsure aerial photo dated 2012

Getmapping Plc Aerial Photography 2012

On-site

The southern portion of the site has been developed. This includes the access road and three bank of cabins in the east of the site as well as a change to the ground cover to the north of the cabins. The northern lorry parking area appears to have been resurfaced and some of the structures along the eastern boundary are no longer present.

The pit in the south of the site is no longer visible and appears to be infilled and is grassed over.

The diesel fuel and waste oil tanks are present in the north of the site.

Off-site

No significant changes

Extract from Groundsure aerial photo dated 2018

Getmapping Plc Aerial Photography 2018

On-Site

The site is broadly similar to present.

Off-site

The off-site layout is broadly similar to present.

4. Previous work at the site

Previous relevant land quality assessment and ground investigation reports for the site include the following:

- Draft Baseline Phase 1 Environmental Contamination Assessment, Carillion Wharf & Depot Site, ERM Ltd, February 2009;

Additionally a ground investigation report for BRM's main site to the south was carried out in 2017 (it should be noted that this is off-site but is of relevance to this assessment):

- Amec Foster Wheeler, Britannia Refined Metals Limited, Water Storage Tank & Silver Plant Baghouse Development, Ground Investigation Report, July 2017

4.1 Draft Baseline Phase 1 Environmental Contamination Assessment, Carillion Wharf & Depot Site, ERM Ltd, February 2009

Objectives	A baseline desk study review of potential contamination risks to the site was commissioned to support the anticipated expiry of Carillion's ten-year lease which was due to end in September 2009.
Scope of works	The baseline assessment comprised the following scope of works: • an assessment of the site geology, hydrogeology and hydrology; • a review of historical maps of the site and surrounding area; • a review of environmental database information for the site and surrounding area; • a site walkover inspection; and • preliminary qualitative risk assessment.
Study Findings	The study identified sources to include possible contaminants: • Oil and diesel spills, • a leaking brick septic tank, • leaky drains with no oil/water interceptors, • made ground from previous infilling of the land as well as ash and slag from either BRM or from the Cemex works or contaminated aggregates form the latter. • Aerial fallout from BRM operations to the south, notably potentially containing lead. The ERM report contains a photograph of an oil store situated adjacent and to the south of the current waste oil tanks. This store comprises a shipping container style store that is situated on a concrete slab of significant thickness with several spill kit bins. The slab is in very good condition with insignificant staining. This source will be considered as part of Source 3 for the purposes of this report. Based on the findings of the desk-based assessment, the risk assessment assessed risks to groundwater and surface water receptors as moderate.

	ERM also identified the asbestos in the buildings to be an environmental risk.
Conclusions/ Recommendations	Based on the risk assessment ERM concluded that '*the overall potential for soil and groundwater impacts to be present on site to be moderate*'. They recommended ground investigation to focus on the fuel and oil sources, the septic tank and the drainage. The report also recommended a drainage survey was carried out to assess if the drainage is sound and to re-assess the condition of the asbestos in the office building to assess for dilapidation during the lease to Carillion. It is noted however, that the recommendations were made with a view to assessing any costs that could be recovered from Carillon for repairs/remediation and to set baseline for any future tenants.

4.2 Amec Foster Wheeler, Britannia Refined Metals Limited, Water Storage Tank & Silver Plant Baghouse Development, Ground Investigation Report, July 2017[8]

In 2016, a ground investigation was conducted by Amec Foster Wheeler in order to provide information on the ground and groundwater conditions to inform the design of a new water storage tank and silver plant (Ag Baghouse) on the main BRM site to the south of this site. The closest borehole in this report is approximately 80m south (BH1).

The Ground Investigation consisted of four cable percussion boreholes (two with rotary core follow on) and three dynamic probes within the footprint of the proposed water tank which were proceeded until their refusal within the Terrace Gravel.

Strata encountered during the ground investigation are summarised in Section 5: Geology below:

The report also gave characteristic geotechnical parameters (summarised in Table 4.1) of the varying horizons encountered which they recommend for use in design. They have been derived from interpretation of their borehole information, in-situ and laboratory testing results in conjunction with their experience and literature recommendations.

Table 4.1: Summary of Characteristic Geotechnical Design Parameters Recommended for Design Within Amec Foster Wheeler GIR Report.

[8] Figure 3 of the 2017 Amec Foster Wheeler report, references 1990 and 2005 ground investigations and the exploratory hole locations from these are shown, however, these reports were not available to review for this report.

Strata	Bulk Density, γ_b, (kN/m^3)	Undrained Shear Strength, C_u (kN/m^2)	Effective Internal angle of frictional resistance, φ' (degs)	Undrained soil stiffness, E_u (MN/m^2)	Effective soil Stiffness, E' (MN/m^2)
Made Ground	16 (cohesive) 19 (granular)	5 (cohesive only)	20 (cohesive) 32 (granular)	2 (cohesive)	1.2 (cohesive) 30 (granular)
Alluvium	16 (11 for Peat)	15	21	6	3.6
Boyn Hill Gravel	19	-	33	-	40
Seaford/Newhaven Chalk	17.5 (15.5 dry density)	-	-	-	-

5. Environmental setting

Geology & Hydrogeology

Information on the site environmental setting has been obtained from the following sources:

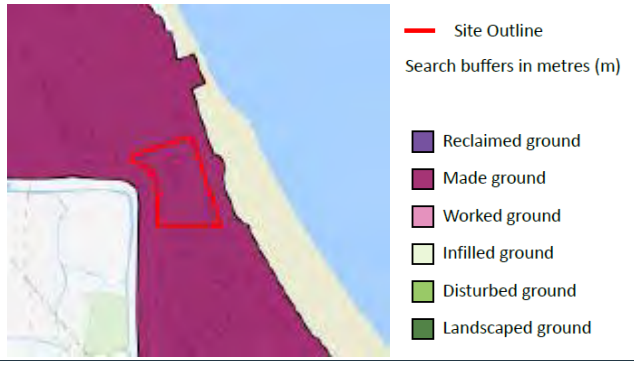
- British Geological Survey (BGS) Geology of Britain Viewer[9];
- The Environment Agency Catchment Data Explorer[10]
- The MAGIC website[11] which provides geographic information about the natural environment from across government.

The groundwater and surface water sensitivity has been based on The Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008[12].

Reference has also been made to the BGS database of borehole records of the ground conditions present within the surrounding area and a previous ground investigation report[13] carried out for BRM on the main site to the south.

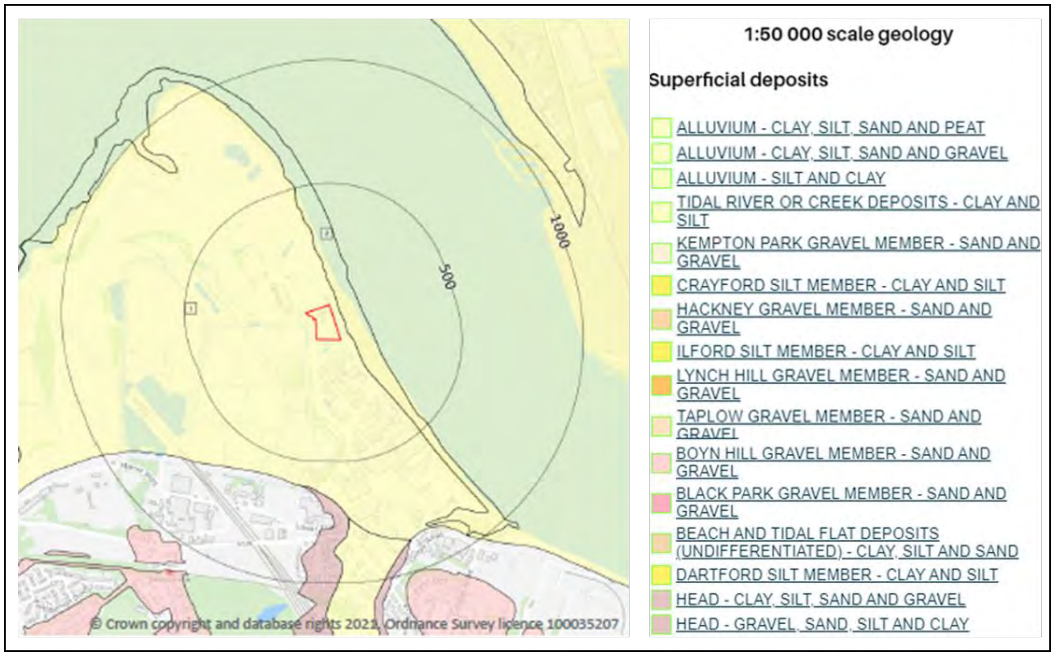
Geology

Figure 5.1 Extract of BGS artificial and made ground geological map



9 https://mapapps.bgs.ac.uk/geologyofbritain/home.html
10 https://environment.data.gov.uk/catchment-planning/
11 https://magic.defra.gov.uk/
12 NHBC/ CIEH / Environment Agency, Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008
13 Amec Foster Wheeler Ground Investigation Report for BRM; Water Storage Tank and Silver Plant Baghouse Development, Reference 39166R06i02, dated July 201713.

Figure 5.2 Extract of BGS artificial and made ground geological map



Strata	Brief Description and location	Average thickness (m)	Aquifer and approximate water level
Topsoil	Topsoils are likely to be present in the grassed, vegetated and landscaped areas of the site. These are typically sandy gravelly clayey soils with roots and rootlets.	Not known.	NA
Made Ground	The closest borehole to the site (BH01[14]) encountered 2.8m of made ground comprising sandy gravelly cobbles of angular brick, concrete and clinker which is consistent with fill for land raising. Further south, made ground is of similar composition with some clays, silts and gravels being encountered as well as siliceous clasts and 'slag'. The slag is known to be shown on a drawing, however, this has not been supplied at the time of writing.	Not known on site but between 1.7 and 3.4m (1.1 to 2.0m AOD) to the south of the site.	Perched water in BH02 Anecdotal evidence from the tenants at the site indicates that even shallow excavations became quickly inundated with groundwater.

[14] Borehole records from the Amec Foster Wheeler ground investigation report are situated approximately 80m south (BH01), 420m south (BH02), and 440m south-east (BH03 and BH04).

	Additionally, WB services have laid ~60 tonnes of Type 1 for vehicle tracking around the site during their tenancy which has consolidated significantly.		
Superficial Deposits	Mapping indicates alluvium is the dominant uppermost natural strata at the site and that these are variably sand and peat, silt sand and gravel and silt and clay as well as tidal river or creek deposits of clay and silt. Investigations to the south of the site describe the alluvium as very soft, locally soft, occasionally locally firm silty, locally sandy, locally gravelly clay with occasional organic remains and bands of peat.	To the south of the site, the alluvium was observed to be between 11.0m and 11.8m thick. The base was encountered at -8.4m to -10.75m AOD.	Secondary (Undifferentiated) Aquifer Identified in alluvium in BH02 at a depth of 8m bgl (-4.33m AOD).
Boyn Hill Gravel	BGS mapping indicates that Boyn Hill Gravel outcrops to the south-east of the site. The ground investigation on the adjacent site to the south indicates that this member underlies the alluvium. Boyn Hill Gravel is described in BGS mapping as sand and gravel. Adjacent ground investigation data indicates the member is a medium to dense, locally very loose and locally very dense, silty, sandy gravel or gravelly sand with localised clay lenses/beds.	6.9 to 9.1m to the south of the site with the greater thickness being encountered in the north.	Secondary Aquifer (Undifferentiated) Groundwater identified at 13.8m (-8.8m AOD) bgl in BH01 to the south of the site.
Bedrock: Chalk	BGS data details the bedrock at the site as comprising the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated). Ground investigation from the adjacent site describes the chalk as follows: *structureless chalk recovered as slightly sandy silty GRAVEL (Grade Dc) passing into compacted off white sandy gravelly silt with depth in BH01 and BH04 (Grade Dm). The clasts are described as very weak to weak, low to medium density off-white with black speckling, and the matrix is described as off-white to yellowish orange.*	The base of the Chalk was not proven and there is limited borehole information in this area, however, regional scale BGS cross sections and borehole records indicate the chalk is over 100m in thickness. The adjacent ground investigation identified the top of the chalk at approximately 21.5m bgl (-16.6m AOD) in BH1.	Principal Aquifer Water strikes were not encountered in the chalk during the adjacent ground investigation, the maximum depth of drilling was -25.55m AOD. The nearest BGS borehole records are >600m away and the ground levels are not recorded, therefore it is not possible to determine the piezometric surfaces for water in the chalk. The records available however, indicate that groundwater wells were drilled into the chalk for industrial processes abstraction.

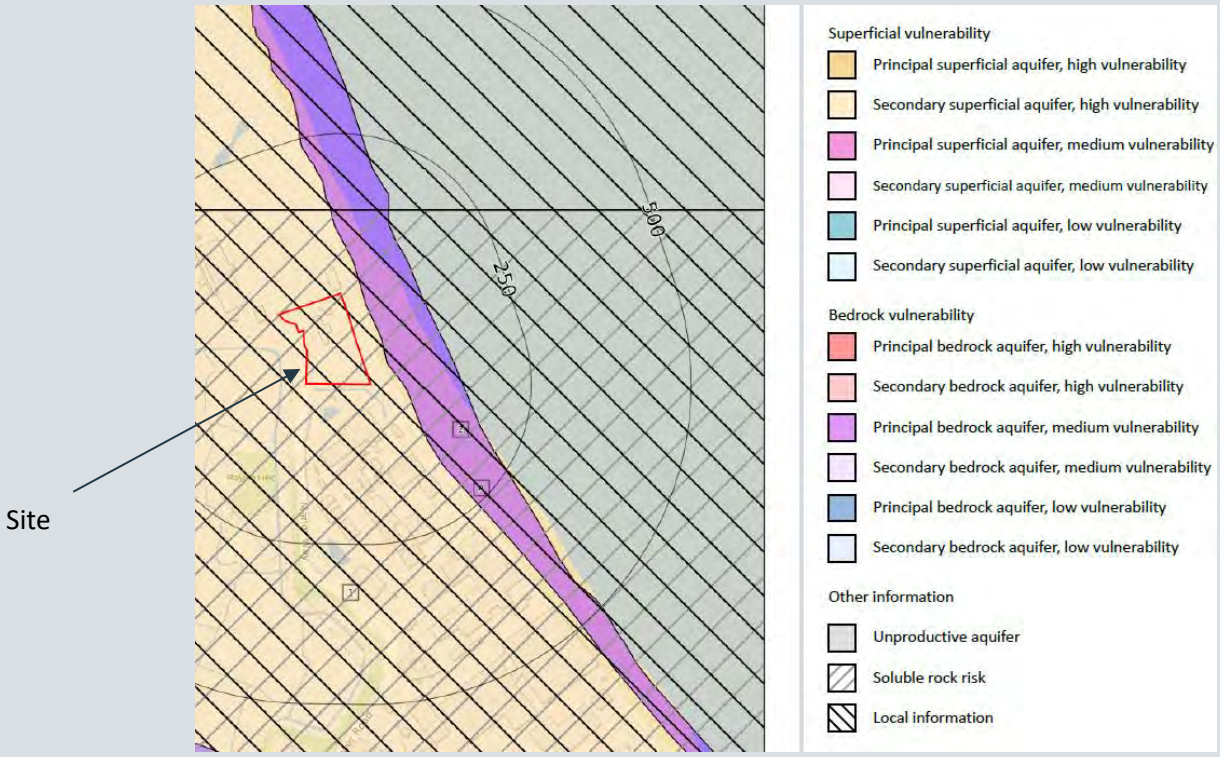
Records[15] from the New Northfleet Paper Mills indicate that not all of the wells drilled for abstraction were successful due to limited flow as well as the increase in salination of the water due to ingress from the marshes and Thames. These records also indicate there was significant drawdown of the water table due to an increase in industrial abstraction across the area at the time.

Hydrogeological sensitivity[16]

The Secondary superficial aquifer is of high sensitivity and has a high infiltration (leaching) value. potential deposits.

The underlying chalk bedrock at the site is of medium vulnerability and the principal flow mechanism is via well connected fractures.

Figure 5.3 Summary of Hydrogeology

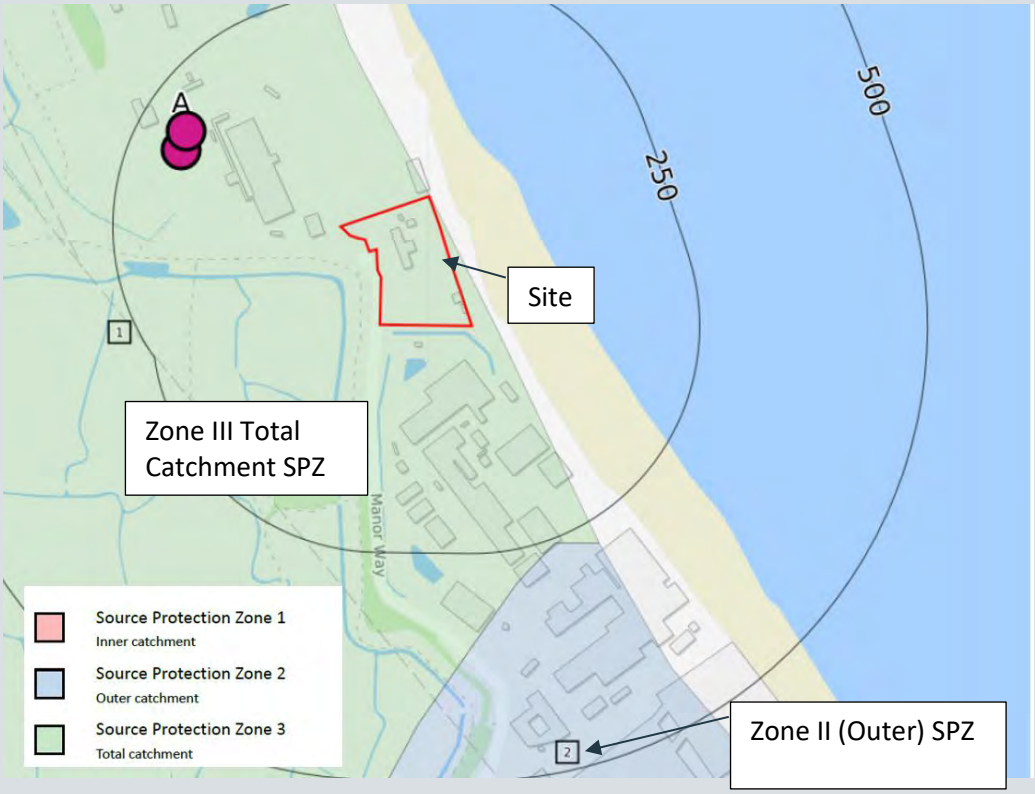


There is one licensed abstraction situated within 1km of the site. This is located 199m north-west of the site and is held for Cemex UK Materials Ltd for mineral washing and has a maximum daily volume of 105m^3. The database does not include details of which aquifer the abstraction is from.

15 A letter between the New Northfleet Paper Mills Site Manager and the Geological Survey and Museum dated 1939 attached to BGS borehole record TQ67/46 (271/141).
16 Private water supplies are not included in the database and as such are not considered within the risk assessment, however, there remains the potential for risks to private water supplies.

The site lies within a Source Protection Zone III (Total Catchment). Outer SPZs for groundwater abstractions in the vicinity are shown in Figure 5.4. The site lies 256m north of a Zone II (outer SPZ catchment).

Figure 5.4 Summary of Source Protection Zones



There are a number of drainage ditches in the vicinity of the site including on the southern boundary meaning run-off and shallow perched water in the made ground may drain to the ditches.

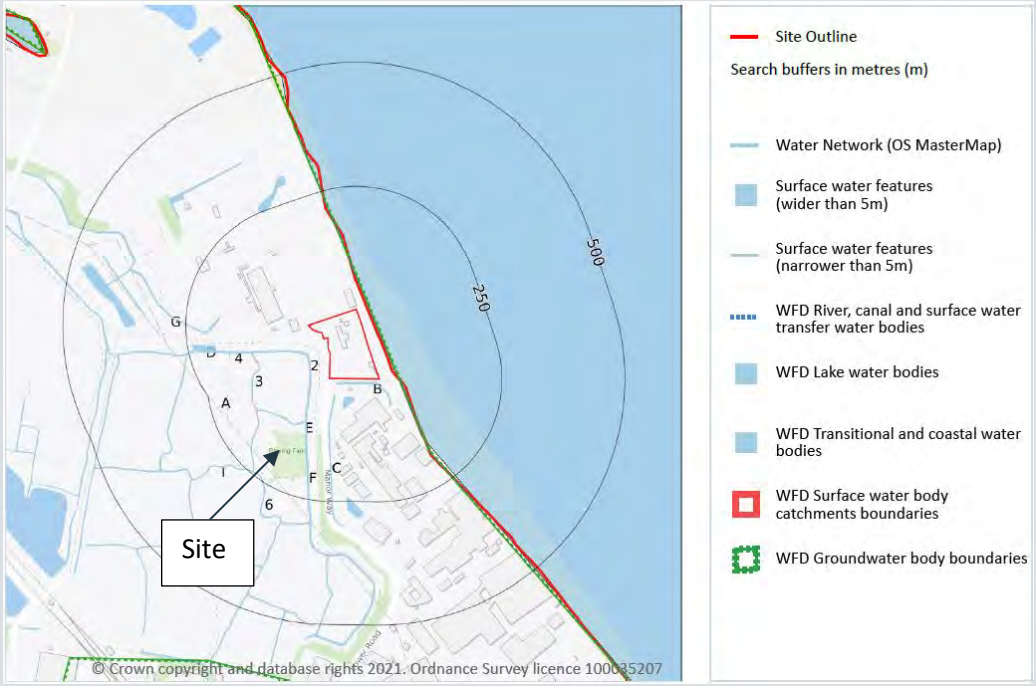
Groundwater flow direction in the secondary aquifer at the site is not known but is likely to be influenced by the variable nature of the soils which may result in there being no single piezometric surface, instead water levels and flow may be localised. The flow may be influenced by the local topography, which is lower to the west (marshes and SSSI) and water may flow from the site to the west. The flow in the secondary aquifer will also be influenced by flood wall and river wall which are sheet piled to an unknown depth. The walls have the potential to divert the water flowing towards it to the north and the south. Given the distance of the abstraction from the site and the low abstraction volume they are unlikely to have significant influence on groundwater flow direction at the site.

The groundwater within the chalk is identified under the Water Framework Directive under the name West Kent Darent and Cray Chalk. Data for the year 2019 indicate this body is classified as poor for chemical quality and has a poor overall rating.

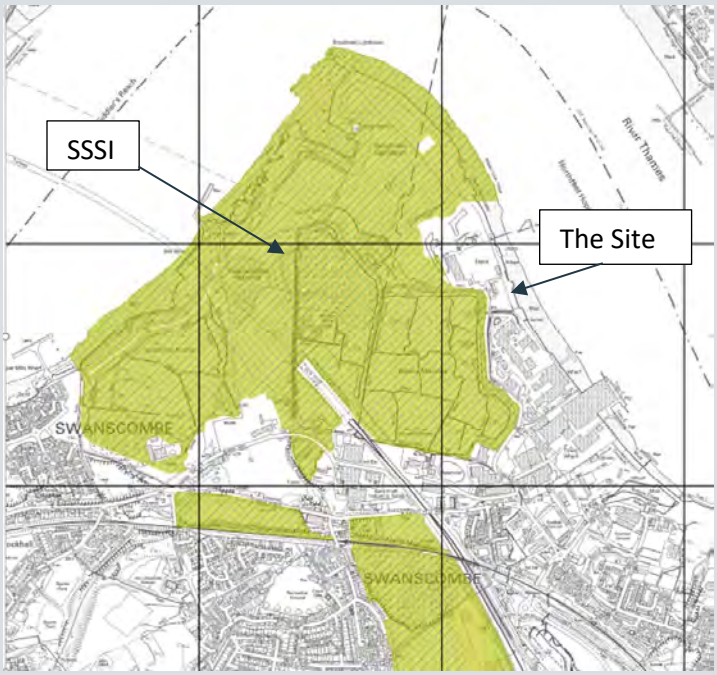
The site is not situated within a Nitrate Vulnerable Zone (NVZ).

A search of Local Authority information regarding private abstraction information is awaited.

Groundwater Sensitivity	The site is underlain by Secondary and Principal Aquifers, and there is an abstraction located within 200m of the site although this is not a drinking water abstraction. The site lies within a Total Catchment SPZ and the groundwater vulnerability is high with respect to the Secondary Aquifer and medium with respect to the Principal Aquifer. Groundwater in the Principal Aquifer is

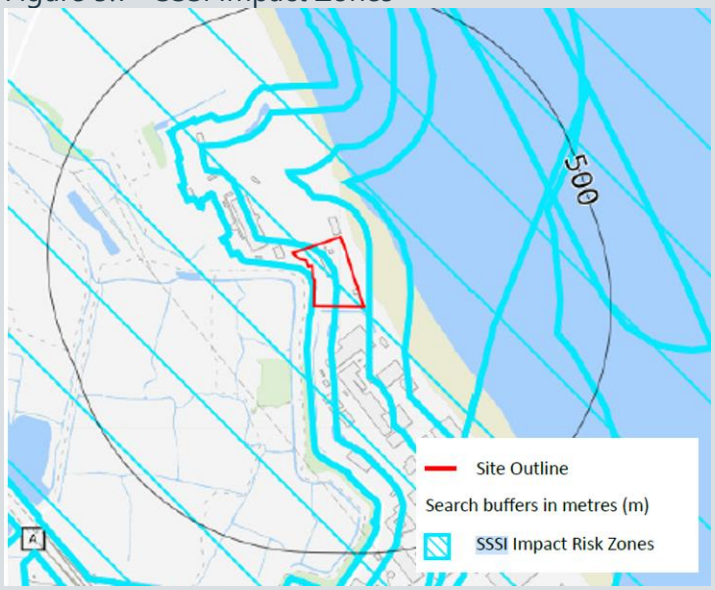
	anticipated to be in the upper 40m of ground although this has not been proven. It is possible that the Principal Aquifer is in hydraulic continuity with the Secondary Aquifer as well as with the tidal and saline marshes and / or River Thames which would degrade the quality of the groundwater. With the exception of the recently designated SSSI, the surrounding land use is predominantly industrial and has been as such for a number of years which could have also led to a degradation in groundwater quality. Groundwater Sensitivity: **Moderately High**
Hydrology	The closest surface water feature to the site is an inland river situated on the BRM site 8m to the south. There are also a range of inland rivers situated approximately 40m west of the site within the Swanscombe Peninsular SSSI. It is not anticipated that there is a significant flow within these water features and it is likely that they the either drain to land or to the River Thames. The Environment Agency Catchment Data Explorer indicates that the site lies within the Medway catchment which is a coastal catchment. The only related surface body listed within 250m of the site is the River Thames (Middle). Data published for 2019 indicates that the ecological quality was classified as 'Moderate' and the chemical quality failed to meet objectives, with an overall quality assessment of 'Moderate'. Figure 5.5 Summary of Hydrology  Surface water drainage at the site is modified by a limited network of artificial surface water and foul drains, soakaways and septic tanks. There are no significant discharges to controlled waters[17] located within 500m. Records of discharges indicate they are revoked or lapse or they enter the River Thames.
Hydrological sensitivity	The nearest surface water course is an unnamed inland river to the south of the site, for which the receiving water is unknown and which is located within an industrial site (i.e. the BRM main site). The closest surface water course/s which could be more sensitive are located to the west of the site. These comprise a range of connected inland rivers within a SSSI. There are no surface water abstractions within 1km of the site.

[17] Groundsure Report, Reference GS8390086, December 2021

	Surface Water Sensitivity: **Moderate**
Ecology	Swanscombe Peninsular was designated and SSSI in November 2021 and as a result is not listed in the Groundsure Report as records were not updated in time. This SSSI is in recognition of the land's national importance for plants, geology, birds and invertebrates – including one of the rarest spiders in the country. The SSSI is adjacent the west boundary of the site and at its closest is 40m away. Two other SSSIs exist within 2km of the site. These are Bakers' Hole which is 1172m to the south of the site and Swanscombe Kull Site which is 1925m to the south-west. These are designated on the basis of geological and physiographical features as opposed to ecological, however, Baker's Hole SSSI has been incorporated into the Swanscombe Peninsular SSSI. Figure 5.6 Ecological Sensitivity[18] 

[18] 1a Swanscombe Peninsula SSSI Summary map 11 March 2021.pdf (defra.gov.uk)

Figure 5.7 SSSI Impact Zones



Ecological sensitivity	The ecological sensitivity of the site is assessed as **high** given that there are statutory designated ecologically sensitive sites adjacent to the site. Ecological Sensitivity: **High**

6. Preliminary risk assessment

6.1 Conceptual model

This chapter presents the initial conceptual site model (CSM) developed for the site and identifies the presence of any potentially unacceptable risks. The conceptual model is a representation of the relationship between contaminant sources, pathways and receptors developed on the basis of hazard identification. Unique identification numbers or letters are allocated to each source, pathway and receptor; these are then carried forward to the risk assessment. The CSM provides a graphical representation summarising the key features of the sites, along with the plausible pathways and any sources (as detailed in Chapters 2 to 4) of relevance to the risk assessment. This conceptual model is shown schematically in Figure 3 along with the contaminant sources considered further in the risk assessment detailed below in Table 6.1. Land uses for which the assessment has been undertaken are future commercial/industrial (lease of land) in an ongoing capacity and future commercial/industrial (redevelopment scenario) use i.e. 'commercial/industrial' use with some landscaped areas.

6.2 Potential contaminant sources

A number of potential sources of contamination have been identified at the site. These are shown on Figure 2.

Table 6.1 On-Site Sources of Contamination

Potential Source Number	Potential Source	Associated Contaminants	Comment	Considered in Risk Assessment
Source S1	Current Fuel Storage Tanks	Hydrocarbons	Hydrocarbons (diesel) stored in above-ground tanks	Yes
Source S2	Current waste oil tanks	Hydrocarbons	Hydrocarbons (oil) stored in two above ground tanks	Yes
Source S3	Workshops/ Stores / COSHH / Vehicle washdown / Vehicle parking	Hydrocarbons, oils, lubricants, solvents, detergents, paints (TBT), antifreeze	Widespread and sporadic use of substances in all areas of the site including on soft permeable ground. Vehicle washdown takes place in the north-east of the site in the lorry park which comprises compact granular cover as opposed to hardstanding. No single significant source area and so focus on general coverage in grassed areas.	Yes
Source S4	Electrical transformer/switch gear	Hydrocarbons, PCBs	No evidence of loss of oils to ground and small scale. Low volume source and PCBs have low mobility in soil.	No
Source S5.1 and 5.2)	Soakaways, septic tanks and drainage	Oils, hydrocarbons, Organics, metals, pathogens	It is not known if the drainage system incorporates soakaways and interceptors. The previous report for the site describes the potential for compromised drainage and a leaking septic tank (the presence of which is to be confirmed).	Yes

Potential Source Number	Potential Source	Associated Contaminants	Comment	Considered in Risk Assessment
Source S6	Made ground and infilled ground	Metals, PAHs, TPH, asbestos, ground gas	Land raising and infill have the potential to have introduced contaminants. Moreover, slag and ash have been identified in made ground to the south which is consistent with cement works operations or burning; the land on site was reclaimed concurrently with surrounding land to the north (cement works) with the BRM main site to the south being developed a couple of years later but it is likely that the made ground has similar constituents/source material.	Yes
Source S7	Waste storage/transfer	Metals, PAHs, TPH, asbestos	Waste may have been stored sporadically across the site as well as in locations identified during the walkover.	Yes
Source S8	Demolished buildings	Asbestos	Current building on site known to contain asbestos. No evidence of demolished buildings and structures on site. Fill also has potential to contain asbestos.	No – asbestos will be considered in the context of made ground and fill
Source S9	Burning ground/burial pit	Metals, PAHs, TPH, asbestos, dioxins and furans, ground gas	South-east corner of site	Yes

6.3 Identified receptors

Potential receptors specific to the site are given below (note: only the receptors considered to be at risk from a source have been included):

Table 6.2 Summary of Receptors

Receptor Type	Descriptions
Future commercial/industrial use (ongoing scenario)[19]	BRM personnel, tenants and site visitors (R1)
Future commercial/industrial site users (redevelopment scenario)	BRM personnel and site visitors (R2)
Groundwater	Secondary and Principal Aquifers (R3)

[19] This assessment has been completed for redevelopment purposes and the current tenants have been given notice to vacate the site. However, should redevelopment not take place, the site may continue to be used in a similar fashion to the current arrangement. Thus, for the purpose of this report the 'ongoing use scenario' is represented by similar activities and practices that currently occur. The main differentiator between ongoing use and the future redevelopment scenario is that in the latter, there is likely to be an increase in hardstanding cover/import of clean cover soils which will both break the pathway from soils to human receptors and decrease the potential for rainwater infiltration and leaching, both of which reduce risks. It is also assumed that a 'ongoing use' would not include any new buildings/building locations or buildings would be temporary cabins similar to those currently on the south of the site.

Surface water	Surface water inland rivers within Swanscombe SSSI (R4)
Services	Water pipes (R5)
Buildings	Buildings (R6)

The River Thames is unlikely to be in hydraulic continuity with the site due to the two sheet pile walls and the low permeability alluvial soils underlying the site and the Thames River. Whilst the site is within the catchment of the Thames, drainage from the site is likely to be to the west and a significant distance away along drainage routes. Therefore, the River Thames is not included as a receptor.

It assumed no public access will be permitted and so the public are not included as a receptor.

6.4 Identified pathways

Potential environmental fate and exposure pathways specific to the site are:

- Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours (pathway P1);
- Track back of soil into buildings and direct contact, ingestion or inhalation inside building (pathway P2);
- Leaching/transport of contamination from soils via rainwater infiltration or rainwater run-off via drainage (pathway P3);
- Vertical and lateral migration in groundwater including baseflow to surface water bodies (pathway P4);
- Migration of gas and vapours and accumulation in buildings and structures (pathway P5); and
- Migration through water pipes (pathway P6).

6.5 Exclusions from risk assessment

Redevelopment workers

The risk assessment does not consider risks to construction or site maintenance workers on the basis that risks to workers will be dealt with under the Health and Safety at Work Act (1974) and regulations made under the act. Site-specific contamination data obtained from all site investigations should be included in the pre-construction information (a requirement of Construction Design and Management Regulations 2015) for any proposed below ground works, to enable any contractors to address potential risk from contamination as necessary in their risk assessments and method statements. Moreover, as the exact details of the method adopted are not currently known, it is not considered appropriate to provide a wide ranging and speculative risk assessment for construction or maintenance workers.

Invasive species

Identification and assessment of invasive species (such as Japanese knotweed and giant hogweed) is outside of this scope of works and so they are not considered within the risk assessment.

Unexploded ordnance (UXO)

Assessment of unexploded ordnance (UXO) risks at the site has been carried out separately by other parties and is not part of this current LQA assessment. The assessment concluded that there are moderate risks at the site in some scenarios. The full assessment should be reviewed prior to any intrusive works.

6.6 Preliminary risk assessment

A preliminary risk assessment has been undertaken for these potential source-pathway-receptor linkages to identify potentially unacceptable risks on a qualitative basis. This approach is based on Department for the Environment Food and Rural Affairs (DEFRA) Statutory Guidance on Contaminated Land[20] , Construction Industry Research and Information Association (CIRIA) guidance on risk assessment[21], and the Environment Agency Guidance on Land contamination risk management[22]. The risk is therefore based on a consideration of both:

- the likelihood of an event (probability – takes into account both the presence of the hazard and receptor and the integrity of the pathway); and
- the severity of the potential consequence (takes into account both the potential severity of the hazard and the sensitivity of the receptor).

Further information on the risk assessment methodology used is given in Appendix C. The method of dealing with identified risks and the level of significance of those risks will be a function of site use. Potentially unacceptable risks identified are considered in Table 6.3.

[20] Department for Environment, Food and Rural Affairs, Circular 01/2012, Contaminated Land. April 2012
[21] Construction Industry Research and Information Association (CIRIA), Contaminated Land Risk Assessment. A Guide to Good Practice. CIRIA C552, 2001
[22] https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks

Table 6.3 Potential environmental risks

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
Current fuel storage tanks (S1), current waste oil tanks (S2)	Hydrocarbons, diesel	S1: Hydrocarbons (diesel) stored in above-ground tanks situated on a bund / drip tray and with no visual evidence of spills. Area of storage appears to require better management, however, and the tanks have been in use for a significant number of years and as such could have resulted in localised impacts. S2: Hydrocarbons (oil) stored in two above ground tanks on the same bund as the above ground diesel tanks. No evidence of spillage (although one lid was found open and the tanks are full). Oil is less mobile than diesel, however, it may persist in the environment for a greater duration as it is less volatile. Source 1 & 2 are grouped for this assessment due to the common location on the same drip tray/bund, likely management and duration on site.				
		R1 Future commercial site users (on-going use scenario)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Low/likelihood** Tanks are above ground, appear in reasonable condition and are bunded. Soils beneath are inaccessible. No significant surface staining observed, no spillage/ leakage incidents known. The tank area is not a significant portion of the site and so tracking is likely to be limited and surface contamination is likely to reduce over time to being exposed to air.	**Moderate/Low** [Risks could be mitigated through investigation and discounting the risk]
		R2 Future commercial use (BRM redevelopment)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Likely** The future design is not confirmed. Thus, exposure to impacted in-situ or redistributed soils (via reprofiling) may occur.	**Moderate** [Risks could be mitigated through the design (e.g. slab) and management (placement under slabs or cover in landscaped areas or disposal) of soils]

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R3 Groundwater	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Low Likelihood** Although the tanks are in good condition, they have been used for several years and repeated use may have led to moderate spillages. Moreover, there may have been other tanks in this location historically. Groundcover does not appear to be of hardstanding and as such infiltration is more likely.	**Moderate/Low** [An increase hardstanding is likely if the site is redeveloped; this would decrease infiltration and lower risks]
		R4 Surface water	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Unlikely** Significant distance to surface water receptors from source.	**Low** [An increase hardstanding is likely if the site is redeveloped; this would decrease infiltration and lower risks]
		R5 Services	P6 Migration through water pipes	Tainting of water supply [**Mild**]	**Low likelihood** Tanks are above ground. No significant surface staining observed, no spillage/ leakage incidents known and significant volumes of spillage would be required to penetrate pipes.	**Negligible** [Any new services at the site should be laid in clean fill material.]
Workshop activities / Stores COSHH and vehicle washdown (S3) and Waste storage/transfer (S7)	Hydrocarbons, diesel, oils, lubricants, solvents, detergents, paints (TBT), antifreeze	Widespread and sporadic use of small volumes of substances in all areas of the site including on soft permeable ground. No single significant source or source area identified and the substances used are mobile and moved around the site; as such the source could now be considered to be potentially impacted shallow soils across the site. Vehicle washdown takes place in the lorry park in the north-east part of the site. Waste may have been stored sporadically across the site as well as in locations identified during the walkover. These wastes are not stored for significant durations and would require management and duty of care documentation. Contaminants are unlikely to be present in quantities that could cause significant leaching, however shallow soils may be impacted, notably from asbestos fibres resulting from deposition of demolition and construction wastes. Sources 3 and 7 are grouped in this assessment as they both have the potential to have affected shallow soils and may be widespread but not necessarily in specific locations i.e. they represent diffuse sources as opposed to point sources, additionally, the relevant contaminants are likely to be similar with the exception that there is the potential for asbestos fibres from waste activities and detergents, paints and antifreeze are unlikely to be within waste streams.				

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R1 Future commercial site users (on-going use scenario)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building	Health Hazard [**Medium**]	**Low likelihood** Management controls and vegetative cover in many areas will limit exposure via windblown dust and in general only small quantities of substances are likely to remain in surface soils. Over time, rain is likely to have caused downward migration into deeper soils. Waste materials are not stored on site for long periods as the site is used for waste transfer. The operator should hold appropriate duty of care documentation and have knowledge of the substances brought to site and these should be managed accordingly. However, materials were stored on areas of soft permeable ground and as such deleterious impacts to shallow soils may have occurred. Demolition wastes in particular may have the potential to introduce asbestos fibres to shallow surface soils.	**Moderate/Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R2 Future commercial use (BRM redevelopment)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building	Health Hazard [Medium]	**Likely** The future design is not confirmed. Thus, exposure to impacted in-situ or redistributed soils (via reprofiling) may occur. Waste materials are not stored on site for long periods as the site is used for waste transfer. The operator should hold appropriate duty of care documentation and have knowledge of the substances brought to site and these should be managed accordingly. However, materials were stored on areas of soft permeable ground and as such deleterious impacts to shallow soils may have occurred. Demolition wastes in particular may have the potential to introduce asbestos fibres to shallow surface soils.	**Moderate** [Risks could be mitigated through the design (e.g. slab) and management (placement under slabs, clean cover or disposal) of soils]
		R3 Groundwater	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Likely** When considered as a whole, there could be a multiplying effect of many years of uncontrolled substance use and waste deposition at the site with no protective hardstanding. This could have resulted overall in deleterious soil quality which has the potential to leach over a wider area.	**Moderate** [Risks could be mitigated through the design (e.g. slab) and management (placement under slabs or disposal) of soils]
		R4 Surface water	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Unlikely** Groundwater baseflow to surface water receptor unlikely to give rise to significant degradation of surface water given distance between source and receptor.	**Low** [Risks could be mitigated through the design (e.g. slab) and management (placement under slabs or disposal) of soils

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R5 Services	P6 Migration through water pipes	Tainting of water supply [**Mild**]	**Unlikely** Given the volume of the substances used and the area over which any contamination would be spread, impacts to pipes are considered unlikely.	**Negligible** [Any new services at the site should be laid in clean fill material.]
Soakaways (S5.1), septic tanks and drainage (S5.2)	Oils, hydrocarbons, organics, metals, pathogens	It is not known if the drainage system incorporates soakaways and interceptors. The previous report for the site describes the potential for compromised drainage and a leaking septic tank (the presence of which is to be confirmed.				
		R3 Groundwater	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Likely** If the drains and septic tank are compromised and there are no oil/water interceptors at the site, there is the potential for pollution. Contaminants will be diluted, however, given the flushing effect may have the potential to travel further within the water body.	**Moderate** [Risks would be mitigated through investigation of tank and drainage and installing interceptor as part of development]
		R4 Surface water	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Likely** If the drains and septic tank are compromised and there are no oil/water interceptors at the site, there is the potential for pollution. Contaminants will be diluted, however, given the flushing effect may have the potential to travel further within groundwater and as such there is an increased potential for surface water to be impacted via baseflow or over topping and migration in drains.	**Moderate** [Risks would be mitigated through investigation of tank and drainage and installing interceptor as part of development]
Made Ground (S6)	Metals, PAHs, TPH, asbestos, ground gas	Made ground is present at site, associated with land raising. Materials used for land raising were derived off-site and may have included cement works wastes. The land raising was carried out in the 1970s when material management was unlikely to have been well controlled. Previous investigations on the adjacent site to the south indicated made ground included slag and ash, however, that land was reclaimed several years after the site which was reclaimed concurrently with the cement works to the north.				

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
	Metals, PAHs, TPH, asbestos	R1 Future commercial site users (on-going use scenario)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building.	Health Hazard [**Medium**]	**Likely** Materials used in land reclamation unlikely to have been well controlled in earlier phase of redevelopment. Vegetation, partial hardstanding and imported cover will mitigate risks somewhat in those areas, however, no ground investigation has been carried out at the site to quantify the risks.	**Moderate** **[**Risks could be mitigated by investigation of the ground conditions**]**
		R2 Future commercial use (BRM redevelopment)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building. P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Likely** Materials used in site reclamation unlikely to have been well controlled in earlier phase of redevelopment. No ground investigation has been carried out at the site to assess if soils are impacted/presence of asbestos. The future design is not confirmed. Thus, exposure to impacted in-situ or redistributed soils (via reprofiling) may occur.	**Moderate** [Risks could be mitigated through the design (e.g. slab, gas protection) and management (placement under slabs, clean cover or disposal) of soils]

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R3 Groundwater	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Likely** Materials used in site reprofiling unlikely to have been well controlled, however, given the likely groundwater level at the site and the age of deposition, it is probable that much of the contaminant load has been diluted and migrated from the site. However, there remains residual risks as no investigation of the soils has taken place and the future piling/redevelopment may mobilise shallow soil contaminants or promote downward migration of shallower groundwater to deeper groundwater during redevelopment.	**Moderate** [Risks could be reduced by increased hardstanding and surface water drainage control; piling risk assessment would be required for any deep foundations]
		R4 Surface water	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Low Likelihood** Materials used in site reprofiling unlikely to have been well controlled, however, given the likely groundwater level at the site and the age of deposition, it is probable that much of the contaminant load has been diluted and migrated from the site. However, there remains residual risks as no investigation of the soils has taken place and the future piling/redevelopment may mobilise shallow soil contaminants or promote lateral migration of shallower groundwater to off-site surface water during redevelopment.	**Moderate/Low** [Risks could be reduced by increased hardstanding and surface water drainage control; piling risk assessment would be required for any deep foundations]

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R5 Services	P6 Migration through water pipes	Tainting of water supply [**Mild**]	**Unlikely** Materials used in site reprofiling unlikely to have been well controlled, however, given the likely groundwater level at the site and the age of deposition, it is probable that much of the contaminant load has been diluted and migrated from the site. Moreover, no knowns issues relating to drinking water at the site have been reported.	**Negligible** [Any new services at the site should be laid in clean fill material.]
	Ground gas	R6 Buildings (methane only)	P5 Migration of gas and vapours and accumulation in buildings and structures	Catastrophic damage to buildings, structures and services (explosion and building collapse) [**Severe**]	**Low likelihood** Buildings currently occupy a small part of the site and there is granular made ground and soft standing allowing gas release over a wide area. Future development is likely to include significantly larger buildings and concrete cover, thus increasing the potential for gas build up within voids and structures.	**Moderate** [Risk could be mitigated by assessing gas regime and design of structures and service corridors to mitigate any identified soil gas risk]
		R1 Future commercial site users (on-going use scenario)	P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Low Likelihood** Risks to human health from ground gas however is of low likelihood as there have been no reported issues during the occupation of the building since construction over forty years ago.	**Moderate/low** [Risk could be mitigated by assessing gas regime and design of structures and service corridors to mitigate any identified soil gas risk]
		R2 Future commercial use (BRM redevelopment)	P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Likely** Risks to human health from ground gas however is of low likelihood as there have been no reported issues during the occupation of the building since construction over forty years ago.	**Moderate** [Risk could be mitigated by assessing gas regime and design of structures and service corridors to mitigate any identified soil gas risk]

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
Burning grounds/waste pit (S9)	Metals, PAHs, TPH, dioxins and furans, asbestos, ground-gas	This area is not extensive in size, however, if burning has taken place and or wastes have been buried, there is the potential for contamination as well as unstable ground conditions.				
	Metals, PAHs, TPH, dioxins and furans, asbestos,	R1 Future commercial site users (on-going use scenario)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building. P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Unlikely** The area is vegetated over and in an unused part of the site. Nearby buildings are above ground temporary cabins and as such gas risk is negligible. The permanent building is a significant distance from this source.	**Low**
		R2 Future commercial use (BRM redevelopment)	P1 Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours P2 Track back of soil into buildings and direct contact, ingestion or inhalation inside building. P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Likely** The future design is not confirmed. Thus, interaction with impacted in-situ or redistributed soils (via reprofiling) may occur. Risks from gases could result from new overlying structures.	**Moderate** [Risks could be mitigated through the design (e.g. slab, gas protection) and management (placement under slabs or disposal) of soils]
		R3 Groundwater	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Likely** Infilled waste pits have the potential for ongoing pollution due to the potential for higher anticipated contaminant load. Risks to deeper groundwater will increase should piling take place through this feature without further investigation.	**Moderate** [Risks could be mitigated through the design (e.g. slab, gas protection) and management (placement under slabs or disposal) of soils]

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R4 Surface water	P3 Leaching of contamination from soils via rainwater infiltration P4 Vertical and lateral migration in groundwater	Pollution of Controlled waters [**Medium**]	**Low likelihood** Given the distance to sensitive surface water features, significant dilution and attenuation is likely and as such risks to surface waters are reduced.	**Moderate/Low** [Risks could be mitigated through the design (e.g. slab, gas protection) and management (placement under slabs or disposal) of soils]
		R5 Services	P6 Migration through water pipes	Tainting of water supply [**Mild**]	**Unlikely** Impact to services unlikely given size of the source and low likelihood of services being present in this area of the site due to the pit being in active recent use. Also, no issues with water supply have been reported.	**Negligible** [Any new services at the site should be laid in clean fill material.]
	Ground gas	R6 Buildings (future) (Methane only)	P5 Migration of gas and vapours and accumulation in buildings and structures	Catastrophic damage to buildings, structures and services (explosion and building collapse) [**Severe**]	**Low likelihood** Future buildings directly over this area or in close proximity may be at risk from ground gas from this source, However, the source is relatively small in size.	**Moderate** [Risk could be mitigated by assessing gas regime and design of structures and service corridors to mitigate any identified soil gas risk]
		R1 Future commercial site users (on-going use scenario)	P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Low likelihood** Risks to human health from ground gas however to this receptor is of low likelihood as there are no buildings over this source.	**Moderate/low** [Risk could be mitigated by assessing gas regime and design of structures and service corridors to mitigate any identified soil gas risk]

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk
		R2 Future commercial use (BRM redevelopment)	P5 Migration of gas and vapours and accumulation in buildings and structures	Health Hazard [**Medium**]	**Likely** Risks to human health from ground gas however is of low likelihood as there have been no reported issues during the occupation of the building since construction over forty years ago.	**Moderate** [Risk could be mitigated by assessing gas regime and design of structures and service corridors to mitigate any identified soil gas risk]

The risks from the identified potential sources are summarised below:

Table 6.4 Summary of environmental risks from potential sources

		R1 Future site users (on-going use scenario)	R2 Future commercial site users (redevelopment scenario)	R3 Groundwater (Secondary and Principal Aquifer)	R4 Surface Water (Swanscombe SSSI inland rivers)	R5 Services (Water pipes)	R6 Buildings
Current Fuel Storage Tanks (S1) and current waste oil storage tanks (S2)	Hydrocarbons (diesel and oil)	Moderate/ Low	Moderate	Moderate/ Low	Low	Negligible	
Workshop activities / Stores COSHH and vehicle washdown (S3) and Waste storage/transfer (S7)	Hydrocarbons, diesel, oils, lubricants, solvents, detergents, paints (TBT), antifreeze, asbestos	Moderate/ Low	Moderate	Moderate	Low	Negligible	
Soakaways (S5.1), septic tanks and drainage (S5.2)	Oils, hydrocarbons, organics, metals, pathogens			Moderate	Moderate		
Made Ground (S6)	Metals, PAHs, TPH, asbestos	Moderate	Moderate	Moderate	Moderate/ Low	Negligible	
	Ground gas	Moderate/ Low	Moderate				Moderate
Burning grounds / waste pit (S9)	Metals, PAHs, TPH, dioxins and furans, asbestos,	Low	Moderate	Moderate	Moderate/ Low	Negligible	
	Ground-gas	Moderate/ Low	Moderate				Moderate

7. Geotechnical issues and constraints

7.1 Geotechnical Risks and Hazards

The key geotechnical risks and hazards are summarised below:

- There is no available site-specific GI data. Any historical borehole records held in the BGS database are confidential and not available for viewing. A previous GI was carried out for the proposed new water tank and baghouse on the main BRM site to the south, but the GI covered a small area and may not be representative of the ground conditions beneath this site. Therefore, a ground investigation is required to establish the ground conditions and derive geotechnical properties for design and construction of the proposed works.
- The presence of some records of made ground on Site are recorded, associated with the history of the site, including on-site refuse tips. The made ground is likely to be variable in nature, composition and extent, but could include inert aggregates and/or slag or ash from either the BRM lead refinery or the Portland Cement Works to the southeast.
- Although the on-site risk is reported as very low, the local ground conditions present a moderate to high stability risk associated with running sands and compressible deposits close to the site. Therefore, the risk of such hazards relating to ground conditions occurring on the site cannot be discounted.
- Ground water levels are anticipated to be shallow which may restrict some investigation approaches such as trial pits and cause stability problems during any excavations.
- There may be contamination of soil and / or groundwater, due to historic use of the site.
- Obstructions may exist within the site from previous buildings foundations that have since been demolished, this includes anchor systems associated with the flood defence wall to the east of the site boundary. Striking these anchor systems may affect the integrity of the flood defence.
- Services have not been fully identified and surveyed. Further service investigations and surveys will be required to identify any recorded and unrecorded services which may be affected by the proposed development. Building plans should be reviewed to identify the location of the flood wall defence anchors and previous building footprints.

7.2 Geotechnical Risk Assessment

A preliminary Geotechnical Risk Register (GRR) has been prepared and is included as Appendix D. The GRR summarises all the geotechnical risks and hazards identified during this Desk Study Phase and provides proposed mitigation measures for further investigation and assessment to control and/or manage these risks to an acceptable level, as the development progresses to the next phases.

The preliminary GRR is considered a live document that needs to be reviewed and updated during the subsequent phases of the proposed development.

The GRR has been developed in general accordance with the guidance presented in the ICE/DETR Document 'Managing Geotechnical Risk' (2001).

8. Conclusions and recommendations

8.1 Conclusions

There are potential moderate risks to site users in the scenario of on-going use associated with the made ground present in areas of soft landscaping.

The risks to future site users in a redevelopment scenario are moderate and associated with areas of hydrocarbon storage, made ground, the use of chemicals and waste storage, and potential a burning/waste pit. The risks to future site users and buildings in a redevelopment scenario will arise where landscaping areas are present or where gas accumulation is enhanced due to surface cover. There is uncertainty regarding the nature of the historic made ground at the site which was used to raise/reclaim the land for construction of the site – given the date of deposition and the likely lack of controls at that time, there may be a range of contamination present. There is also uncertainty regarding shallow soils due to use of chemicals and vehicle/plant maintenance/storage and temporary waste deposition prior to transfer off site in areas where no hardstanding is present.

Risks to groundwater (Secondary and Principal Aquifer which may be in hydraulic continuity) from soils, chemical use, burning ground waste/pit and the drainage system have been assessed as moderate. Risks to surface water courses in the adjacent Swanscombe Peninsular SSSI have been assessed as moderate from the drainage at the site.

All other risks were assessed as moderate/low or below for all the other sources identified at the site.

In the event that the site is not redeveloped, there remains the potential for ongoing environmental risks and as such liability associated with the drainage system due to reported damage and leaks.

In the event that the site is redeveloped, it is probable that the existing drainage would not be suitable for the new development; in this case, the existing drainage should be properly decommissioned.

If the site is redeveloped, BRM are likely to require a new environmental permit or a variation to an existing one. Environmental permits require a Site Condition Report (SCR) which needs to include baseline soil and groundwater data. This data would be collected during any ground investigation carried out.

8.2 Recommendations

The majority of the site area is unlikely to be affected by gross or significant contamination. However, no ground investigation has been caried out at the site to quantify the risks and there are a number of sensitive receptors at, under or adjacent to the site. A geo-environmental ground investigation is recommended to:

- confirm the presence and nature of the identified potential sources of contamination which present potential risks to receptors is likely to be required.

- quantify / characterise the geotechnical risks that have been identified and to inform the design.
- Support planning permission: redevelopment of the site will require planning permission and is likely that a condition thereof is that an interpretative ground investigation report is submitted.
- provide greater cost certainty and reduce project risk: ground investigation will provide quantitative data to assess the need for / suitability and provide more cost certainty in relation to:
    - remediation (should it be required);
    - soil re-use on site; and
    - disposal off-site of soils.
- provide baseline soil and groundwater data which is likely to be required to support any environmental permit.

As the drainage on the site represents a potential ongoing and acute environmental risk, it is recommended that the drainage system, any soak-aways and septic tanks are investigated for integrity.

Should contamination be confirmed to be present, further detailed risk assessment or mitigation measures may be required. Such mitigation actions could include (but not be limited to):

- Placement of a hardstanding / buildings over much of the site which could mitigate risks to human health but limiting exposure to contaminants in the shallow soils
- Placement of hardstanding / buildings would also reduce infiltration of rainwater.
- Remediation of soils and groundwater including activities such as source removal and off-site disposal of soils. Soil disposal can represent a significant cost to redevelopment; ground investigation could provide an indication of the waste classification of the soils which would facilitate any remediation strategy.
- Risks to buildings and people from ground gas could be mitigated by assessing the gas regime and design of structures and service corridors to mitigate any identified soil gas risk.

Site-specific contamination data should be included in the pre-construction information for any proposed below ground works, to enable any contractors to address as necessary in their risk assessments and method statements.

Appendix A
Figures

Figure 1 – Site Location Plan and Layout

Figure 2 – Potential Sources of Contamination

Figure 3 – Conceptual Site Model

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175800

175700

Oil drums and ad-blue IBCs within shipping container

Storage / car parking garage

Storage building

Storage shipping container (disused)

Site access road

WB Services' Office

Made ground/fill underlies whole site

Parking areas

Possible soakaway/septic tank

Parking areas

Plant, materials, chemical storage on grassed area

CMP Thames' access gate

CMP Thames' plant storage area

Bollards

MP

Flood gate - access to CRM Thames' wharf area

Above ground oil and diesel tanks

Historic oil store location

Telemetry building

Transformer/ switchgear

Transport yard

Approximate boundary between leaseholder areas

River Thames

Waste storage

CMP Thames' staff parking area

CMP Thames' office cabins and welfare

Flood defence wall

Burning ground/waste

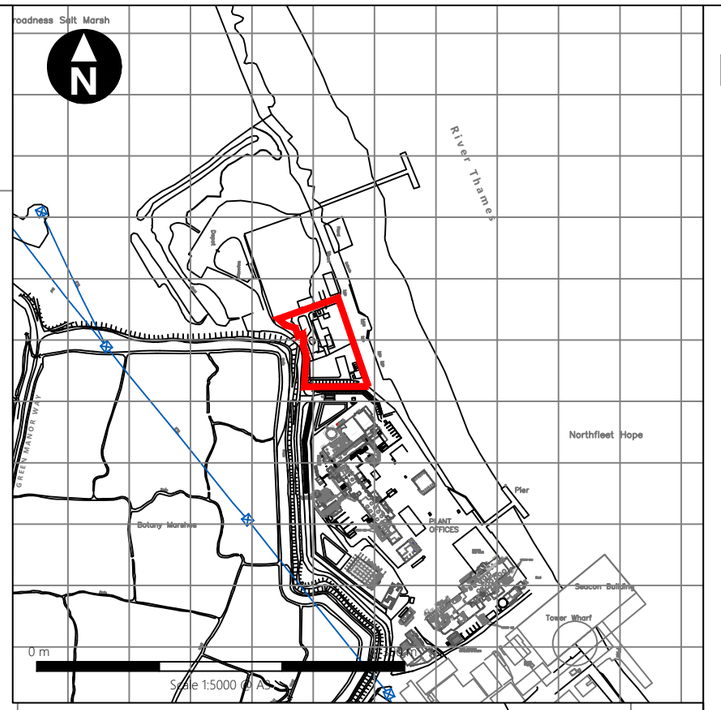
Drain

Manor Way

Gatehouse

Weighbridge

BRM Main Site



Key

Proposed site boundary

0 m 50 m

Scale 1:1000 @ A3

Britannia Refined Metals
BRM Area 4 Geo-environmental Desk Study

Figure 1
Site location and layout

January 2022

wood.

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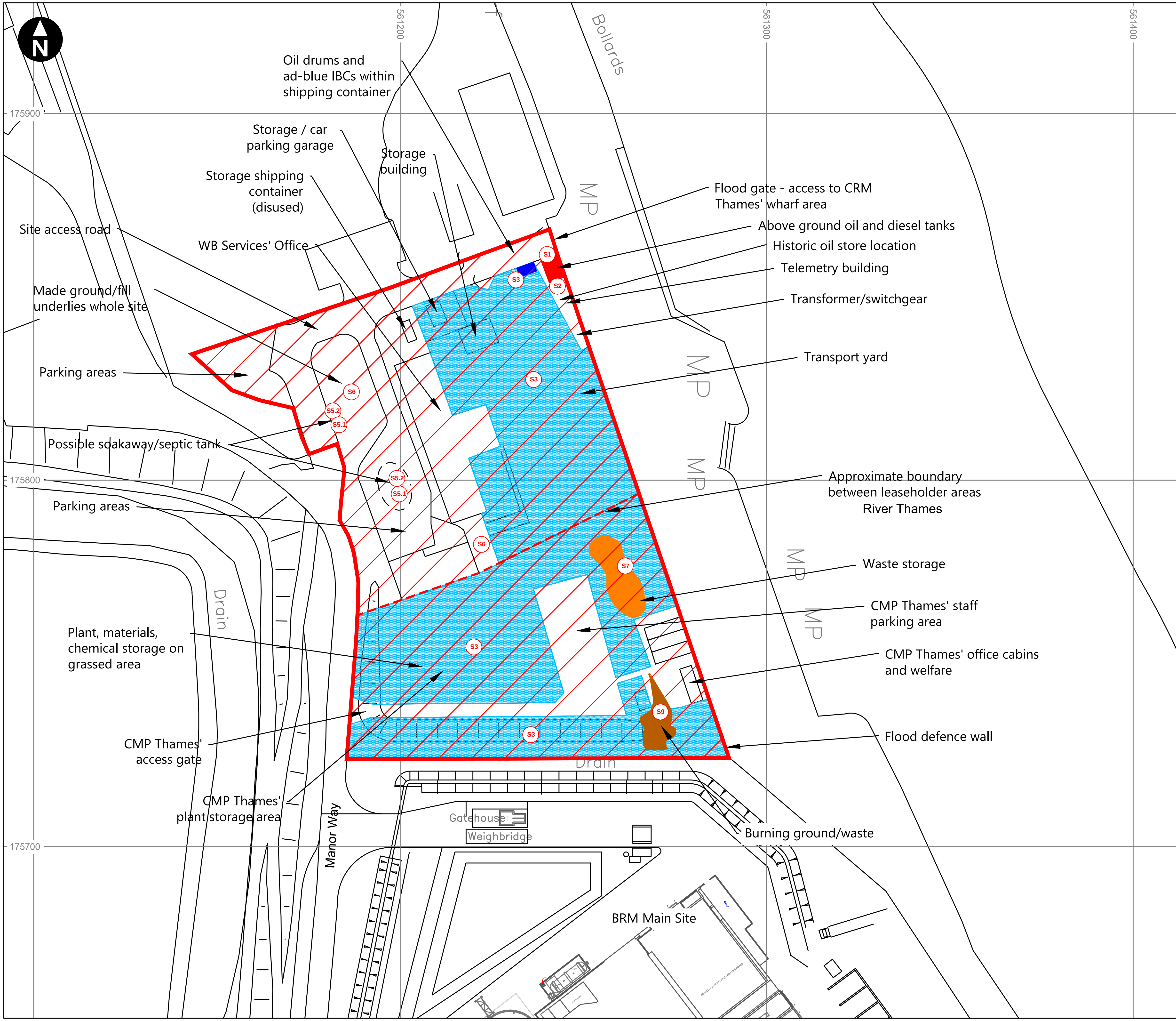

Key

- Proposed site boundary
- Workshop activities/Stores/ COSHH and vehicle washdown area
- Waste storage
- Burning ground
- Oil drums and ad-blue IBCs within shipping container
- Above ground oil and diesel tanks
- Made ground/fill underlies whole site
- Sources
  - S1) Current Fuel Storage tanks
  - S2) Current waste oil storage tanks
  - S3) Workshop activities/Stores/ COSHH and vehicle washdown
  - S5.1) Soakaways
  - S5.2) Drains and septic tank (location unknown)
  - S6) Made Ground
  - S7) Waste storage/transfer
  - S9) Burning grounds/waste pit

0 m 50 m

Scale 1:1000 @ A3

Britannia Refined Metals
BRM Area 4 Geo-environmental Desk Study

Figure 2
Potential sources of contamination

January 2022

wood.

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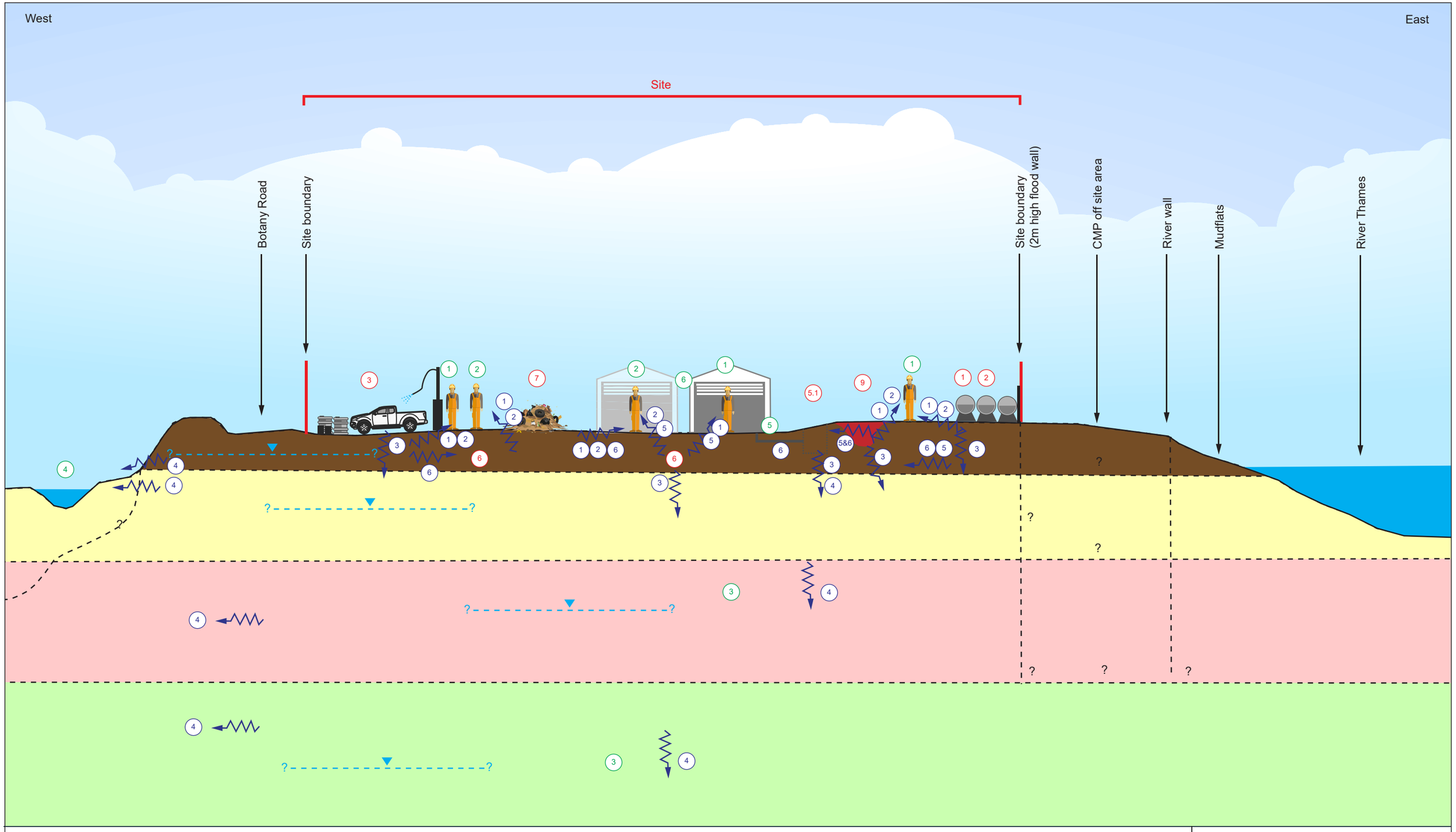

Key

- Made ground
- Alluvium
- Boyn Hill gravel
- Chalk
- Groundwater (present but not categorised)
- Pathway flow

Sources

1) Current Fuel Storage tanks
2) Current waste oil storage tanks
3) Workshop activities/Stores/COSHH and vehicle washdown
5.1) Soakaways
5.2) Septic tanks and drainage (location unknown)
6) Made Ground
7) Waste storage/transfer
9) Burning grounds/waste pit

Receptors

1) Future commercial site users (on-going use scenario)
2) Future commercial site users (redevelopment scenario)
3) Groundwater (Secondary and Principal Aquifer)
4) Surface Water (Swanscombe SSSI inland rivers)
5) Services (Water pipes)
6) Buildings

Pathways

1) Direct contact, ingestion or inhalation of contaminated soils and soil dust and vapours
2) Track back of soil into buildings and direct contact, ingestion or inhalation inside building
3) Leaching of contamination from soils via rainwater infiltration
4) Vertical and lateral migration in groundwater
5) Migration of gas and vapours and accumulation in buildings and structures
6) Migration through water pipes

Britannia Refined Metals
BRM Area 4 Geo-environmental Desk Study

Figure 3
Conceptual site model

January 2022

wood.

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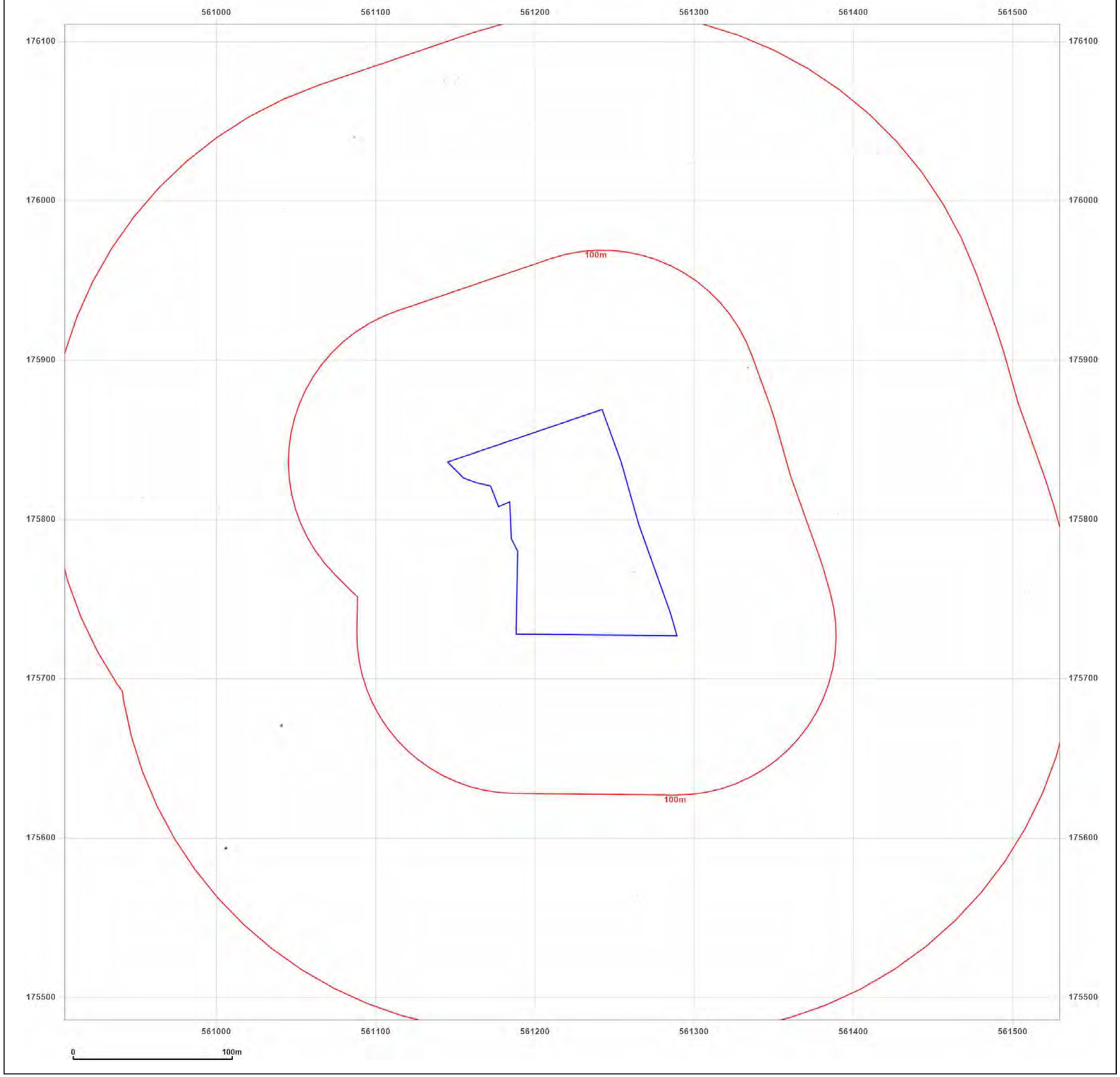
Appendix B
Groundsure Geo-Environmental Search



Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1864-1865**

Scale: 1:2,500

Printed at: 1:2,500

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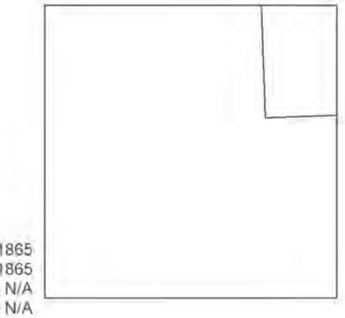
Surveyed 1864
Revised 1864
Edition N/A
Copyright N/A
Levelled N/A



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Revised 1865
Edition N/A
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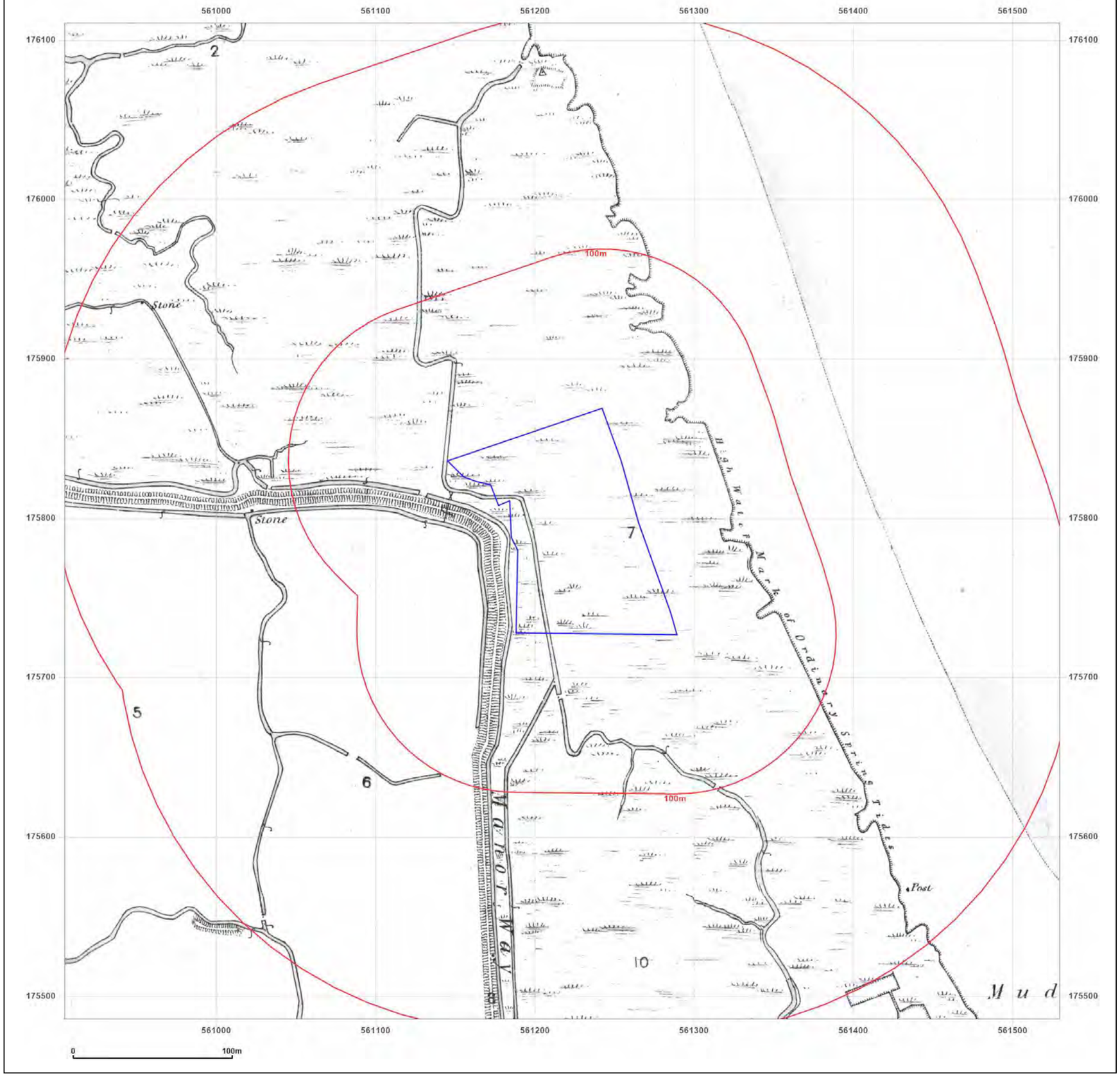
Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1865**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 09 December 2021

Map legend available at:
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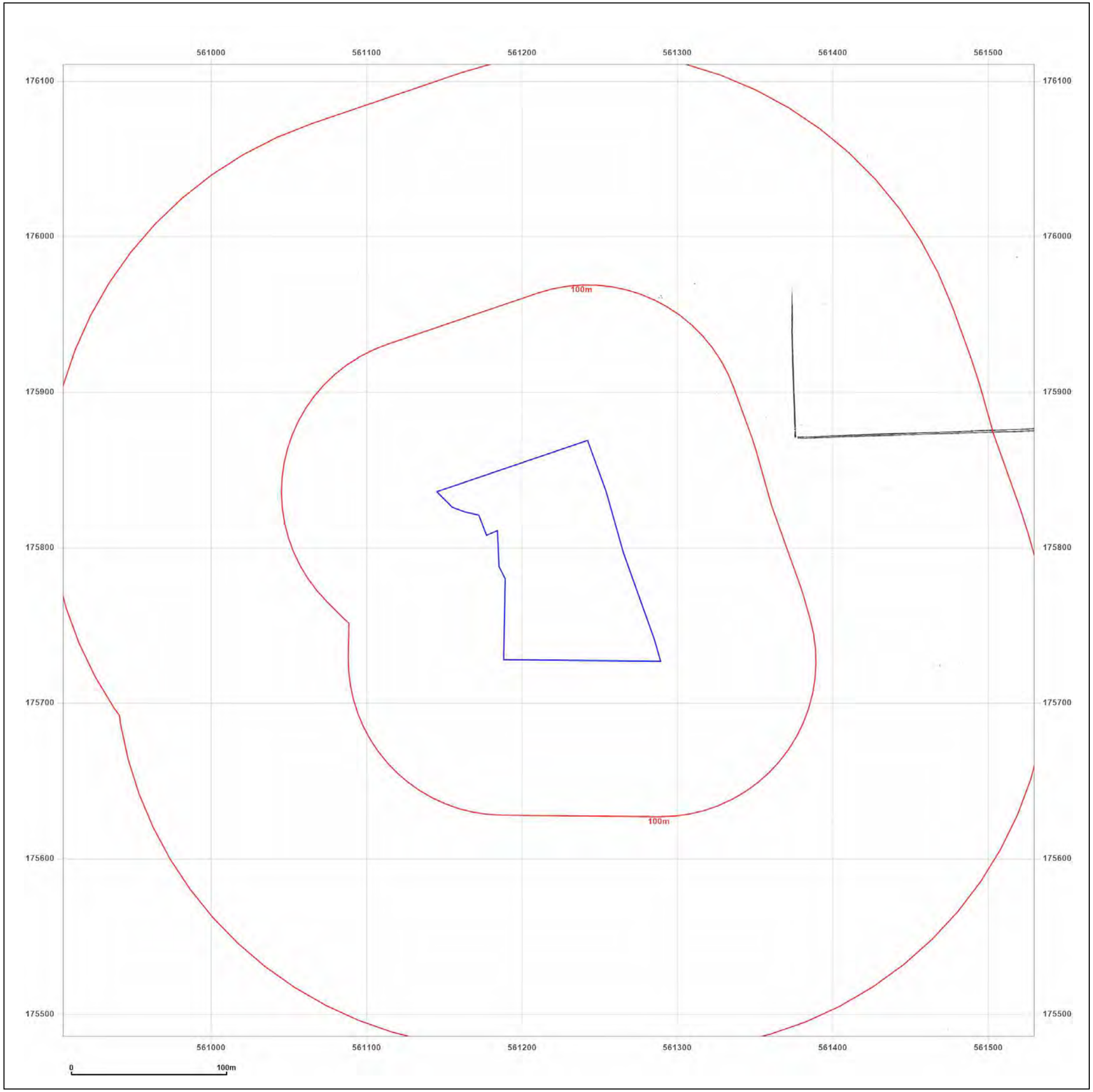

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1866-1870**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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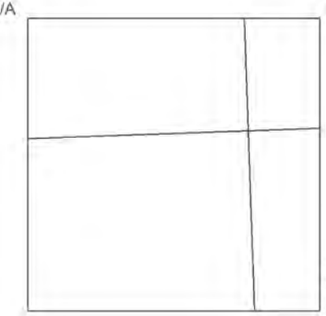
Surveyed 1867
Revised 1867
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1866
Revised 1866
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1870
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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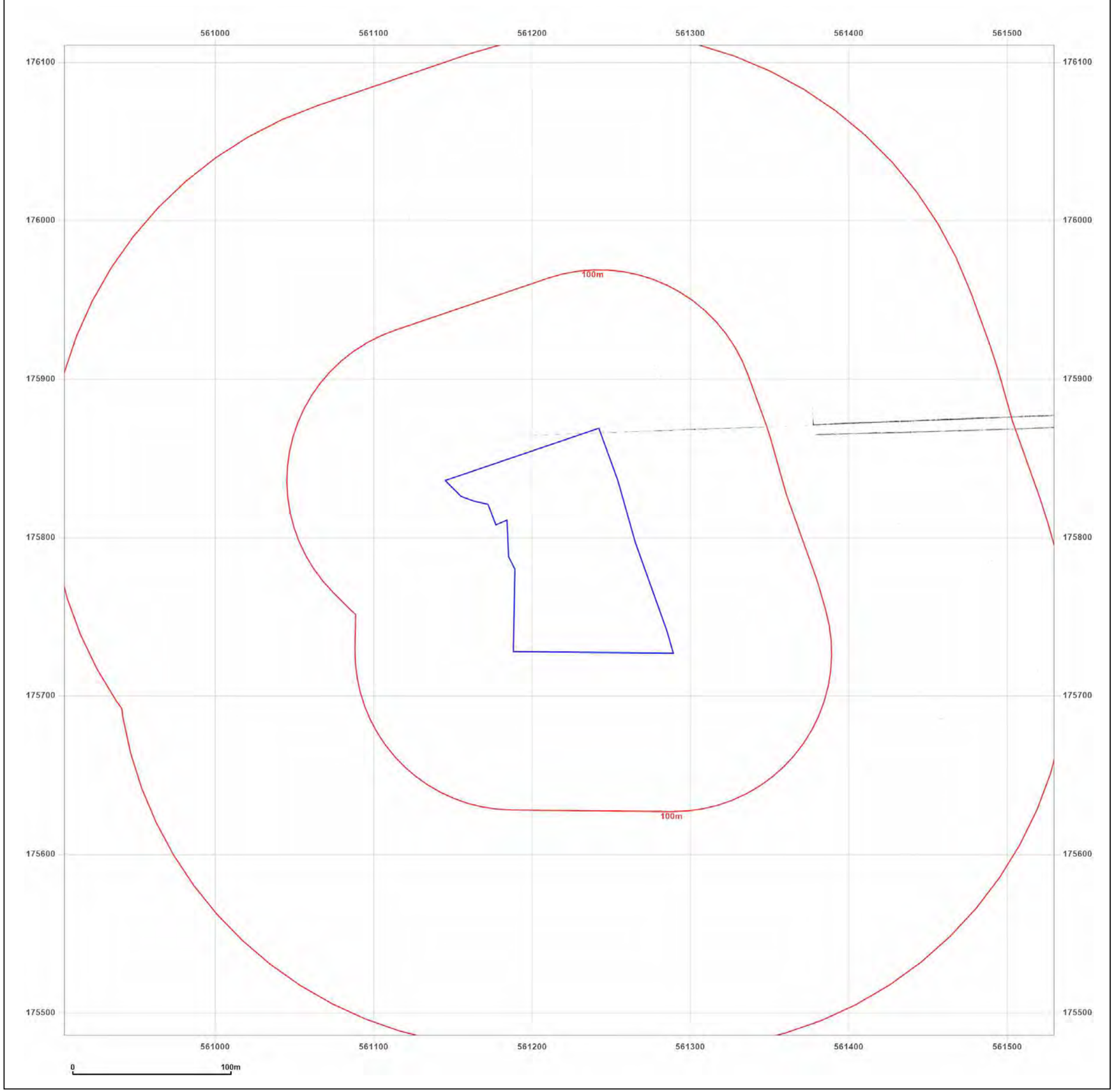

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1866-1870**

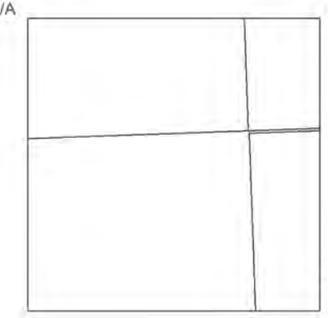
Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1866
Revised 1866
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1867
Revised 1867
Edition N/A
Copyright N/A
Levelled N/A



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

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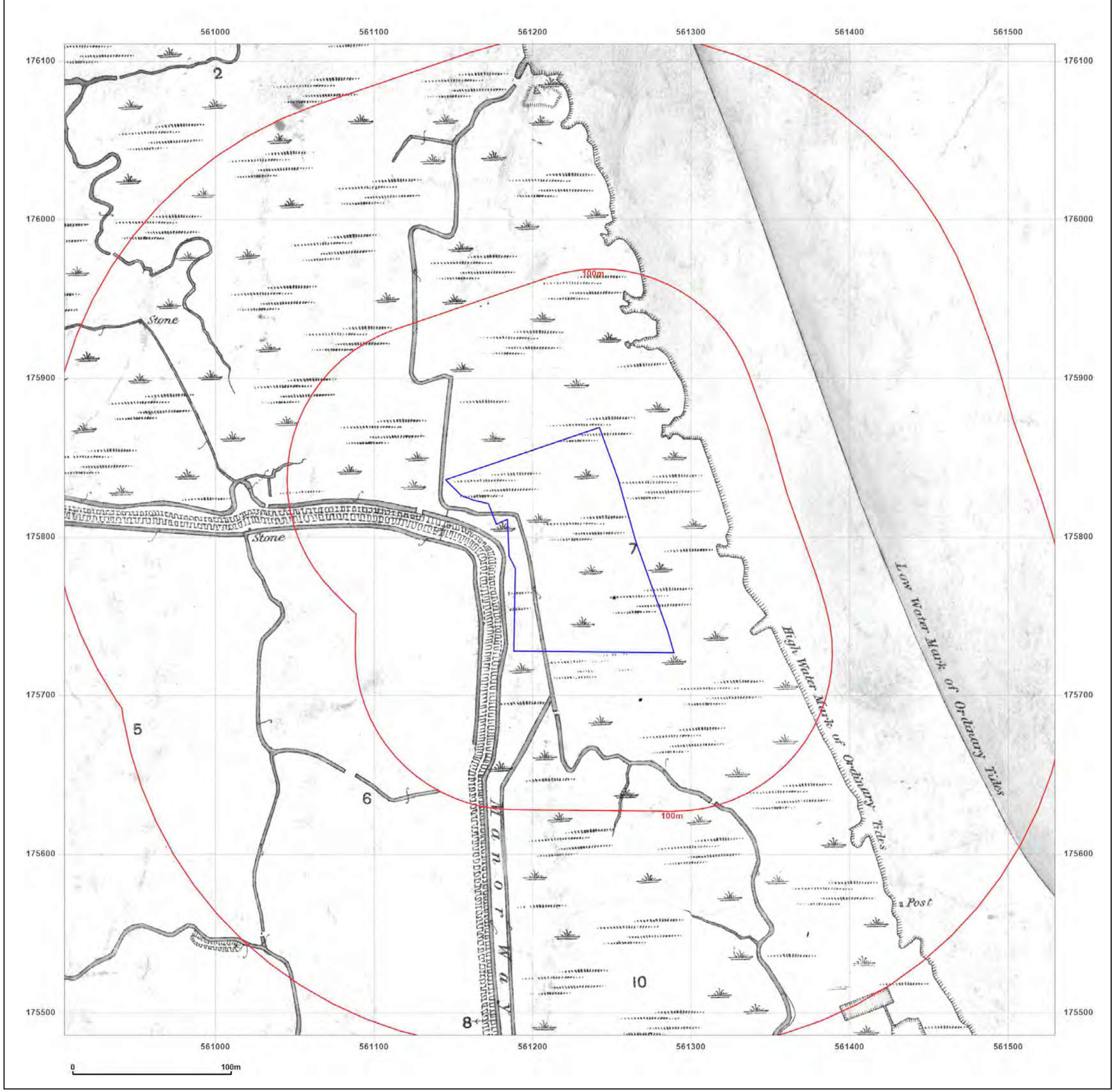

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1872**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1872
Revised 1872
Edition N/A
Copyright N/A
Levelled N/A

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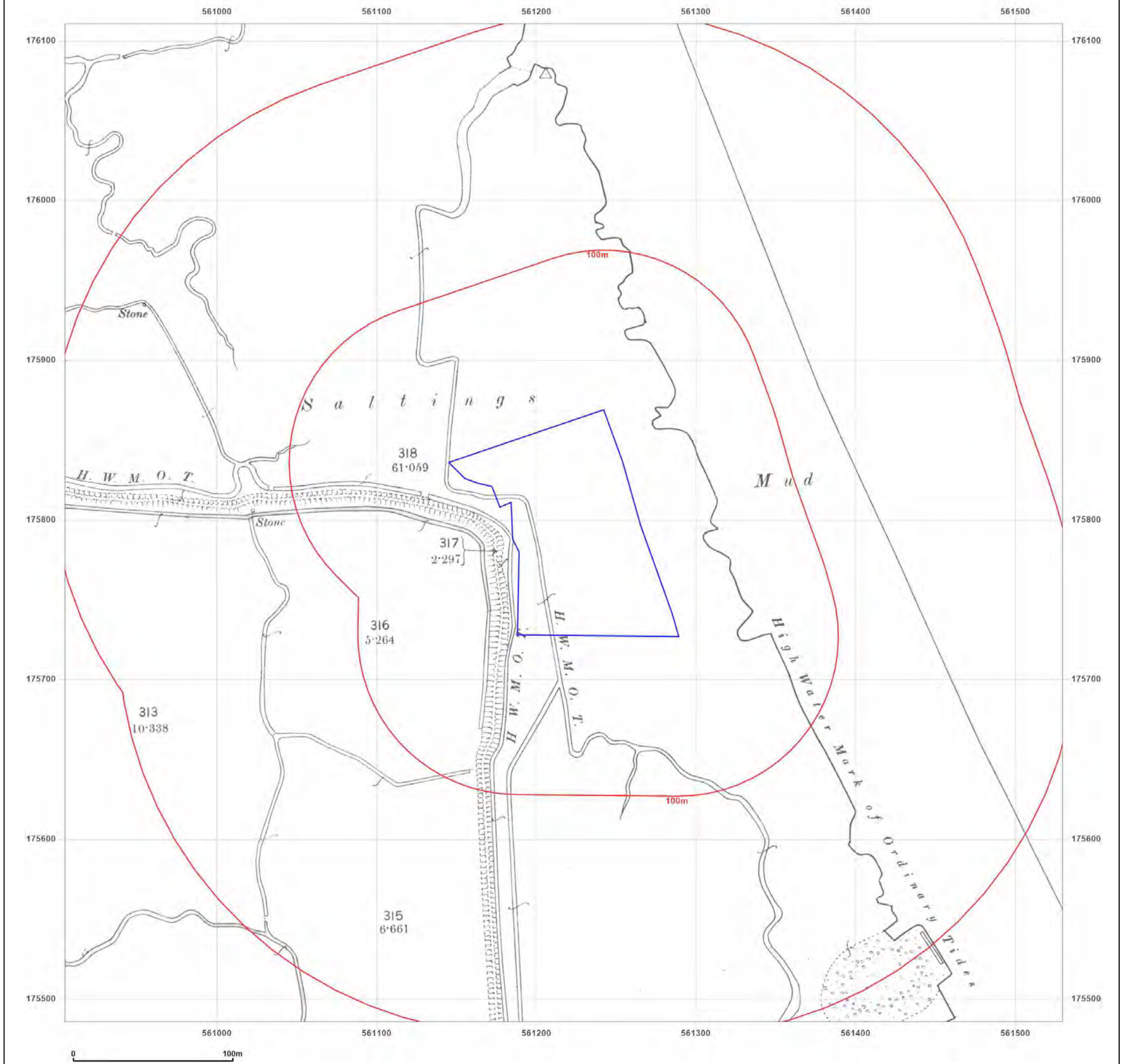

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1897**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1897
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A

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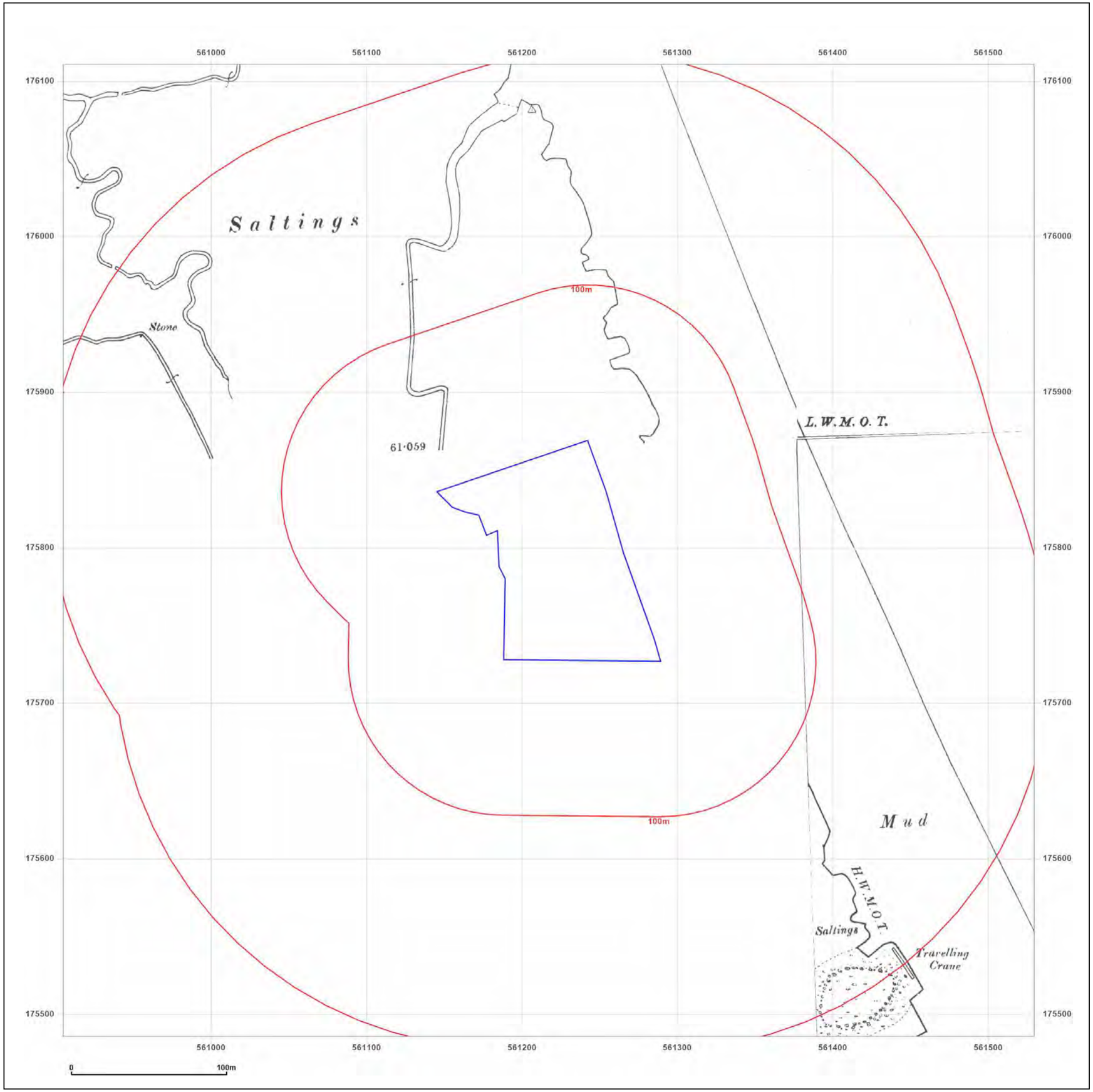

Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1897-1898**

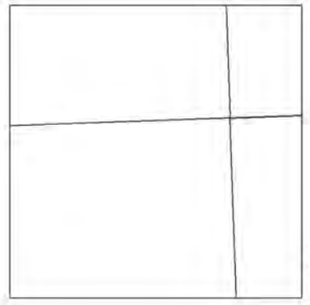
Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1897
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1897
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1898
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

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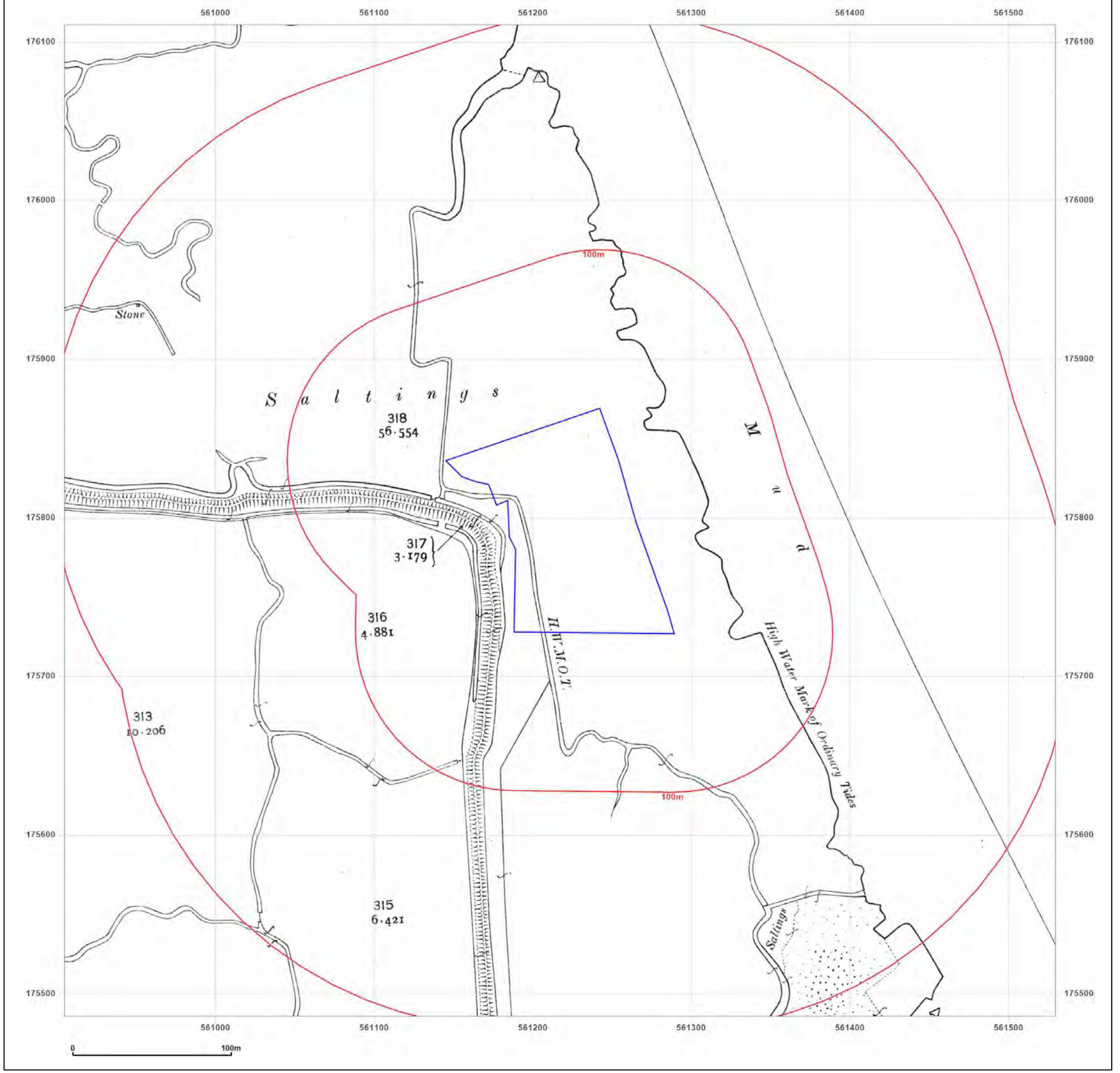

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1909**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1864
Revised 1907
Edition 1909
Copyright N/A
Levelled N/A

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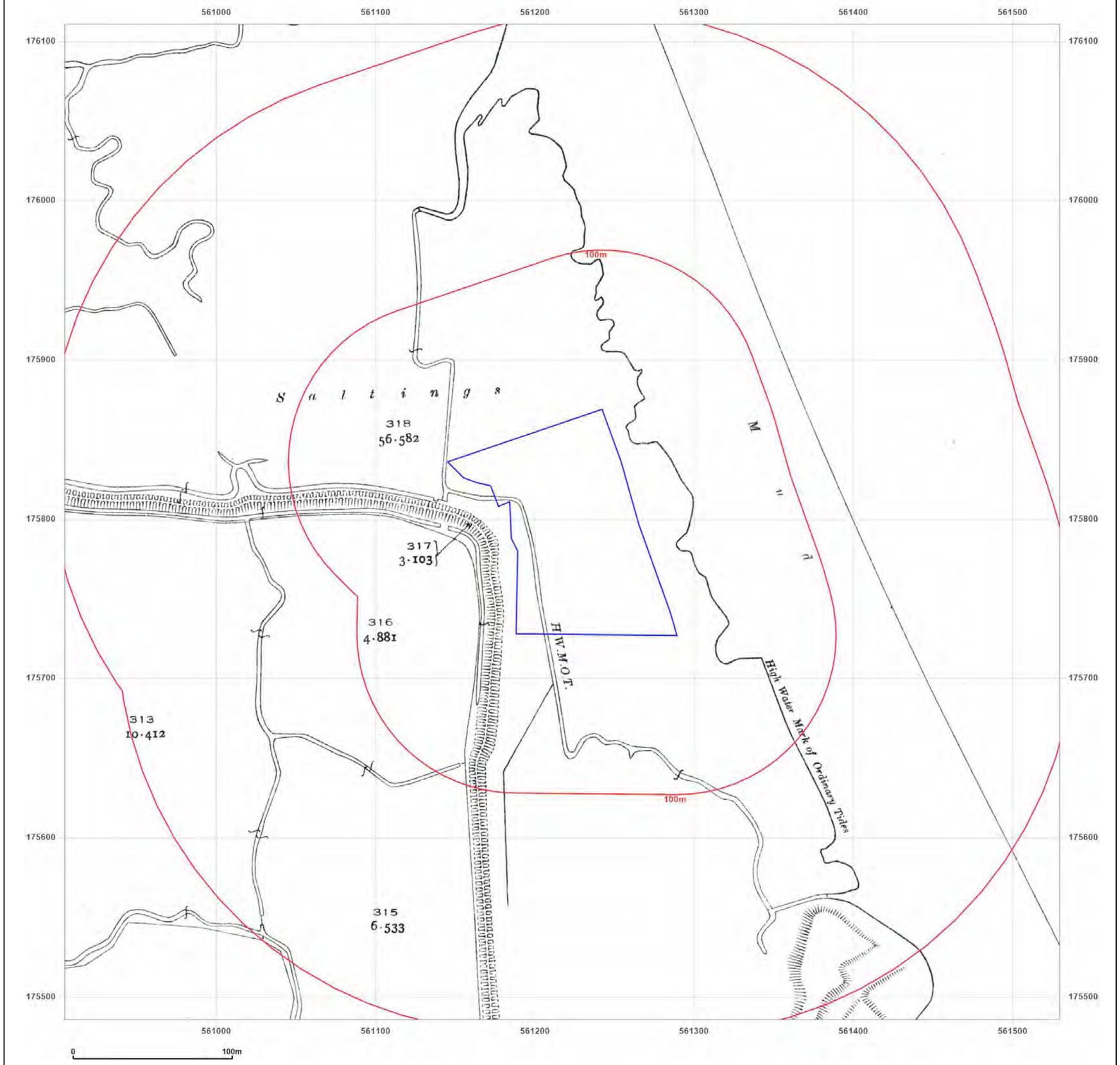

Groundsure INSIGHTS

Site Details:

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ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1932
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 09 December 2021

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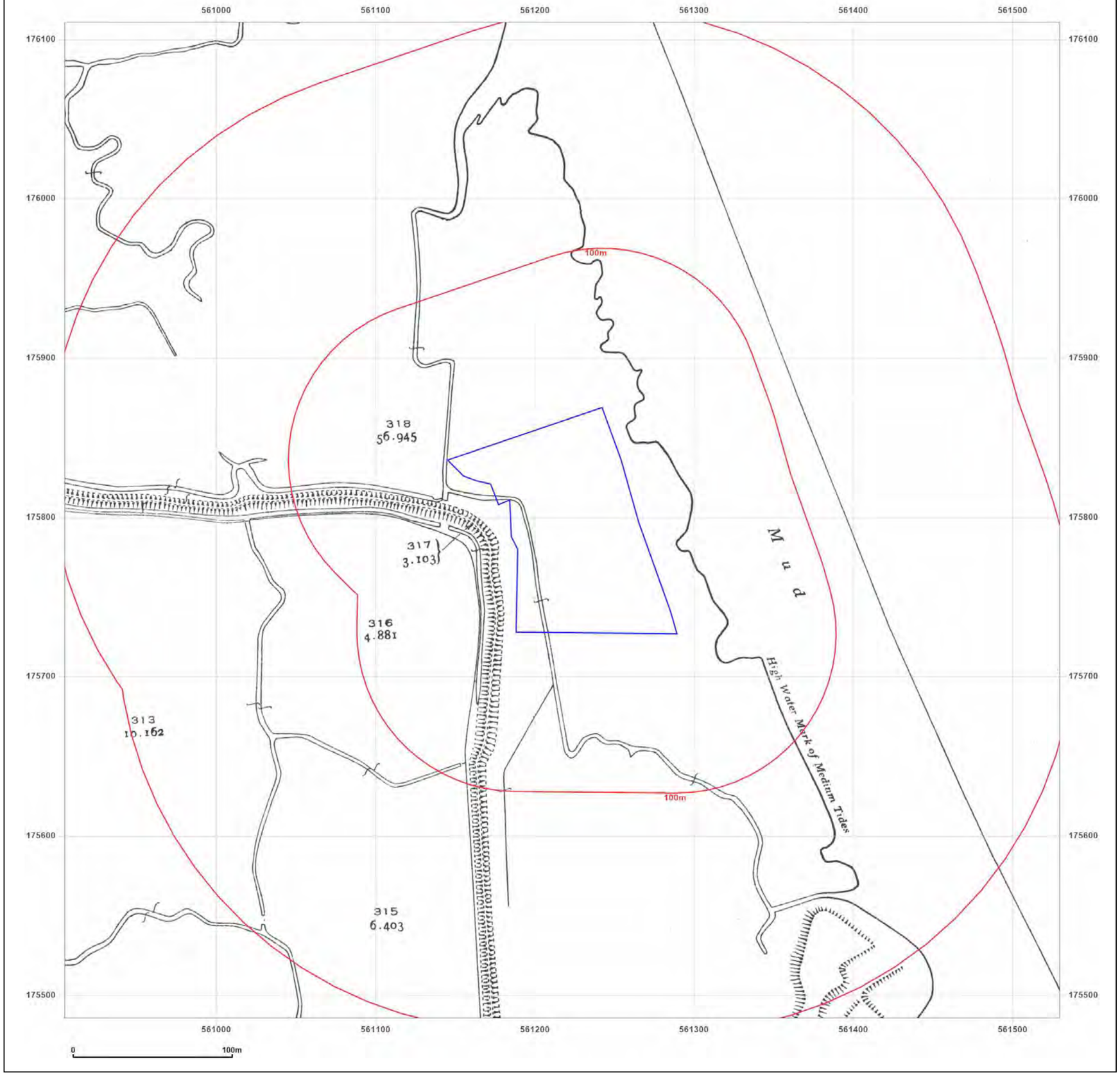

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series
Map date: **1939**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1939
Revised 1939
Edition N/A
Copyright N/A
Levelled N/A

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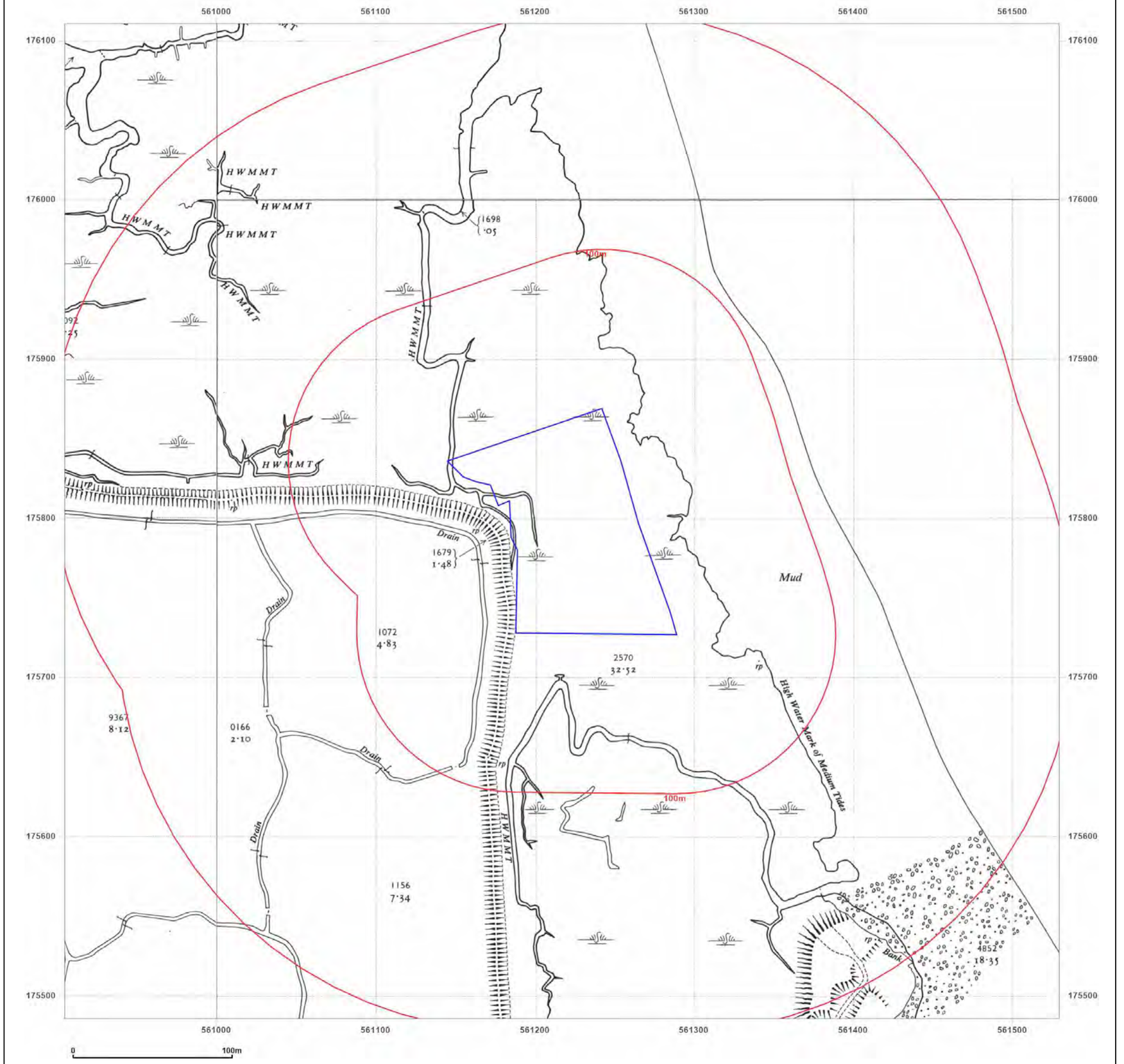

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1952**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled 1948

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled 1948

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled 1952

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1970-1971**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1952
Revised 1970
Edition N/A
Copyright 1970
Levelled 1961

Surveyed 1952
Revised 1970
Edition N/A
Copyright 1971
Levelled 1952

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Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1978**

Scale: 1:2,500

Printed at: 1:2,500

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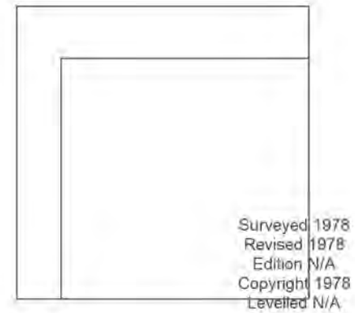

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Map legend available at:
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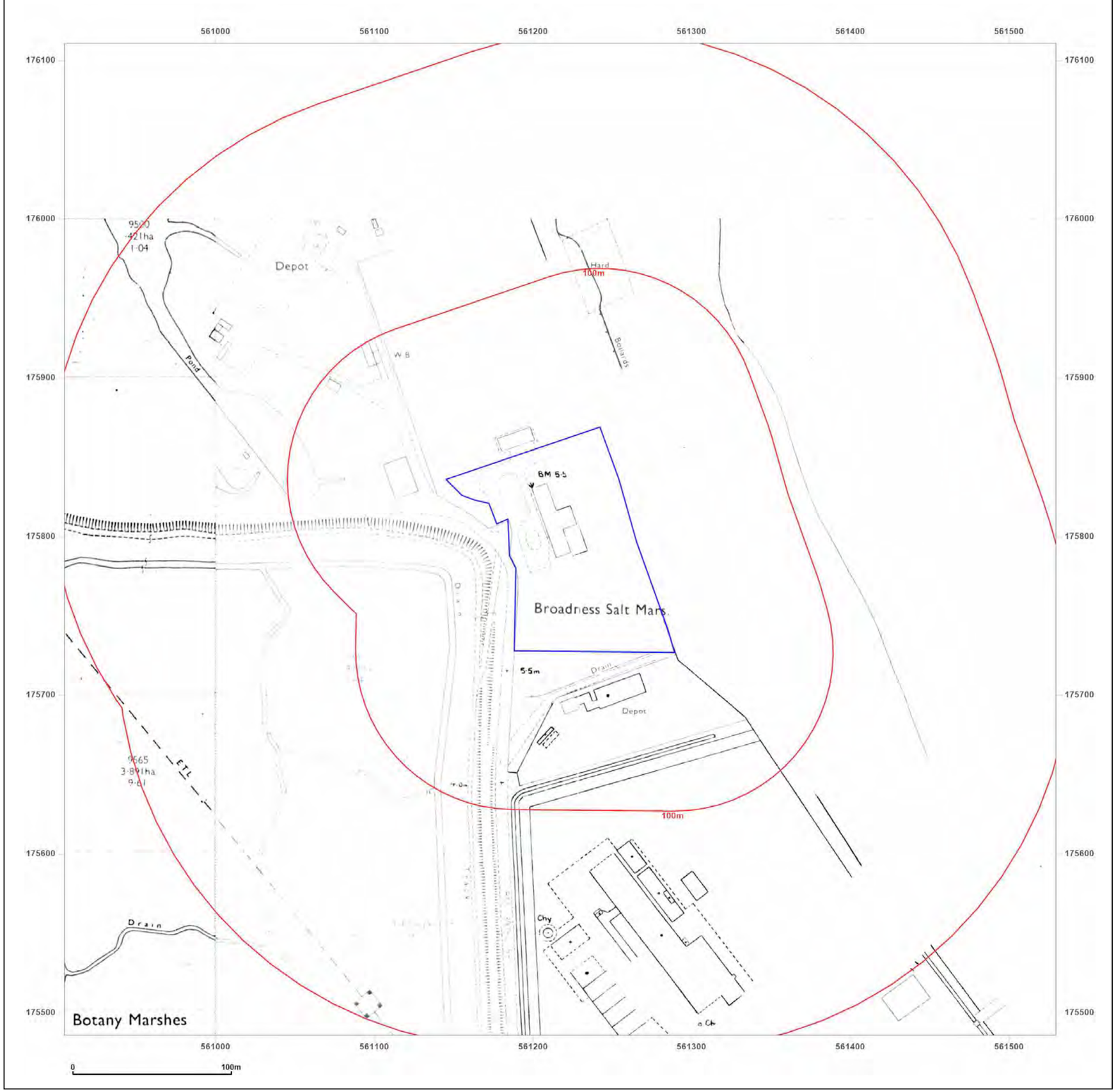

Groundsure INSIGHTS

Site Details:

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ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1984-1989**

Scale: 1:2,500

Printed at: 1:2,500

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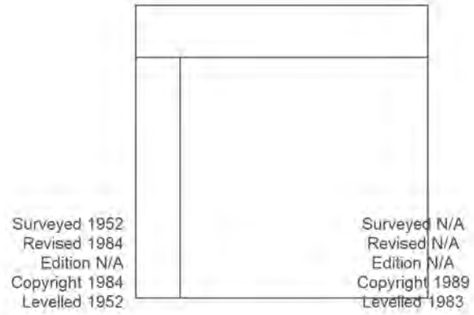

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Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1989-1992**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1992
Levelled N/A

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

Surveyed 1983
Revised 1989
Edition N/A
Copyright 1989
Levelled 1983

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Groundsure INSIGHTS

Site Details:

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ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
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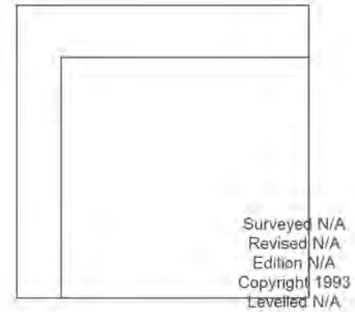

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Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

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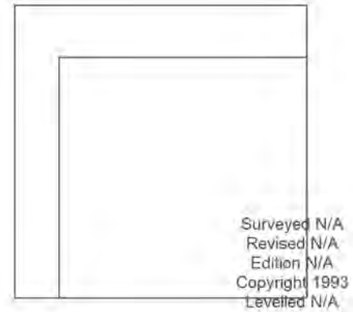

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Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

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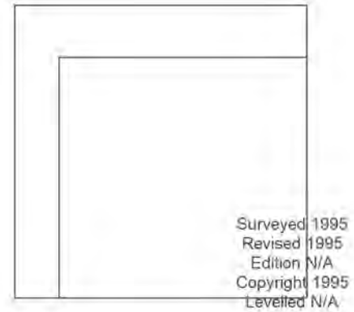

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Production date: 09 December 2021

Map legend available at:
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Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

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W E
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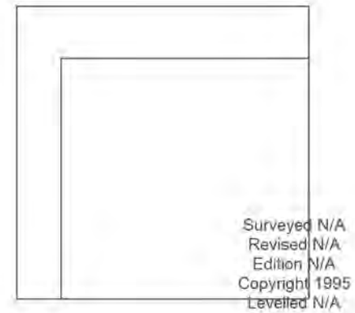

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Production date: 09 December 2021

Map legend available at:
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Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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W: www.groundsure.com

Production date: 09 December 2021

Map legend available at:
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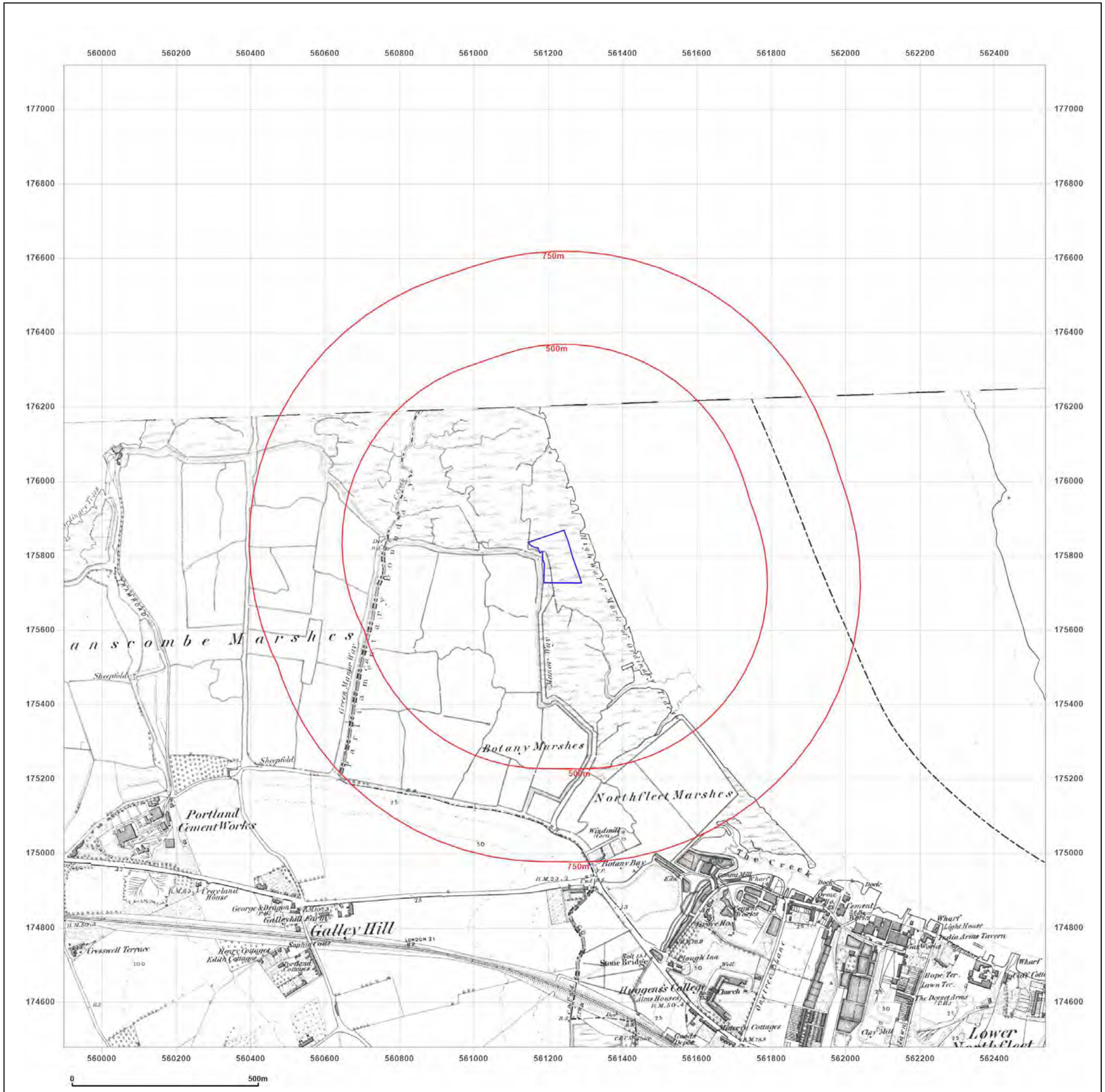

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1863-1865**

Scale: 1:10,560

Printed at: 1:10,560

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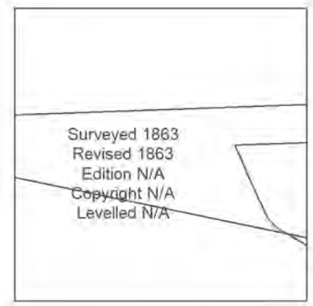

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Production date: 09 December 2021

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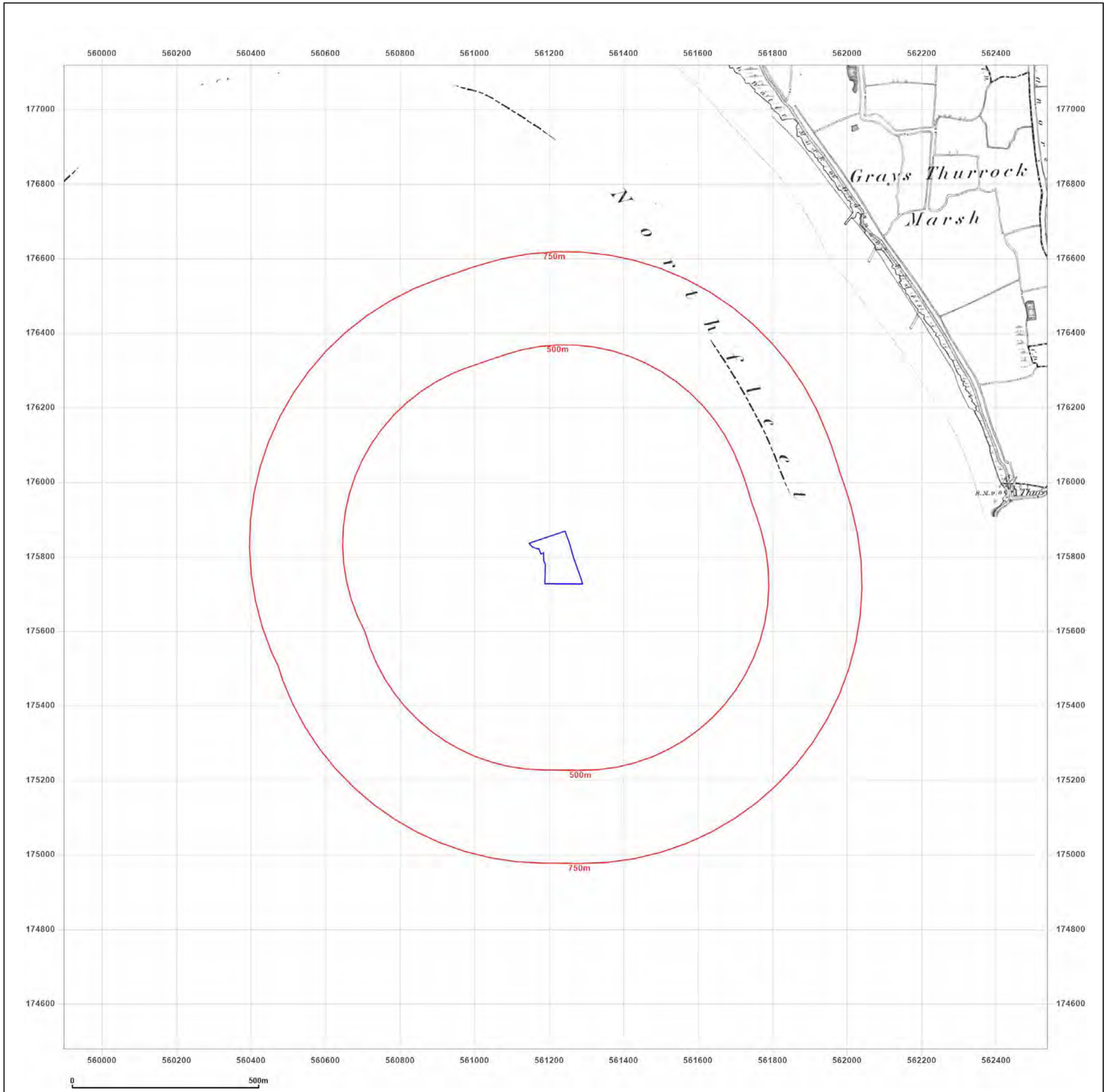

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1865**

Scale: 1:10,560

Printed at: 1:10,560

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W E
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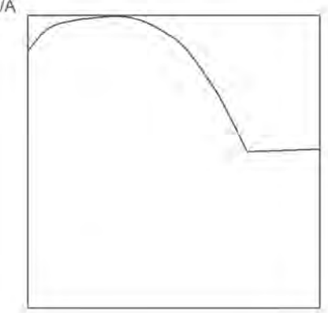
Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A



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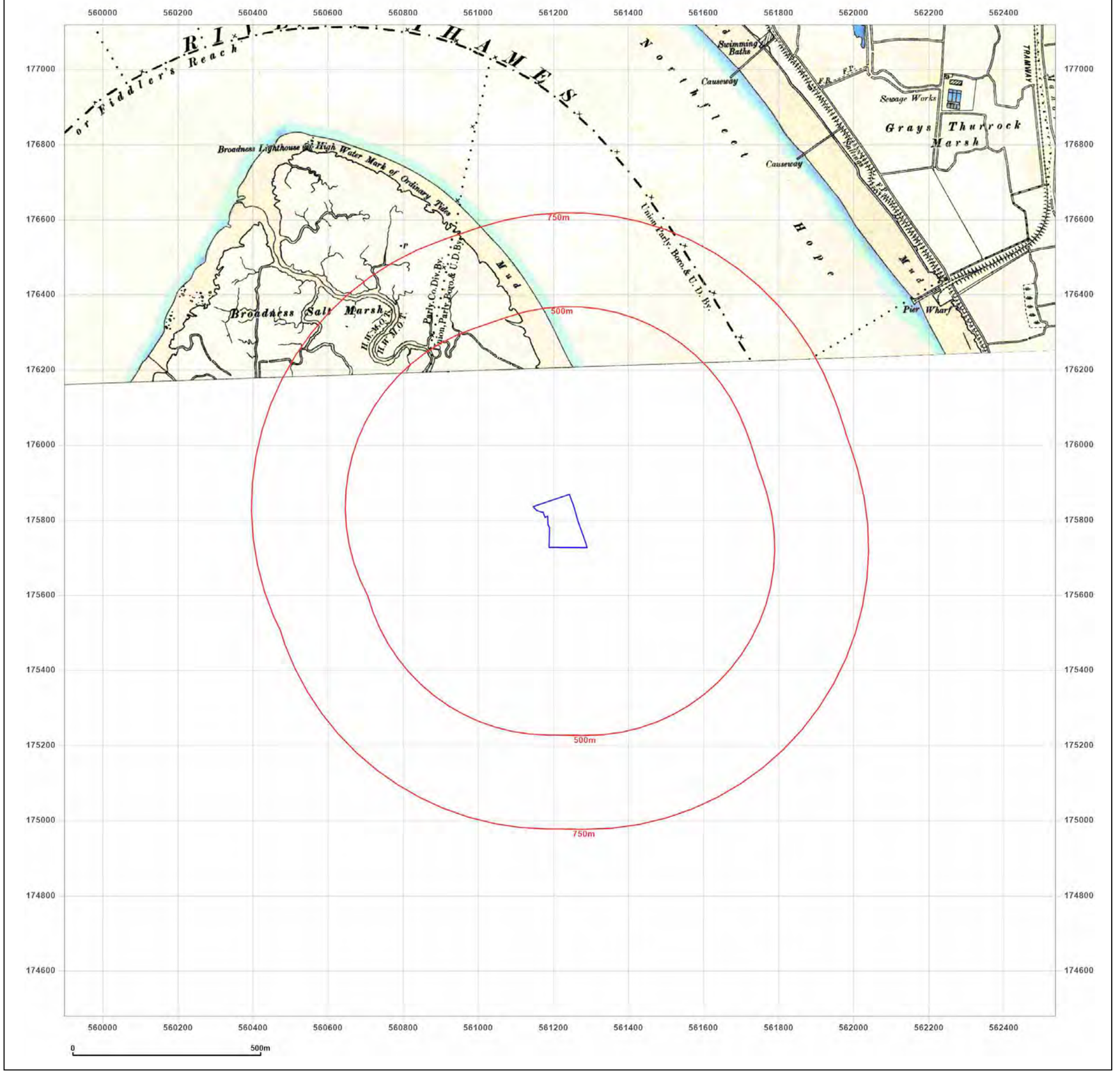

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1888**

Scale: 1:10,560

Printed at: 1:10,560

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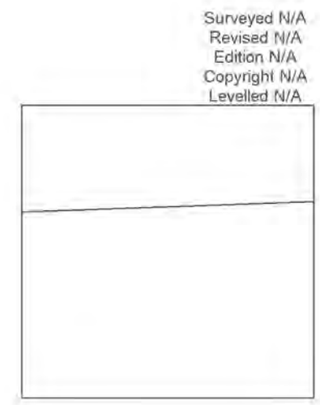

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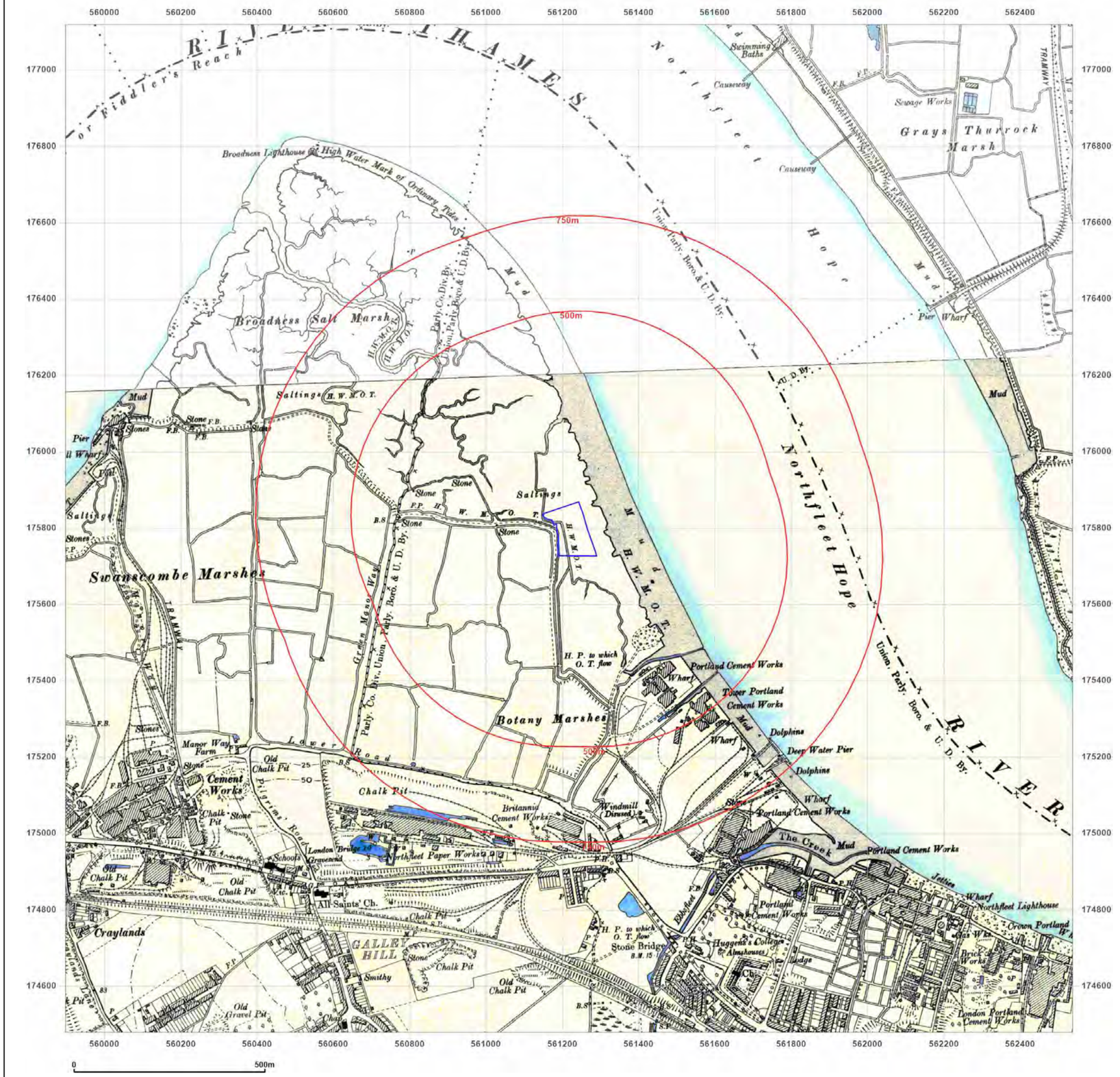

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1895**

Scale: 1:10,560

Printed at: 1:10,560

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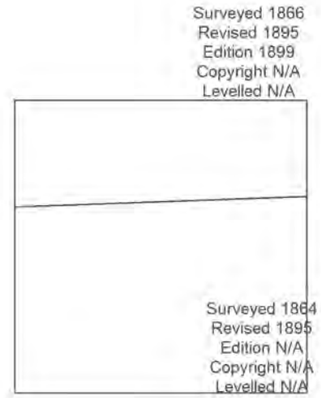

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Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1895**

Scale: 1:10,560

Printed at: 1:10,560

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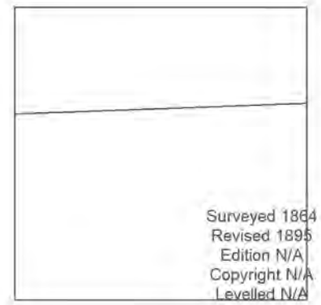

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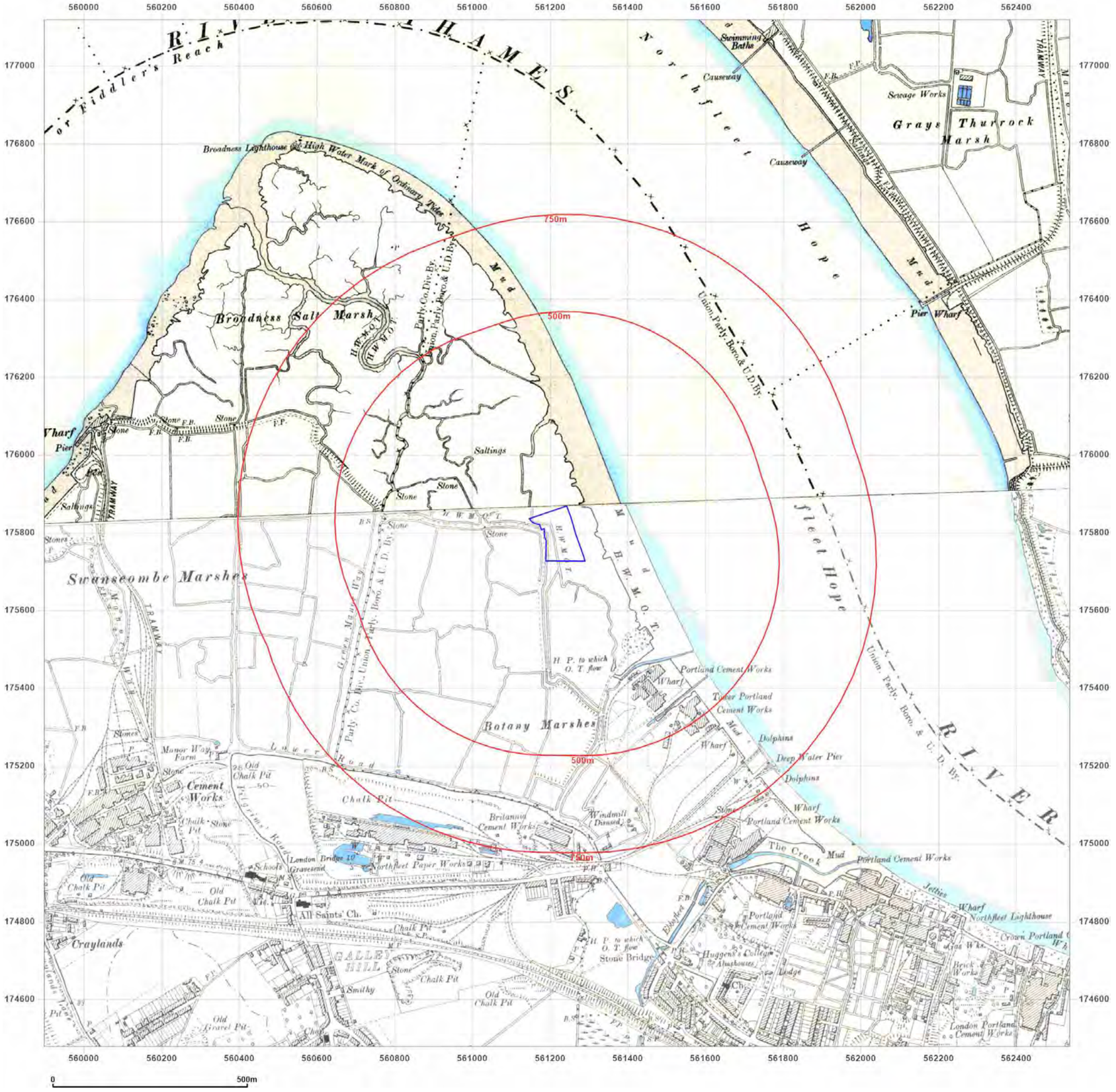

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1895-1898**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1866
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

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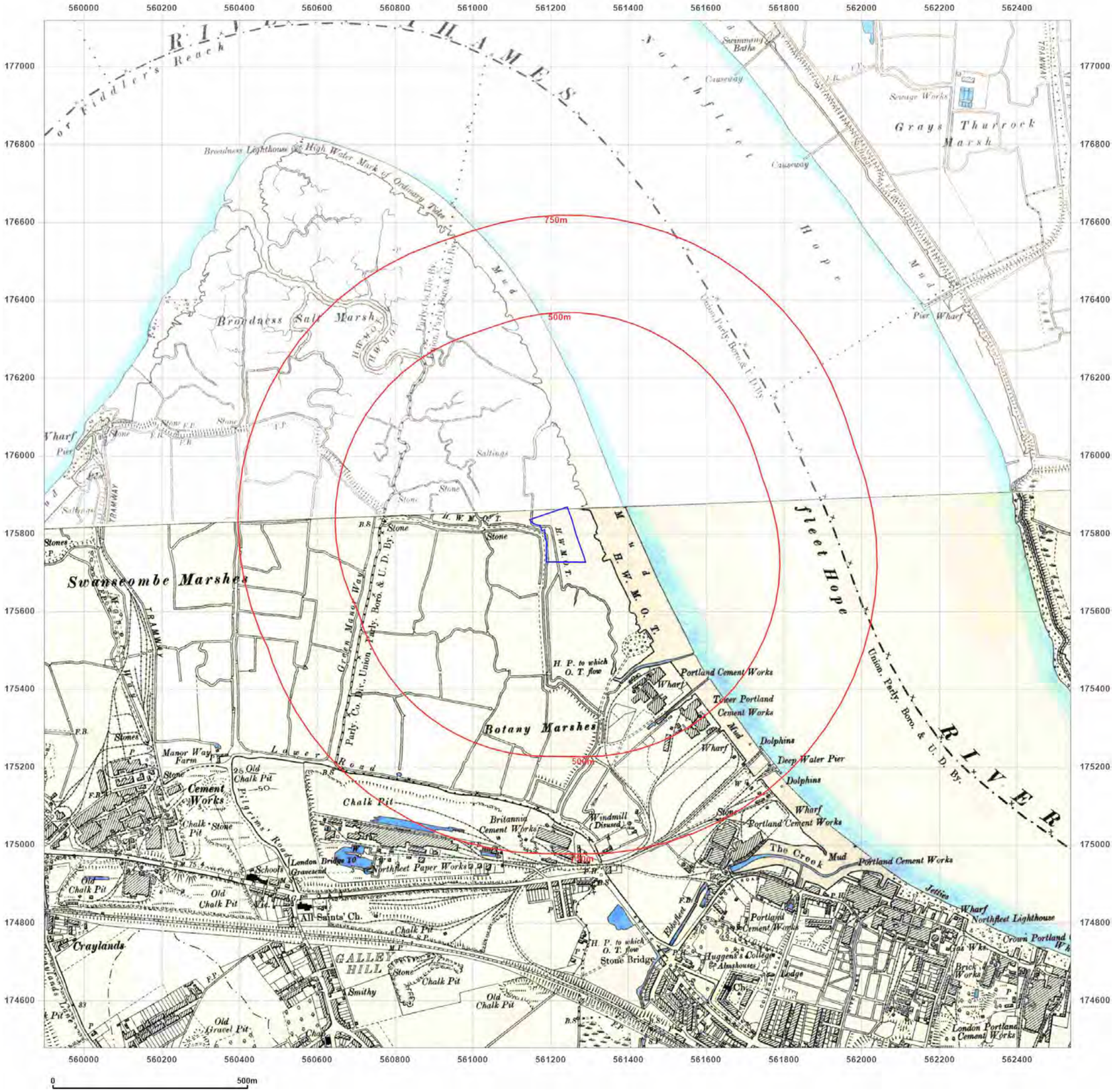

Groundsure INSIGHTS

Site Details:

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ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1895-1898**

Scale: 1:10,560

Printed at: 1:10,560

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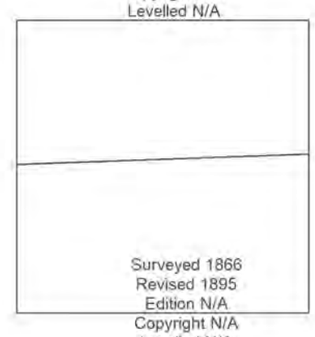
Surveyed 1866
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1866
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 09 December 2021

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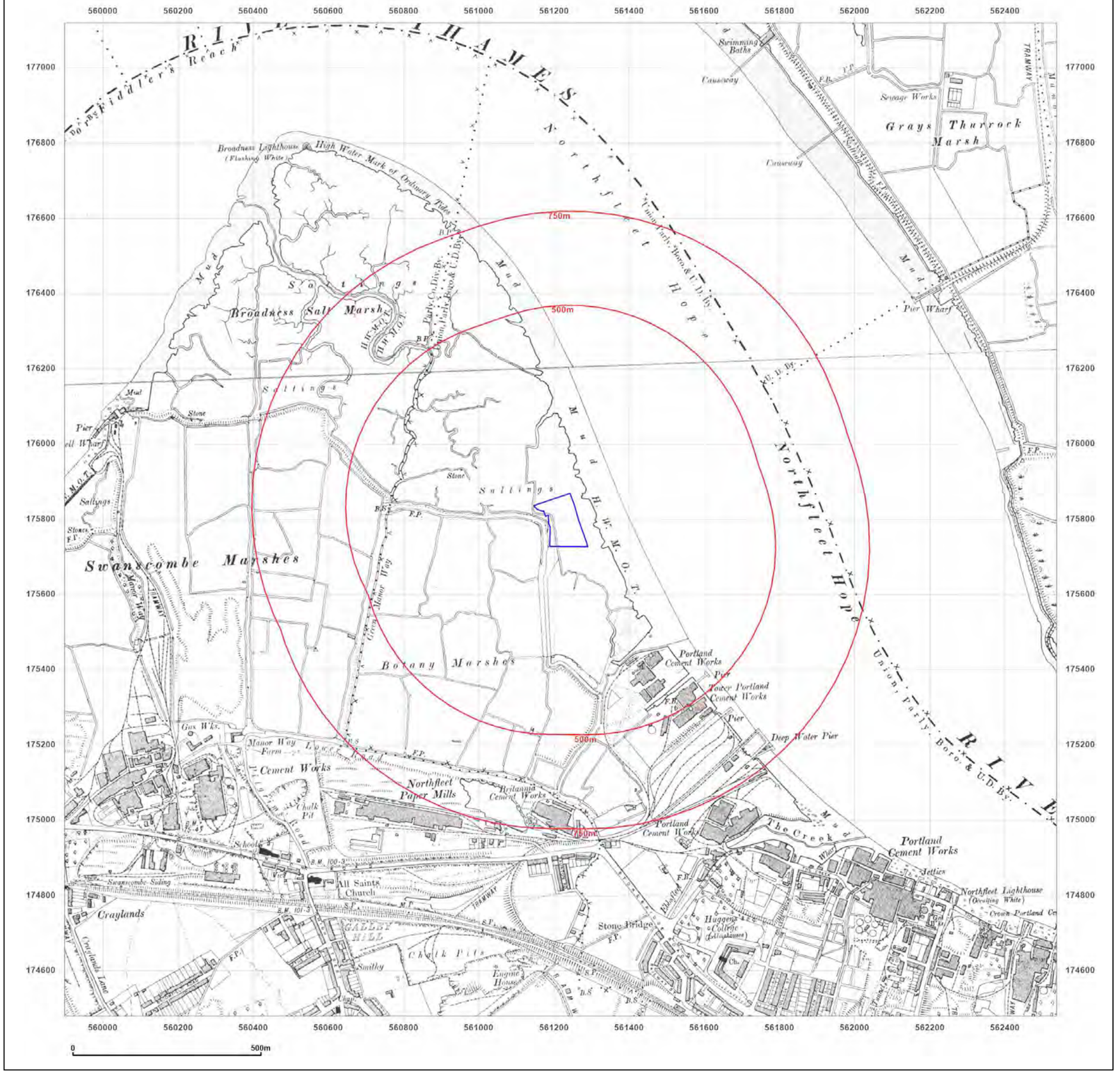

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1907-1910**

Scale: 1:10,560

Printed at: 1:10,560

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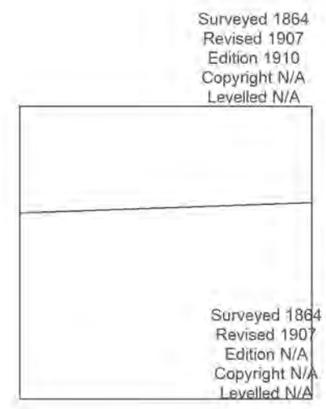

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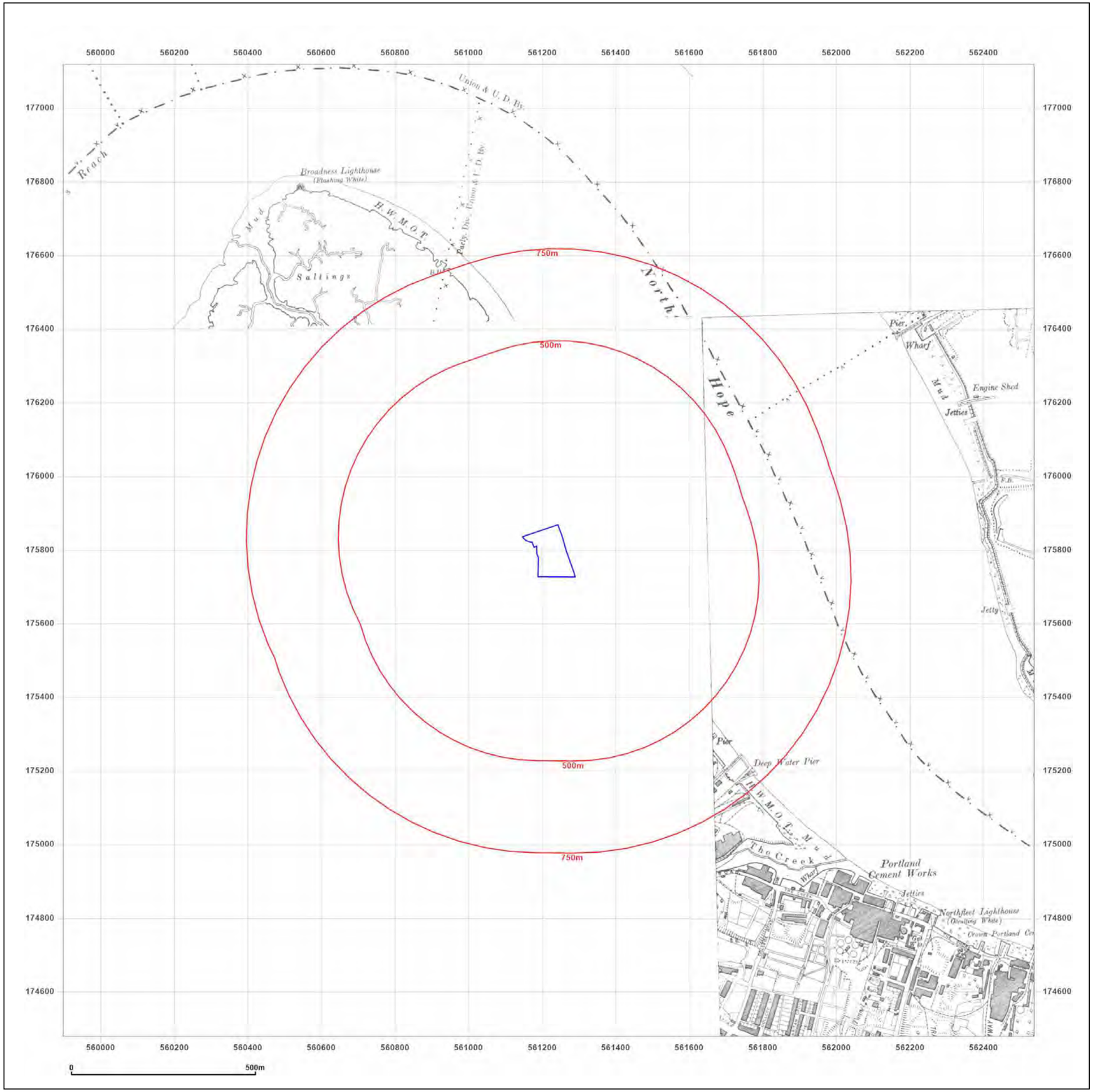

Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1916**

Scale: 1:10,560

Printed at: 1:10,560

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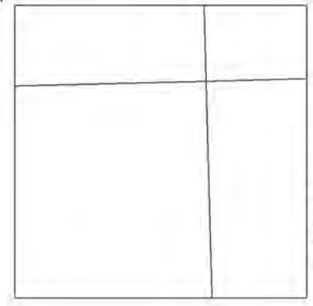
Surveyed 1864
Revised 1916
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1864
Revised 1916
Edition N/A
Copyright N/A
Levelled N/A

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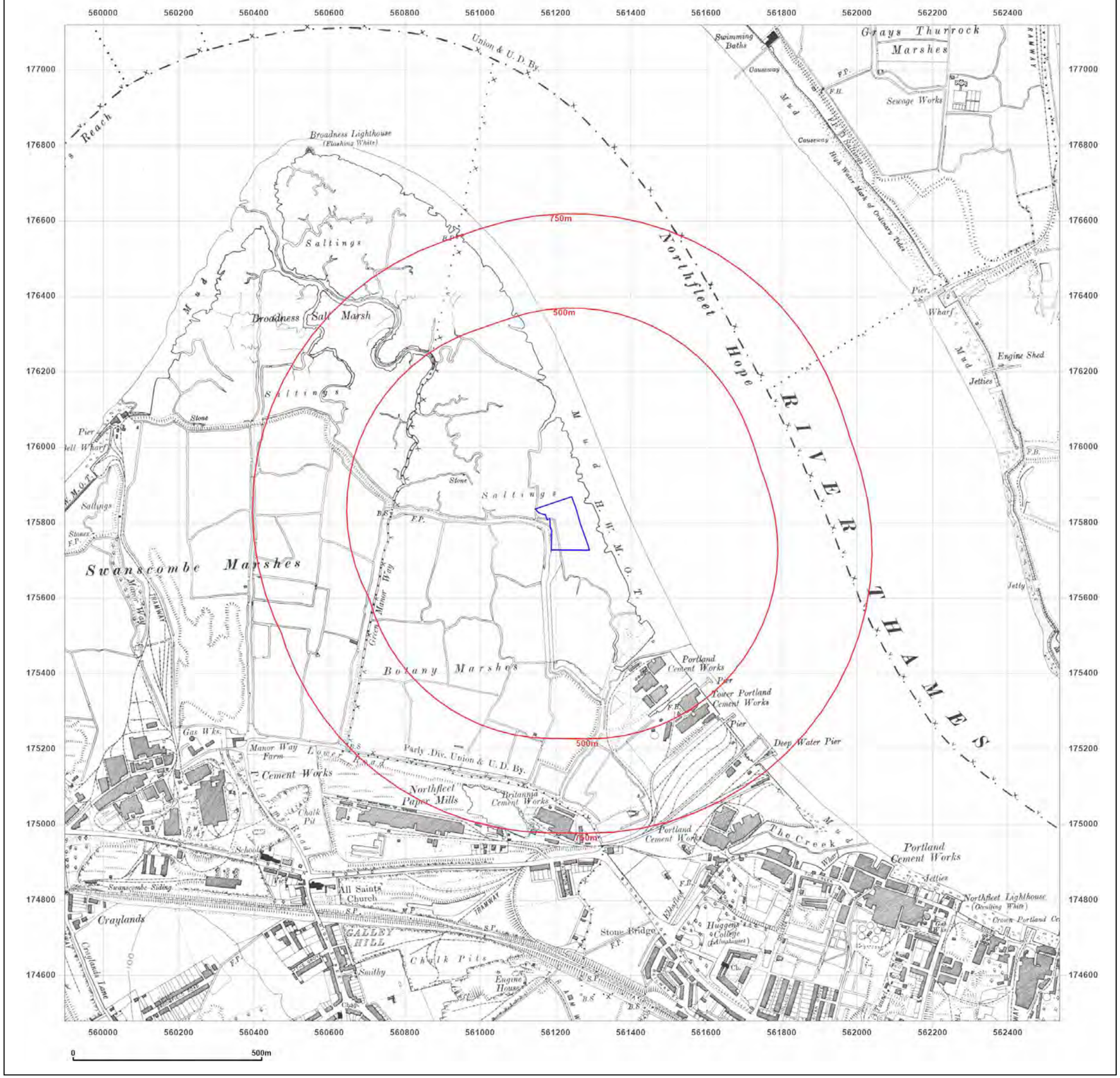

Groundsure INSIGHTS

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1864
Revised 1923
Edition 1923
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

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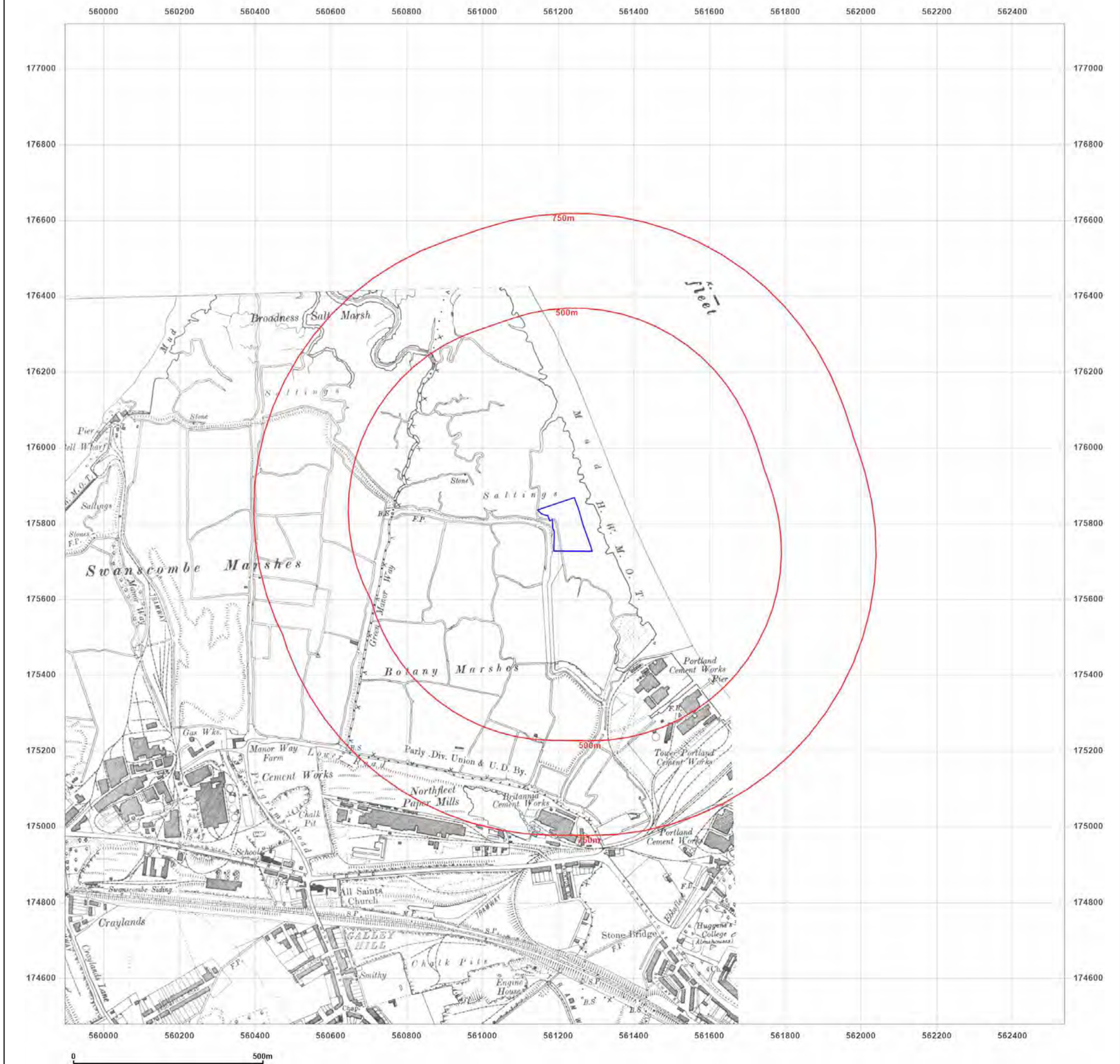

Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

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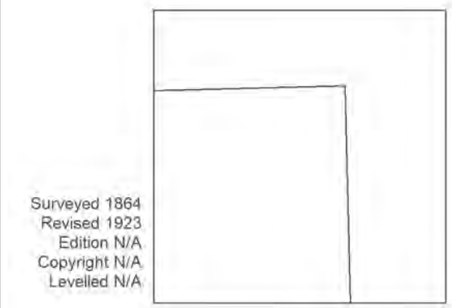

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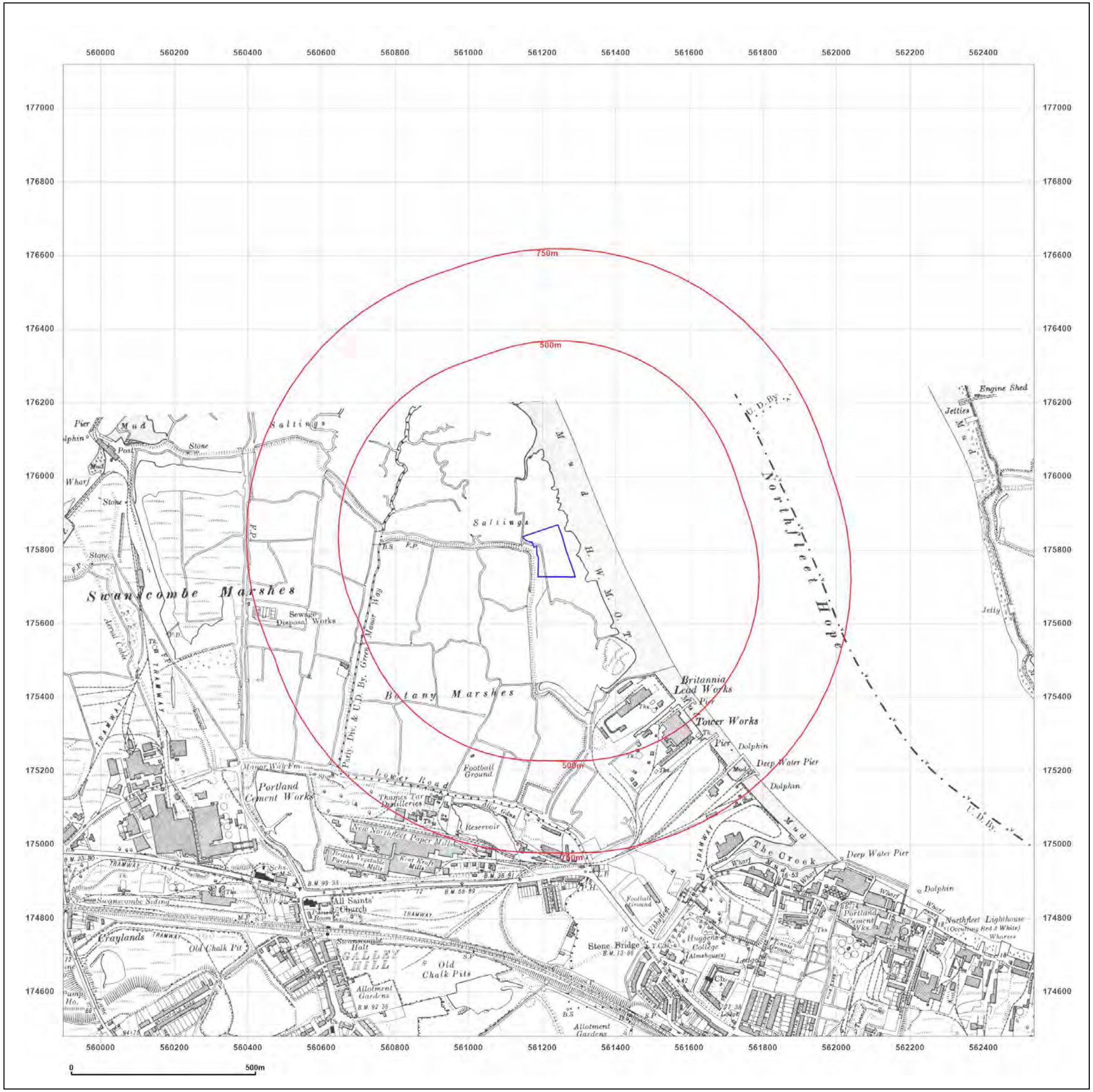

Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1932**

Scale: 1:10,560

Printed at: 1:10,560

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Production date: 09 December 2021

Map legend available at:
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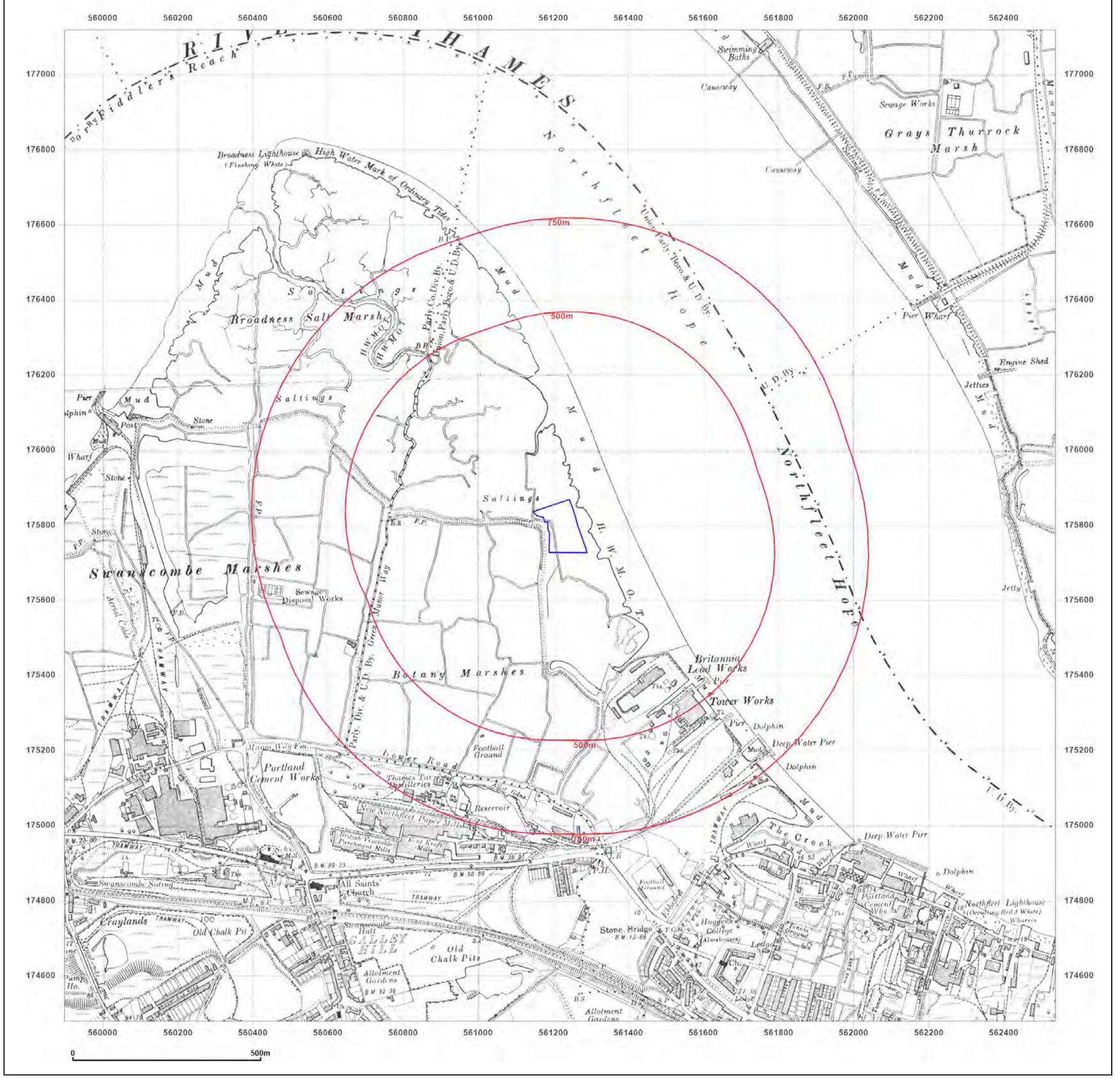

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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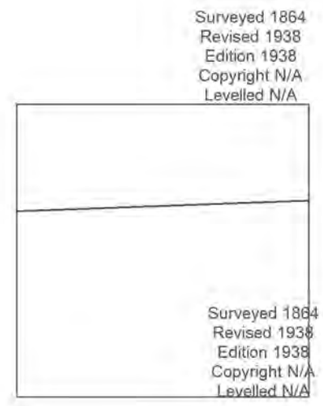

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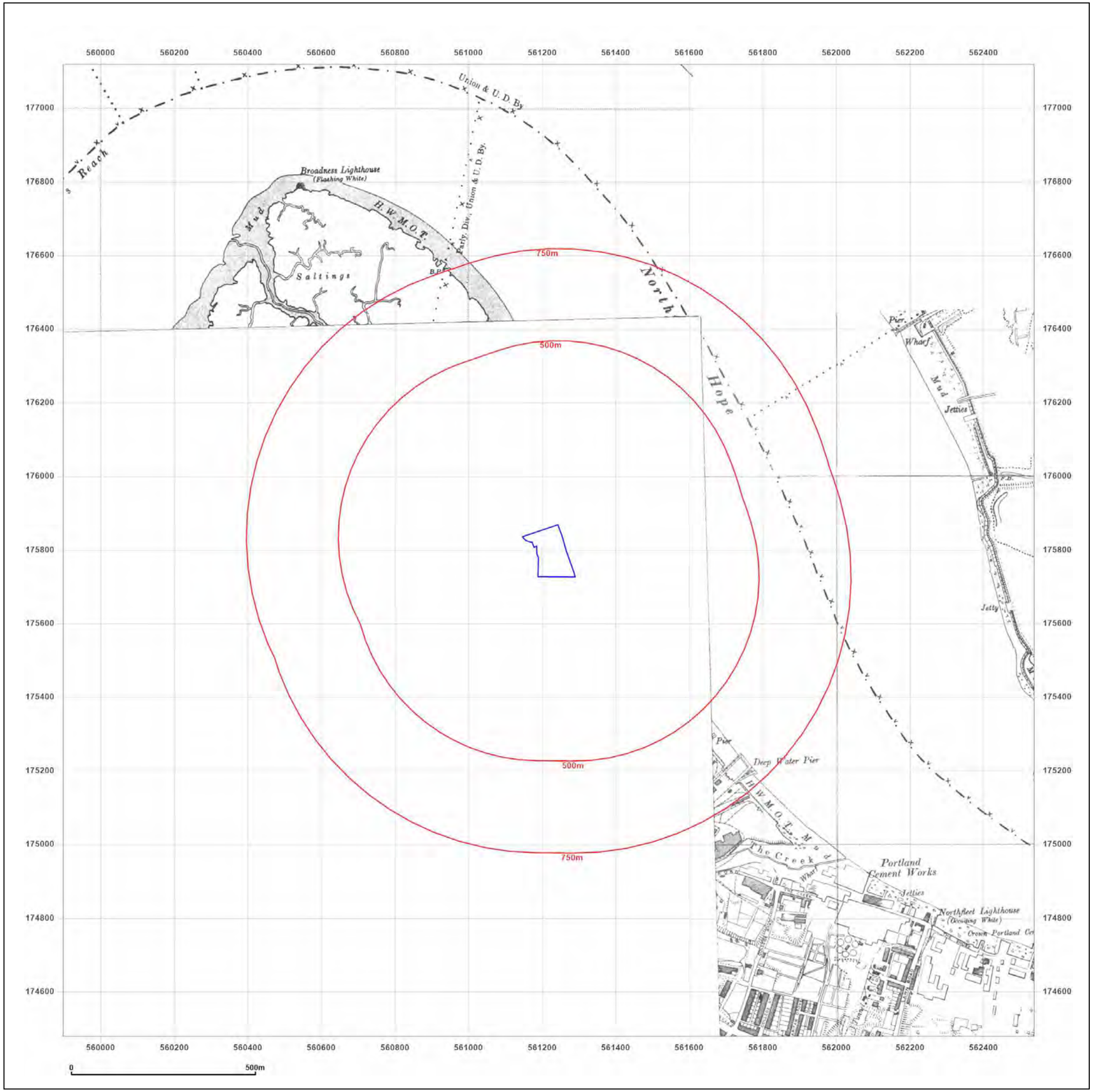

Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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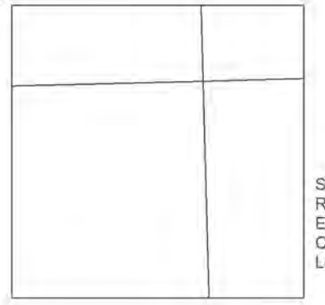
Surveyed 1864
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A



Surveyed 1864
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

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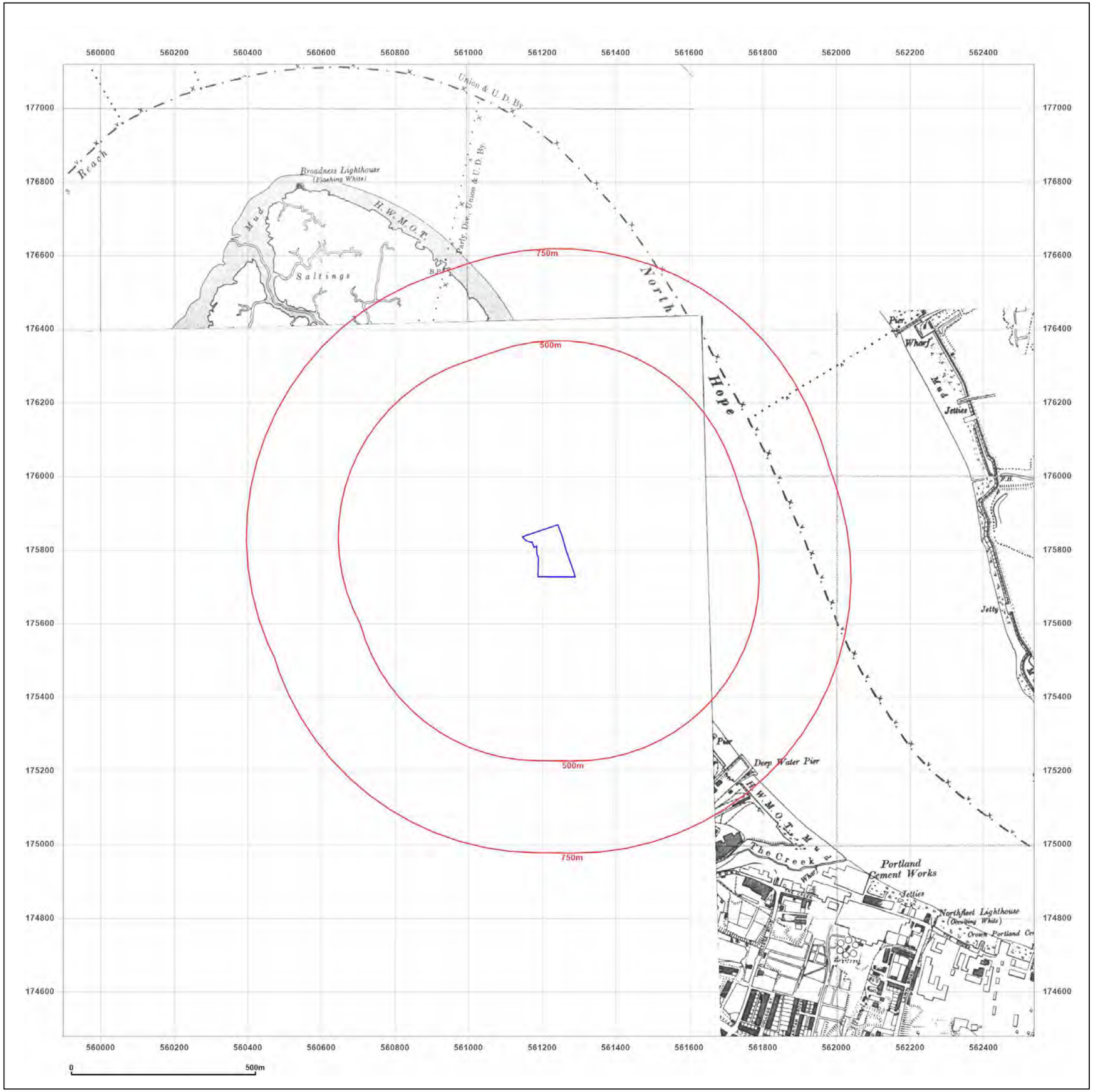

Groundsure INSIGHTS

Site Details:

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ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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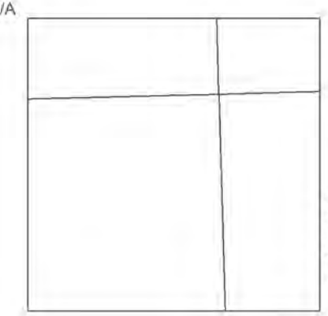
Surveyed 1864
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1866
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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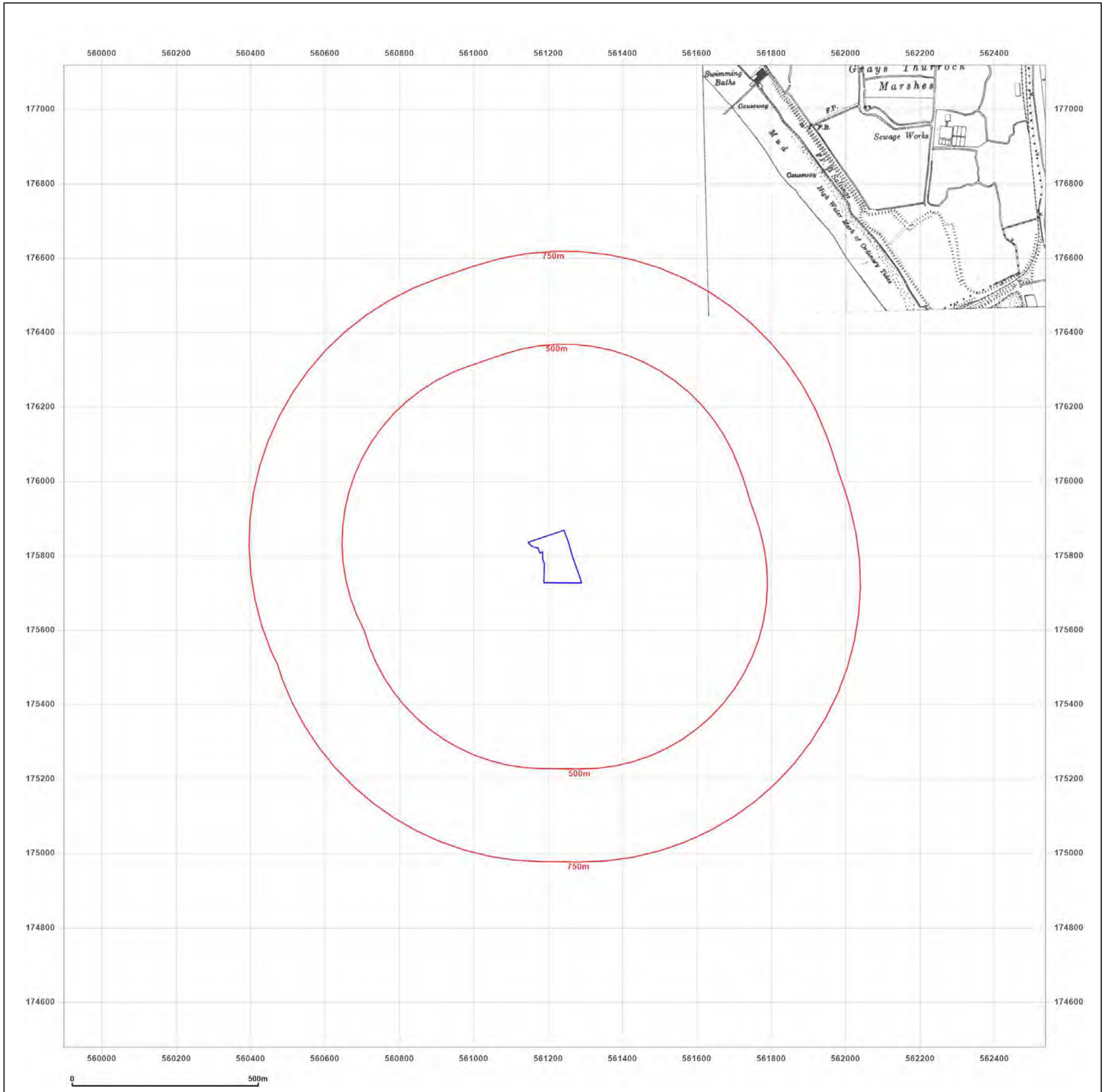

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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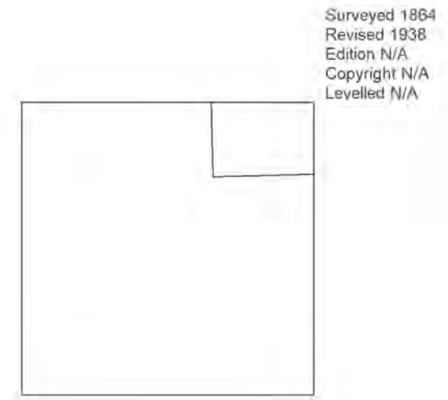

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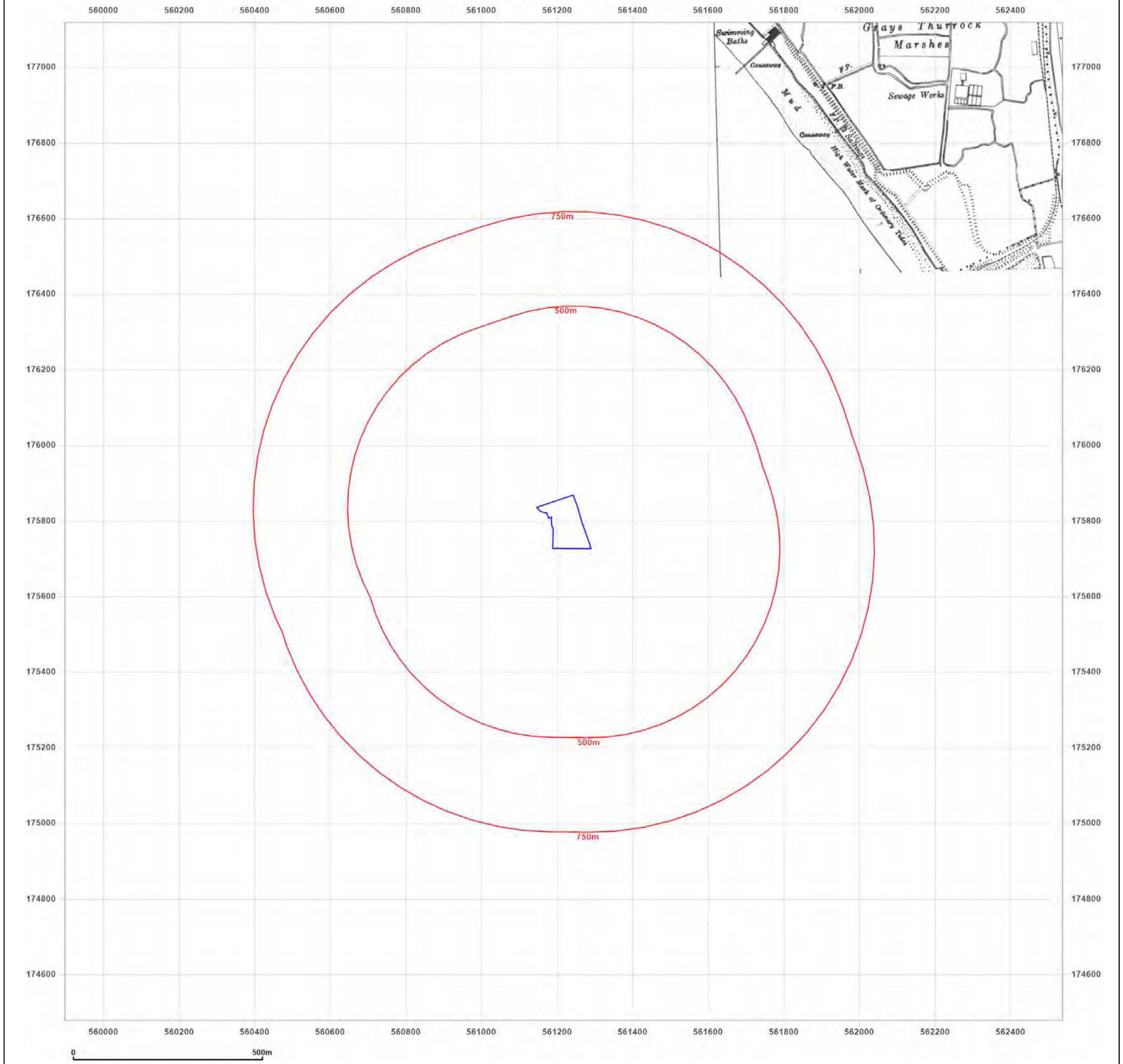

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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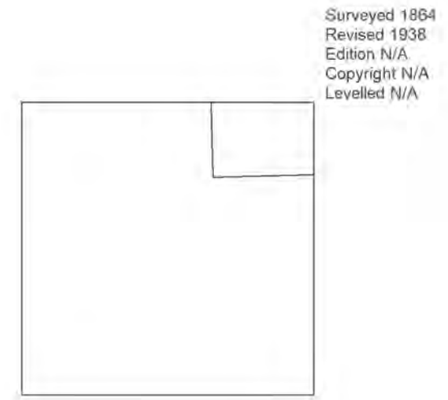

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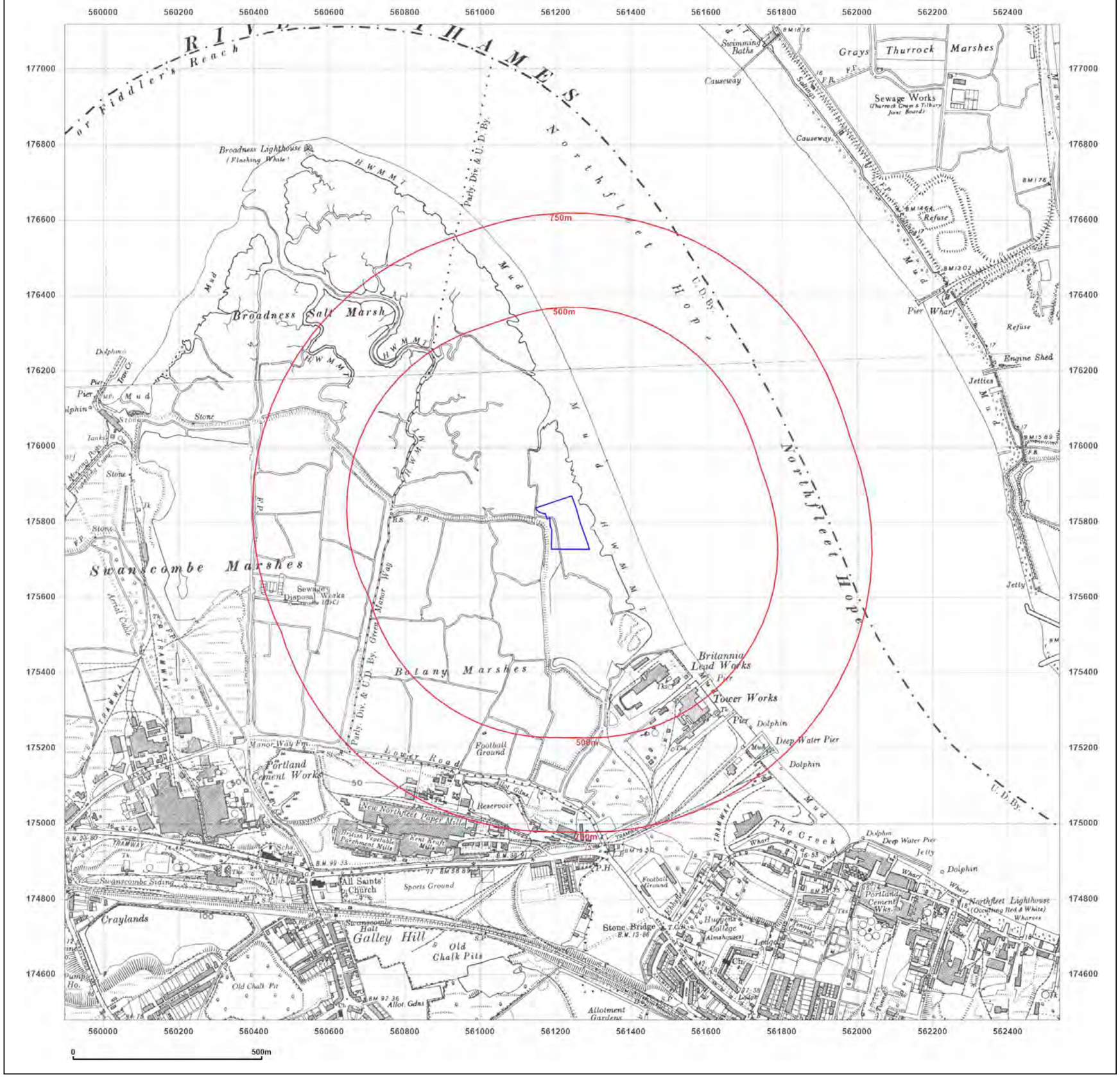

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: County Series

Map date: **1946-1947**

Scale: 1:10,560

Printed at: 1:10,560

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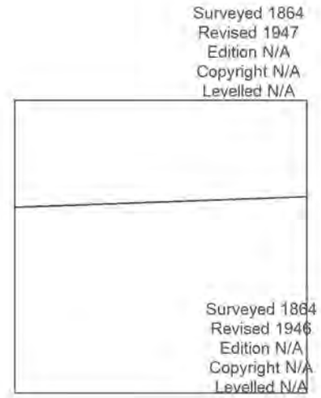

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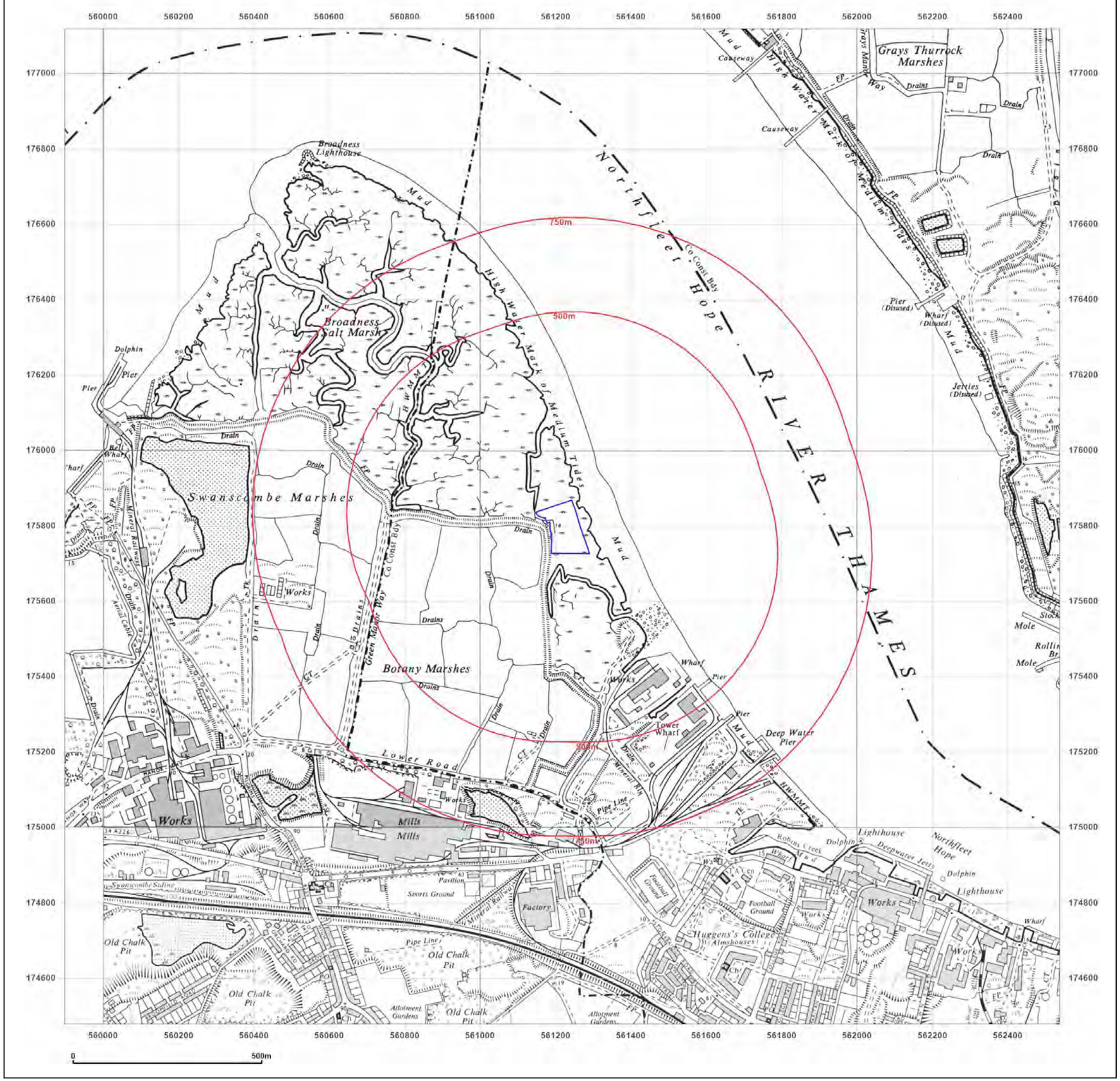

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: Provisional
Map date: **1955**
Scale: 1:10,560
Printed at: 1:10,560

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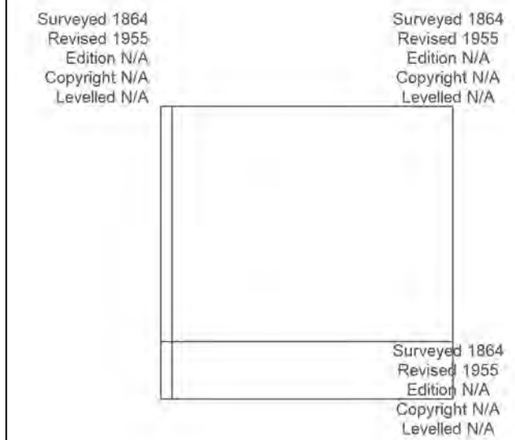

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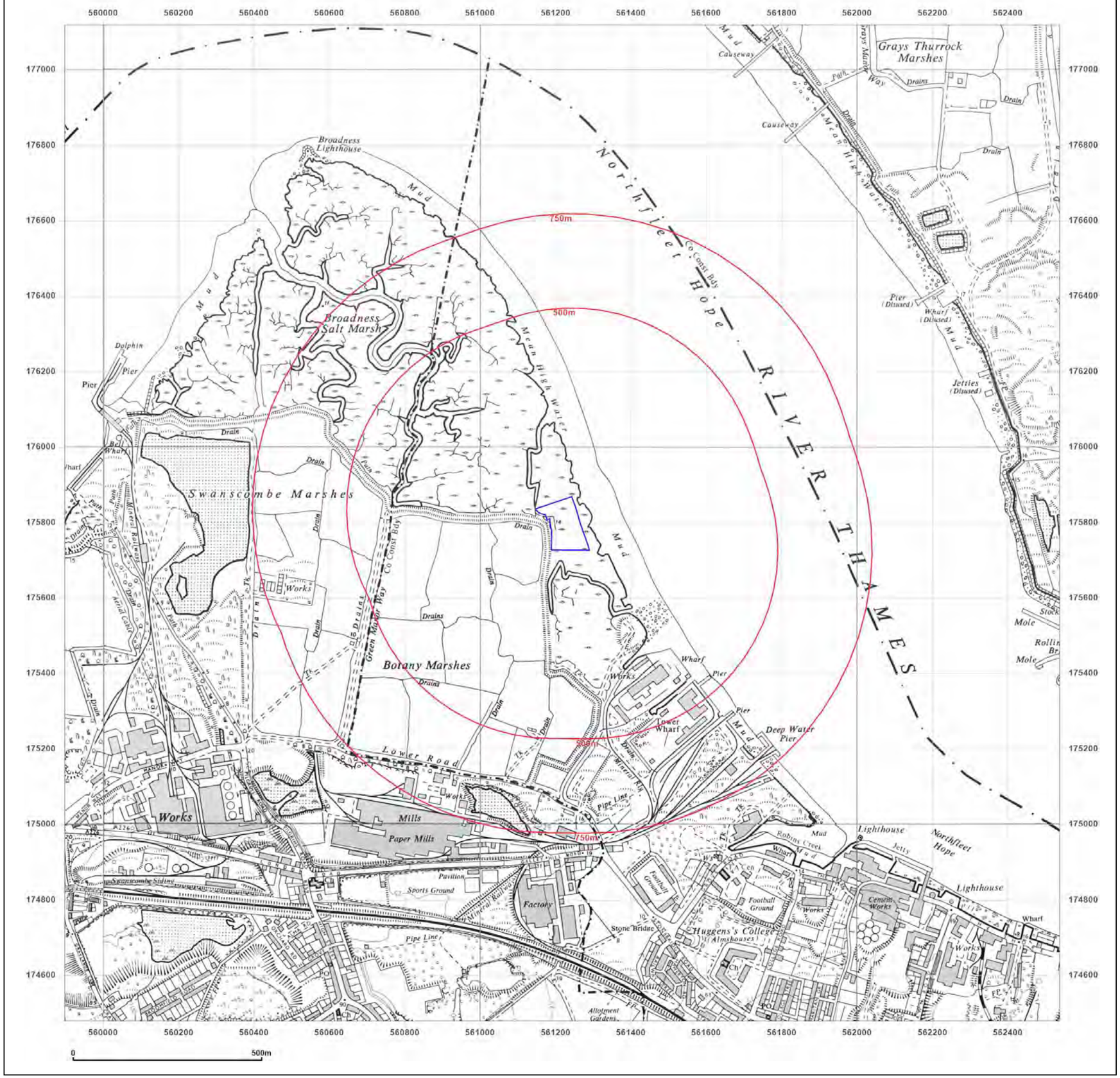

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: Provisional
Map date: **1961-1966**
Scale: 1:10,560
Printed at: 1:10,560

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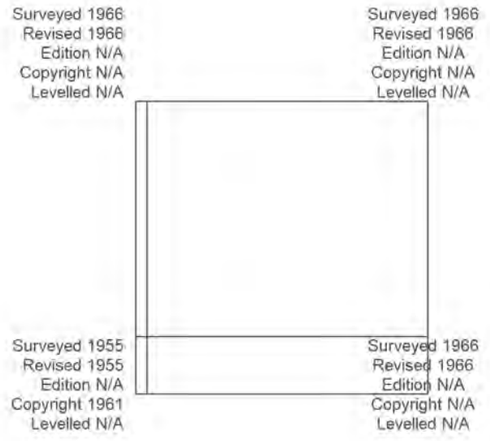

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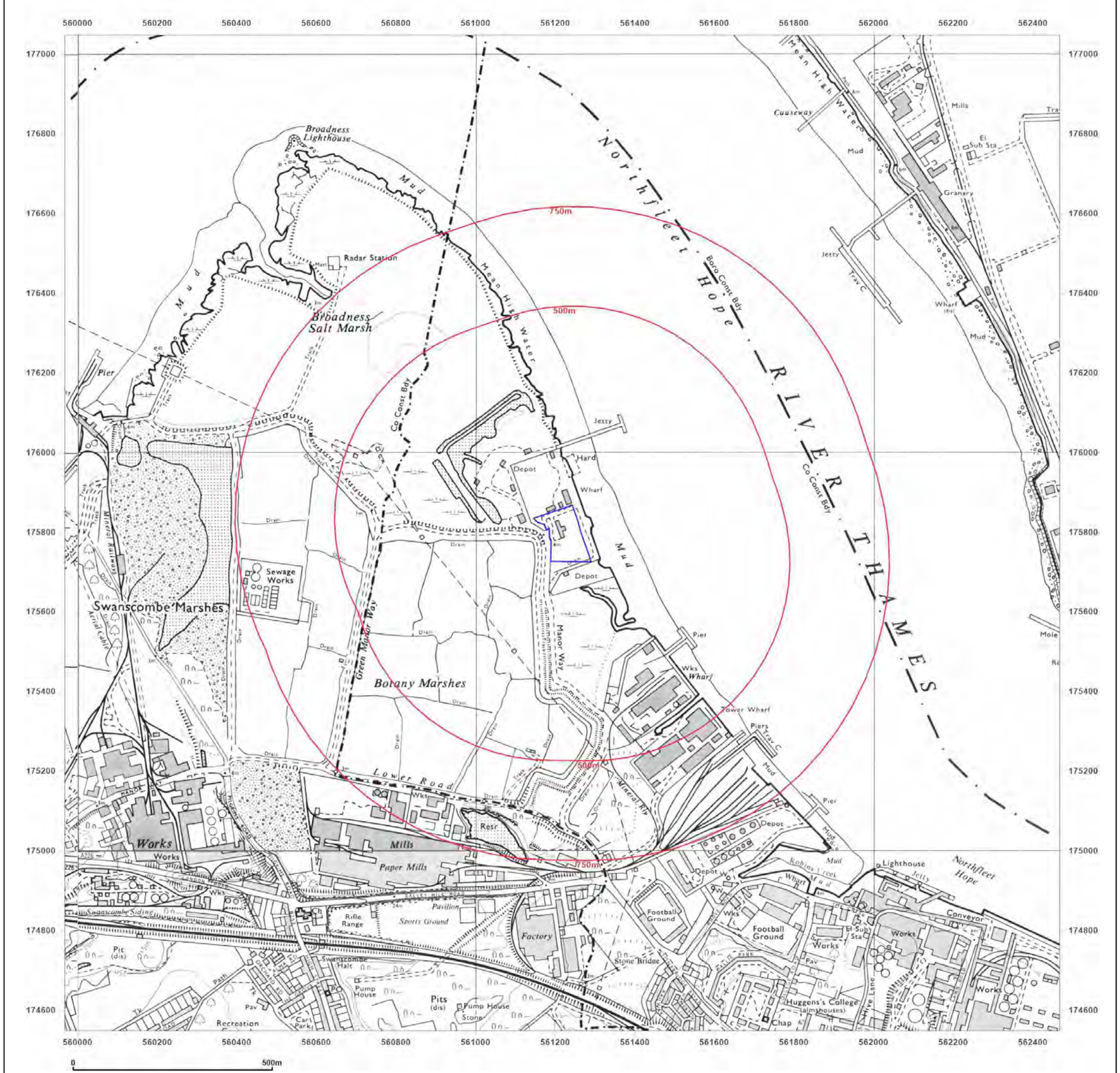

Groundsure INSIGHTS

Site Details:

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BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1971-1974**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1974
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1973
Revised 1973
Edition N/A
Copyright N/A
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Surveyed 1974
Revised 1974
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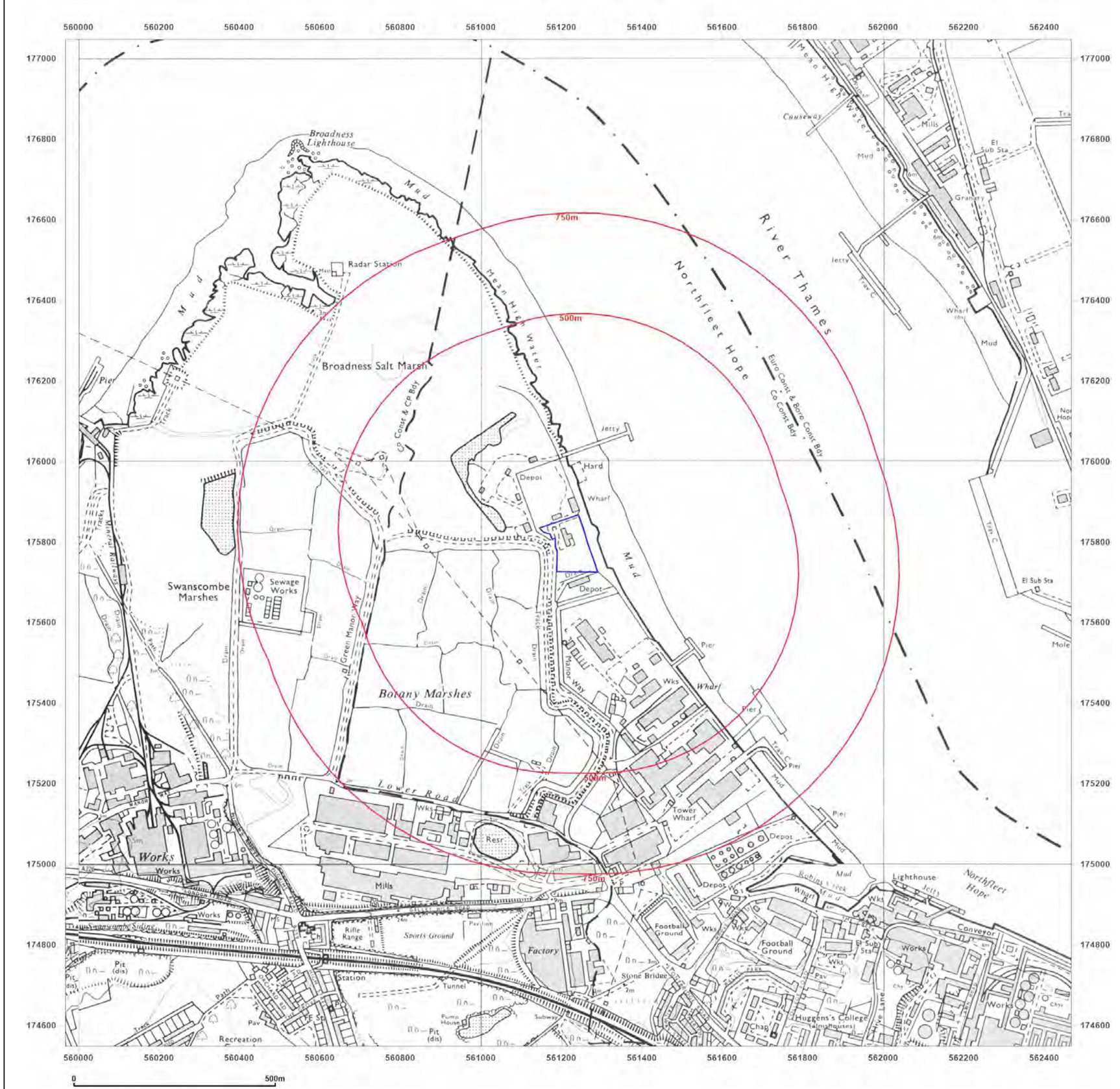

Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1977-1982**

Scale: 1:10,000

Printed at: 1:10,000

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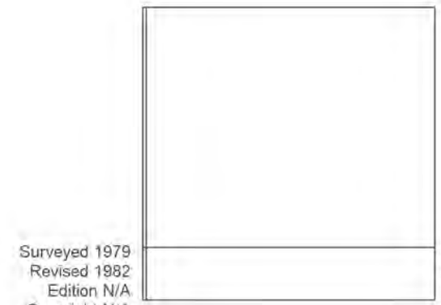
Surveyed 1981
Revised 1982
Edition N/A
Copyright N/A
Levelled N/A



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Revised 1982
Edition N/A
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Surveyed 1977
Revised 1977
Edition N/A
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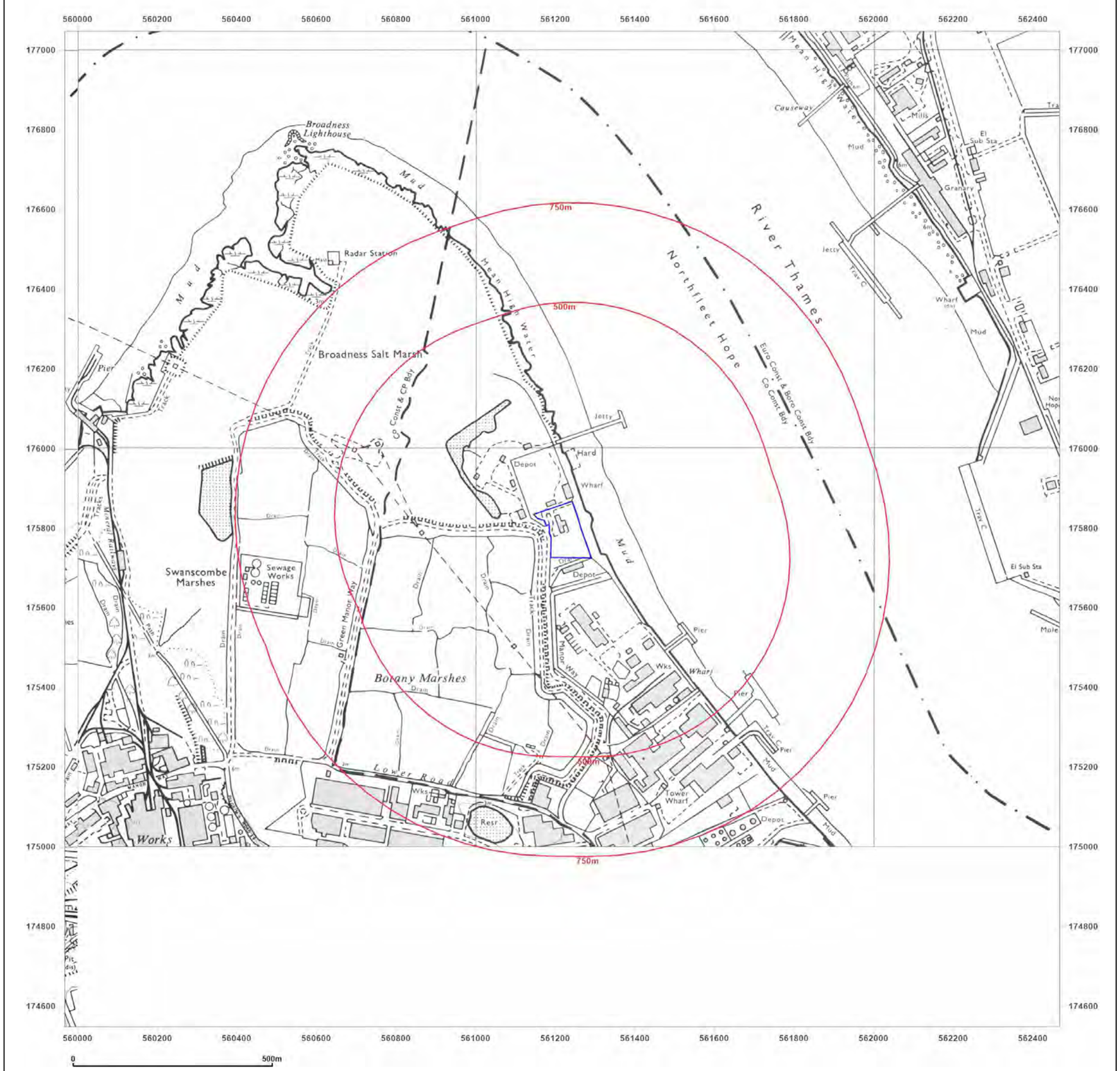

Groundsure INSIGHTS

Site Details:

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Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1992-1993**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1992
Revised 1993
Edition N/A
Copyright N/A
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Surveyed 1981
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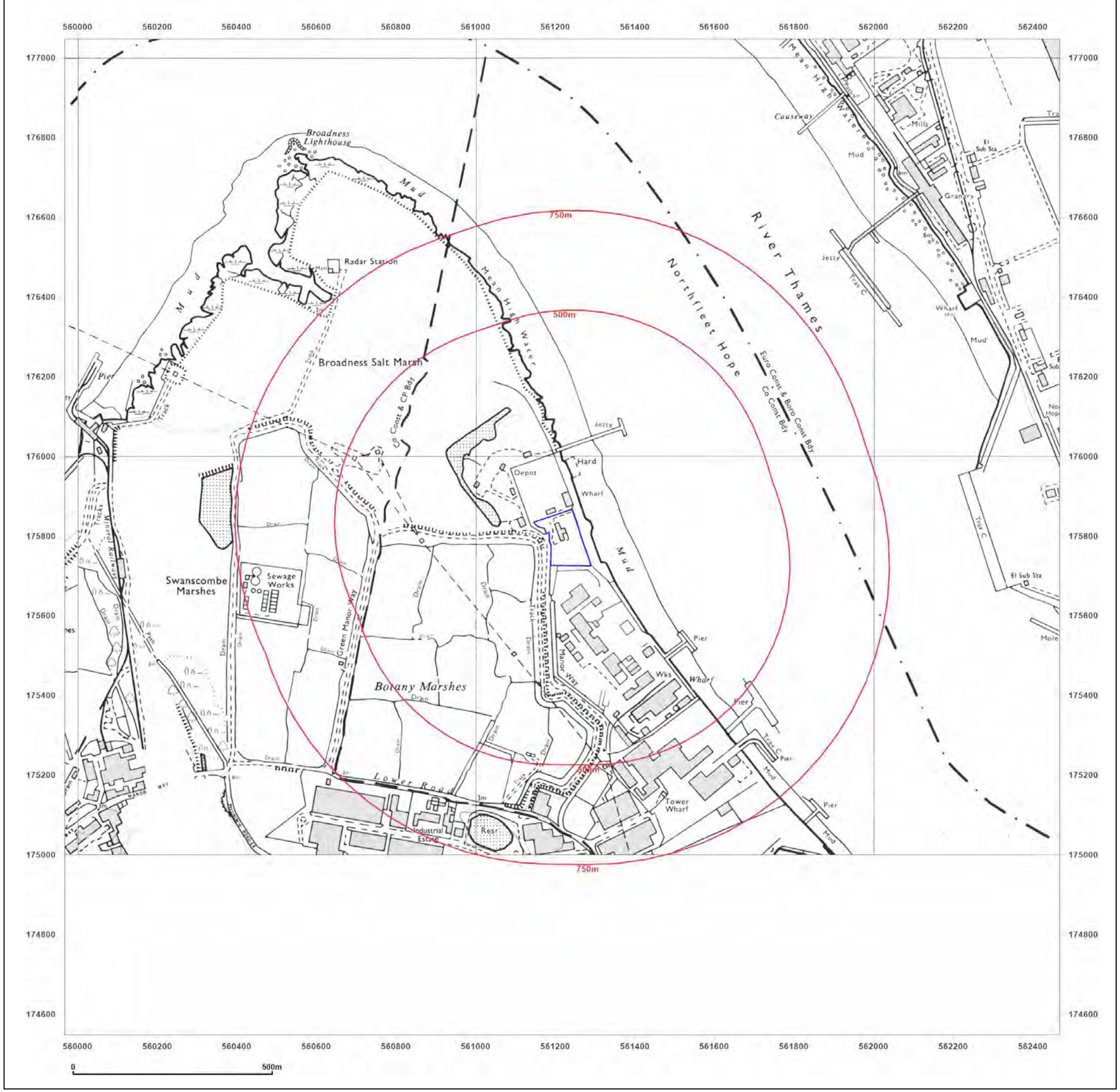

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
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ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **1993-1995**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1992
Revised 1995
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1981
Revised 1993
Edition N/A
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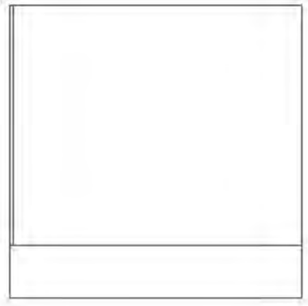

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Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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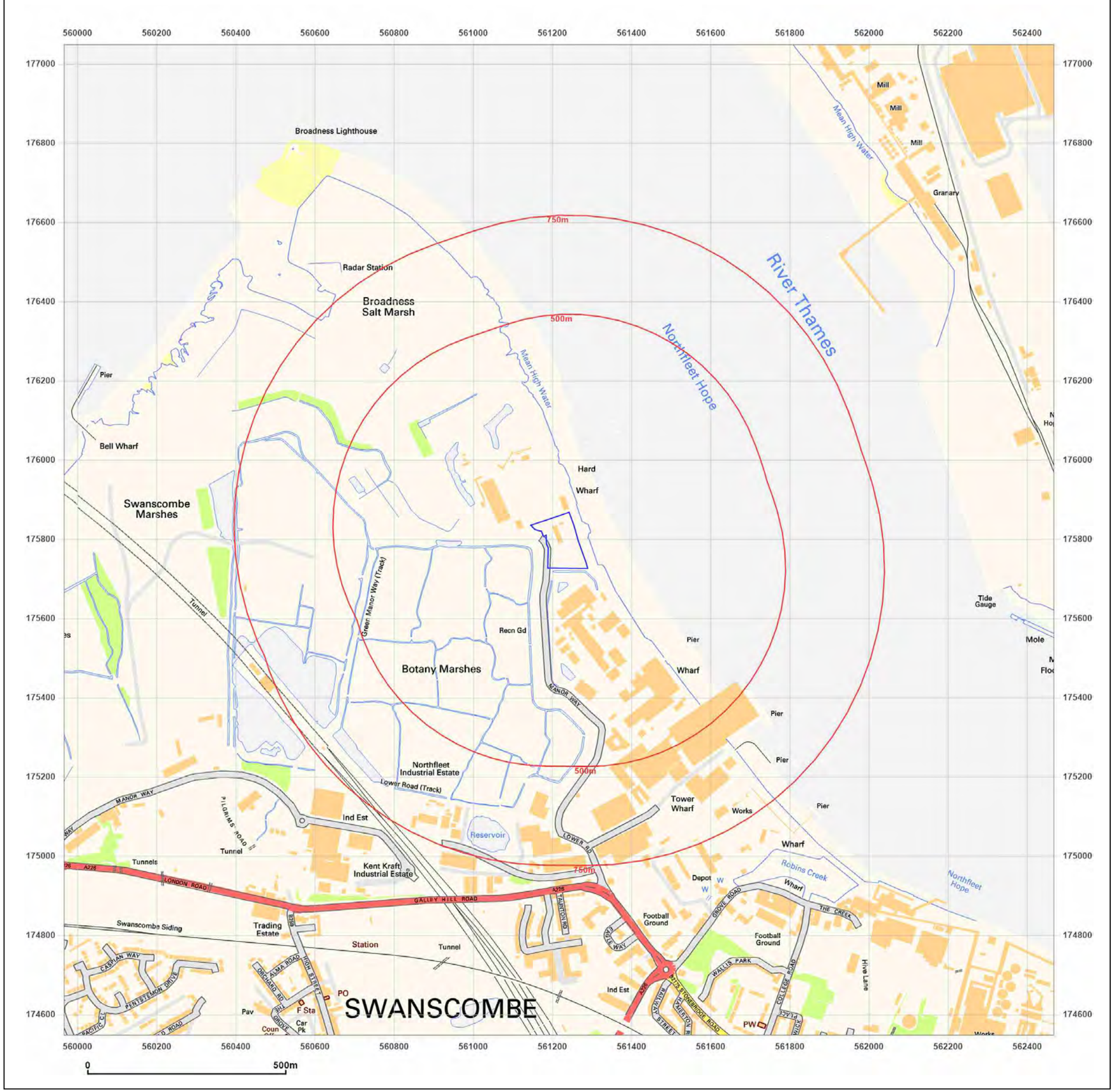

Groundsure INSIGHTS

Site Details:

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GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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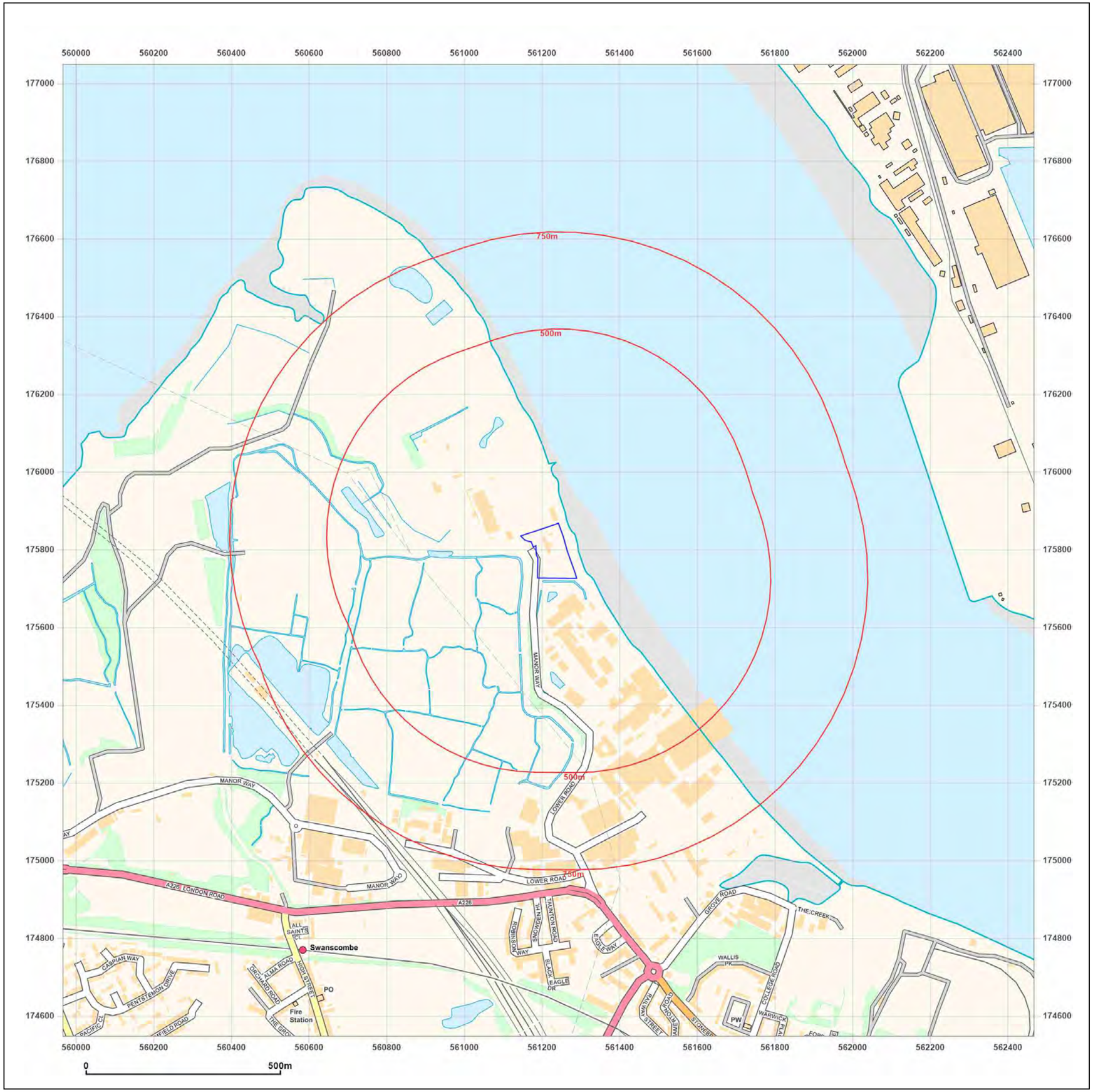

Groundsure INSIGHTS

Site Details:

W B SERVICES UK LTD,
BOTANY MARSH, LOWER
ROAD, NORTHFLEET,
GRAVESEND, DA11 9BB

Client Ref: BRM_Area_4_Desk_Study
Report Ref: GS-8390085
Grid Ref: 561217, 175798

Map Name: National Grid

Map date: **2021**

Scale: 1:10,000

Printed at: 1:10,000

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Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

W B SERVICES UK LTD, BOTANY MARSH, LOWER ROAD, NORTHFLEET, GRAVESEND, DA11 9BB

Order Details

Date: 09/12/2021

Your ref: BRM_Area_4_Desk_Study

Our Ref: GS-8390086

Client: Wood Plc

Site Details

Location: 561209 175806

Area: 1.15 ha

Authority: Gravesham Borough Council

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	Historical industrial land uses	3	5	10	66	-
18	1.2	Historical tanks	0	0	7	37	-
20	1.3	Historical energy features	0	0	0	0	-
20	1.4	Historical petrol stations	0	0	0	0	-
20	1.5	Historical garages	0	0	0	0	-
20	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
21	2.1	Historical industrial land uses	6	7	17	89	-
26	2.2	Historical tanks	0	0	7	63	-
29	2.3	Historical energy features	0	0	0	0	-
29	2.4	Historical petrol stations	0	0	0	0	-
29	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
30	3.1	Active or recent landfill	0	0	0	2	-
31	3.2	Historical landfill (BGS records)	0	0	0	0	-
31	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
31	3.4	Historical landfill (EA/NRW records)	0	0	2	1	-
32	3.5	Historical waste sites	0	0	0	0	-
32	3.6	Licensed waste sites	0	0	0	3	-
33	3.7	Waste exemptions	0	1	6	1	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
35	4.1	Recent industrial land uses	1	2	9	-	-
36	4.2	Current or recent petrol stations	0	0	0	0	-
36	4.3	Electricity cables	0	0	0	0	-
36	4.4	Gas pipelines	0	0	0	0	-
37	4.5	Sites determined as Contaminated Land	0	0	0	0	-

37	4.6	Control of Major Accident Hazards (COMAH)	1	0	0	0	-
37	4.7	Regulated explosive sites	0	0	0	0	-
37	4.8	Hazardous substance storage/usage	0	0	0	1	-
38	4.9	Historical licensed industrial activities (IPC)	0	0	0	3	-
38	4.10	Licensed industrial activities (Part A(1))	0	0	8	1	-
40	4.11	Licensed pollutant release (Part A(2)/B)	0	0	2	0	-
41	4.12	Radioactive Substance Authorisations	0	0	0	0	-
41	4.13	Licensed Discharges to controlled waters	0	0	8	1	-
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	1	0	-
43	4.17	List 2 Dangerous Substances	0	0	1	0	-
43	4.18	Pollution Incidents (EA/NRW)	0	0	0	1	-
44	4.19	Pollution inventory substances	0	0	4	0	-
46	4.20	Pollution inventory waste transfers	0	0	1	0	-
48	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
49	5.1	Superficial aquifer	Identified (within 500m)				
51	5.2	Bedrock aquifer	Identified (within 500m)				
52	5.3	Groundwater vulnerability	Identified (within 50m)				
53	5.4	Groundwater vulnerability- soluble rock risk	Identified (within 0m)				
53	5.5	Groundwater vulnerability- local information	Identified (within 0m)				
55	5.6	Groundwater abstractions	0	0	2	0	5
57	5.7	Surface water abstractions	0	0	0	0	1
58	5.8	Potable abstractions	0	0	0	0	0
58	5.9	Source Protection Zones	1	0	0	1	-
58	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
59	6.1	Water Network (OS MasterMap)	0	4	14	-	-

61	6.2	Surface water features	0	4	7	-	-
61	6.3	WFD Surface water body catchments	1	-	-	-	-
62	6.4	WFD Surface water bodies	0	1	0	-	-
62	6.5	WFD Groundwater bodies	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
63	7.1	Risk of flooding from rivers and the sea	High (within 50m)				
64	7.2	Historical Flood Events	1	0	0	-	-
64	7.3	Flood Defences	1	0	0	-	-
65	7.4	Areas Benefiting from Flood Defences	1	0	2	-	-
65	7.5	Flood Storage Areas	0	0	0	-	-
66	7.6	Flood Zone 2	Identified (within 50m)				
67	7.7	Flood Zone 3	Identified (within 50m)				
Page	Section	Surface water flooding					
68	8.1	Surface water flooding	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding					
70	9.1	Groundwater flooding	High (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
71	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	2
72	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
72	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
72	10.4	Special Protection Areas (SPA)	0	0	0	0	0
72	10.5	National Nature Reserves (NNR)	0	0	0	0	1
73	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
73	10.7	Designated Ancient Woodland	0	0	0	0	0
73	10.8	Biosphere Reserves	0	0	0	0	0
73	10.9	Forest Parks	0	0	0	0	0
74	10.10	Marine Conservation Zones	0	0	0	0	1
74	10.11	Green Belt	0	0	0	0	0
74	10.12	Proposed Ramsar sites	0	0	0	0	0

74	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
75	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
75	10.15	Nitrate Sensitive Areas	0	0	0	0	0
75	**10.16**	**Nitrate Vulnerable Zones**	0	0	0	0	1
76	**10.17**	**SSSI Impact Risk Zones**	2	-	-	-	-
77	**10.18**	**SSSI Units**	0	0	0	0	2
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
79	11.1	World Heritage Sites	0	0	0	-	-
79	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
79	11.3	National Parks	0	0	0	-	-
79	11.4	Listed Buildings	0	0	0	-	-
80	11.5	Conservation Areas	0	0	0	-	-
80	11.6	Scheduled Ancient Monuments	0	0	0	-	-
80	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
81	**12.1**	**Agricultural Land Classification**	Urban (within 250m)				
82	12.2	Open Access Land	0	0	0	-	-
82	12.3	Tree Felling Licences	0	0	0	-	-
82	12.4	Environmental Stewardship Schemes	0	0	0	-	-
82	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
83	**13.1**	**Priority Habitat Inventory**	0	5	8	-	-
84	**13.2**	**Habitat Networks**	3	2	5	-	-
85	13.3	Open Mosaic Habitat	0	0	0	-	-
85	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
86	**14.1**	**10k Availability**	Identified (within 500m)				
87	**14.2**	**Artificial and made ground (10k)**	1	0	0	1	-
88	**14.3**	**Superficial geology (10k)**	1	1	1	0	-

89	14.4	Landslip (10k)	0	0	0	0	-
90	**14.5**	**Bedrock geology (10k)**	1	0	0	0	-
91	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
92	**15.1**	**50k Availability**	Identified (within 500m)				
93	**15.2**	**Artificial and made ground (50k)**	1	0	0	1	-
94	**15.3**	**Artificial ground permeability (50k)**	1	0	-	-	-
95	**15.4**	**Superficial geology (50k)**	1	1	0	0	-
96	**15.5**	**Superficial permeability (50k)**	Identified (within 50m)				
96	15.6	Landslip (50k)	0	0	0	0	-
96	15.7	Landslip permeability (50k)	None (within 50m)				
97	**15.8**	**Bedrock geology (50k)**	1	0	0	0	-
98	**15.9**	**Bedrock permeability (50k)**	Identified (within 50m)				
98	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
99	**16.1**	**BGS Boreholes**	0	0	20	-	-
Page	Section	Natural ground subsidence					
101	**17.1**	**Shrink swell clays**	Low (within 50m)				
102	**17.2**	**Running sands**	Moderate (within 50m)				
104	**17.3**	**Compressible deposits**	High (within 50m)				
106	**17.4**	**Collapsible deposits**	Negligible (within 50m)				
107	**17.5**	**Landslides**	Very low (within 50m)				
108	**17.6**	**Ground dissolution of soluble rocks**	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
110	18.1	Natural cavities	0	0	0	0	-
111	**18.2**	**BritPits**	0	0	1	0	-
111	**18.3**	**Surface ground workings**	0	2	14	-	-
112	18.4	Underground workings	0	0	0	0	0
112	**18.5**	**Historical Mineral Planning Areas**	1	0	0	0	-

112	**18.6**	**Non-coal mining**	0	0	0	0	2
113	18.7	Mining cavities	0	0	0	0	0
113	18.8	JPB mining areas	None (within 0m)				
113	18.9	Coal mining	None (within 0m)				
113	18.10	Brine areas	None (within 0m)				
114	18.11	Gypsum areas	None (within 0m)				
114	18.12	Tin mining	None (within 0m)				
114	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
115	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
116	**20.1**	**BGS Estimated Background Soil Chemistry**	1	1	-	-	-
116	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
116	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
117	21.1	Underground railways (London)	0	0	0	-	-
117	21.2	Underground railways (Non-London)	0	0	0	-	-
118	21.3	Railway tunnels	0	0	0	-	-
118	**21.4**	**Historical railway and tunnel features**	0	0	1	-	-
118	21.5	Royal Mail tunnels	0	0	0	-	-
118	21.6	Historical railways	0	0	0	-	-
119	21.7	Railways	0	0	0	-	-
119	21.8	Crossrail 1	0	0	0	0	-
119	21.9	Crossrail 2	0	0	0	0	-
119	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 01/09/2018

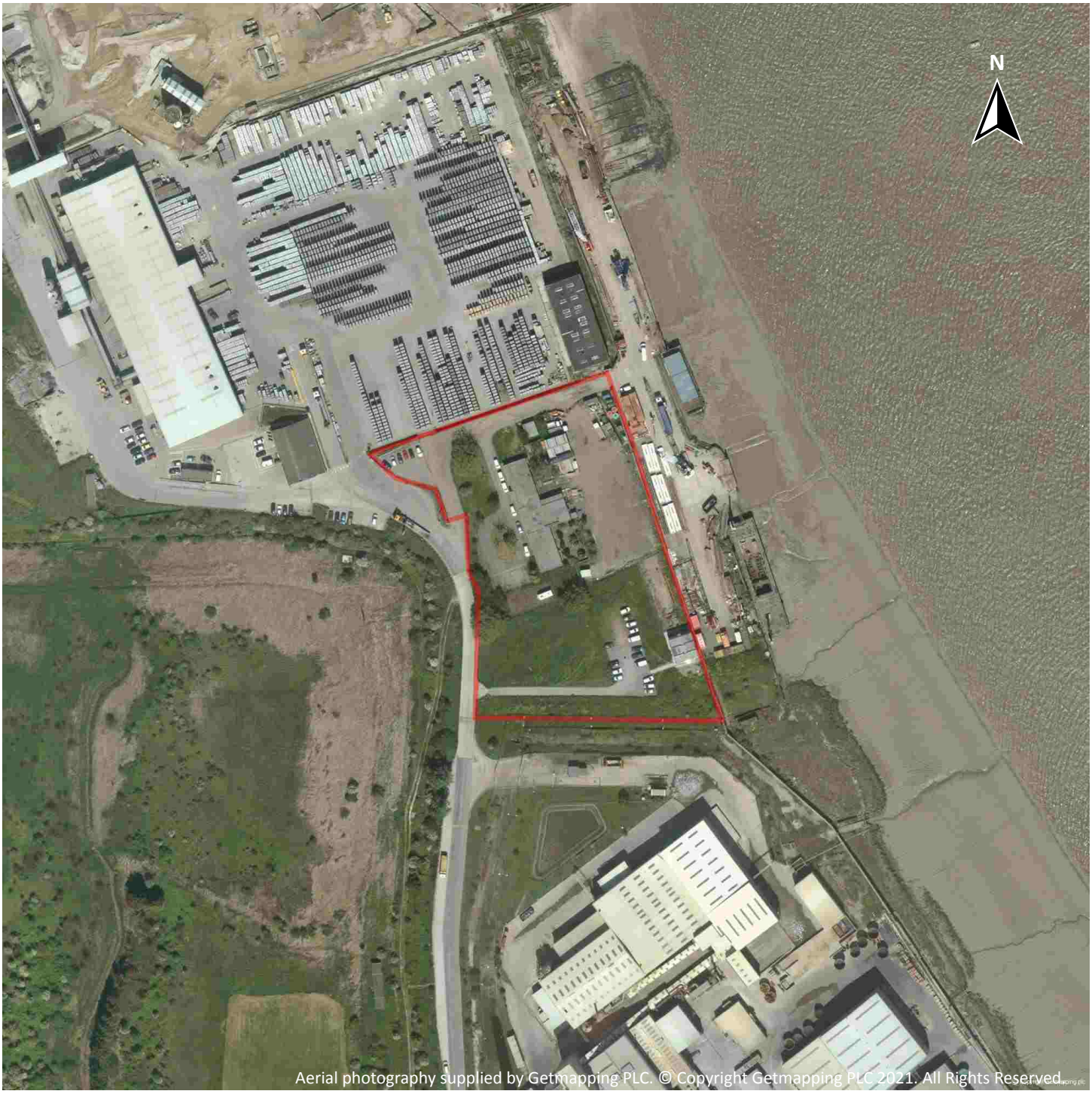
Site Area: 1.15ha

Recent site history - 2015 aerial photograph

Capture Date: 30/06/2015

Site Area: 1.15ha

Recent site history - 2012 aerial photograph



Capture Date: 25/05/2012

Site Area: 1.15ha

Recent site history - 2004 aerial photograph

Capture Date: 02/09/2004

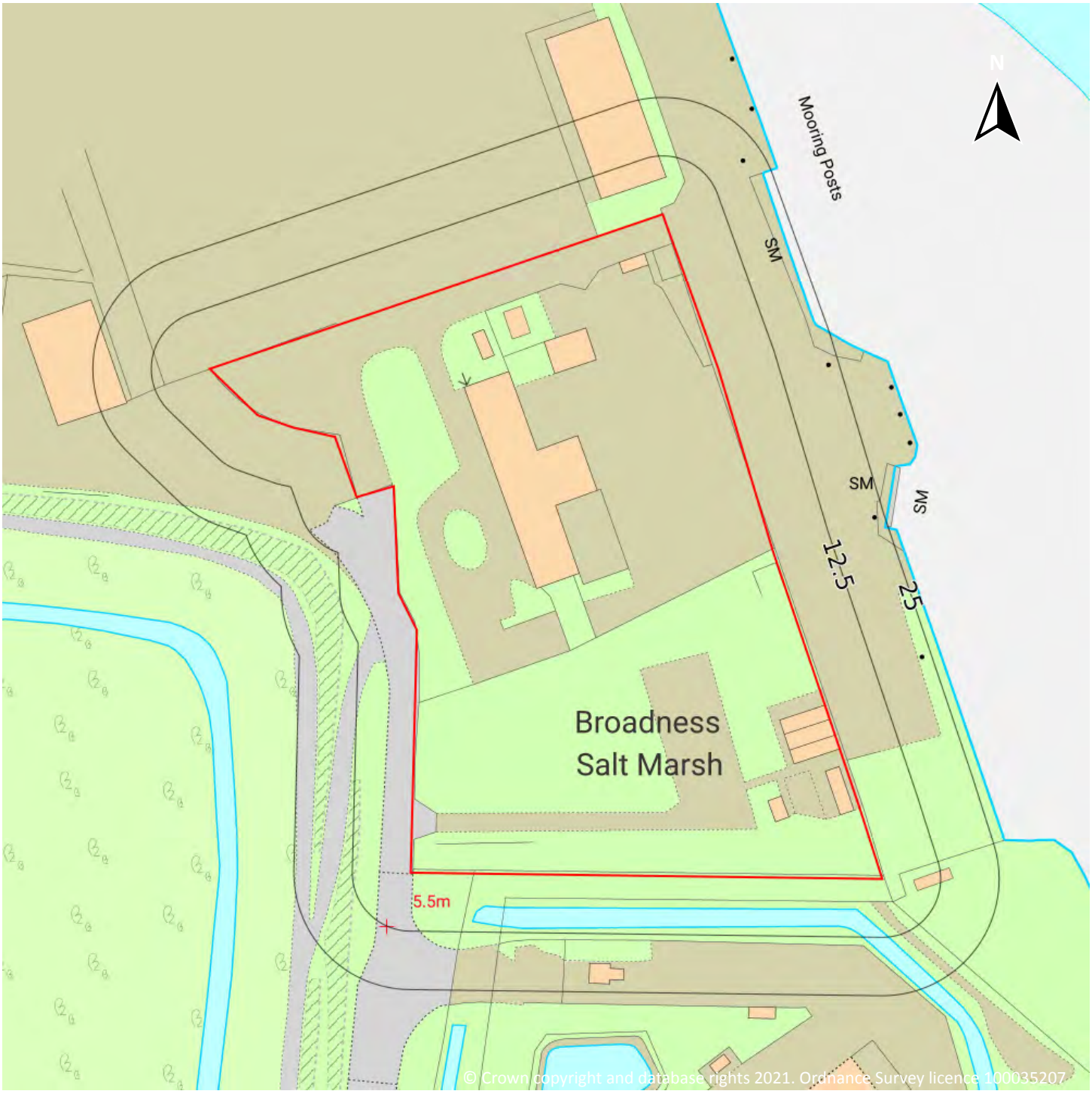
Site Area: 1.15ha

Recent site history - 1999 aerial photograph

Capture Date: 03/09/1999

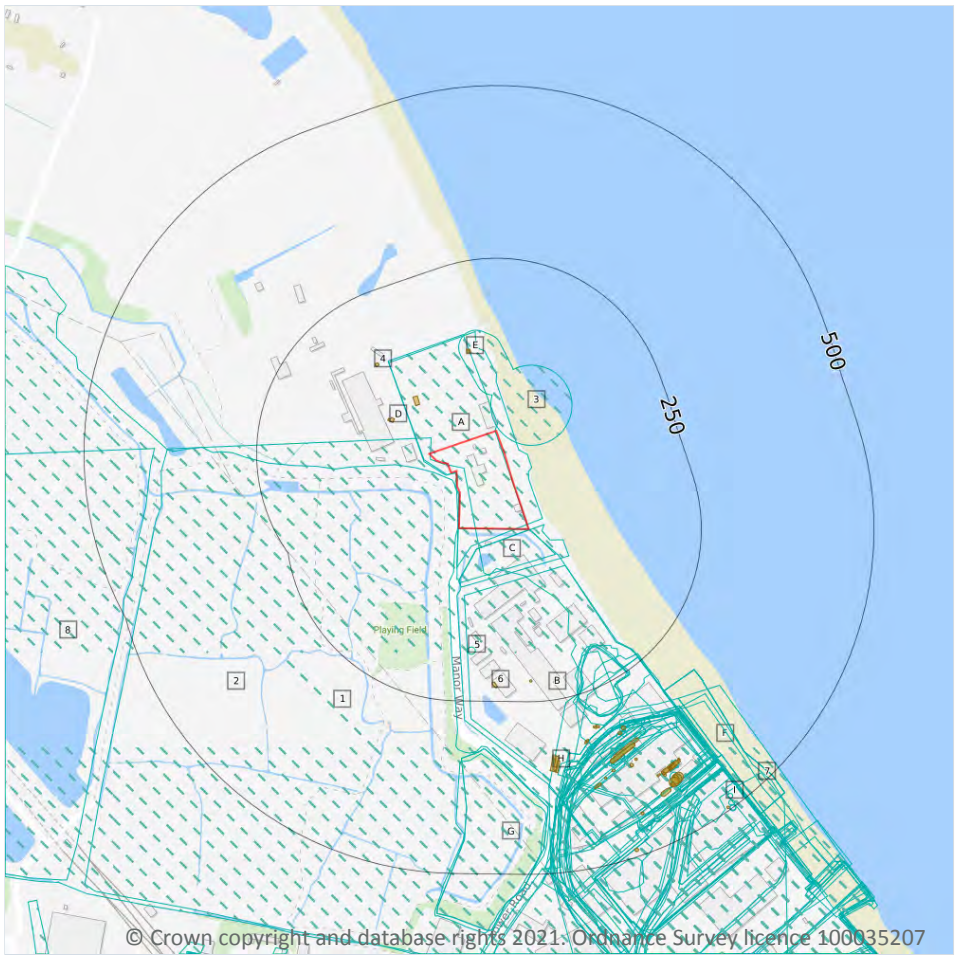
Site Area: 1.15ha

OS MasterMap site plan



Site Area: 1.15ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

1.1 Historical industrial land uses

Records within 500m	84

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
1	**On site**	**Marshes**	**1898**	**2215152**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Depot**	**1993**	**2262232**
A	**On site**	**Unspecified Depot**	**1973 - 1992**	**2280218**
B	0m S	Unspecified Works	1993	2216490
C	1m S	Unspecified Depot	1982 - 1992	2263526
2	1m W	Marshes	1888	2239504
C	1m S	Unspecified Depot	1973	2185803
3	4m NE	Unspecified Wharf	1973 - 1993	2255798
B	66m S	Unspecified Works	1982 - 1992	2284101
5	172m S	Unspecified Tank	1982 - 1993	2213283
B	190m SE	Unspecified Ground Workings	1932	2257618
B	190m SE	Refuse Heap	1923	2283173
B	193m SE	Unspecified Heaps	1938	2259815
B	195m SE	Unspecified Heaps	1946	2232165
B	198m SE	Unspecified Ground Workings	1955 - 1966	2234949
B	222m SE	Refuse Heap	1895	2189143
B	237m SE	Railway Sidings	1973	2202766
B	243m SE	Unspecified Works	1973	2260716
B	277m SE	Unspecified Wharf	1955 - 1966	2269240
B	298m SE	Cement Works	1895	2199106
B	298m SE	Railway Sidings	1895	2225407
F	305m SE	Unspecified Wharf	1993	2180024
F	305m SE	Unspecified Wharf	1992	2214482
F	305m SE	Unspecified Wharf	1982	2278448
B	306m SE	Unspecified Tank	1895	2155403
B	308m SE	Cement Works	1895 - 1898	2275278
B	312m SE	Lead Works	1932	2223432
B	312m S	Tramway Sidings	1907	2192430
B	312m S	Cement Works	1907	2287388

ID	Location	Land use	Dates present	Group ID
B	313m SE	Railway Sidings	1955 - 1966	2205830
B	313m SE	Unspecified Works	1955 - 1966	2277588
B	313m SE	Lead Works	1938 - 1946	2233327
B	314m SE	Tramway Sidings	1895	2183477
B	314m SE	Cement Works	1888 - 1895	2290552
B	314m SE	Tramway Sidings	1923	2177258
B	315m SE	Tramway Sidings	1923	2207417
B	315m SE	Cement Works	1923	2266415
B	316m SE	Tramway Sidings	1946	2211957
B	317m SE	Unspecified Tank	1898	2275096
G	319m S	Unspecified Pit	1895	2176598
G	319m S	Unspecified Pit	1907	2218767
B	320m SE	Railway Sidings	1898	2202160
B	320m SE	Railway Sidings	1898	2279978
B	321m SE	Tramway Sidings	1938	2232919
B	321m SE	Tramway Sidings	1932	2247739
B	322m SE	Unspecified Tank	1895	2227228
B	323m SE	Unspecified Tank	1923	2155404
B	324m SE	Unspecified Wharf	1898	2257834
B	326m SE	Railway Sidings	1888	2291106
G	326m S	Unspecified Pit	1923	2290959
7	327m SE	Unspecified Wharf	1895	2197254
B	331m SE	Cement Works	1923	2236115
B	337m SE	Unspecified Tank	1895	2155406
B	337m SE	Railway Sidings	1992	2241092
B	337m SE	Railway Sidings	1982	2230046
B	340m S	Unspecified Tank	1895	2155405
B	345m SE	Unspecified Tanks	1907 - 1923	2190850

ID	Location	Land use	Dates present	Group ID
B	346m S	Unspecified Tanks	1898	2267791
B	349m SE	Unspecified Tanks	1923	2255843
B	351m S	Unspecified Tanks	1888	2225554
B	353m S	Unspecified Tanks	1895	2224084
B	396m SE	Unspecified Tanks	1932 - 1938	2278662
8	398m W	Marshes	1898	2216805
B	409m SE	Unspecified Tank	1973 - 1993	2211821
B	413m SE	Unspecified Wharf	1888	2261354
B	414m SE	Unspecified Tanks	1932	2290281
B	414m SE	Unspecified Wharf	1895	2239342
B	417m SE	Unspecified Tanks	1938	2201545
B	417m SE	Unspecified Tanks	1946	2249898
B	423m SE	Unspecified Commercial/Industrial	1982 - 1992	2293562
B	428m SE	Unspecified Wharf	1973	2179164
B	431m SE	Unspecified Wharf	1966	2177417
B	431m SE	Unspecified Wharf	1955	2242180
B	445m SE	Cement Works	1888	2288980
B	445m SE	Cement Works	1907 - 1923	2252125
B	446m SE	Tower Works	1938	2239514
B	448m SE	Tower Works	1932	2173363
B	448m SE	Tower Works	1946	2194506
B	477m SE	Tramway Sidings	1923	2180973
I	481m SE	Unspecified Tank	1895	2155395
I	489m SE	Unspecified Tank	1898	2169808
I	496m SE	Unspecified Tank	1895	2236599
I	496m SE	Unspecified Tank	1888	2224325
B	500m S	Refuse Heap	1955 - 1966	2193731

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	44

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 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
D	70m NW	Tanks	1999	377627
D	72m N	Tanks	1999	377626
E	119m N	Unspecified Tank	1978	383473
E	119m N	Unspecified Tank	1970	400342
4	147m NW	Unspecified Tank	1999	368887
B	218m S	Unspecified Tank	1999	368886
6	222m S	Tanks	1999	377625
B	300m S	Unspecified Tank	1978	390064
B	300m S	Unspecified Tank	1970	404712
B	316m SE	Unspecified Tank	1898	368888
B	316m S	Unspecified Tank	1978	368889
B	317m S	Unspecified Tank	1970	368885
B	321m SE	Unspecified Tank	1897 - 1907	407459
H	330m S	Tanks	1989	386103
H	331m S	Unspecified Tank	1978	368884
H	338m S	Unspecified Tank	1970	368883
B	340m SE	Tanks	1897 - 1898	387561
B	345m SE	Unspecified Tanks	1907	379235
B	366m SE	Unspecified Tank	1898	368890
B	369m S	Unspecified Tank	1999	368882
B	370m SE	Unspecified Tank	1907	368881

ID	Location	Land use	Dates present	Group ID
B	376m S	Unspecified Tank	1999	368878
B	382m S	Tanks	1999	377624
B	396m SE	Unspecified Tank	1952	368897
B	397m SE	Unspecified Tank	1932	368880
B	397m SE	Tanks	1952 - 1970	397733
B	398m SE	Tanks	1978 - 1989	393649
B	399m SE	Tanks	1970	409145
B	400m SE	Tanks	1939	398750
B	400m SE	Tanks	1993 - 1995	401757
B	401m SE	Tanks	1970	403976
B	402m SE	Unspecified Tank	1978 - 1989	392140
B	402m SE	Unspecified Tank	1993 - 1995	407140
B	403m SE	Tanks	1999	402239
B	413m SE	Tanks	1978 - 1989	411064
B	413m SE	Tanks	1993 - 1999	385616
B	415m SE	Tanks	1970	383620
B	415m SE	Unspecified Tank	1932 - 1939	389974
B	422m SE	Unspecified Tank	1952	396537
B	422m SE	Tanks	1970	385624
B	426m SE	Tanks	1970 - 1999	406173
B	441m S	Unspecified Tank	1907	368879
B	488m S	Unspecified Tank	1932 - 1939	397664
I	494m SE	Unspecified Tank	1897	368900

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	0

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 un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.4 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, 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'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

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 un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

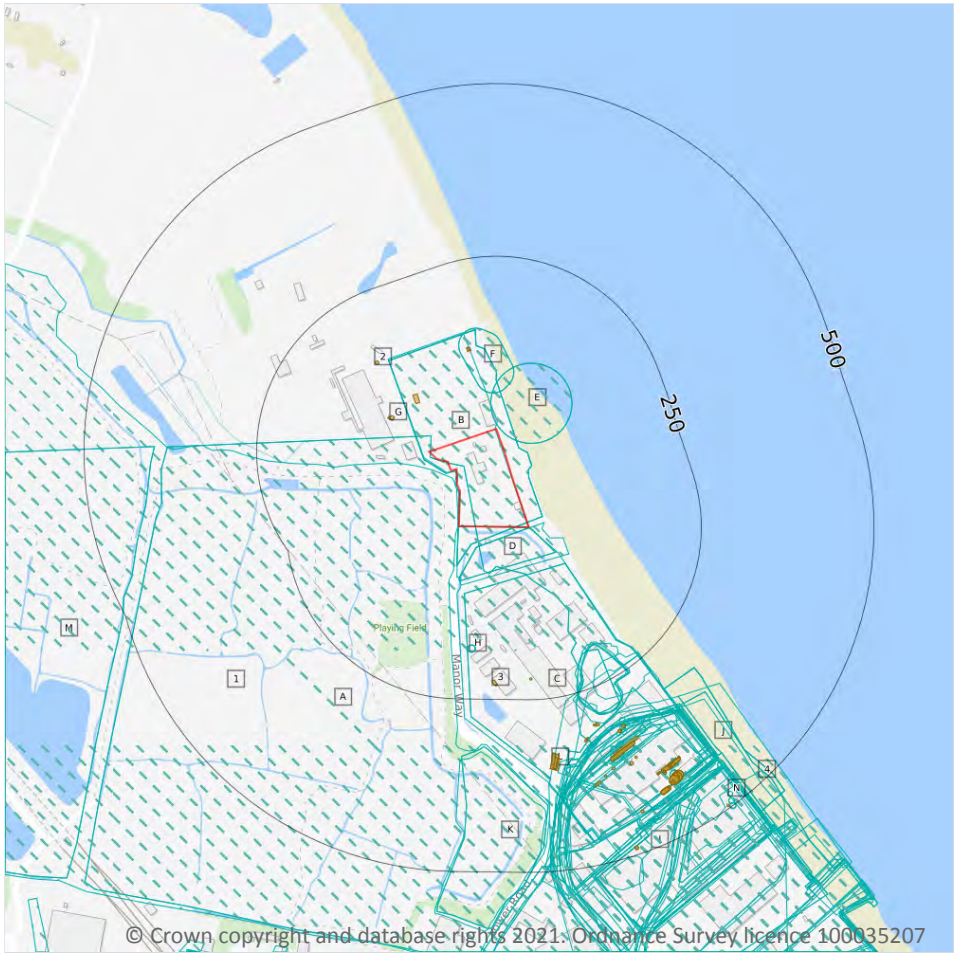
1.6 Historical military land

Records within 500m	0

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

2.1 Historical industrial land uses

Records within 500m	119

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 21**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Marshes**	**1898**	**2215152**
A	**On site**	**Marshes**	**1898**	**2215152**
B	**On site**	**Unspecified Depot**	**1993**	**2262232**

ID	Location	Land Use	Date	Group ID
B	**On site**	**Unspecified Depot**	**1982**	**2280218**
B	**On site**	**Unspecified Depot**	**1973**	**2280218**
B	**On site**	**Unspecified Depot**	**1992**	**2280218**
C	0m S	Unspecified Works	1993	2216490
D	1m S	Unspecified Depot	1982	2263526
D	1m S	Unspecified Depot	1992	2263526
1	1m W	Marshes	1888	2239504
D	1m S	Unspecified Depot	1973	2185803
E	4m NE	Unspecified Wharf	1993	2255798
E	4m NE	Unspecified Wharf	1973	2255798
F	52m N	Unspecified Wharf	1982	2255798
F	52m N	Unspecified Wharf	1992	2255798
C	66m S	Unspecified Works	1982	2284101
C	66m S	Unspecified Works	1992	2284101
H	172m S	Unspecified Tank	1993	2213283
H	172m S	Unspecified Tank	1982	2213283
H	172m S	Unspecified Tank	1992	2213283
C	190m SE	Unspecified Ground Workings	1932	2257618
C	190m SE	Refuse Heap	1923	2283173
C	193m SE	Unspecified Heaps	1938	2259815
C	193m SE	Unspecified Heaps	1938	2259815
C	195m SE	Unspecified Heaps	1946	2232165
C	198m SE	Unspecified Ground Workings	1955	2234949
C	198m SE	Unspecified Ground Workings	1966	2234949
C	222m SE	Refuse Heap	1895	2189143
I	237m SE	Railway Sidings	1973	2202766
C	243m SE	Unspecified Works	1973	2260716
C	277m SE	Unspecified Wharf	1955	2269240

ID	Location	Land Use	Date	Group ID
C	277m SE	Unspecified Wharf	1966	2269240
C	298m SE	Cement Works	1895	2199106
I	298m SE	Railway Sidings	1895	2225407
J	305m SE	Unspecified Wharf	1993	2180024
J	305m SE	Unspecified Wharf	1982	2278448
J	305m SE	Unspecified Wharf	1992	2214482
C	306m SE	Unspecified Tank	1895	2155403
C	308m SE	Cement Works	1898	2275278
C	308m SE	Cement Works	1898	2275278
C	312m SE	Lead Works	1932	2223432
C	312m S	Cement Works	1907	2287388
I	312m S	Tramway Sidings	1907	2192430
C	313m SE	Unspecified Works	1955	2277588
C	313m SE	Unspecified Works	1966	2277588
I	313m SE	Railway Sidings	1955	2205830
I	313m SE	Railway Sidings	1966	2205830
C	313m SE	Lead Works	1938	2233327
C	314m SE	Lead Works	1946	2233327
C	314m SE	Cement Works	1895	2290552
I	314m SE	Tramway Sidings	1895	2183477
I	314m SE	Tramway Sidings	1923	2177258
C	315m SE	Cement Works	1923	2266415
C	315m SE	Tramway Sidings	1923	2207417
I	316m SE	Tramway Sidings	1946	2211957
C	317m SE	Unspecified Tank	1898	2275096
C	317m SE	Unspecified Tank	1898	2275096
K	319m S	Unspecified Pit	1907	2218767
K	319m S	Unspecified Pit	1895	2176598

ID	Location	Land Use	Date	Group ID
I	320m SE	Railway Sidings	1898	2202160
I	320m SE	Railway Sidings	1898	2279978
C	320m SE	Cement Works	1888	2290552
I	321m SE	Tramway Sidings	1938	2232919
I	321m SE	Tramway Sidings	1932	2247739
C	322m SE	Unspecified Tank	1895	2227228
C	323m SE	Unspecified Tank	1923	2155404
C	324m SE	Unspecified Wharf	1898	2257834
C	324m SE	Unspecified Wharf	1898	2257834
I	326m SE	Railway Sidings	1888	2291106
K	326m S	Unspecified Pit	1923	2290959
4	327m SE	Unspecified Wharf	1895	2197254
C	331m SE	Cement Works	1923	2236115
C	337m SE	Unspecified Tank	1895	2155406
C	337m SE	Railway Sidings	1992	2241092
C	337m SE	Railway Sidings	1982	2230046
C	340m S	Unspecified Tank	1895	2155405
C	345m SE	Unspecified Tanks	1907	2190850
C	346m S	Unspecified Tanks	1898	2267791
C	346m S	Unspecified Tanks	1898	2267791
C	347m SE	Unspecified Tanks	1923	2190850
C	349m SE	Unspecified Tanks	1923	2255843
C	351m S	Unspecified Tanks	1888	2225554
C	353m S	Unspecified Tanks	1895	2224084
C	396m SE	Unspecified Tanks	1932	2278662
M	398m W	Marshes	1898	2216805
M	398m W	Marshes	1898	2216805
C	398m SE	Unspecified Tanks	1938	2278662

ID	Location	Land Use	Date	Group ID
C	409m SE	Unspecified Tank	1993	2211821
C	409m SE	Unspecified Tank	1982	2211821
C	409m SE	Unspecified Tank	1973	2211821
C	409m SE	Unspecified Tank	1992	2211821
C	413m SE	Unspecified Wharf	1888	2261354
C	414m SE	Unspecified Tanks	1932	2290281
C	414m SE	Unspecified Wharf	1895	2239342
C	417m SE	Unspecified Tanks	1938	2201545
C	417m SE	Unspecified Tanks	1946	2249898
I	423m SE	Unspecified Commercial/Industrial	1982	2293562
I	423m SE	Unspecified Commercial/Industrial	1992	2293562
C	428m SE	Unspecified Wharf	1973	2179164
I	429m SE	Cement Works	1895	2275278
C	431m SE	Unspecified Wharf	1955	2242180
C	431m SE	Unspecified Wharf	1966	2177417
I	438m SE	Cement Works	1898	2275278
I	438m SE	Cement Works	1898	2275278
I	445m SE	Cement Works	1888	2288980
I	445m SE	Cement Works	1923	2252125
I	446m SE	Tower Works	1938	2239514
I	448m SE	Tower Works	1946	2194506
I	448m SE	Tower Works	1932	2173363
I	448m SE	Cement Works	1907	2252125
I	448m SE	Cement Works	1895	2275278
I	450m SE	Cement Works	1923	2252125
I	477m SE	Tramway Sidings	1923	2180973
N	481m SE	Unspecified Tank	1895	2155395
N	489m SE	Unspecified Tank	1898	2169808

ID	Location	Land Use	Date	Group ID
N	489m SE	Unspecified Tank	1898	2169808
N	496m SE	Unspecified Tank	1895	2236599
N	496m SE	Unspecified Tank	1888	2224325
I	500m S	Refuse Heap	1966	2193731

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**70**

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 21**

ID	Location	Land Use	Date	Group ID
G	70m NW	Tanks	1999	377627
G	72m N	Tanks	1999	377626
F	119m N	Unspecified Tank	1978	383473
F	119m N	Unspecified Tank	1970	400342
2	147m NW	Unspecified Tank	1999	368887
C	218m S	Unspecified Tank	1999	368886
3	222m S	Tanks	1999	377625
C	300m S	Unspecified Tank	1978	390064
C	300m S	Unspecified Tank	1970	404712
C	316m SE	Unspecified Tank	1898	368888
C	316m S	Unspecified Tank	1978	368889
C	317m S	Unspecified Tank	1970	368885
C	321m SE	Unspecified Tank	1897	407459
C	321m SE	Unspecified Tank	1907	407459
L	330m S	Tanks	1989	386103
L	330m S	Tanks	1989	386103

ID	Location	Land Use	Date	Group ID
L	331m S	Unspecified Tank	1978	368884
L	338m S	Unspecified Tank	1970	368883
C	340m SE	Tanks	1898	387561
C	345m SE	Unspecified Tanks	1907	379235
C	345m SE	Tanks	1897	387561
C	366m SE	Unspecified Tank	1898	368890
C	369m S	Unspecified Tank	1999	368882
C	370m SE	Unspecified Tank	1907	368881
C	376m S	Unspecified Tank	1999	368878
C	382m S	Tanks	1999	377624
C	396m SE	Unspecified Tank	1952	368897
C	397m SE	Tanks	1952	397733
C	397m SE	Tanks	1970	397733
C	397m SE	Unspecified Tank	1932	368880
C	398m SE	Tanks	1978	393649
C	398m SE	Tanks	1989	393649
C	398m SE	Tanks	1989	393649
C	399m SE	Tanks	1970	409145
C	400m SE	Tanks	1939	398750
C	400m SE	Tanks	1995	401757
C	400m SE	Tanks	1993	401757
C	400m SE	Tanks	1995	401757
C	401m SE	Tanks	1970	403976
C	402m SE	Unspecified Tank	1978	392140
C	402m SE	Unspecified Tank	1989	392140
C	402m SE	Unspecified Tank	1989	392140
C	402m SE	Unspecified Tank	1995	407140
C	402m SE	Unspecified Tank	1993	407140

ID	Location	Land Use	Date	Group ID
C	402m SE	Unspecified Tank	1995	407140
C	403m SE	Tanks	1999	402239
C	413m SE	Tanks	1978	411064
C	413m SE	Tanks	1989	411064
C	413m SE	Tanks	1989	411064
C	413m SE	Tanks	1995	385616
C	413m SE	Tanks	1993	385616
C	413m SE	Tanks	1999	385616
C	413m SE	Tanks	1995	385616
C	415m SE	Tanks	1970	383620
C	415m SE	Unspecified Tank	1939	389974
C	415m SE	Unspecified Tank	1932	389974
C	422m SE	Unspecified Tank	1952	396537
C	422m SE	Tanks	1970	385624
C	426m SE	Tanks	1970	406173
C	426m SE	Tanks	1978	406173
C	426m SE	Tanks	1989	406173
C	426m SE	Tanks	1989	406173
C	427m SE	Tanks	1995	406173
C	427m SE	Tanks	1993	406173
C	427m SE	Tanks	1999	406173
C	427m SE	Tanks	1995	406173
C	441m S	Unspecified Tank	1907	368879
I	488m S	Unspecified Tank	1939	397664
I	488m S	Unspecified Tank	1932	397664
N	494m SE	Unspecified Tank	1897	368900

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	0

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'.

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.

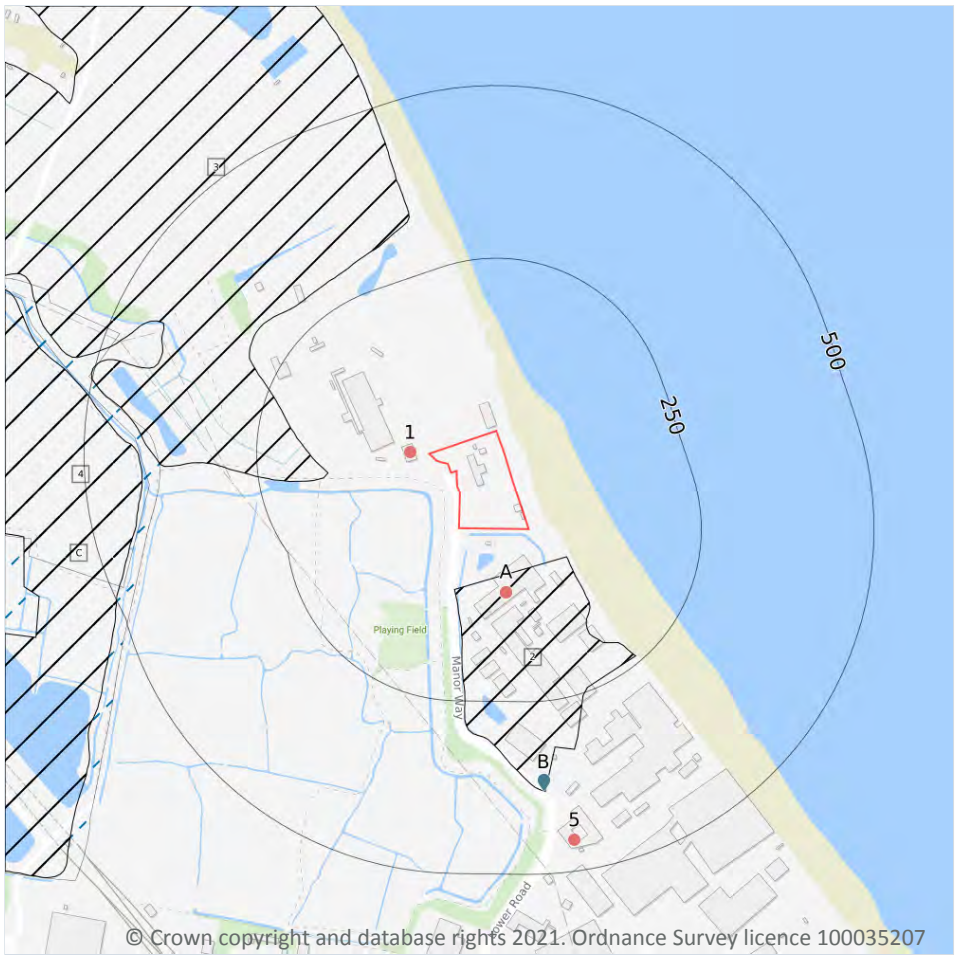
2.5 Historical garages

Records within 500m	0

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'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Active or recent landfill

Historical landfill (EA/NRW)

Licensed waste sites

Waste exemptions

3.1 Active or recent landfill

Records within 500m	2

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

Features are displayed on the Waste and landfill map on **page 30**

ID	Location	Details	
C	390m W	Operator: Swanscombe Development L L P Site Address: South Pit And Surge Pile, Swanscombe Marsh, Swanscombe, Kent, DA10 0LL	WML Number: 19373 EPR Reference: SWA002 Landfill type: A07: Industrial Waste Landfill (Factory curtilage) Status: Closure IPPC Reference: - EPR Number: EA/EPR/EB3802FX/V002

ID	Location	Details	
4	407m W	Operator: Swanscombe Development LLP Site Address: South Pit Phase 3 Landfill, Manor Way, Kent, DA10 0LL	WML Number: 0 EPR Reference: - Landfill type: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE Status: Transfer Effective IPPC Reference: - EPR Number: -

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	**3**

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.

Features are displayed on the Waste and landfill map on **page 30**

ID	Location	Details		
2	53m S	Site Address: Botany Road, Botany Road, Northfleet, Kent Licence Holder Address: -	Waste Licence: Yes Site Reference: 21EM, P/02/01 Waste Type: Inert, Industrial, Special Environmental Permitting Regulations (Waste) Reference: SJ1/L/BRI001 Licence Issue: 14/06/1977 Licence Surrender: 19/09/2000	Operator: Britannia Refined Metals Licence Holder: Brit. Lead First Recorded 31/12/1977 Last Recorded: -

ID	Location	Details		
3	149m W	Site Address: Broadness, Swanscombe, Kent Licence Holder Address: -	Waste Licence: Yes Site Reference: P/01/11, 21EZ Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 15/08/1977 Licence Surrender: 02/11/1992	Operator: Blue Circle Industries Plc Licence Holder: Blue Circle Industries Plc First Recorded 31/12/1977 Last Recorded: 29/10/1992
C	417m W	Site Address: Southpit, Swanscombe Marsh, Swanscombe, Kent Licence Holder Address: -	Waste Licence: Yes Site Reference: P/01/11A, 21EY Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 14/06/1977 Licence Surrender: -	Operator: - Licence Holder: Blue Circle Industries Plc First Recorded 31/12/1977 Last Recorded: 31/12/1992

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	**3**

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

Features are displayed on the Waste and landfill map on **page 30**

ID	Location	Details		
B	367m S	Site Name: Botany Road Site Address: Botany Road, Northfleet, Kent, DA11 Correspondence Address: Botany Road, Northfleet, Kent, DA11	Type of Site: Industrial Waste Landfill (Factory curtilage) Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: BRI001 EPR reference: - Operator: Britannia Refined Metals Waste Management licence No: 19387 Annual Tonnage: 0	Issue Date: 14/06/1997 Effective Date: - Modified: - Surrendered Date: - Expiry Date: 27/07/1998 Cancelled Date: - Status: Expired

ID	Location	Details		
B	367m S	Site Name: Botany Road Site Address: Botany Road, Northfleet, Kent, DA11 Correspondence Address: -	Type of Site: Industrial Waste Landfill (Factory curtilage) Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRI001 EPR reference: EA/EPR/TP3898HP/A001 Operator: Britannia Refined Metals Limited Waste Management licence No: 19387 Annual Tonnage: 75000	Issue Date: 14/06/1997 Effective Date: - Modified: - Surrendered Date: - Expiry Date: 27/07/1998 Cancelled Date: - Status: Expired
B	367m S	Site Name: Botany Road Site Address: Botany Road, Northfleet, Kent, DA11 Correspondence Address: -	Type of Site: Industrial Waste Landfill (Factory curtilage) Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRI001 EPR reference: EA/EPR/TP3898HP/A001 Operator: Britannia Refined Metals Limited Waste Management licence No: 19387 Annual Tonnage: 75000	Issue Date: 14/06/1997 Effective Date: - Modified: - Surrendered Date: - Expiry Date: 27/07/1998 Cancelled Date: - Status: Expired

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

3.7 Waste exemptions

Records within 500m **8**

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.

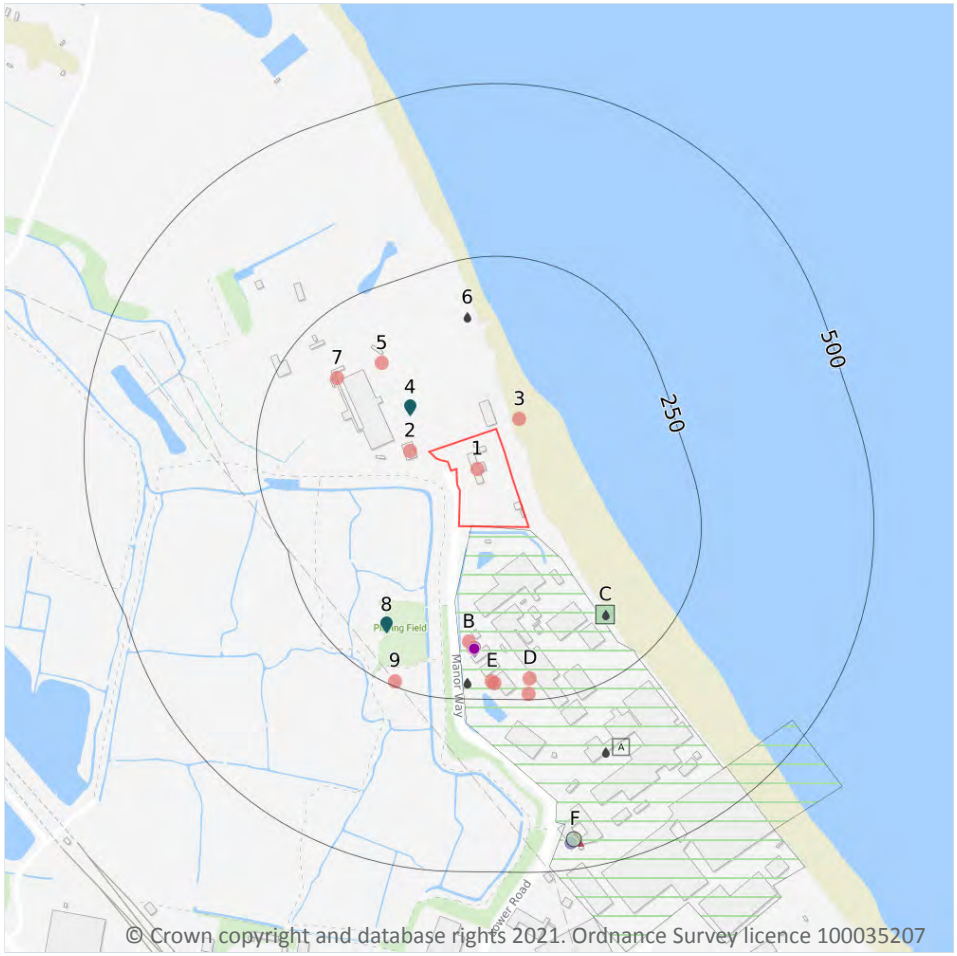
Features are displayed on the Waste and landfill map on **page 30**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	28m W	BOTANY MARSH, LOWER ROAD, NORTHFLEET, GRAVESEND, DA11 9BB	WEX152719	Using waste exemption	Not on a farm	Use of waste in construction
A	92m S	-	WEX235662	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	92m S	-	WEX235662	Disposing of waste exemption	Not on a farm	Burning waste in the open

ID	Location	Site	Reference	Category	Sub-Category	Description
A	92m S	-	WEX235662	Disposing of waste exemption	Not on a farm	Deposit of waste from dredging of inland waters
A	92m S	-	WEX089874	Disposing of waste exemption	Not on a farm	Deposit of waste from dredging of inland waters
A	92m S	-	WEX089874	Disposing of waste exemption	Not on a farm	Burning waste in the open
A	92m S	-	WEX089874	Storing waste exemption	Not on a farm	Storage of waste in a secure place
5	456m S	Britannia Refined Metals Ltd Botany Road GRAVESEND Kent DA11 9BG	EPR/SF0303KJ/A001	Treating waste exemption	Non-Agricultural Waste Only	Crushing waste fluorescent tubes

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

Control of Major Accident Hazards

Hazardous substance storage/usage

Historical licensed industrial activities

Part A(1) industrial activities

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

Licensed Discharges to controlled waters

List 1 Dangerous Substances

List 2 Dangerous Substances

Pollution Incidents (EA/NRW)

Pollution inventory substances

Pollution inventory waste transfers

4.1 Recent industrial land uses

Records within 250m	12

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Cemex UK**	**Botany Marsh, Lower Road, Northfleet, Gravesend, Kent, DA11 9BB**	**Concrete Products**	**Industrial Products**
2	28m W	W B Services UK Ltd	Botany Marsh, Lower Road, Northfleet, Gravesend, Kent, DA11 9BB	Distribution and Haulage	Transport, Storage and Delivery

ID	Location	Company	Address	Activity	Category
3	36m NE	Wharf	Kent, DA11	Moorings and Unloading Facilities	Water
5	146m NW	Tank	Kent, DA11	Tanks (Generic)	Industrial Features
B	167m S	Electricity Sub Station	Kent, DA11	Electrical Features	Infrastructure and Facilities
7	171m NW	Electricity Sub Station	Kent, DA11	Electrical Features	Infrastructure and Facilities
B	177m S	Chimney	Kent, DA11	Chimneys	Industrial Features
D	219m S	Tank	Kent, DA11	Tanks (Generic)	Industrial Features
E	223m S	Tank	Kent, DA11	Tanks (Generic)	Industrial Features
E	227m S	Tank	Kent, DA11	Tanks (Generic)	Industrial Features
D	241m S	Chimney	Kent, DA11	Chimneys	Industrial Features
9	243m S	Pylon	Kent, DA11	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

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	1

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Company	Address	Operational status	Tier
A	**On site**	**Britannia Refined Metals Limited**	**Britannia Refined Metals Limited, Gravesend, Botany Road, Northfleet, Gravesend, Kent, DA11 9BG**	**Current COMAH Site**	**COMAH Upper Tier Operator**

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	1

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Details	
F	456m S	Application reference number: No Details Application status: Approved Application date: 24/06/2015 Address: Britannia Refined Metals Ltd, Botany Road, Northfleet, Gravesend, Kent, England, DA11 9BG	Details: Storage of various hazardous materials Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m **3**

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Details	
F	460m S	Operator: Britannia Refined Metals Ltd Address: Botany Road, Northfleet, Gravesend, Kent, DA11 9BG Process: Non-ferrous Metals Permit Number: AS7850	Original Permit Number: IPCAIRAPP Date Approved: 22-3-1996 Effective Date: 1-4-1996 Status: Superseded By Variation
F	460m S	Operator: Britannia Refined Metals Ltd Address: Botany Road, Northfleet, Gravesend, Kent, DA11 9BG Process: Non-ferrous Metals Permit Number: AX2413	Original Permit Number: IPCMAJVAR Date Approved: 21-4-1997 Effective Date: 29-4-1997 Status: Superseded By Variation
F	460m S	Operator: Britannia Refined Metals Ltd Address: Botany Road, Northfleet, Gravesend, Kent, DA11 9BG Process: Non-ferrous Metals Permit Number: BD7782	Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked - Now Ippc

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m **9**

Records of Part A(1) 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 35**

ID	Location	Details	
B	177m S	Operator: BRITANNIA REFINED METALS LTD Installation Name: NORTHFLEET REFINED METALS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS Permit Number: BM4945IW Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 30/04/2004 Effective Date: 30/04/2004 Last date noted as effective: 01/07/2021 Status: SUPERCEDED
B	177m S	Operator: BRITANNIA REFINED METALS LTD Installation Name: BRITANNIA REFINED METALS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS Permit Number: KP3633LQ Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 04/10/2005 Effective Date: 04/10/2005 Last date noted as effective: 01/07/2021 Status: SUPERCEDED
B	177m S	Operator: BRITANNIA REFINED METALS LTD Installation Name: BRITANNIA REFINED METALS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS Permit Number: ZP3836LP Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 14/02/2007 Effective Date: 01/03/2007 Last date noted as effective: 01/07/2021 Status: SUPERCEDED
B	177m S	Operator: BRITANNIA REFINED METALS LIMITED Installation Name: BOTANY ROAD EPR/BM4945IW Process: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE. Permit Number: AP3302BV Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 30/11/2020 Effective Date: 30/11/2020 Last date noted as effective: 01/07/2021 Status: SUPERCEDED
B	177m S	Operator: BRITANNIA REFINED METALS LIMITED Installation Name: BOTANY ROAD EPR/BM4945IW Process: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE. Permit Number: HP3803LY Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 18/12/2020 Effective Date: 18/12/2020 Last date noted as effective: 01/07/2021 Status: EFFECTIVE
B	177m S	Operator: BRITANNIA REFINED METALS LTD Installation Name: BRITANNIA REFINED METALS Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS Permit Number: RP3236SF Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 02/12/2005 Effective Date: 02/12/2005 Last date noted as effective: 01/07/2021 Status: SUPERCEDED

ID	Location	Details	
B	177m S	Operator: BRITANNIA REFINED METALS LIMITED Installation Name: BRITANNIA REFINED METALS LIMITED Process: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE. Permit Number: TP3535JK Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 18/05/2018 Effective Date: 18/05/2018 Last date noted as effective: 01/07/2021 Status: SUPERCEDED
B	177m S	Operator: BRITANNIA REFINED METALS LIMITED Installation Name: BOTANY ROAD EPR/BM4945IW Process: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE. Permit Number: WP3135QH Original Permit Number: BM4945IW	EPR Reference: - Issue Date: 12/11/2018 Effective Date: 12/11/2018 Last date noted as effective: 01/07/2021 Status: SUPERCEDED
F	460m S	Operator: BRITANNIA REFINED METALS LTD Installation Name: - Process: NON-FERROUS METALS; MELTING WITH CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS Permit Number: BM4945 Original Permit Number: BM4945	EPR Reference: - Issue Date: 30/04/2004 Effective Date: 30/04/2004 Last date noted as effective: 01/10/2004 Status: SUPERSEDED BY PAS

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

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

Records within 500m **2**

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 35**

ID	Location	Address	Details	
4	70m NW	Cemex Concrete Products Ltd, Botany Marshes, Lower Road, Northfleet, Kent, DA11 9BB	Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
8	177m SW	Cemex Concrete Products Ltd, Lower Road, Northfleet, Kent, DA11 9AP	Process: Use of Bulk Cement Status: Current Permit 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	**9**

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 35**

ID	Location	Address	Details	
6	166m N	LAGOON OUTLET, NORTHFLEET SITE, NORTHFLEET, KENT	Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Permit Number: CTMR.0008 Permit Version: 1 Receiving Water: THAMES TIDAL	Status: TRANSFERRED FROM R(PP)A 1951-1961 Issue date: 22/02/1978 Effective Date: 22/02/1978 Revocation Date: -
C	168m SE	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: CNTW.0931 Permit Version: 1 Receiving Water: TIDAL RIVERTHAMES	Status: REVOKED - UNSPECIFIED Issue date: 18/02/1991 Effective Date: 18/02/1991 Revocation Date: 31/05/1996
E	227m S	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CNTW.0932 Permit Version: 1 Receiving Water: TIDAL RIVERTHAMES	Status: REVOKED - UNSPECIFIED Issue date: 18/02/1991 Effective Date: 18/02/1991 Revocation Date: 31/05/1996
E	227m S	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CNTW.0932 Permit Version: 1 Receiving Water: TIDAL RIVERTHAMES	Status: REVOKED - UNSPECIFIED Issue date: 18/02/1991 Effective Date: 18/02/1991 Revocation Date: 31/05/1996
E	227m S	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CNTW.0932 Permit Version: 1 Receiving Water: TIDAL RIVERTHAMES	Status: REVOKED - UNSPECIFIED Issue date: 18/02/1991 Effective Date: 18/02/1991 Revocation Date: 31/05/1996

ID	Location	Address	Details	
E	227m S	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CNTW.0932 Permit Version: 1 Receiving Water: TIDAL RIVERTHAMES	Status: REVOKED - UNSPECIFIED Issue date: 18/02/1991 Effective Date: 18/02/1991 Revocation Date: 31/05/1996
E	227m S	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CNTW.0932 Permit Version: 1 Receiving Water: TIDAL RIVERTHAMES	Status: REVOKED - UNSPECIFIED Issue date: 18/02/1991 Effective Date: 18/02/1991 Revocation Date: 31/05/1996
E	227m S	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: CNTW.0932 Permit Version: 1 Receiving Water: TIDAL RIVERTHAMES	Status: REVOKED - UNSPECIFIED Issue date: 18/02/1991 Effective Date: 18/02/1991 Revocation Date: 31/05/1996
A	345m S	BRITANNIA REFINED METALS, BOTANY RO, BRITANNIA REFINED METALS BOTANY, ROAD NORTHFLEET GRAVESEND KE, NT,DA11 9B	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CPLR.0023 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 04/12/1969 Effective Date: 04/12/1969 Revocation Date: 17/10/1989

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	1

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Name	Status	Receiving Water	Authorised Substances
C	169m SE	Britannia Refined Metals Ltd	Active	Thames Estuary	Mercury (other), Cadmium

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

4.17 List 2 Dangerous Substances

Records within 500m	1

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Name	Status	Receiving Water	Authorised Substances
C	169m SE	Britannia Refined Metals	Active	Thames Estuary	Arsenic, Copper, Lead, Nickel, Zinc

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

4.18 Pollution Incidents (EA/NRW)

Records within 500m	1

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 35**

ID	Location	Details	
F	456m S	Incident Date: 18/05/2002 Incident Identification: 79682 Pollutant: Oils and Fuel Pollutant Description: Gas and Fuel Oils	Water Impact: Category 4 (No Impact) 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	4

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.

Features are displayed on the Current industrial land use map on **page 35**

ID: B, Location: 178m S, Permit: BM4945IW
Operator: Britannia Refined Metals Limited
Activity: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE.
Address: Botany Road Northfleet Gravesend Kent DA11 9BG
Sector Metals, Sub-sector: Non-Ferrous
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Arsenic	1kg	1.25kg

ID: B, Location: 178m S, Permit: BM4945IW
Operator: Britannia Refined Metals Limited
Activity: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE.
Address: Botany Road Northfleet Gravesend Kent DA11 9BG
Sector Metals, Sub-sector: Non-Ferrous
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Cadmium	1kg	1.6kg

ID: B, Location: 178m S, Permit: BM4945IW
Operator: Britannia Refined Metals Limited
Activity: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE.
Address: Botany Road Northfleet Gravesend Kent DA11 9BG
Sector Metals, Sub-sector: Non-Ferrous
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Controlled Waters	Arsenic	5kg	Below Reporting Threshold
Controlled Waters	Cadmium	1kg	Below Reporting Threshold
Air	Carbon monoxide	100000kg	Below Reporting Threshold
Air	Copper	10kg	Below Reporting Threshold
Controlled Waters	Copper	20kg	Below Reporting Threshold
Air	Dioxins and furans (PCDDs/PCDFs) - as ITEQ	1e-5kg	Below Reporting Threshold
Air	Dioxins and furans (PCDDs/PCDFs) - as WHO TEQ	1e-5kg	Below Reporting Threshold
Air	Lead	100kg	Below Reporting Threshold
Controlled Waters	Lead	20kg	Below Reporting Threshold
Controlled Waters	Nickel	20kg	Below Reporting Threshold
Air	Nitrogen oxides (NO and NO2) as NO2	100000kg	Below Reporting Threshold
Air	Particulate matter - total	10000kg	Below Reporting Threshold
Air	Selenium	100kg	Below Reporting Threshold
Air	Sulphur oxides (SO2 and SO3) as SO2	100000kg	Below Reporting Threshold
Controlled Waters	Zinc	100kg	Below Reporting Threshold
Air	Zinc	100kg	Below Reporting Threshold

ID: B, Location: 178m S, Permit: BM4945IW
Operator: Britannia Refined Metals Limited
Activity: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE.
Address: Botany Road Northfleet Gravesend Kent DA11 9BG
Sector Metals, Sub-sector: Non-Ferrous
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Carbon dioxide	10000000kg	16220940kg

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

4.20 Pollution inventory waste transfers

Records within 500m	1

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.

Features are displayed on the Current industrial land use map on **page 35**

ID: B, Location: 178m S, Permit: BM4945IW
Operator: Britannia Refined Metals Limited
Activity: NON-FERROUS METALS; MELTING CAPACITY >4T/D LEAD/CADMIUM OR 20T/D OTHERS AND FOR ALLOYS A VESSEL WITH A DESIGN HOLDING CAPACITY OF 5 TONNES OR MORE.
Address: Botany Road Northfleet Gravesend Kent DA11 9BG
Sector: Metals, Sub-sector: Non-Ferrous
Releases:

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R5	Recycling/reclamation of other inorganic materials	0.357	Absolute Value	20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	No
R6	Regeneration of acids or bases	0.395	Absolute Value	20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	No
R4	Recycling/reclamation of metals and metal compounds	290.22	Absolute Value	17 04 05	iron and steel	No
R4	Recycling/reclamation of metals and metal compounds	17.58	Absolute Value	17 04 07	mixed metals	No
R4	Recycling/reclamation of metals and metal compounds	3.22	Absolute Value	17 04 11	cables other than those mentioned in 17 04 10	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	18.54	Absolute Value	17 02 01	wood	No

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	4.5	Absolute Value	20 01 08	biodegradable kitchen and canteen waste	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	26.76	Absolute Value	20 03 01	mixed municipal waste	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	10.4	Absolute Value	15 01 01	paper and cardboard packaging	No
D1	Deposit into or onto land (eg landfill, etc.)	76.8	Absolute Value	17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	No
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	4.7	Absolute Value	15 02 02	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	Yes
R4	Recycling/reclamation of metals and metal compounds	0.18	Absolute Value	16 01 07	oil filters	Yes
R4	Recycling/reclamation of metals and metal compounds	0.047	Absolute Value	20 01 35	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components (6)	Yes
R5	Recycling/reclamation of other inorganic materials	0.197	Absolute Value	20 01 21	fluorescent tubes and other mercury-containing waste	Yes
R4	Recycling/reclamation of metals and metal compounds	0.63	Absolute Value	15 01 10	packaging containing residues of or contaminated by dangerous substances	Yes

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
D9	Physio-chemical treatment not specified elsewhere in this Table which results in final compounds or mixtures which are discarded by means of any of the operations numberes D1 to D12 (eg evaporation, drying, calcination, etc.)	41.48	Absolute Value	13 05 08	mixtures of wastes from grit chambers and oil/water separators	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	0.15	Absolute Value	17 06 05	construction materials containing asbestos	Yes
D1	Deposit into or onto land (eg landfill, etc.)	604.12	Absolute Value	10 04 01	slags from primary and secondary production	Yes
R4	Recycling/reclamation of metals and metal compounds	1265.88	Absolute Value	10 04 02	dross and skimmings from primary and secondary production	Yes

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

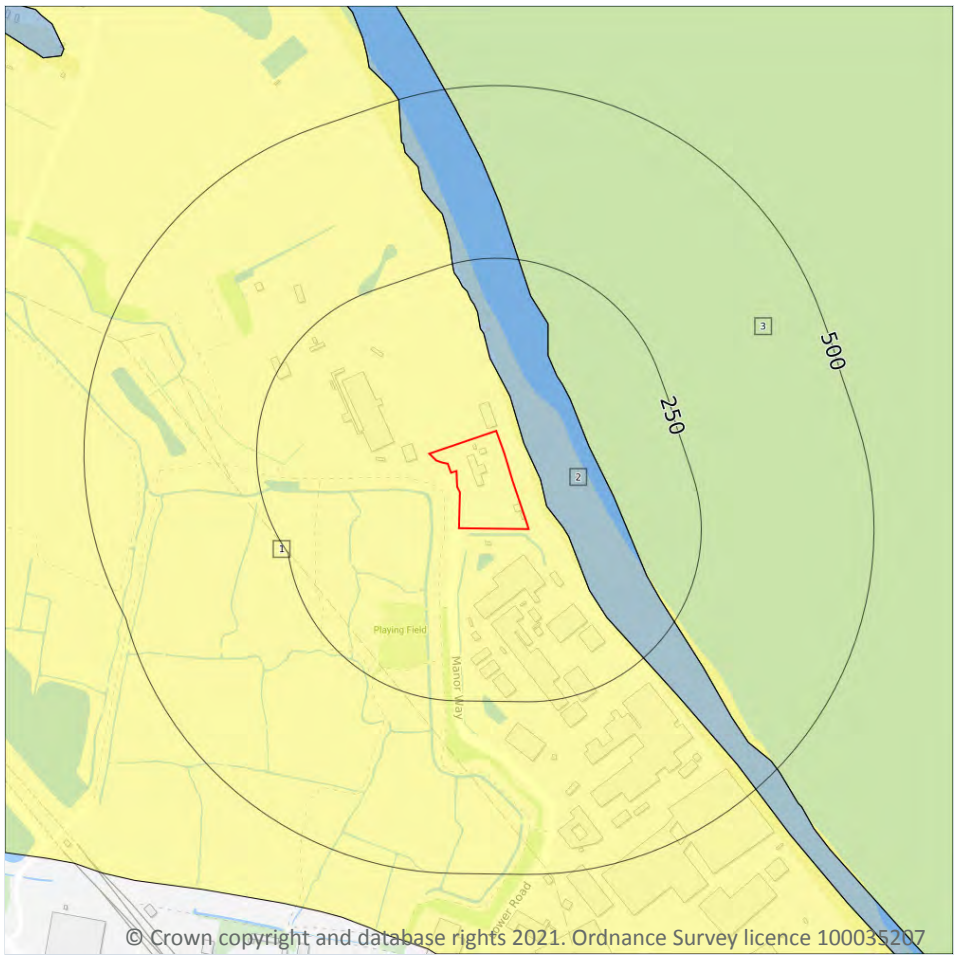
4.21 Pollution inventory radioactive waste

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.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	3

Aquifer status of groundwater held within superficial geology.

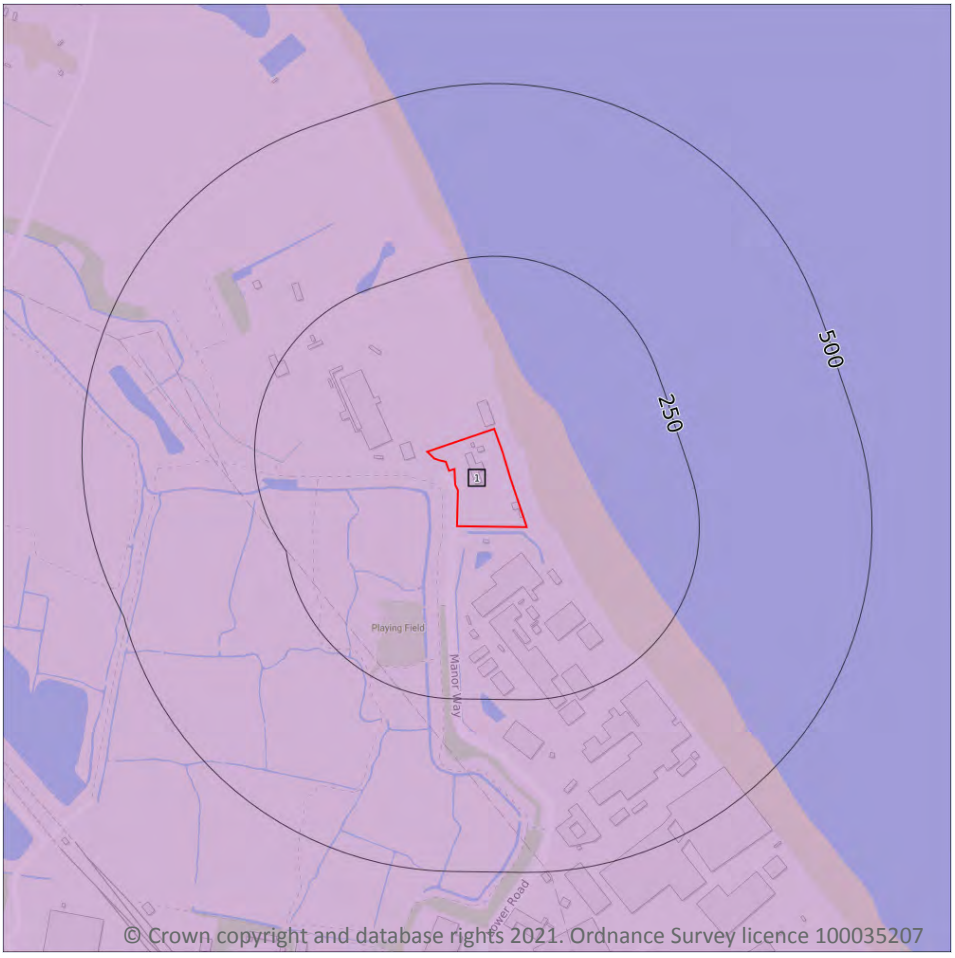
Features are displayed on the Hydrogeology map on **page 49**

ID	Location	Designation	Description
1	**On site**	**Secondary Undifferentiated**	**Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type**
2	32m E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

ID	Location	Designation	Description
3	116m NE	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

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	1

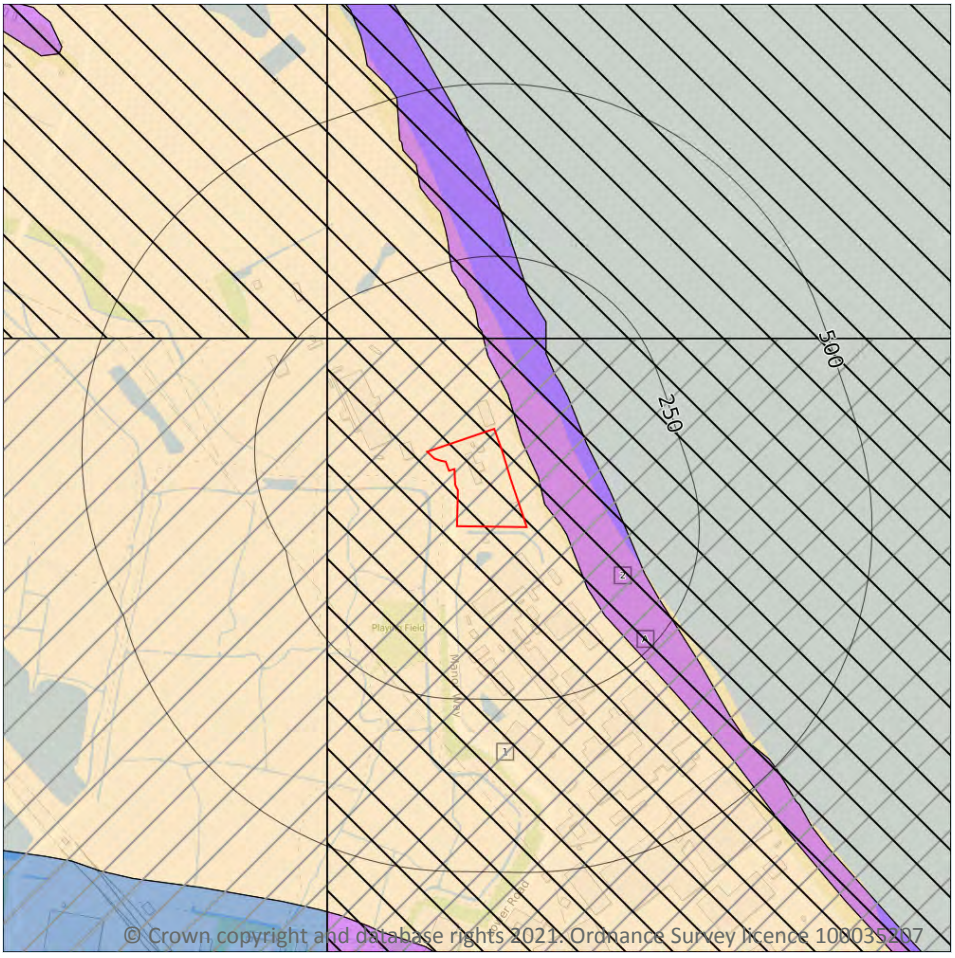
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 51**

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

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

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability

- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	2

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 52**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: <300mm/year**	**Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: No Data**	**Vulnerability: Medium Aquifer type: Principal Flow mechanism: Well connected fractures**
2	31m E	Summary Classification: Principal bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Unproductive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: Unproductive Aquifer type: Unproductive Thickness: >10m Patchiness value: >90% Recharge potential: No Data	Vulnerability: Medium Aquifer type: Principal 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
A	**Significant soluble rocks are likely to be present. Problems unlikely except with considerable surface or subsurface water flow.**	**10.0%**

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

5.5 Groundwater vulnerability- local information

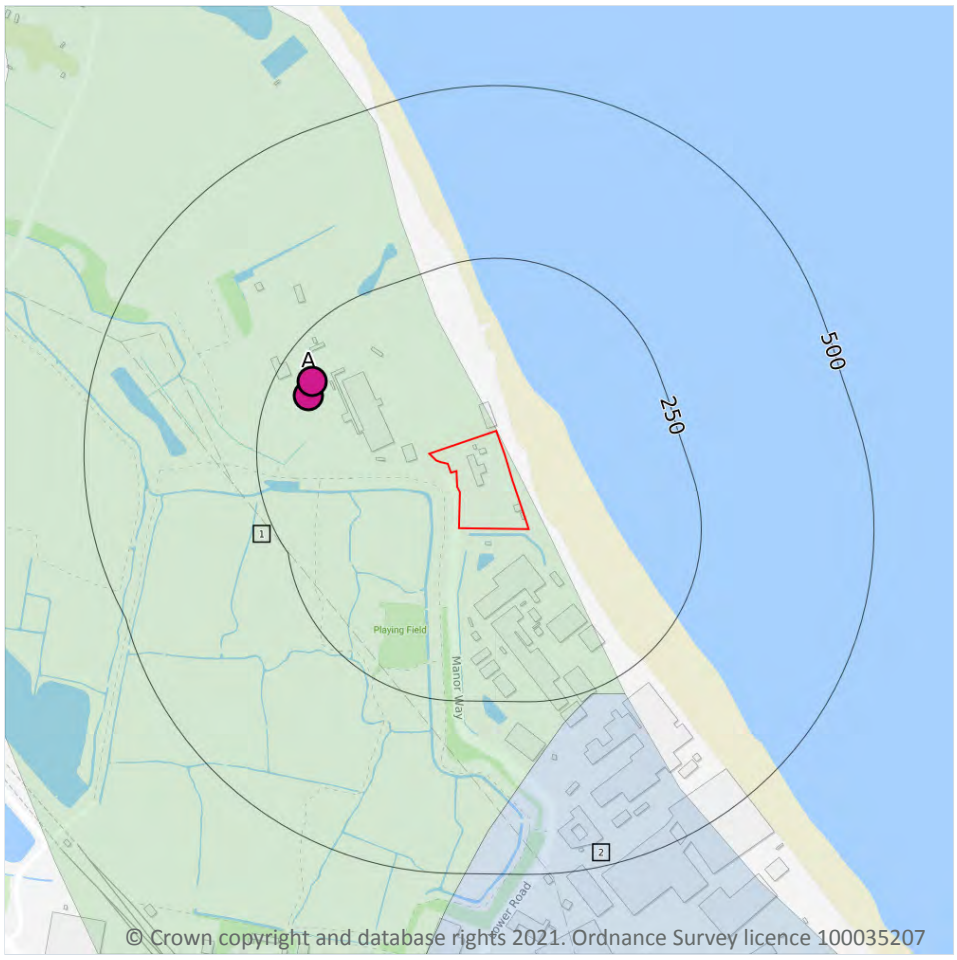
Records on site	**1**

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.

ID	Summary	Additional information
A	**Potentially increased vulnerability of the bedrock aquifer due to limited cover by superficial deposits**	**Removal of, or limited cover of, superficial deposits within the River Thames**

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
- 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	7

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.

Features are displayed on the Abstractions and Source Protection Zones map on **page 55**

ID	Location	Details	
A	194m NW	Status: Historical Licence No: 01/158 Details: Mineral Washing Direct Source: Southern Region Groundwater Point: A BOREHOLE AT SWANSCOMBE MARSHES Data Type: Point Name: Cemex UK Materials Ltd Easting: 560970 Northing: 175920	Annual Volume (m^3): 26300 Max Daily Volume (m^3): 105 Original Application No: - Original Start Date: 01/12/2005 Expiry Date: 31/03/2014 Issue No: 1 Version Start Date: 18/10/2006 Version End Date: -
A	199m NW	Status: Active Licence No: 01/158/R01 Details: Mineral Washing Direct Source: Southern Region Groundwater Point: BOREHOLE AT SWANSCOMBE MARSHES Data Type: Point Name: Cemex UK Materials Ltd Easting: 560976 Northing: 175941	Annual Volume (m^3): 26,300 Max Daily Volume (m^3): 105 Original Application No: - Original Start Date: 01/04/2014 Expiry Date: 31/03/2026 Issue No: 2 Version Start Date: 21/12/2018 Version End Date: -
-	714m SW	Status: Historical Licence No: 01/153 Details: Dust suppression Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLES AT SWANSCOMBE, KENT Data Type: Point Name: Willetts Easting: 560490 Northing: 175550	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 19/08/2002 Expiry Date: 01/09/2004 Issue No: 2 Version Start Date: 21/07/2003 Version End Date: -
-	714m SW	Status: Historical Licence No: 01/153 Details: Mineral Washing Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLES AT SWANSCOMBE, KENT Data Type: Point Name: Willetts Easting: 560490 Northing: 175550	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 19/08/2002 Expiry Date: 01/09/2004 Issue No: 2 Version Start Date: 21/07/2003 Version End Date: -
-	1852m SE	Status: Active Licence No: 9/40/01/0092/A/GR/R1 Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET Data Type: Point Name: Kimberly-Clark Limited Easting: 562759 Northing: 174599	Annual Volume (m^3): 320,000 Max Daily Volume (m^3): 1,309 Original Application No: - Original Start Date: 01/04/2018 Expiry Date: 31/03/2030 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -

ID	Location	Details	
-	1859m SE	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET Data Type: Point Name: Kimberly-Clark Limited Easting: 562760 Northing: 174590	Annual Volume (m^3): 400000 Max Daily Volume (m^3): 1309 Original Application No: - Original Start Date: 27/05/1966 Expiry Date: 31/03/2018 Issue No: 101 Version Start Date: 24/04/2002 Version End Date: -
-	1956m SE	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT 1, GREENSAND BOREHOLE, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562860 Northing: 174560	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/05/1966 Version End Date: -

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

5.7 Surface water abstractions

Records within 2000m	**1**

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 55**

ID	Location	Details	
-	854m SE	Status: Active Licence No: 9/40/01/0522/S Details: Mineral Washing Direct Source: Southern Region Surface Waters Point: POINT A, TIDAL RIVER THAMES AT SWANSCOMBE. Data Type: Point Name: Robert Brett & Sons Ltd Easting: 561870 Northing: 175100	Annual Volume (m^3): 45,500 Max Daily Volume (m^3): 375 Original Application No: - Original Start Date: 06/02/1990 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2002 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	2

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 55**

ID	Location	Type	Description
1	**On site**	**3**	**Total catchment**
2	256m S	2	Outer catchment

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

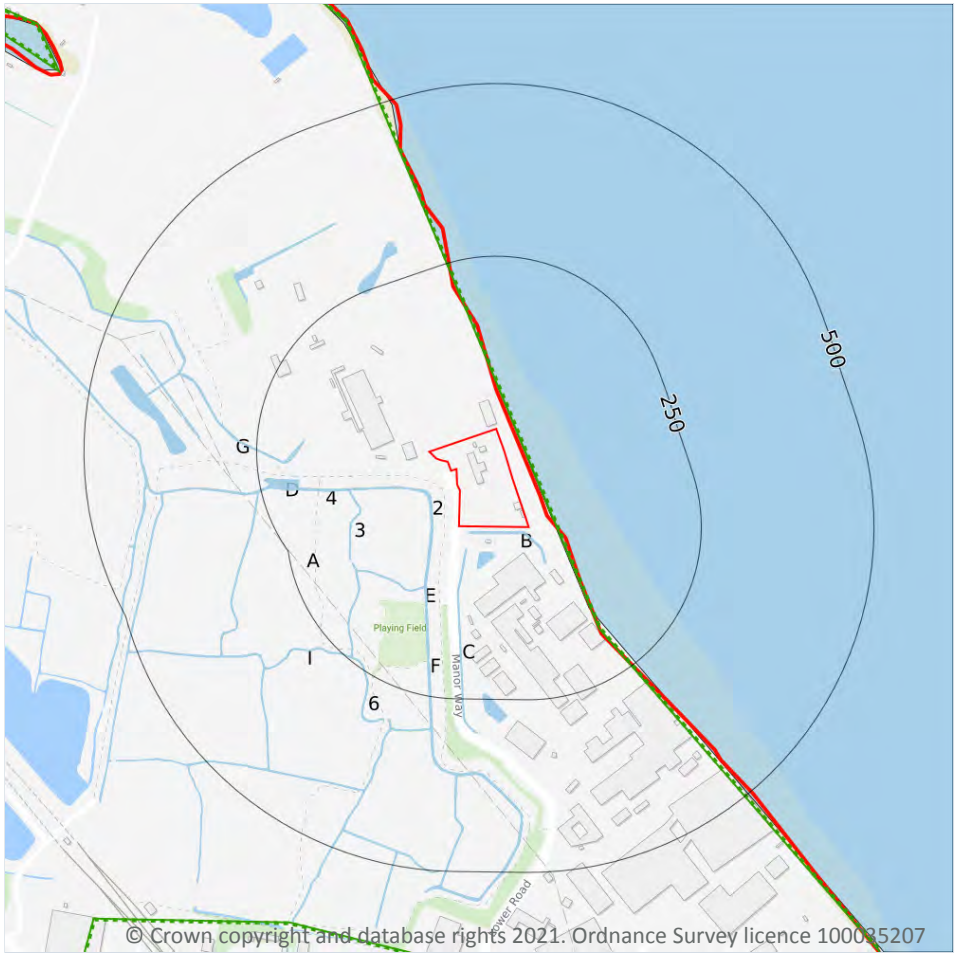
5.10 Source Protection Zones (confined aquifer)

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	**18**

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

Features are displayed on the Hydrology map on **page 59**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	8m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
B	9m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	32m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
2	39m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	99m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	99m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	107m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
E	110m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
3	128m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
4	129m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	161m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	161m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	181m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	197m W	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
D	197m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	239m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
6	243m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	245m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**11**

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.

Features are displayed on the Hydrology map on **page 59**

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 59**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**Coastal Catchment**	**Not part of a river WB catchment**	**130**	**Lower Medway**	**Medway**

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 59**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
1	25m NE	Transi	THAMES MIDDLE	GB530603911402	Moderate	Fail	Moderate	2019

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

6.5 WFD Groundwater bodies

Records on site	1

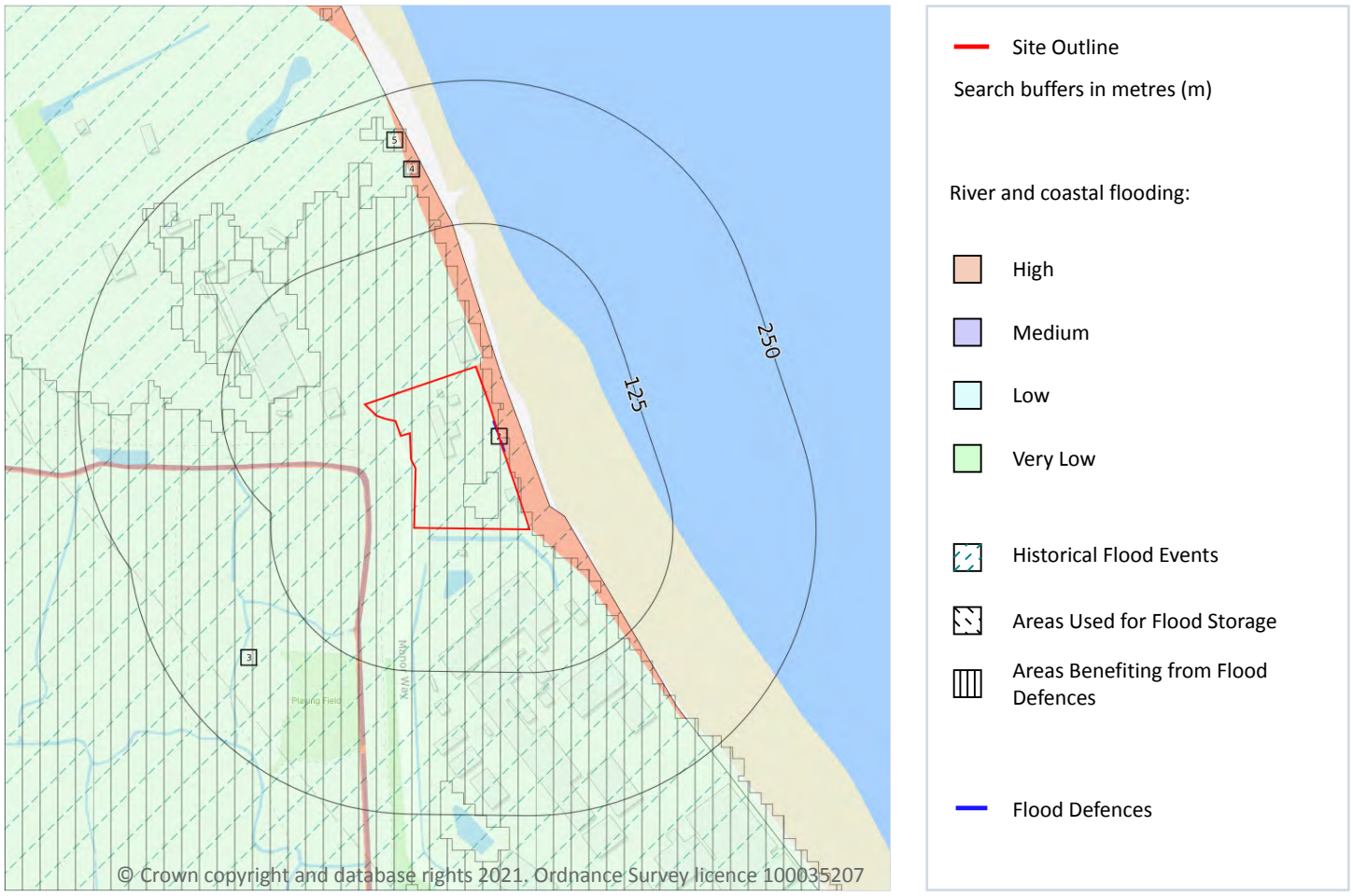
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**West Kent Darent and Cray Chalk**	**GB40601G501800**	**Poor**	**Poor**	**Poor**	**2019**

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	3

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).

Features are displayed on the River and coastal flooding map on **page 63**

Distance	Flood risk category
On site	**High**
0 - 50m	High

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

7.2 Historical Flood Events

Records within 250m	**1**

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.

Features are displayed on the River and coastal flooding map on **page 63**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
A	**On site**	**07301e900_Feb1953_Dartford/swanscombe**	**1953-02-01 1953-02-05**	**Sea**	**Overtopping of defences**	**Tidal**

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

7.3 Flood Defences

Records within 250m	**1**

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.

Features are displayed on the River and coastal flooding map on **page 63**

ID	Location	Update
2	**On site**	**01/09/2021**

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

7.4 Areas Benefiting from Flood Defences

Records within 250m	3

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.

Features are displayed on the River and coastal flooding map on **page 63**

ID	Location	
3	**On site**	**Area benefiting from flood defences**
4	175m N	Area benefiting from flood defences
5	197m N	Area benefiting from flood defences

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

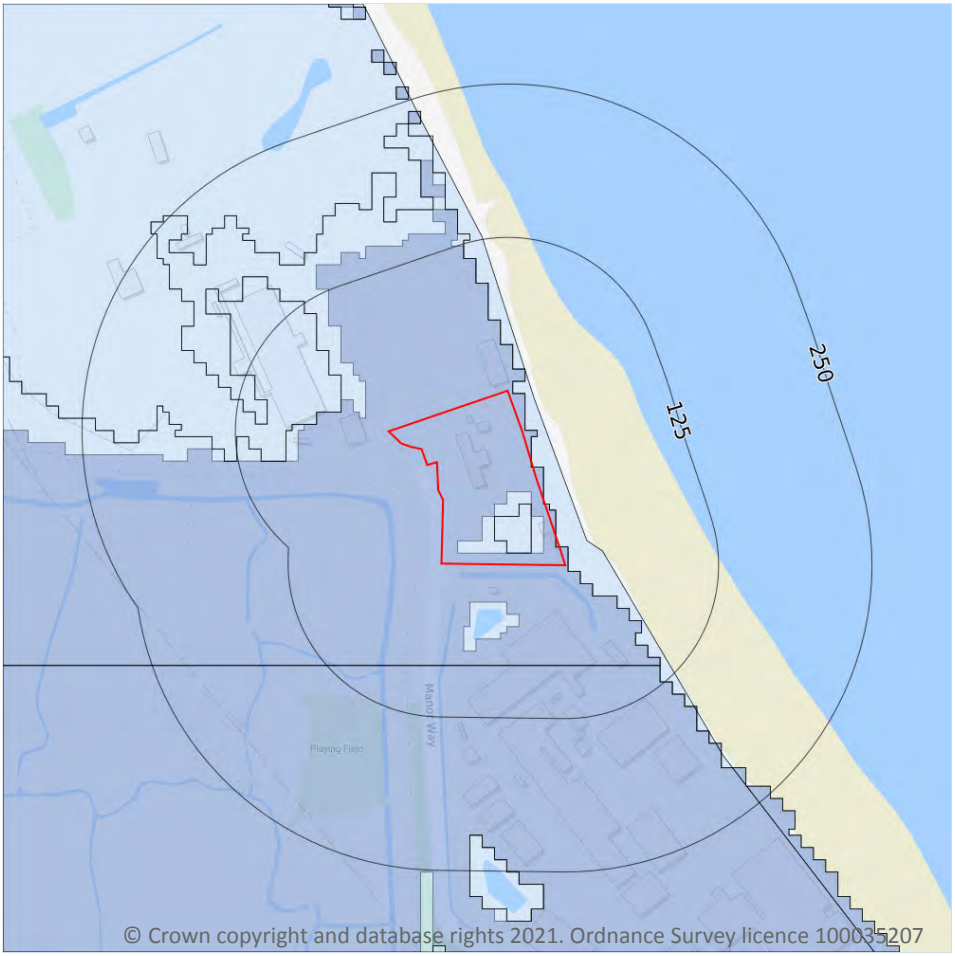
7.5 Flood Storage Areas

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



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

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.

Features are displayed on the River and coastal flooding map on **page 63**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

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

7.7 Flood Zone 3

Records within 50m	1

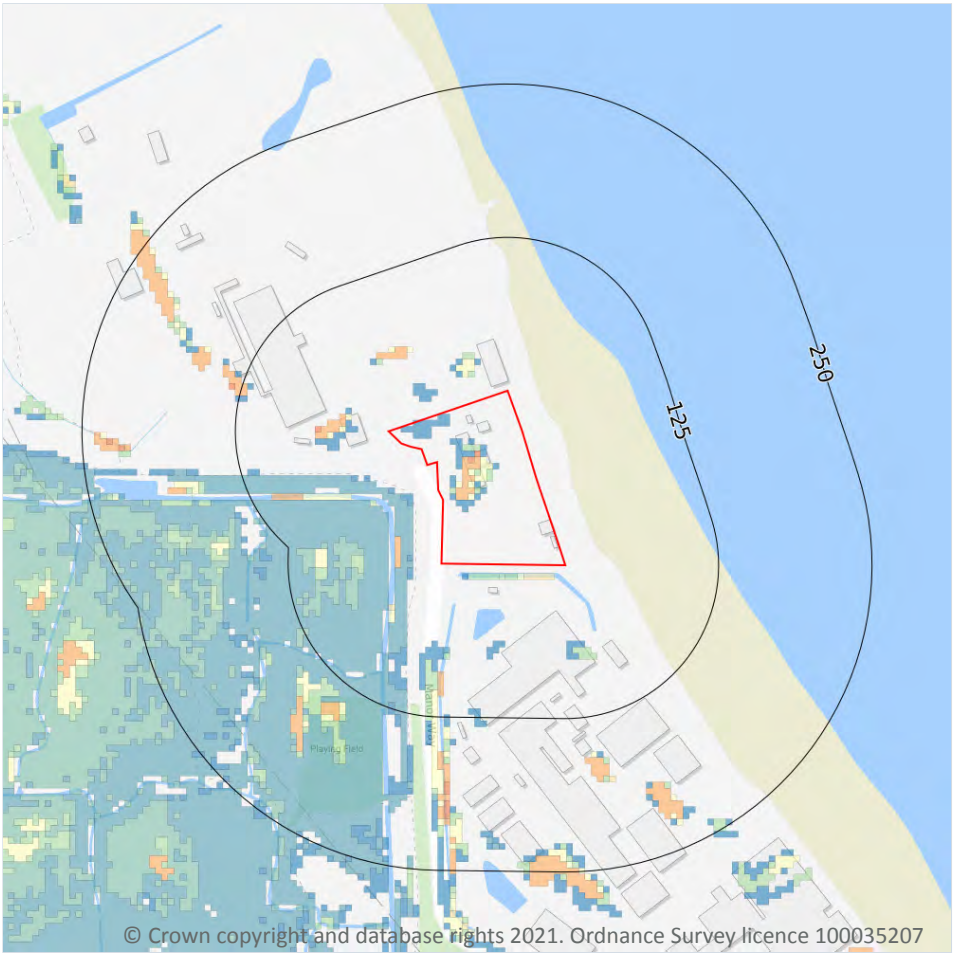
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 63**

Location	Type
On site	**Zone 3 - (Fluvial Models)**

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

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

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 68**

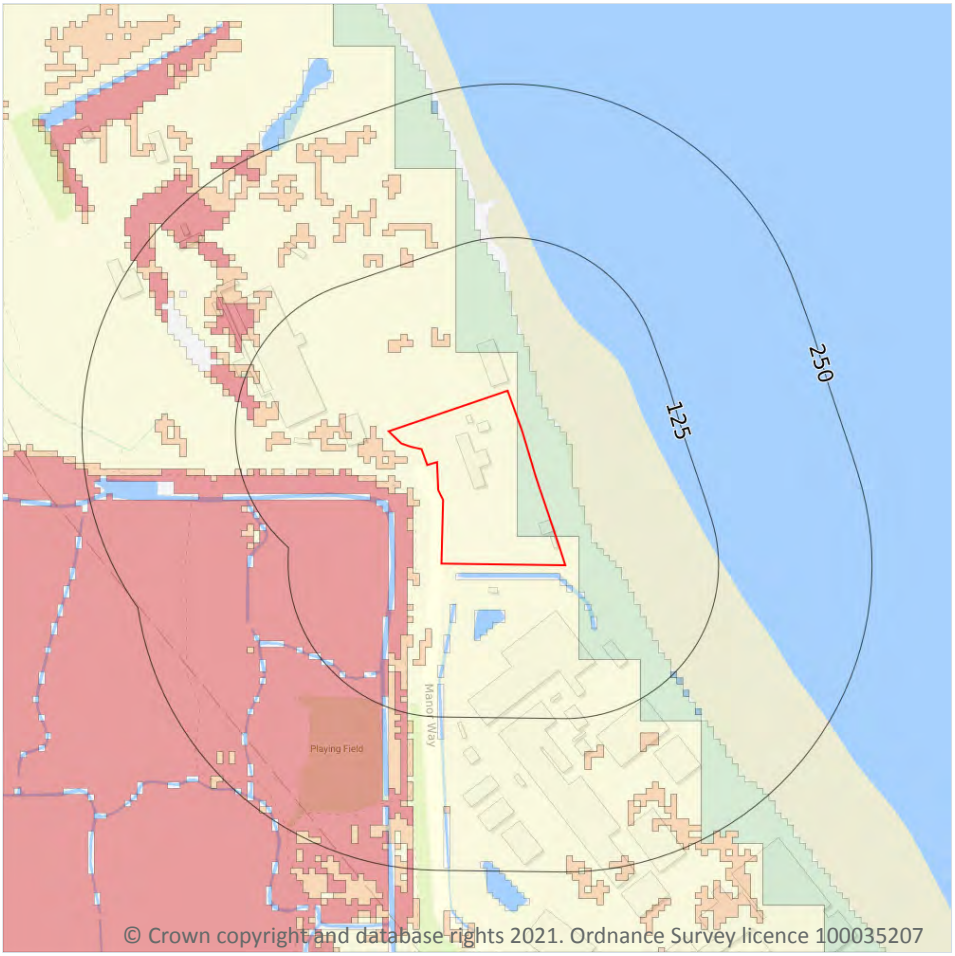
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

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	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.3m and 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

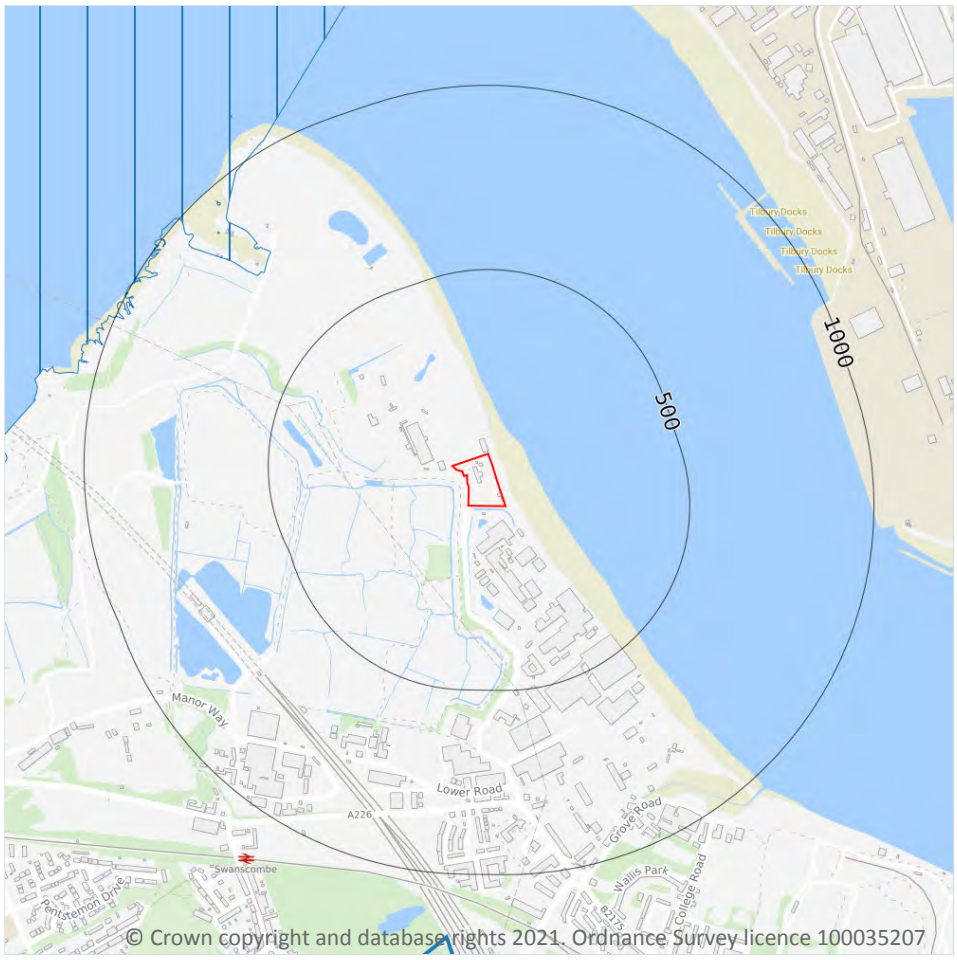
Highest risk on site	**Moderate**
Highest risk within 50m	**High**

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 70**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

National Nature Reserves (NNR)

Marine Conservation Zones

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	2

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 71**

ID	Location	Name	Data source
2	1172m S	Bakers Hole	Natural England

ID	Location	Name	Data source
-	1925m SW	Swanscombe Skull Site	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	0

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.

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

10.5 National Nature Reserves (NNR)

Records within 2000m	1

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.

Features are displayed on the Environmental designations map on **page 71**

ID	Location	Name	Data source
-	1925m SW	Swanscombe Skull Site	Natural England

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	1

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.

Features are displayed on the Environmental designations map on **page 71**

ID	Location	Name	Status
1	733m NW	Swanscombe	Designated

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

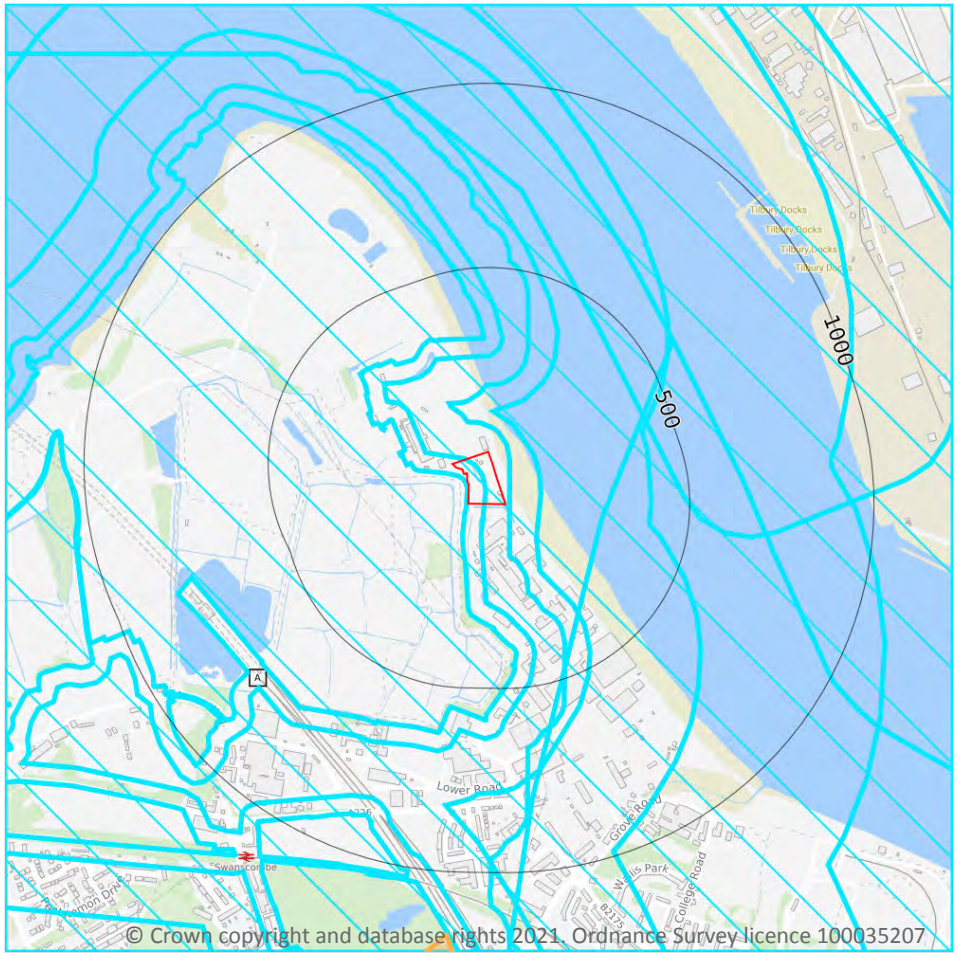
Records within 2000m	1

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
841m SW	North Kent	Groundwater	G65	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	2

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 76**

ID	Location	Type of developments requiring consultation
A	**On site**	**All applications - All planning applications - except householder applications.**

ID	Location	Type of developments requiring consultation
A	On site	**All applications - All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures. Infrastructure - Pipelines, pylons and overhead cables. any transport proposal including road, rail and by water (excluding routine maintenance). airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha. Residential - Residential development of 10 units or more. 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 or dust either in its construction or operation (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. Discharges - Any discharge of water or liquid waste that is discharged to ground (ie to seep away) or to surface water, such as a beck or stream. Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply .**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	**2**

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 76**

ID:	23
Location:	1172m S
SSSI name:	Bakers Hole
Unit name:	Baker's Hole: Whole Site
Broad habitat:	Earth Heritage
Condition:	Unfavourable - Declining
Reportable features:	

Feature name	Feature condition	Date of assessment
FM - Quaternary of the Thames	Unfavourable - Declining	16/03/2012

ID: -
Location: 1925m SW
SSSI name: Swanscombe Skull Site
Unit name: Disused Pits
Broad habitat: Earth Heritage
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
FM - Pleistocene Vertebrata	Favourable	16/11/2012
FM - Quaternary of the Thames	Favourable	16/11/2012

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

11 Visual and cultural designations

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	0

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.

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

11.5 Conservation Areas

Records within 250m	0

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.

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.

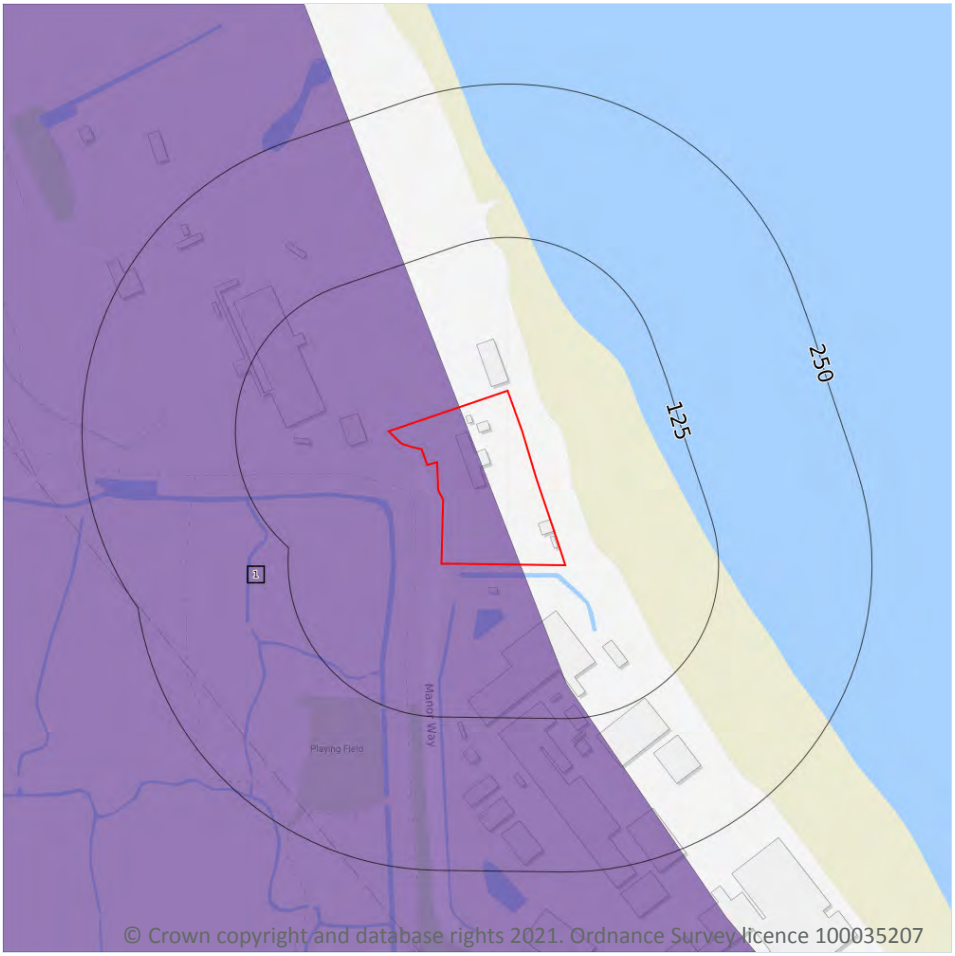
11.7 Registered Parks and Gardens

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 81**

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.

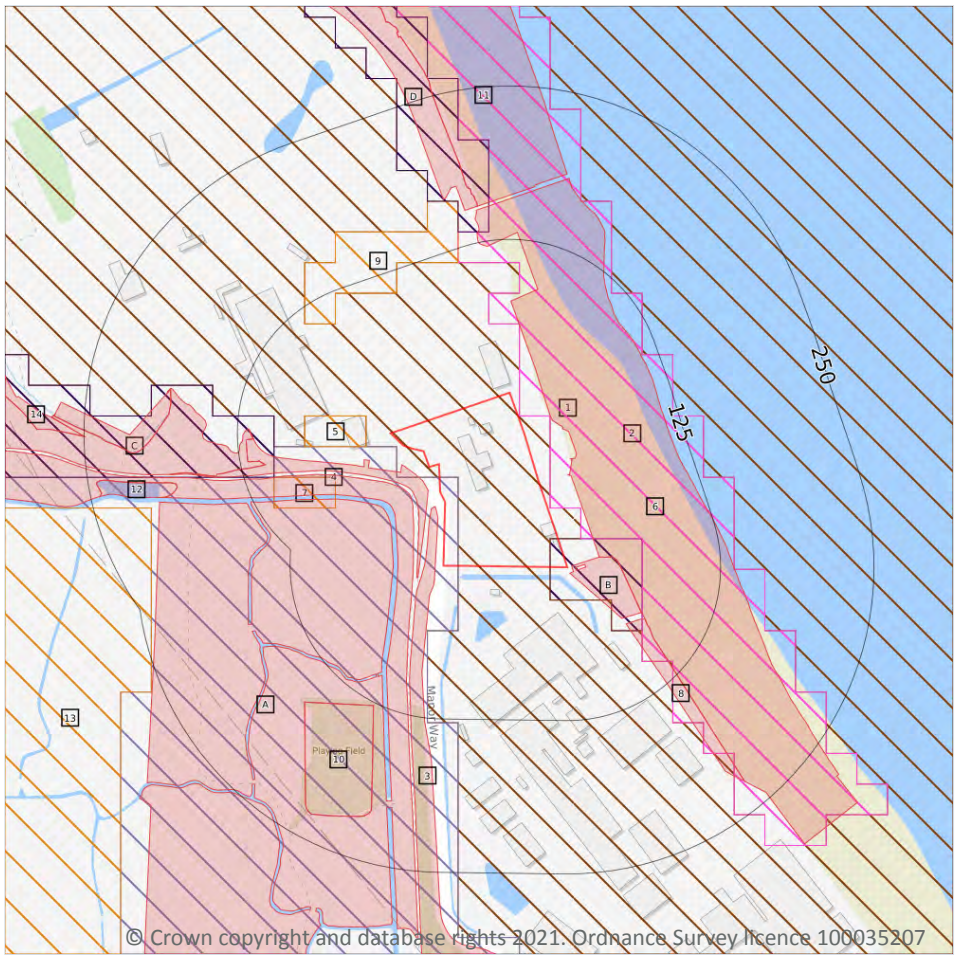
12.5 Countryside Stewardship Schemes

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



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	13

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

Features are displayed on the Habitat designations map on **page 83**

ID	Location	Main Habitat	Other habitats
B	4m E	Coastal saltmarsh	Main habitat: SALTM (INV > 50%)
3	6m W	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
4	10m W	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
A	24m W	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)

ID	Location	Main Habitat	Other habitats
6	24m E	Mudflats	Main habitat: MUDFL (INV > 50%)
8	67m SE	No main habitat but additional habitats present	Additional: SALTM (INV 50%)
C	106m W	Coastal saltmarsh	Main habitat: CFPGM (INV > 50%); SALTM (INV > 50%)
10	128m SW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
D	153m N	Coastal saltmarsh	Main habitat: SALTM (INV > 50%)
11	154m N	Mudflats	Main habitat: MUDFL (INV > 50%)
12	179m W	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
C	181m W	Coastal saltmarsh	Main habitat: CFPGM (INV > 50%); SALTM (INV > 50%)
14	250m W	Coastal saltmarsh	Main habitat: SALTM (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	**10**

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.

Features are displayed on the Habitat designations map on **page 83**

ID	Location	Type	Habitat
1	**On site**	**Network Enhancement Zone 2**	**Not specified**
A	**On site**	**Restorable Habitat**	**Not specified**
B	**On site**	**Primary Habitat**	**Saltmarsh**
2	1m E	Associated Habitats	Other associated habitats
5	20m W	Network Enhancement Zone 1	Not specified
7	58m SW	Network Enhancement Zone 1	Not specified
C	95m W	Primary Habitat	Saltmarsh
9	100m NW	Network Enhancement Zone 1	Not specified
D	132m N	Primary Habitat	Saltmarsh
13	204m W	Network Enhancement Zone 1	Not specified

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.

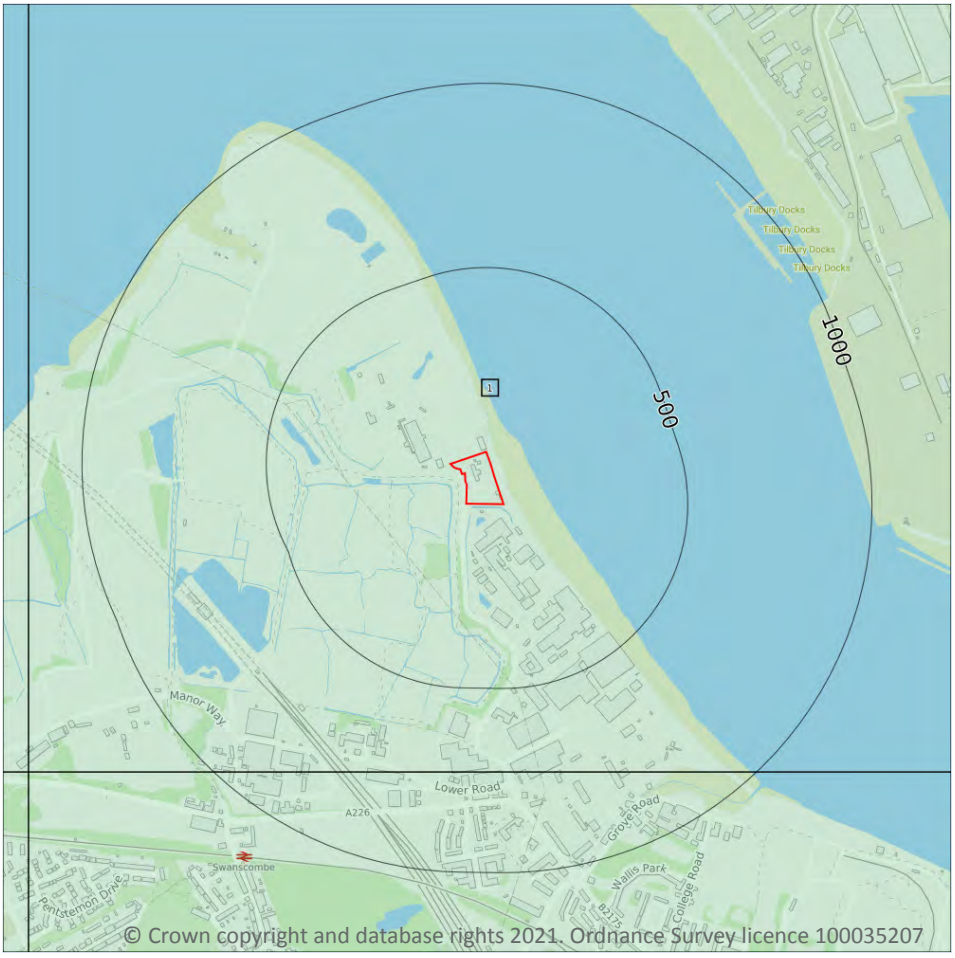
13.4 Limestone Pavement Orders

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

14.1 10k Availability

Records within 500m **1**

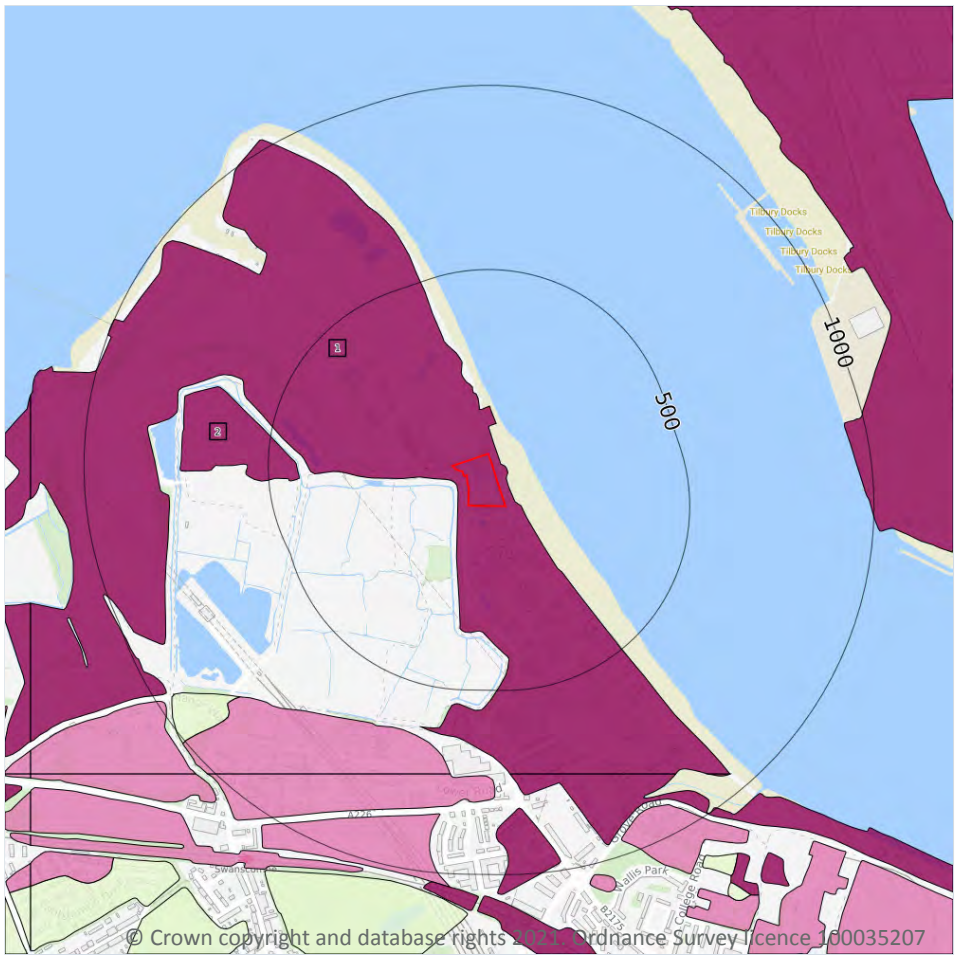
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 86**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**TQ67NW**

This data is sourced from the British Geological Survey.

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



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	2

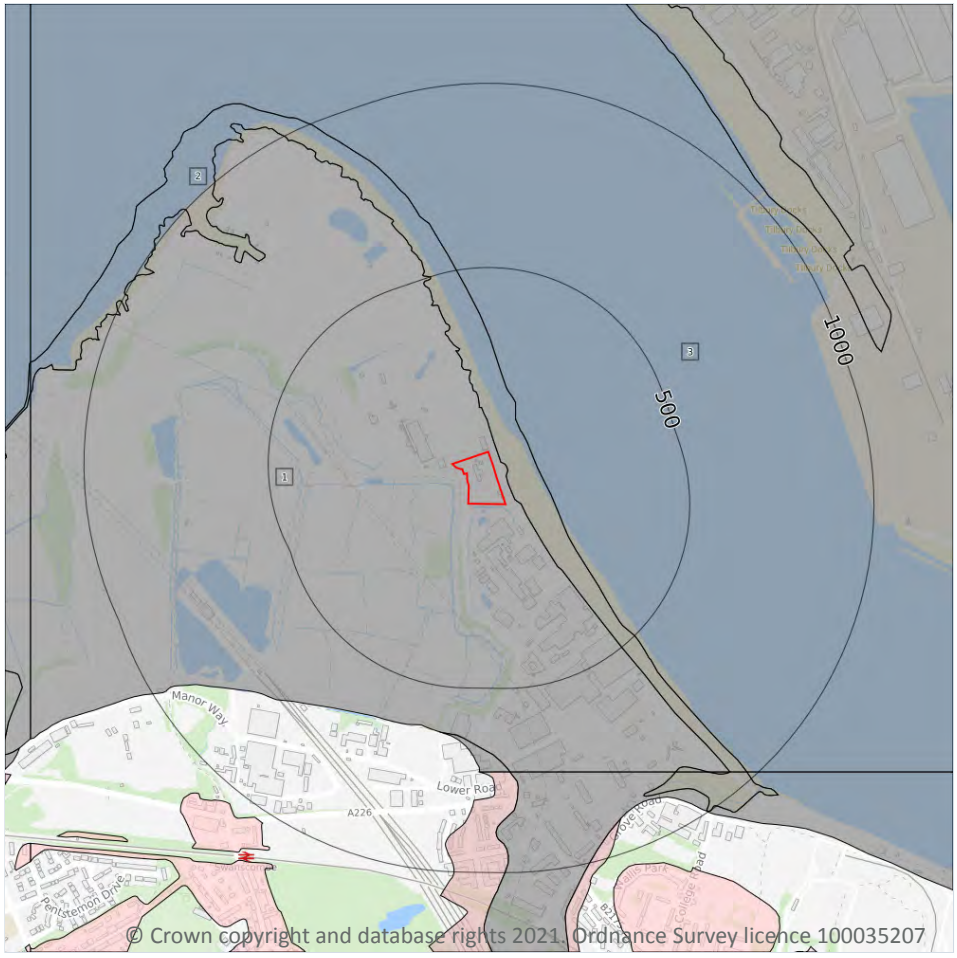
Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 87**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-UKNOWN**	**Made Ground (Undivided)**	**Unknown/unclassified Entry**
2	417m W	MGR-UKNOWN	Made Ground (Undivided)	Unknown/unclassified Entry

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 88**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-Z**	**Alluvium - Silt (unlithified Deposits Coding Scheme)**	**Silt**
2	23m E	TRD-Z	Tidal River Or Creek Deposits - Silt	Silt
3	105m NE	ALV-Z	Alluvium - Silt (unlithified Deposits Coding Scheme)	Silt

This data is sourced from the British Geological Survey.

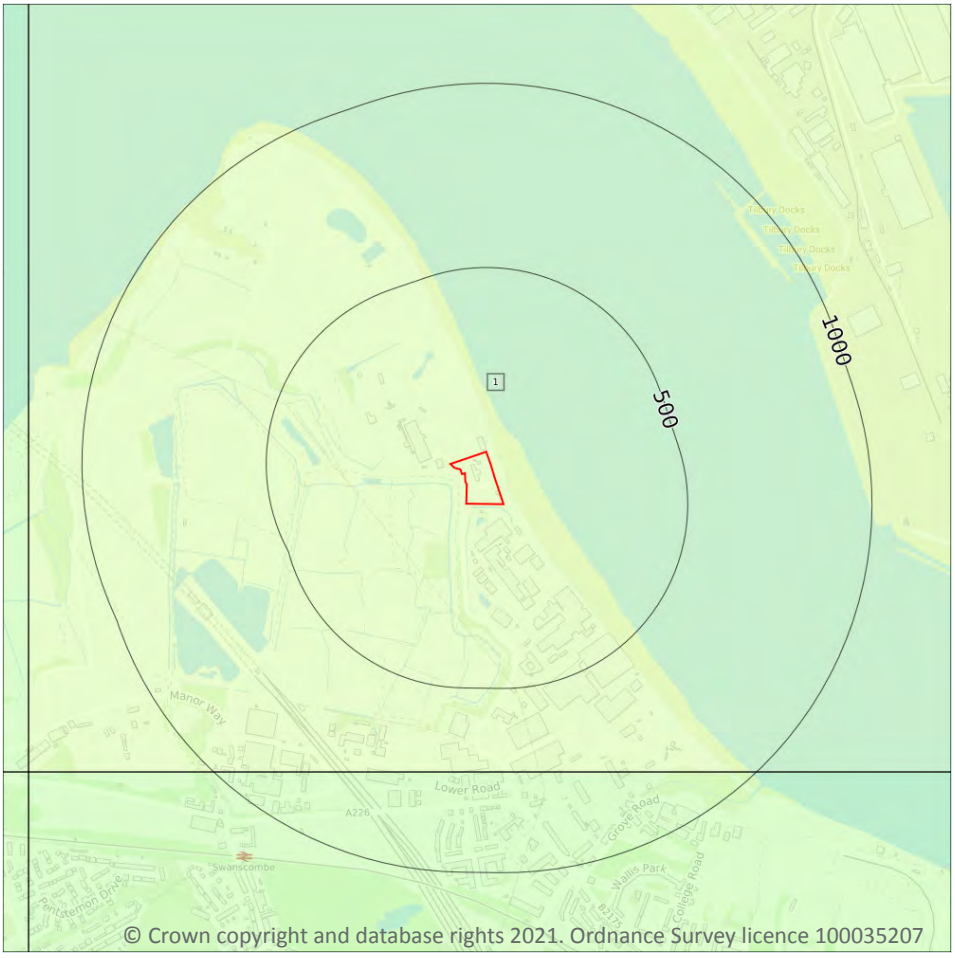
14.4 Landslip (10k)

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	1

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 90**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**CK-CHLK**	**Chalk Group - Chalk**	**Maastrichtian Age - Cenomanian Age**

This data is sourced from the British Geological Survey.

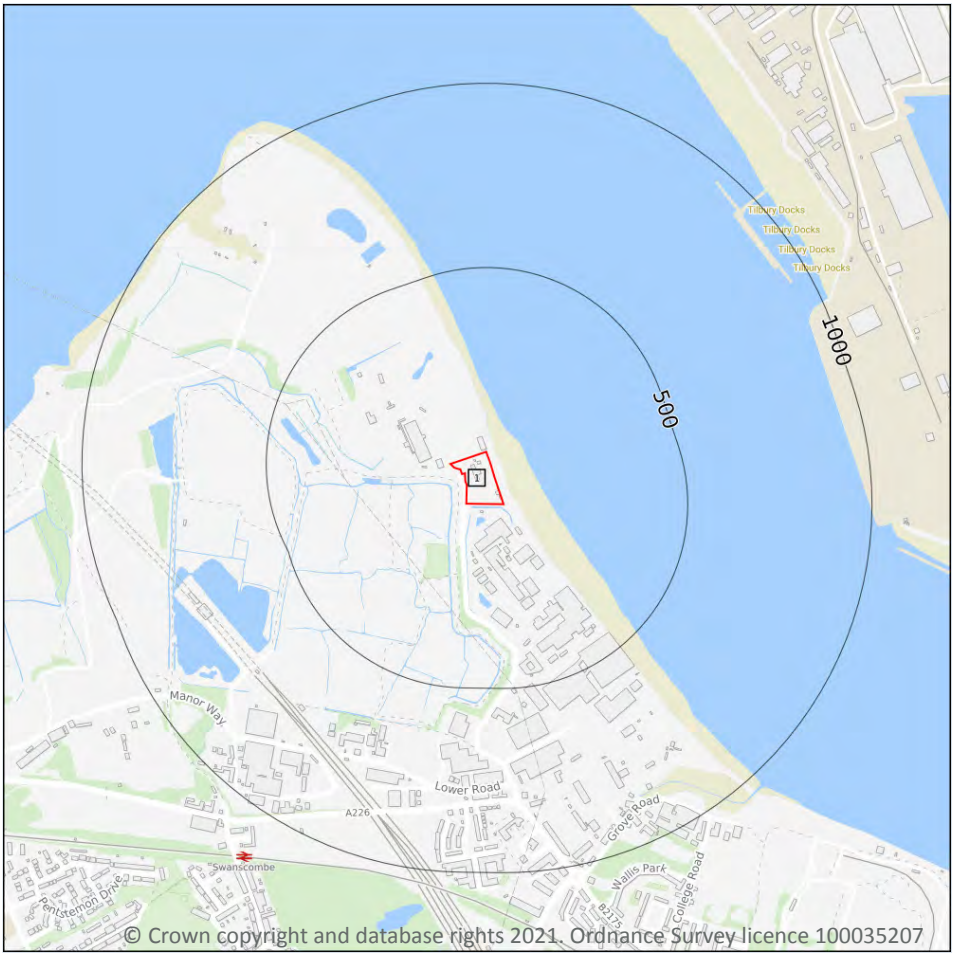
14.6 Bedrock faults and other linear features (10k)

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

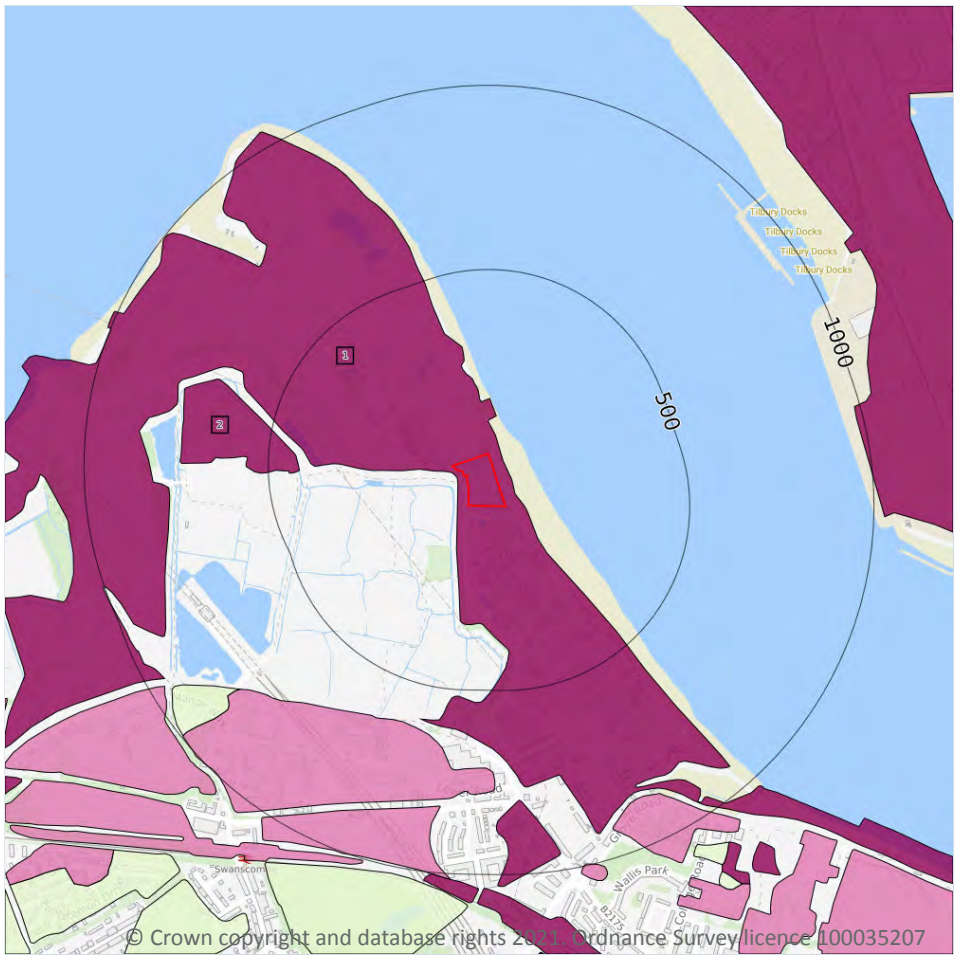
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 92**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW271_dartford_v4**

This data is sourced from the British Geological Survey.

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



Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	2

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.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 93**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**MADE GROUND (UNDIVIDED)**	**ARTIFICIAL DEPOSIT**
2	415m W	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

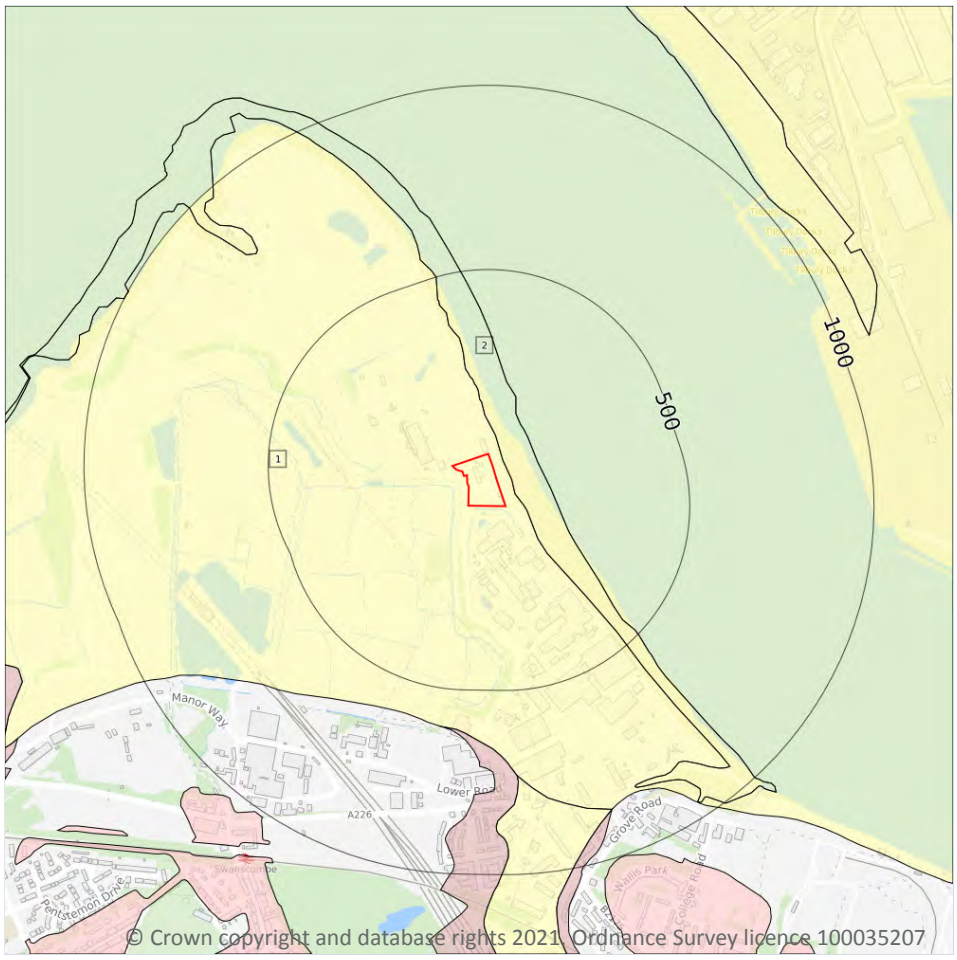
Records within 50m	1

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Very High**	**Low**

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 **2**

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 95**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-XCZSP**	**ALLUVIUM**	**CLAY, SILT, SAND AND PEAT**
2	32m E	TRD-XCZ	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	2

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**	**Moderate**	**Very Low**
32m NW	Intergranular	Low	Very 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.

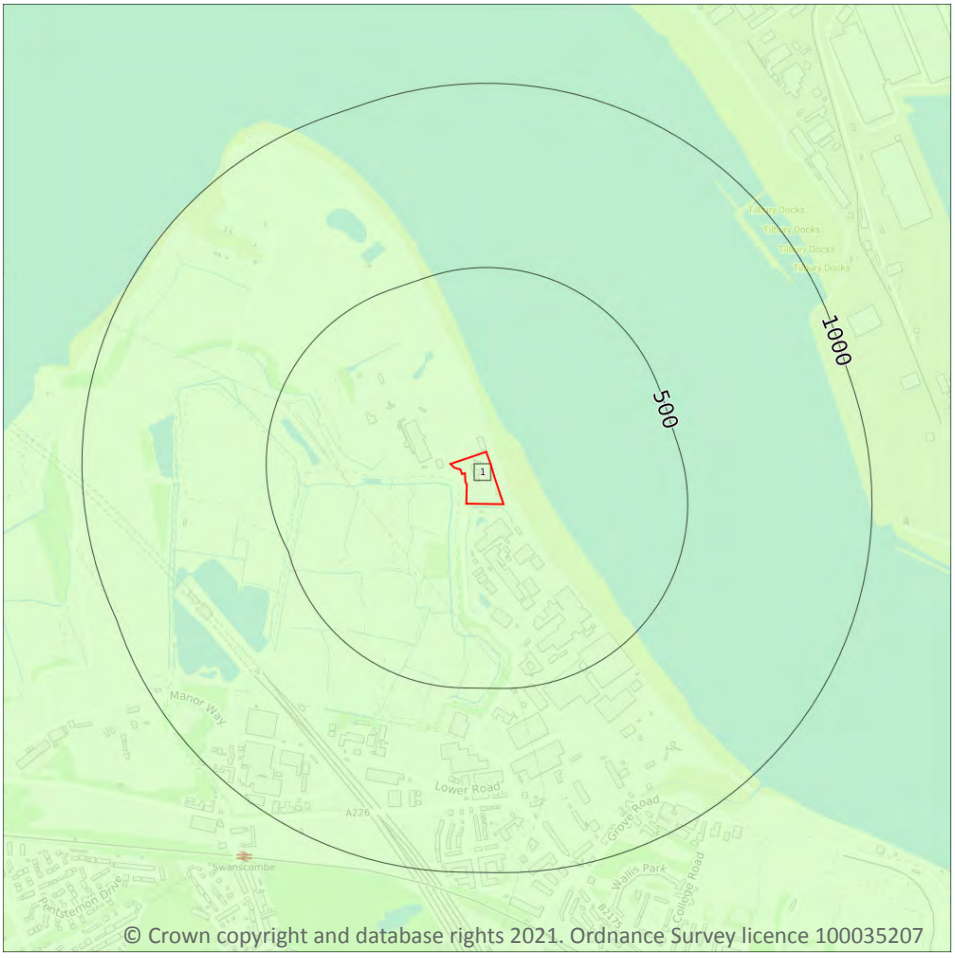
15.7 Landslip permeability (50k)

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	1

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 97**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**LSNCK-CHLK**	**LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION (UNDIFFERENTIATED) - CHALK**	**TURONIAN**

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	**Fracture**	**Very High**	**Very High**

This data is sourced from the British Geological Survey.

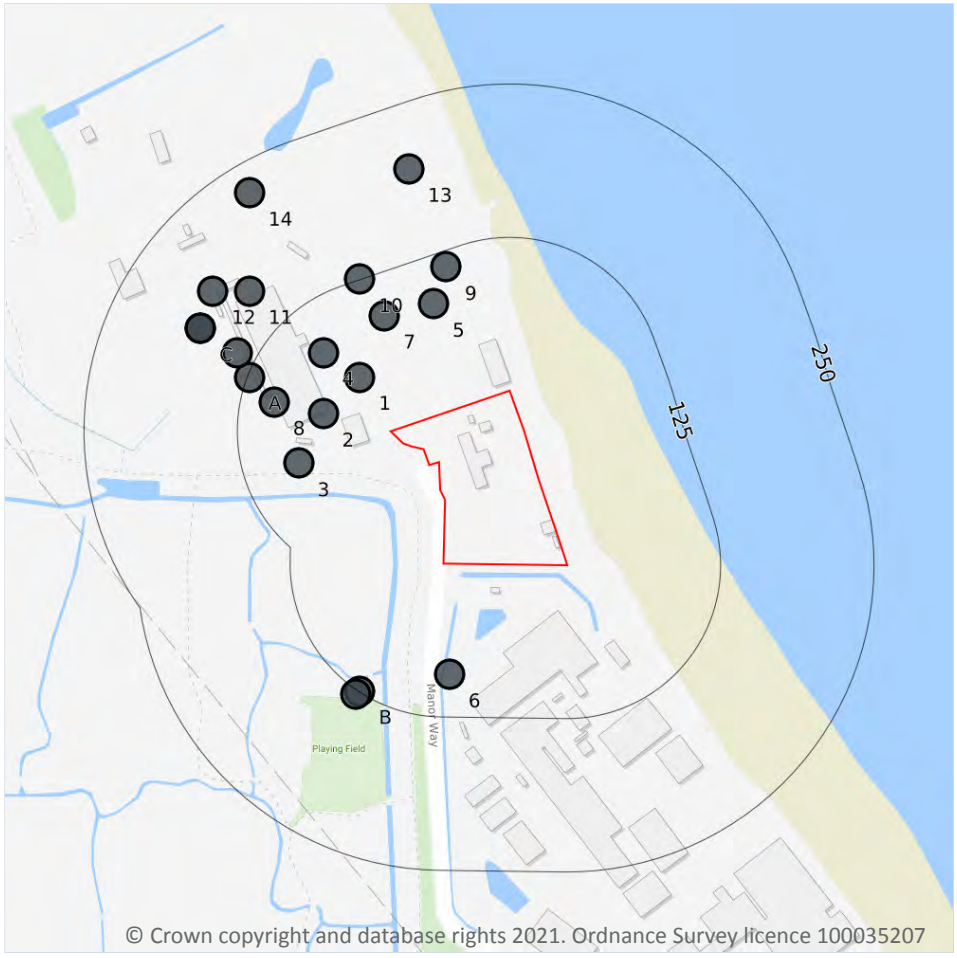
15.10 Bedrock faults and other linear features (50k)

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

16.1 BGS Boreholes

Records within 250m	20

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.

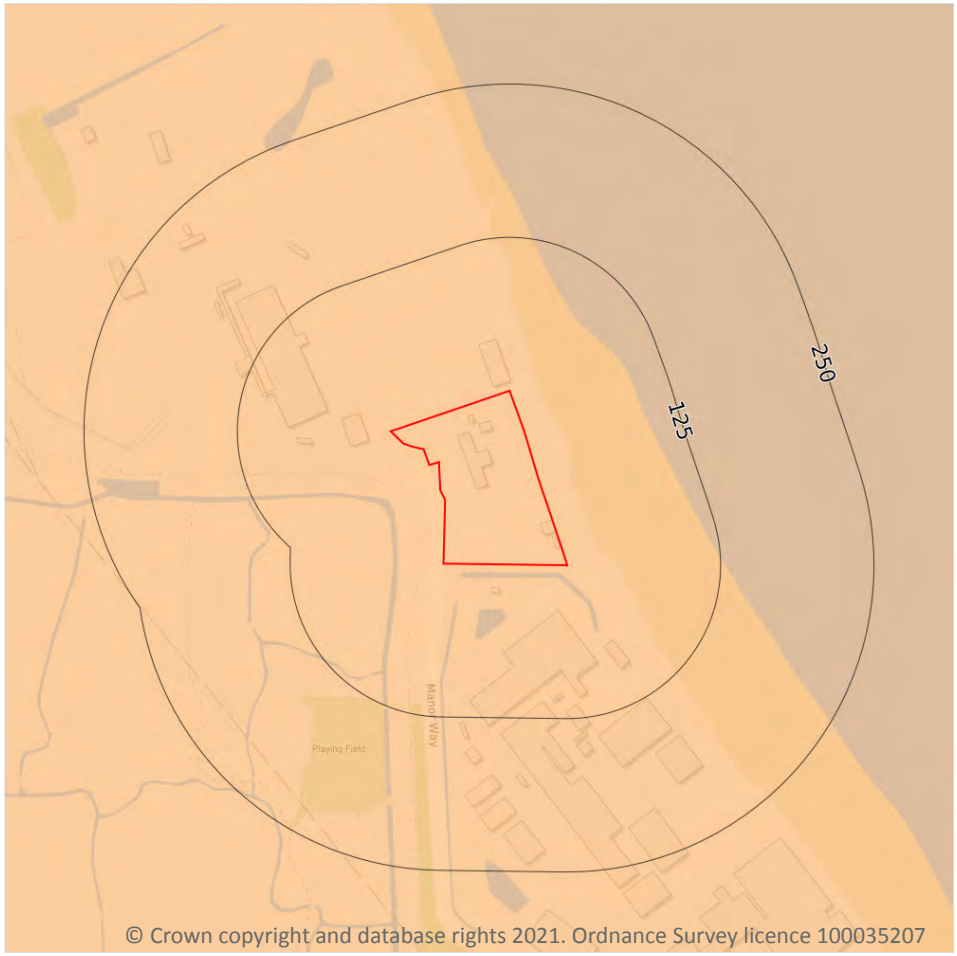
Features are displayed on the Boreholes map on **page 99**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	51m NW	561120 175880	RMC NORTHFLEET TPB11	-	Y	N/A
2	57m W	561090 175850	RMC NORTHFLEET B8/8A	-	Y	N/A
3	79m W	561070 175810	RMC NORTHFLEET TPB14	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	85m NW	561090 175900	RMC NORTHFLEET TPB10	-	Y	N/A
5	87m N	561180 175940	RMC NORTHFLEET TPB16	-	Y	N/A
6	90m S	561193 175638	BOTANY MARSHES BY/7/80	-	Y	N/A
7	91m N	561140 175930	RMC NORTHFLEET TPB15	-	Y	N/A
8	98m W	561050 175860	RMC NORTHFLEET B7/7A/7B/7C	-	Y	N/A
9	112m N	561190 175970	RMC NORTHFLEET TPB13A	-	Y	N/A
A	123m W	561030 175880	RMC NORTHFLEET TPB9A	-	Y	N/A
B	124m SW	561120 175624	SWANSCOMBE 2 2	-	Y	N/A
10	126m N	561120 175960	RMC NORTHFLEET TPB12	-	Y	N/A
B	128m SW	561117 175622	SWANSCOMBE 2 1	-	Y	N/A
A	141m NW	561020 175900	RMC NORTHFLEET B6	-	Y	N/A
11	162m NW	561030 175950	RMC NORTHFLEET B5	-	Y	N/A
C	177m NW	560990 175920	RMC NORTHFLEET TP9	-	Y	N/A
C	177m NW	560990 175920	RMC NORTHFLEET TPB9	-	Y	N/A
12	185m NW	561000 175950	RMC NORTHFLEET B4	-	Y	N/A
13	198m N	561160 176050	RMC NORTHFLEET B11	-	Y	N/A
14	226m NW	561030 176030	RMC NORTHFLEET B9	-	Y	N/A

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	1

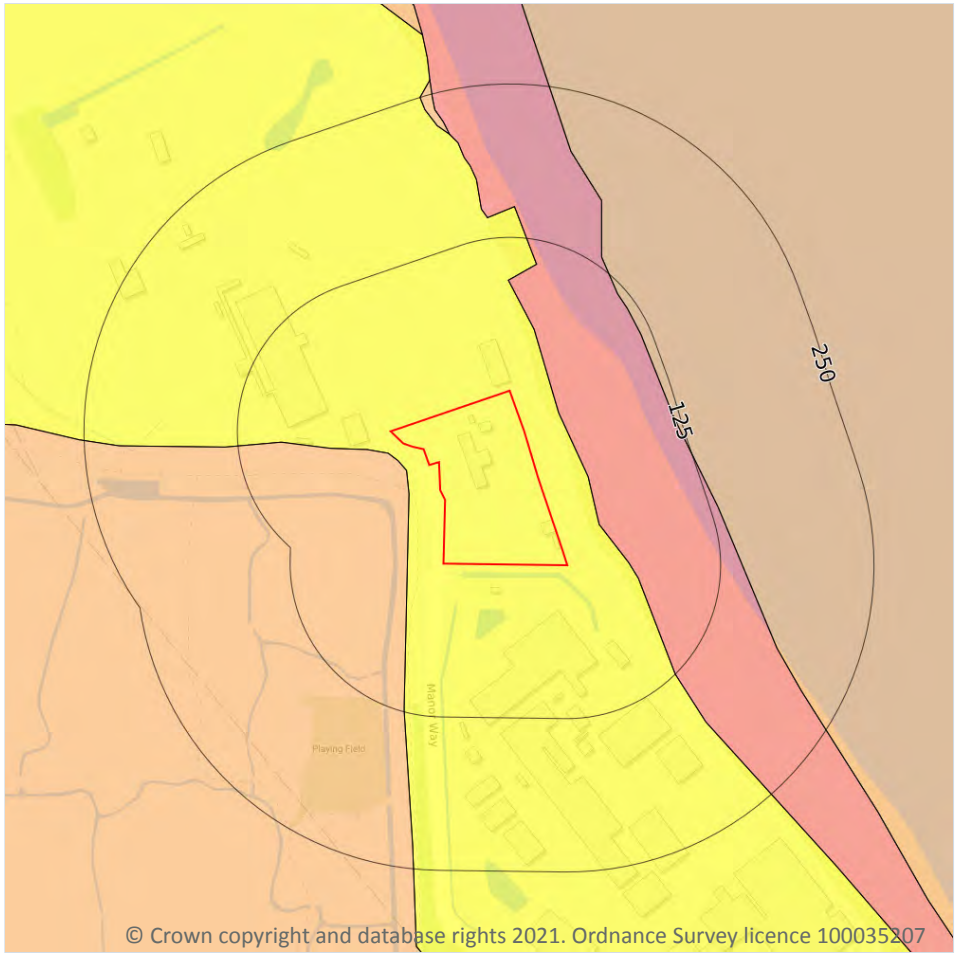
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and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

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 101**

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



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	3

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.

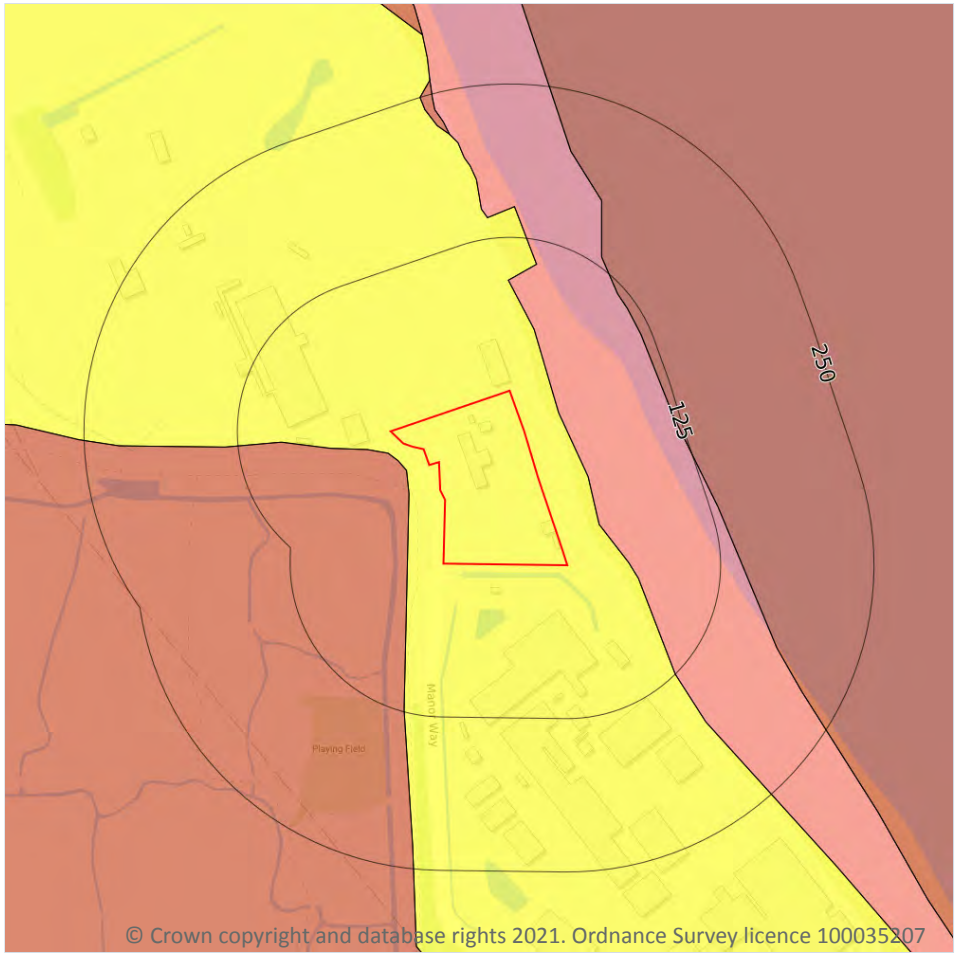
Features are displayed on the Natural ground subsidence - Running sands map on **page 102**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
14m SW	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.
32m E	Moderate	Running sand conditions are probably 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



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

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.

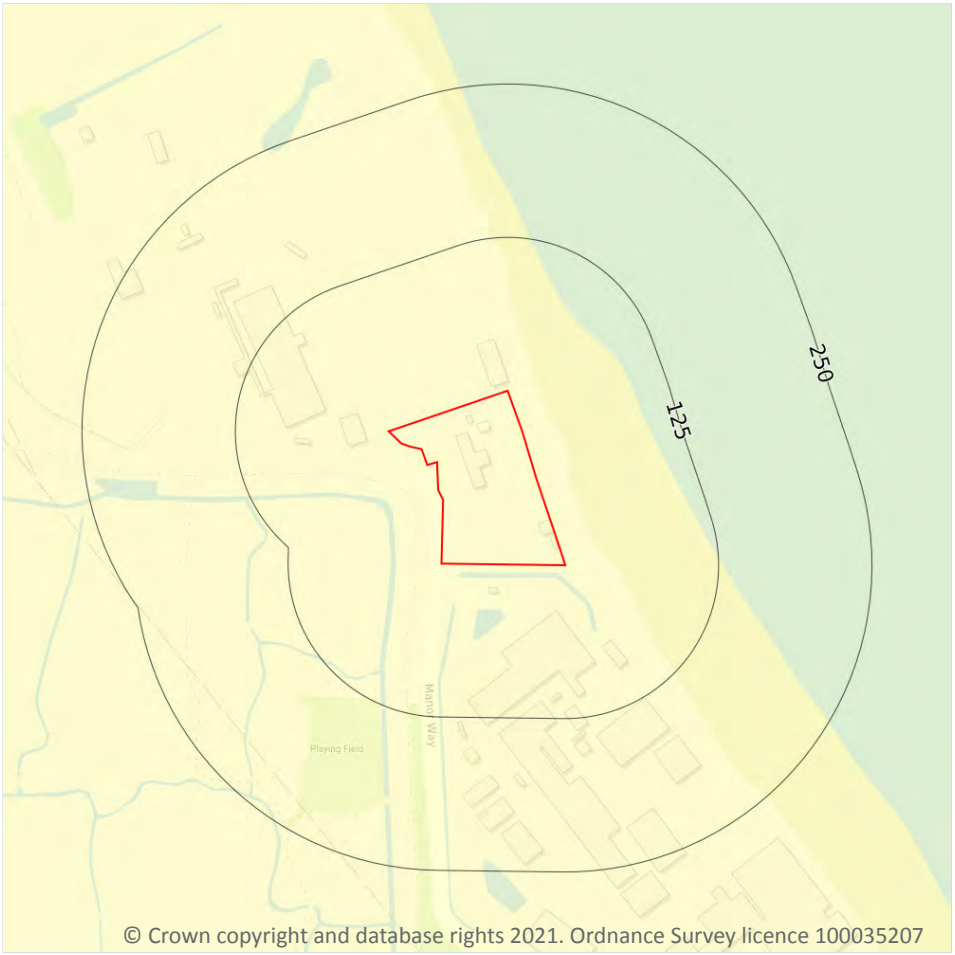
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 104**

Location	Hazard rating	Details
On site	**Very low**	**Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.**
14m SW	High	Highly compressible strata present. Significant constraint on land use depending on thickness.

Location	Hazard rating	Details
32m E	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

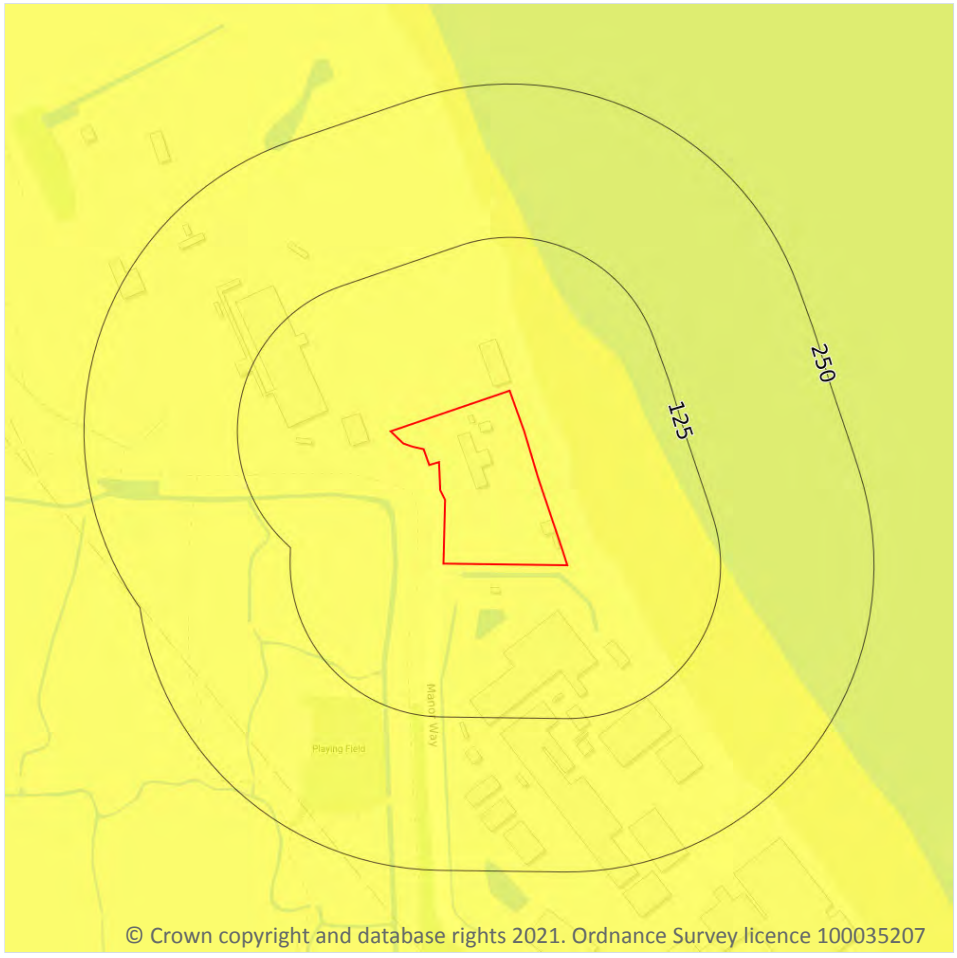
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 106**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

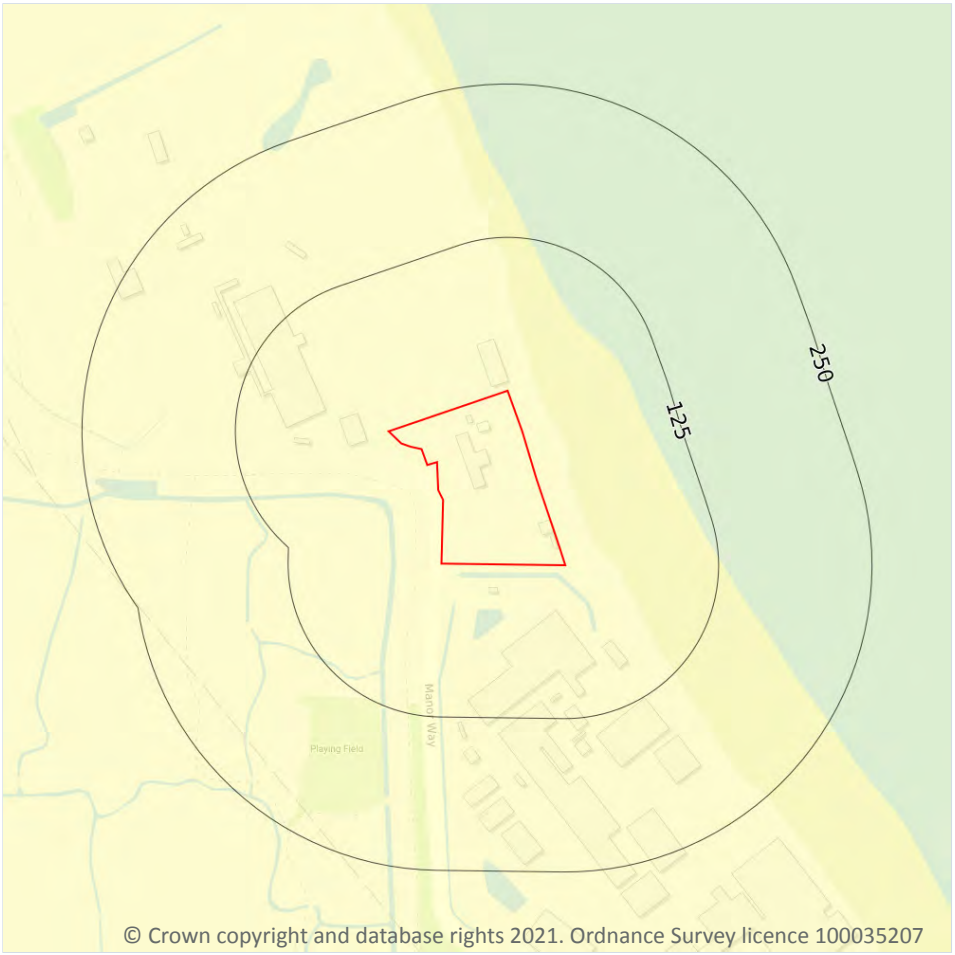
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 107**

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



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

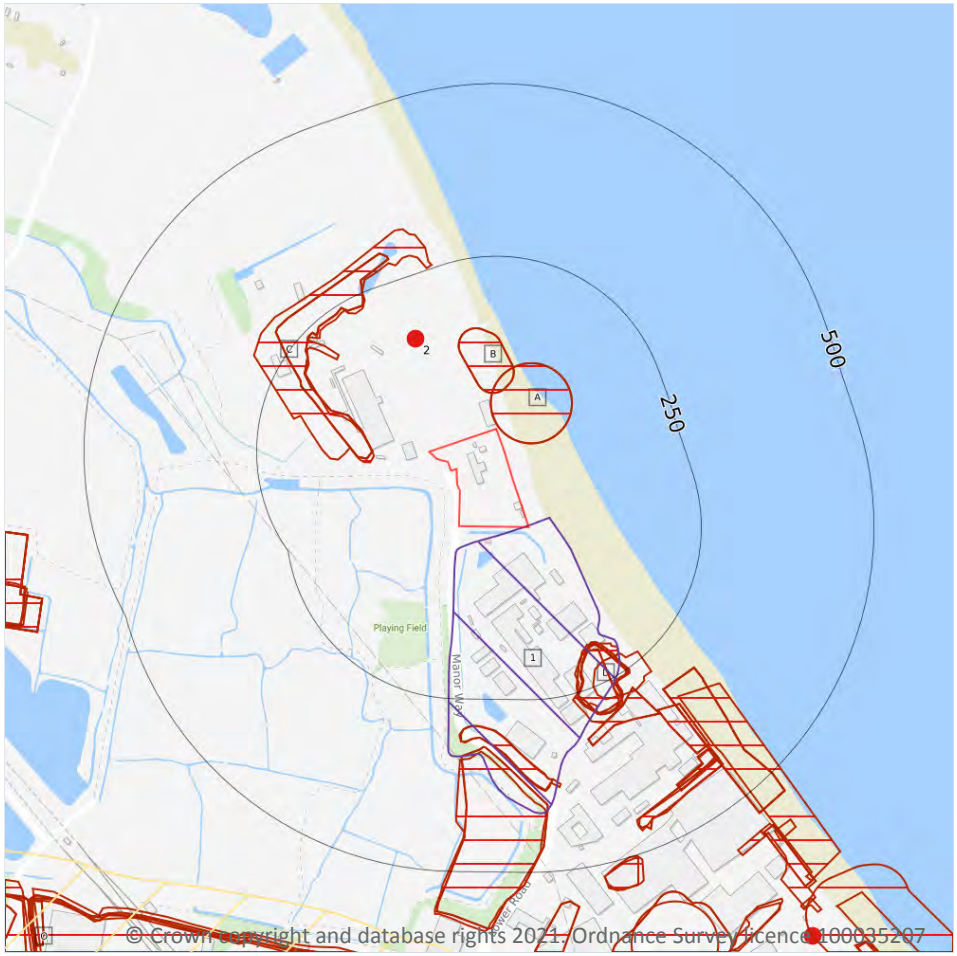
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 108**

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	1

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 110**

ID	Location	Details	Description
2	161m N	Name: Northfleet Wharf Address: NORTHFLEET, Kent Commodity: Marine Sand & Gravel Status: Active	Type: Sea, river or canal wharf where mineral commodities are unloaded and stored Status description: Site which is actively extracting mineral products, or in the case of wharfs and rail depots, is actively handing minerals

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	16

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 110**

ID	Location	Land Use	Year of mapping	Mapping scale
A	4m NE	Unspecified Wharf	1993	1:10000
A	4m NE	Unspecified Wharf	1973	1:10000
B	52m N	Unspecified Wharf	1982	1:10000
B	52m N	Unspecified Wharf	1992	1:10000
C	80m W	Ponds	1973	1:10000
C	82m W	Pond	1992	1:10000
C	82m W	Pond	1993	1:10000
C	82m W	Pond	1982	1:10000
D	190m SE	Unspecified Ground Workings	1932	1:10560
D	190m SE	Refuse Heap	1923	1:10560
D	193m SE	Unspecified Heaps	1938	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
D	193m SE	Unspecified Heaps	1938	1:10560
D	195m SE	Unspecified Heaps	1946	1:10560
D	198m SE	Unspecified Ground Workings	1955	1:10560
D	198m SE	Unspecified Ground Workings	1966	1:10560
D	222m SE	Refuse Heap	1895	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 is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	1

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.

Features are displayed on the Mining, ground workings and natural cavities map on **page 110**

ID	Location	Site Name	Mineral	Type	Planning Status	Planning Status Date
1	**On site**	**Southfleet**	**Chalk**	**Surface mineral working**	**Valid**	**Not available**

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	2

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).

Features are displayed on the Mining, ground workings and natural cavities map on **page 110**

ID	Location	Name	Commodity	Class	Likelihood
O	588m S	Not available	Chalk	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
-	727m S	Not available	Chalk	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

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 115**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**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	2

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 km^2. 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 km^2; 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 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
32m E	15 mg/kg	No data	100 - 200 mg/kg	60 - 120 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 km^2).

This data is sourced from the British Geological Survey.

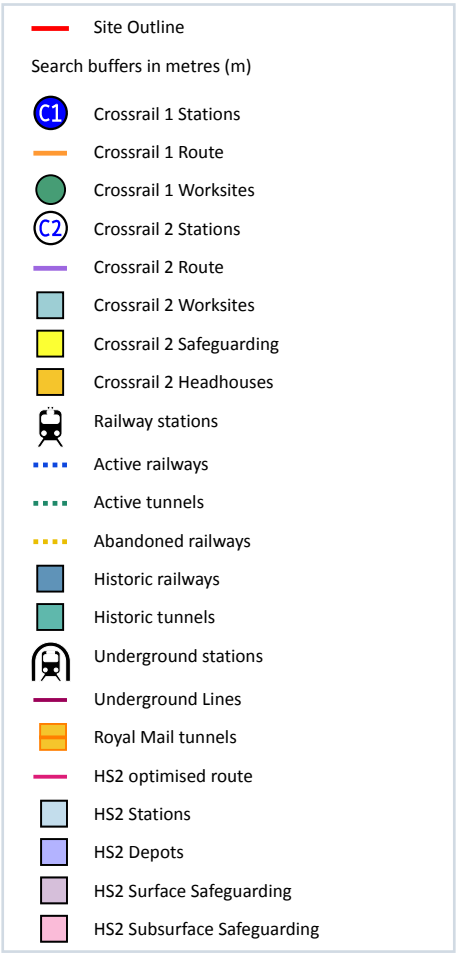
20.3 BGS Measured Urban Soil Chemistry

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 km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



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	1

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 117**

Location	Land Use	Year of mapping	Mapping scale
237m SE	Railway Sidings	1973	10000

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	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

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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