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Mr. Andy Jessop

By email only: andy.jessop@bellway.co.uk

26 May 2021

Subject: Harbour Village – Phase 1A, Proposed House Plots 52 to 54 Factory Road Ground Conditions
Our ref: L-17855cz-2.4.2-21-72-CJB Rev C

Dear Mr. Jessop,

IDOM Merebrook (**IDOM**) have been commissioned by Bellway Homes Limited (Thames Gateway) (**Bellway**) to carry out an intrusive ground investigation at Phase 1a of their Northfleet Embankment (Harbour Village), Kent. The purpose of the assessment is for contamination testing and preliminary waste classification. An assessment of the ground conditions for foundation design has also been made.

Introduction

The Phase 1a Northfleet Embankment site is located at Factory Road, Northfleet, Kent approximately 475 m to the east of Northfleet Railway Station. The site is bounded to the east and south by Factory Road and to the north and west by the former Tarmac Cement Works. The site occupies an area of approximately 0.04 hectares centered on National Grid reference 562095, 174495. The former Cement works sits within an old quarry. Phase 1A and the land immediately to the north sit at the original ground level. The land surrounding has been quarried and is approximately 10 m below the ground level at Phase 1A.

The proposed development comprises three residential properties with private gardens and associated infrastructure. The proposed development layout is indicated on the Bellway drawing EBB-BPTW-02-00-DR-A-013 Rev C04 (dated 27 November) which is appended to this letter report. The phasing plan for the wider site (Northfleet Embankment West) is also appended.

Background

The following reports were compiled by IDOM and others which include Phase 1A and the wider site (intrusive investigation locations within Phase 1 A are given in *italics*):

- ERM, Northfleet: Phase II Site Investigation Report (0413766), 2 July 2018 (*TP219 at 1.0 and 3.8m*);
- IDOM, Recent Works at the Northfleet Embankment and Former Tarmac Works (L-17855CZ-2.4.2-19-S124-SAM Rev A), 18 June 2019 (*MTP27 at 0.7m*); and
- IDOM, Phase 1 Environmental Assessment (Desk Study): Areas A, C & G Northfleet Embankment (DS-17855CZ-20-250), June 2020;

- IDOM, Contaminated Land Assessment: Areas A, C & G Northfleet Embankment (CLA-17855CZ-20-246), June 2020;
- IDOM, Remediation Method Statement: Areas A, C & G Northfleet Embankment (RMS-17855CZ-20-243), October 2020; and
- IDOM, Northfleet Embankment – Assessment on Ground Conditions (L-17855CZ-2.4.2-21-44-NJA), 18 January 2021 (*MWS404 at 1.4m*).

Summary of the findings across the wider site.

It is intended that the entirety of the former Northfleet Cement works will eventually be redeveloped to provide a mixed-use development including residential housing, a new road link, commercial/employment uses and open space. It is understood that significant re-profiling (cut and fill) of the site will be required to deliver the masterplan. The first parcels of the masterplan to be delivered area as follows:

- Area A. Former inner oil tank storage area. Proposed commercial development.
- Area C. Which is divided into two distinct areas of the former cement works: the Bevan's Works and the Waterfront areas. Both intended for residential development.
- Area G. Former outer oil tank storage area. Proposed amenity space.

These development zones form part of the Northfleet Embankment site and are shown on the Area Location Plan appended to this letter report. Areas A, C and G are referenced in the summary below.

Soil

Within Areas A and G the following conditions have been identified. Occasional low to moderately elevated heavy metals, PAH and chrysotile and amosite asbestos within soil matrices. Hydrocarbons associated with heavy fuel oil (HFO) spillage/leakage have been found locally as oil-coated shallow granular made ground and re-worked gravelly sand and viscous free phase along discontinuities in chalk to depth. VOCs, BTEX compounds or gasoline range hydrocarbons have not been identified. This contamination has not been found to extend beneath Phase 1A

Within Area C investigations have identified localised moderately elevated petroleum hydrocarbons (typically >C16 ranges) and PAH compounds. In addition, widespread elevated heavy metals with notably highly elevated zinc and occasionally lead were identified. Amosite and chrysotile asbestos fibres and loose debris were found in the soil matrices and occasional visible ACMs. Landfill type materials were observed in the area known as the former Upper Cooperage. This contamination has not been found to extend beneath Phase 1A.

Groundwater

PAHs were detected above selected screening levels in two boreholes: MBH3 and ERM BH204, both of which were located in the area of the Upper Cooperage where suspected landfill type wastes were found with hydrocarbon odours but were undetected in all other boreholes. The exceedances were as follows:

- Anthracene was detected in eight samples at or above the UKTAG screening level; in three samples the laboratory limits of detection are greater than the screening value.
- Benzo(b)fluoranthene was detected in four samples at or above the UKTAG screening level in three samples. The laboratory limit of detection is greater than the screening value.

- Benzo(k)fluoranthene was detected in one sample at or above the UKTAG screening level; in two samples the laboratory limits of detection are greater than the screening value.
- Benzo(ghi)perylene was detected in one sample at or above the UKTAG screening level; in three samples the laboratory limits of detection are greater than the screening value.
- Benzo(a)pyrene, was detected in seven samples. The laboratory lower detection limit did not resolve down to the screening level in the remaining samples.

BTEX compounds have not been detected in any samples, however, the lower laboratory detection limits are greater than the screening levels for benzene.

Arsenic exceeded the lower screening level in four samples and marginally above the UKDWS screening in two samples (MBH1 and MBH2 both from 2005).

Lead was analysed from MBH1 and MBH2 in 2005 which was detected at the lower detection limit of $10 \mu\text{g.l}^{-1}$ which exceeds the UKTAG screening levels and is equal to the UKDWS screening level.

Chromium was analysed in one sample from MBH2 (2006) as part of a supplementary investigation to further delineate potential chromium contamination and was detected at $150 \mu\text{g.l}^{-1}$, all as the hexavalent form. Seven other water samples were analysed for dissolved chromium (total) by Merebrook and ERM with concentrations between 1 and $23 \mu\text{g.l}^{-1}$. This would indicate that the elevated hexavalent chromium was localised to MBH2.

Mercury was detected in ERM BH204 above the UKTAG screening level.

Boron was found to exceed the screening level in one sample from ERM BH202, this being the maximum detected concentration of $1,580 \mu\text{g.l}^{-1}$.

TPHCWG petroleum hydrocarbon fractions did not exceed the screening levels in any samples. The maximum concentrations recorded in ERM BH204 were all as aliphatics in the C16-C21 and C21-C35 carbon ranges but were within their respective screening levels. Two samples from 2005 were screened for EPH C10-C40 and these were not identified above the lower detection level of $30 \mu\text{g.l}^{-1}$.

Following a number of phases of investigation, dating back to at least 2001, it is known that groundwater quality in Areas A and G has been impacted by historical spillages/leakages from heavy fuel oil storage tanks and associated pipelines which were in use in the period 1961-1971. A programme of long-term quarterly monitoring has been undertaken by Merebrook up until August 2019. Monitored wells included two located within Area G (MBH105 and PBH5) and one just to the north of Area G (MBH6) and PBH2 in Area A (NB:MBH108 is located 100 m to the south of the current assessment area and is not included within the following discussion). Water samples were tested for a suite of determinants including Total Petroleum Hydrocarbons (TPH), Polyaromatic Hydrocarbons (PAH) and the natural attenuation parameters; pH, dissolved oxygen, nitrate, nitrite, iron, sulphate, sulphide, chloride, ammoniacal nitrogen and alkalinity.

Analysis results have also been reviewed from eight boreholes sampled by ERM covering both areas A and G and which were analysed for a broad suite of: heavy metals, speciated phenols, PAHs, SVOCs, VOCs and speciated petroleum hydrocarbons.

Of the heavy metals analysed, arsenic was found to exceed the lower UKTAG screening level in one sample (ERM BH215).

For the PAHs for which screening levels are available, exceedances of benzo(a)pyrene were found in eight samples and Benzo(b)fluoranthene, Benzo(k)fluoranthene and Benzo(ghi)perylene, in five samples. Total PAH contamination was however at low concentrations.

Petroleum hydrocarbons have been repeatedly detected in PBH2 (maximum 5,600 $\mu\text{g.l}^{-1}$) and PBH5 (maximum 170 $\mu\text{g.l}^{-1}$) but remained undetected in MBH105. TPH were detected in MBH6 on one occasion at 68 $\mu\text{g.l}^{-1}$ (November 2018). TPH were detected in five of the eight ERM boreholes: BH211, BH215, BH216, BH217 and BH221 at levels between 2740 and 12,780 $\mu\text{g.l}^{-1}$. No TPH was detected in BH209, BH210 and BH212. The detected hydrocarbons were weighted mainly in the C16-C21 and C21-C35 hydrocarbon fractions, with a greater proportion of aromatics in those samples with the highest concentrations and more equally distributed amongst the aliphatic and aromatics in samples with lower concentrations.

SVOC (excluding PAHs), VOCs and BTEX were not detected at concentrations above the laboratory level of detection.

Free product was encountered in BH215, BH216, BH217, BH218, BH221 and BH211 wells.

As part of long-term quarterly monitoring free phase was usually encountered as layer of free product above the groundwater in boreholes PBH5 (to the west of the former inner tank farm) and MPBH2 (to the west of the former outer tank farm). Free product was also found to be present in MBH108 (to the south of the box underbridge).

These occurrences were as a highly viscous layer which prevented use of a tape dip/interface meter to confirm their thickness. An oily sheen and suspended oily globules were observed in the purge water from boreholes where free product was detected.

Hydrocarbon odours were observed in all boreholes where free product was encountered (PBH5, MPBH2 and MBH108). An accompanying hydrogen sulphide odour was also noted in MPBH2.

It is known that oil has migrated down through unsaturated chalk to reach groundwater in Areas A and G, resulting in visible oil contamination. No impact upon groundwater or surface water quality has been demonstrated outside the source areas, confirming the low viscous and stable nature of the plume. In addition, it has been consistently seen from quarterly monitoring that dissolved phased hydrocarbons are typically absent in boreholes where no free phase has been observed. Significant contamination of the groundwater at depth is not expected beneath Phase 1A.

IDOM has produced a detailed Remediation Implementation Plan for Northfleet Embankment (RIP-17855cz-20-474, dated December 2020) which includes groundwater treatment.

Ground Gas

The existing body of gas monitoring data indicates a predominantly low risk from ground gas. For the majority of the site, the product of the gas concentrations and gas flows indicate Characteristic Situation 1 (modified Wilson and Card method) gas risk level. Locally methane detected in one location (MWS115) would warrant an increase to Characteristic Situation 2. However, the age, number, duration and coverage of monitoring events is considered to provide only a preliminary picture of the gas regime. Furthermore, cut and fill works have the potential to influence the ground gas regime, particularly in Area C.

Whilst substantial thicknesses of made ground are present across the site, most notably Area C, the composition of gravelly sands, rubble and chalk are consistent with the existing data in indicating a low gas generation potential. However, the complex pattern of ground conditions would likely give rise to a range of low risk through to areas with moderate gas risk levels. These include suspected landfill type wastes in the north-west and central Area C (Upper Cooperage area of the Bevan's Works) and free phase hydrocarbons where permanent gas generation potential is likely to be higher.

Site History

The site history, based on a review of the historic and current maps, dating from 1865 to 2020 is summarised in Table 1 below. Potentially contaminative land uses are shown in bold. Copies of key maps used in this review are appended to this letter report.

Table 1: Summary of the key features shown on historic maps

DATA SOURCE	SITE / SURROUNDINGS
1865 - 1923 (1:2,500 & 1:10,560 scale).	The site is shown to form part of the works associated with the adjacent Clay Mill . The site is shown at the top of an excavation that gradually encroaches into it over time.
	The site sits within a semi-rural and industrial setting. The cement works and associated gas works and brick works are shown approximately 350 m to the north of the site along the River Thames. Northfleet railway station is illustrated approximately 450 m to the west. A brick field is shown 50 m to the south of the site in 1865 and sidings associated with the chalk quarry works approximately 75 m to the east of the site. A gasometer is shown approximately 30 m to the north. Factory Road and the residential properties are shown from 1897 onwards. From 1895 the industrial and residential landscape has expanded.
1932 – 1946 (1:2,500 & 1:10,560 scale).	The site has been developed with a building occupying the southern half of the site. It appears as a portion of the site has been infilled to create the development platform.
	Further residential and industrial expansion are noted. A number of the quarry's are now shown as disused.
1952 – 1966 (1:2,500 & 1:10,560 scale).	The site remains unchanged.
	The former excavations to the north of the site are labelled as allotments.
1973 – 2020 (1:10,000 scale).	The site remains unchanged.
	The surroundings remain unchanged.

In summary, the site sat within the former Clay Mill works, which is within a semi-rural and industrial setting. The historical maps show that the excavations for the Clay Mill encroached into the site footprint before it was developed from around 1932. The northern half of the site was infilled to create a level platform thereby facilitating the construction of a building.

Over time, the residential and industrial land uses have expanded in the environs of the site.

Published Geology

The published geological maps indicate the site is underlain by superficial River Terrace Deposits attributed to the Boyn Hill Gravel Member and the Chalk bedrock attributed to the Lewes Nodular, Seaford and Newhaven Chalk Formations.

There are no historic boreholes completed within the site footprint. The nearby boreholes TQ67SW354 and TQ67SW357 are summarised below.

- TQ67SW354 was constructed by Holst and Company (no date given) approximately 70 m to the east of the site. The recovered geology is described as Made Ground of concrete, ash and bricks to 0.55 m bgl overlying superficial deposits of clay to 2.75 m bgl and Boyn Hill Gravel Member sand and gravel to the base of the exploratory hole at 7.65 m bgl; and,
- TQ67SW357 was also constructed by Holst and Company (04.06.1968) approximately 95 m to the southwest of the site. The recovered soils were described as Made Ground comprising concrete, brick and ash to approximately 1.05 m bgl overlying superficial deposits of sand, gravel and clay to 4.25 m bgl where the Chalk bedrock was encountered. The base of the exploratory hole was terminated at 20 m bgl within the Chalk bedrock. Groundwater was not encountered during the works.

Hydrology

The superficial Boyn Hill Gravel Member deposits are classified by the Environment Agency as a Secondary A Aquifer. These are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases form an important source for the base flow of rivers.

The underlying Seaford Chalk Formation bedrock is classified as a Principal Aquifer. Principal Aquifers usually provide a high level of water storage that can support water supply and the base flow to rivers on a strategic scale. They are characterised by high intergranular and / or fracture permeability.

The River Thames is located 350 m to the northwest of the site. The minor tributary to the River Thames at Robins Creek is shown 400 m to the northwest of the site.

The superficial Boyn Hill Gravel Member deposits are characterised by their high permeability and leaching potential. An assessment of the groundwater vulnerability to contaminants from the ground surface, shows that they are classified as high vulnerability to leaching.

The site does not lie within a groundwater Source Protection Zone (SPZ).

There are no records of any groundwater or surface water abstractions within 250 m of the site.

With reference to the Environment Agency's (EA) Risk of Flooding from Rivers and Sea (RofRaS) mapping the site is not classified indicating the risk to be negligible. However; the local surroundings of the site are classified as very low which is equal to less than one chance in every 1,000 in any given year. The site is not located within 250 m of any flood defences.

It is known that groundwater flows across the wider site (as detailed in the IDOM CLA report) responded to the cessation of water abstraction in the south following closure of site operations, resulting in a switch to a north-north-westerly groundwater flow.

Indicative Ground Stability Hazards

With reference to the Groundsure report, the site is shown in an area of worked ground. The risk of ground stability hazards are summarised as follows:

- The risk for shrink swell clays and compressible deposits is rated as 'negligible';
- The risk for running sands, landslides and collapsible deposits is rated as 'very low'; and,
- The risk of ground dissolution of soluble rocks is rated as 'Moderate'.

Radon

With reference to mapping contained within the Groundsure report (which supersedes estimations derived from Indicative Atlas of Radon in Great Britain) fewer than 1 % of homes are above the action level and no radon protection measures are required.

Air Quality

The site lies within a designated Air Quality Management Area (AQMA) known as 'Northfleet Industrial Area AQMA', which was declared by Gravesham Borough Council in 2002 in relation to annual mean concentrations of PM₁₀ (particulate matter) generated by transport and industrial sources.

Ecology

Information from environmental and ecological datasets was obtained from a review of the MAGIC (Multi-Agency Geographic Information for the Countryside) website and the Groundsure report. The data assessed indicates no designated sites have been identified within one kilometre of the site boundary.

Preliminary Conceptual Model and Contaminants of Concern.

From the Phase 1 assessment a preliminary site conceptual model and risk assessment have been produced using the framework established in Part IIA of the Environmental Protection Act 1990 and detailed in Contaminated Land Report CLR11 - Model Procedures for the Management of Land Contamination.

Potential sources of contamination include Made Ground associated with the infill used to create the development platform in the 1930s, former buildings that occupied the site and their subsequent demolition and the former industrial uses of the adjacent land. The following contaminants of concern associated with these uses area heavy metals, hydrocarbons and asbestos.

Potential pathways for contaminant exposure typically include direct contact or ingestion of soil, inhalation of dust, leaching and lateral/vertical migration, as well as gaseous and vapour flow pathways into internal and external air.

Receptors with the potential to be impacted by on-site contamination include:

- The general public and current site users;
- Residents/users of the future development;
- Controlled waters;
- Construction workers;

- Infrastructure; and,
- Adjacent Land.

The existence of a pollutant linkage requires a pathway by which a receptor could be exposed as a source. A qualitative assessment of risk is thus considered with regard to the site in its current condition and also the proposed end-use scenarios in the section below.

The general public and current site users

The site is disused with no access to the general public. In addition, the majority of the site is covered by concrete hardstanding precluding access to the underlying soils.

The risk to current users is considered to be LOW.

Residents/users of the future development

Due to the infilling of the former clay within the site boundary in the 1930s, the highest sensitivity of use is for the future residents of the development. Without remediation the risk to future residents of the site is considered to be MODERATE.

Controlled Waters

Made Ground is known to overlie the permeable superficial Boyn Hill Gravel Member that in turn overlies the Chalk bedrock. A potential for undiscovered leachable contamination to impact the Chalk Aquifer exists. The risk to the groundwater from vertical migration of contaminants is considered to be MODERATE.

The closest surface water body to the site is the River Thames approximately 350 metres to the north. The risk of horizontal migration of contaminants to the River Thames is considered to be LOW.

Construction Workers

Groundworkers are initially at the greatest risk from exposure to hazardous contamination due to clearance and excavation works and during handling of excavation arisings. However; provided that dust levels and appropriate Health and Safety procedures are adhered to during the site works the risk to construction workers is considered to be LOW.

Infrastructure

Made Ground present within the site is known to be impacted by hydrocarbons. Utility companies apply strict guideline levels on the use of polymeric pipes and may consider all Made Ground unsuitable for typical plastic pipes to be used. It is recommended that the utility provider is consulted with respect to their requirement for water supply pipes.

The risk to polymeric pipes is considered to be HIGH.

Adjacent Land

Previous ground investigations have detected contamination on the site that is non-leachable and therefore not horizontally mobile. The risk to contamination migrating from the subject site to adjacent land is considered to be LOW.

Risk from contamination has been assessed using the source-pathway-receptor and pollutant linkage methodology, whereby a risk can only exist if all elements of source, pathway and receptor, are present.

Table 2: Preliminary Conceptual Model

POSSIBLE POLLUTANT LINKAGE			RISK CHARACTERISATION
POTENTIAL SOURCES	PATHWAYS	RECEPTORS	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (current users)	Low risk identified Potential for contaminated made ground to be present. However, the site is currently disused and inaccessible to public.
	Ingestion and inhalation of contaminated soil and dust		
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (future residents)	Moderate risk identified Potential for contaminated made ground to be present.
	Ingestion and inhalation of contaminated soil and dust		
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (construction workers)	Low risk identified Potential for contaminated made ground to be present but use of appropriate PPE and material handling protocols will mitigate risk
	Ingestion and inhalation of contaminated soil and dust		
Asbestos (made ground)	Ingestion and inhalation of contaminated soil and dust	Human health (future residents)	Moderate risk identified Potential for made ground to contain asbestos.
Contamination (all forms)	Vertical migration to aquifer	Controlled waters	Moderate risk identified Potential for contamination to impact the chalk (Principal Aquifer).
Contamination (all forms)	Horizontal migration to surface water	Controlled waters	Low risk identified No surface water features within 350 m of the site.
Hydrocarbons	Direct contact	Plastic water pipes	High risk identified Hydrocarbon contamination has been identified on site.
Hazardous Gas/Vapours In soil	Ingress into buildings and voids	Human health (future residents and construction workers)	Moderate risk identified Potential for contaminated made ground to be present, which could act as source of hazardous gas. Cannot rule out fuel spillages as source of vapours.
Adjacent Land	Lateral migration of contaminants	Site and the surrounding land	Low risk identified Migration through highly permeable superficial deposits and chalk to adjacent land cannot be ruled out at this stage.

Site Investigations within Phase 1A

Several phases of investigation have been undertaken within Phase 1A by IDOM and others.

IDOM carried out the following scope of works:

- One windowless sampler borehole (MWS404) to a depth of 4.45 metres (January 2021);
- One machine dug trial pit (MTP27) to a depth of 3.0 metres (February 2019).

ERM carried out the following scope of works:

- One machine dug trial pit (TP219) (2018)– logs for this location were not available to IDOM.

The cable percussion borehole MBH23 was completed by IDOM in May 2020, approximately 15 metres to the northwest of Phase 1A. An additional exploratory trial pit, MTP28, was completed at the same time as MTP27 approximately 25 meters to the north of the proposed houses.

Data from the borehole and trial pits are included in the interpretation to fully assess the contaminative status and geological profile of the ground conditions in this area. The exploratory hole location plan (17855cz-304-003) is appended to this letter report.

While limited investigation locations are available for Phase 1A, the limited size of the site means this still equates to one location per 133 m² – which is considered to represent reasonable coverage.

Ground Conditions Encountered (MWS404, MBH23 and MTP27)

A summary of the ground conditions encountered are summarised in Table 3 below. Intrusive site investigations have targeted the general ground conditions and potential for infilled ground.

Table 3: Ground conditions encountered.

STRATA	DEPTH TO TOP RANGE (m bgl)	RELATIVE LEVEL (m AOD)	THICKNESS RANGE (m)
Concrete	0.00	26.10	0.60
Made Ground	0.00	26.10 – 26.00	6.00
Boyn Hill Gravel	6.00	20.00	5.50
Seaford Chalk Formation	11.50	14.50	> 19.00

Made Ground

In MWS404, made Ground was encountered to the maximum depth of the exploratory hole of 4.45 m bgl (21.65 m AOD). The Made Ground generally comprised granular deposits of dark grey to very dark grey, sand, gravel and clinker with frequent secondary and tertiary fragments of brick, concrete, flint, ash and chalk.

Made Ground was also encountered to the full depth of the exploratory hole MTP27 that was excavated in February 2019. Beneath the concrete floor slab, the Made Ground is described as comprising orangish brow, brown and black slightly clayey to clayey, gravelly sand. The tertiary components were recorded as brick, chalk, concrete and roadstone.

MBH23 is a cable percussion hole completed within the nearby vicinity of the house plots in May 2020. The ground conditions encountered were similar to those observed in MWS404 with variable Made Ground of granular and cohesive sediments with tertiary fragments of flint, brick, clinker, ash, concrete and chalk. The Made Ground was recorded to a maximum depth of 6.00 m bgl (20.00 m AOD) overlying silty fine and medium grained sand attributed to the Boyn Hill Gravel Member. The Seaford Chalk Formation bedrock was encountered from 11.50 m bgl (14.50 m AOD).

There were no visible or olfactory evidence of contamination other than the ash and clinker that was recorded during the investigations. There were no visible fragments of asbestos encountered.

Copies of the exploratory hole logs are appended to this letter report, however; there are no geological logs available for the ERM trial pit TP219.

Groundwater

Groundwater was not encountered during the exploratory works at either location.

Geotechnical Assessment

The 'n' values for the SPTs carried out in the Made Ground encountered from ground level (26.10 m AOD) to the base of the hole at 4.45 m bgl (22.10 m AOD) in MWS404 ranged between 2 and 4 indicating very loose and loose conditions. The nearby cable percussion borehole MBH23 recorded similar conditions within the Made Ground with the SPT 'n' values ranging between 5 and 7, demonstrating loose ground conditions. The SPT 'n' values increased within the Boyn Hill Gravel Member to ranges between 12 and 17 indicating medium dense conditions. An SPT 'n' value of 8 was recorded within the weathered Chalk but increased with depth from 14 once the fresh Chalk was encountered to 34 at the base of the exploratory hole.

It is understood that the current design proposal for the house plots includes traditional trench fill foundations.

The two exploratory holes revealed significant thicknesses of Made Ground and in view of the weak ground conditions present, trench fill foundations are not considered appropriate. An alternative foundation solution is recommended.

Ground improvement, comprising the installation of stone columns or concrete columns, is likely to be feasible at the site, provided individual columns do not intercept the chalk. To confirm the suitability of ground improvement, a specialist contractor may want to view the ground conditions for themselves. If ground improvement is not deemed economically or technically suitable, then a piled foundation solution should be adopted.

Environmental Assessment

A total of three samples of made ground were recovered from Phase 1A during previous IDOM ground investigations (MTP27 at 0.7m, MWS404 at 0.4 and 1.4m). The samples were submitted to an MCERTS/UKAS accredited laboratory for chemical analysis. In addition, two samples (TP219 at 1.0 m and 3.8 m) recovered by ERM within Phase 1A and detailed in their 2018 site investigation have been included in the data set. The analysis comprised a broad range of potential contaminants including the principal contaminants of concern that includes heavy metals, polyaromatic hydrocarbons (PAH), petroleum hydrocarbons (TPH) and asbestos. Copies of the analytical certificates (19-28568-3, 20-11138 and 21-51484) are appended to this letter report.

The ERM report only included data for speciated TPH bands and selected PAH contaminants where concentrations were above the laboratory limit of detection. The analytical certificate for the ERM data is included in their Phase 2 Site Investigation Report reference 0413766 dated 02 July 2018.

The results of the chemical analysis have been assessed against *Suitable for Use Levels* (S4ULs) published in 2015 by LQM/CIEH designed to be representative of minimal risk to human health. Where houses with private back gardens have been proposed, S4ULs have been selected for a residential land use where the possibility of consumption of homegrown produce exists.

Based upon the site investigation results, a soil organic matter of 5 % has been adopted. For lead the DEFRA Category 4 Screening Level has been used as this is based on updated toxicological data and a low risk to human health.

An additional set of phytotoxin screening levels have been adopted from 'The Code of Agricultural Practice for the Protection of Soil' Ministry of Agriculture, Fisheries and Food (MAFF), 1993, which are protective of healthy plant growth.

A summary of the results exceeding the respective screening thresholds is presented in Table 4 below.

Table 4: Summary of soils chemical analysis results.

CONTAMINANT	No of Tests	MAX (mg.kg ⁻¹)	MEAN (mg.kg ⁻¹)	SCREENING LEVEL (SL) (mg.kg ⁻¹)	No > SL*
HUMAN HEALTH RISK ASSESSMENT					
Asbestos in soil	3	detected	-	Detected	1
pH	3	8.6	3.5	5 – 9	0
Arsenic	3	69.0	38.7	37	1
Cadmium	3	3.8	1.4	11	0
Chromium (total)	3	37.0	26.7	910	0
Hexavalent Chromium	3	<4.0	<4.0	6	0
Lead	3	510.0	270.7	200	2
Mercury	3	<0.3	<0.3	40	0
Nickel	3	58.0	47.3	130	0
Selenium	3	<1.0	<1.0	250	0
TPH Aliphatic >EC ₅ - EC ₆	3	<0.001	<0.001	160	0
TPH Aliphatic >EC ₆ - EC ₈	3	<0.001	<0.001	530	0
TPH Aliphatic >EC ₈ - EC ₁₀	3	<0.001	<0.001	150	0
TPH Aliphatic >EC ₁₀ - EC ₁₂	3	<1.00	<1.00	760	0
TPH Aliphatic >EC ₁₂ - EC ₁₆	5	21.00	5.23	4300	0
TPH Aliphatic >EC ₁₆ - EC ₂₁	4	63.00	26.35	110000	0
TPH Aliphatic >EC ₂₁ - EC ₃₅	5	240.00	89.33	110000	0
TPH Aromatic >EC ₅ - EC ₇	3	<0.001	<0.001	300	0
TPH Aromatic >EC ₇ - EC ₈	3	<0.001	<0.001	660	0
TPH Aromatic >EC ₈ - EC ₁₀	3	<0.001	<0.001	190	0

CONTAMINANT	No of Tests	MAX (mg.kg ⁻¹)	MEAN (mg.kg ⁻¹)	SCREENING LEVEL (SL) (mg.kg ⁻¹)	No > SL*
TPH Aromatic >EC ₁₀ - EC ₁₂	3	4.40	3.20	380	0
TPH Aromatic >EC ₁₂ - EC ₁₆	5	17.00	6.59	660	0
TPH Aromatic >EC ₁₆ - EC ₂₁	5	210.00	59.99	930	0
TPH Aromatic >EC ₂₁ - EC ₃₅	5	700.00	208.84	1700	0
Benzene	3	<0.001	<0.001	0.37	0
Toluene	3	<0.001	<0.001	660	0
Ethylbenzene	3	<0.001	<0.001	260	0
Xylene	3	<0.002	<0.002	310	0
Naphthalene	3	1.80	0.84	1100	0
Acenaphthylene	3	1.40	0.95	920	0
Acenaphthene	3	5.80	2.62	11000	0
Fluorene	5	47.00	12.37	13	2
Phenanthrene	5	42.00	11.59	3	2
Anthracene	5	46.00	12.96	3.7	2
Fluoranthene	5	23.00	6.92	350	0
Pyrene	5	24.00	6.14	100	0
Benzo(a)anthracene	5	31.00	8.32	27	1
Chrysene	5	4.90	1.49	0.3	2
Benzo(b)fluoranthene	5	78.00	19.97	890	0
Benzo(k)fluoranthene	3	1.40	0.74	860	0
Benzo(a)pyrene	3	19.00	9.12	41	0
Indeno(1,2,3-c,d)pyrene	3	0.05	0.05	13	0
Dibenzo(a,h)anthracene	3	31.00	13.67	440	0
Benzo(g,h,i)perylene	3	66.00	28.42	2000	0
Phenol	3	<1.0	<1.0	380	0
PHYTOTOXICITY RISK ASSESSMENT					
Copper	3	140.0	106.7	200	0
Nickel	3	58.0	47.3	110	0
Zinc	3	1100.0	572.3	300	2

When compared to the screening levels referenced above, the Made Ground was found to be impacted by metals (arsenic and lead), polyaromatic hydrocarbons (PAH) and asbestos. The principle source of contamination is from the ash and clinker rich soils that have been used as infill to raise the ground level.

Exploratory holes carried out in the vicinity of Phase 1A, (including MTP28 completed in February 2019 and MWS401 to MWS403 completed in January 2021), recorded no contaminant concentrations in excess of the screening vales within the Made Ground.

Zootoxic Metals (harmful to human health)

Arsenic concentrations were detected above the screening level protective of human health in one sample of Made Ground recovered from MWS404 at 1.40 metres below ground level (m bgl). Two incidences of lead contamination when compared to the human health screening criteria were recorded (MWS404 at 0.40 m bgl and 1.40 m bgl).

Phytotoxic Metals (harmful to plant health)

Concentrations of zinc exceeded the screening level protective of plant health in two samples of Made Ground from MWS404 (0.40 and 1.40 m bgl).

Organic Contaminants

Concentrations of the PAH compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(a,h)anthracene were found to exceed the respective human health screening criteria in three samples of Made Ground collected from MWS404 at 0.40 m bgl and 1.40 m bgl and MBH23 at 1.00 m bgl whilst one incidence of elevated chrysene in MWS404 at 0.40 m bgl.

Inorganic Contaminants

Trace concentrations of asbestos were detected in one sample of Made Ground from MTP27 (0.70 m).

Waste Considerations

The three samples of Made Ground analyzed from MWS404 and MBH23 would be classified as hazardous for the purposes of waste disposal.

One sample of Made Ground from MTP27 detected trace concentrations (< 0.001 %) of asbestos as loose fibres of chrysotile. Soils within the vicinity of this location would be classified as non-hazardous for waste disposal, however; because asbestos has been detected they could not be considered as inert.

The soil organic matter content of the sample collected from MWS404 at 1.40 m equates to 4.7 % and may qualify as a special waste depending upon the landfill operator.

WAC testing has not been carried out.

Ground Gas Assessment

An assessment of the ground gas conditions has not been carried out within the site boundary. A ground gas risk assessment for the wider development site has not identified significant ground gas that would require the installation of gas protection measures. However, site specific data is recommended to confirm this.

In the absence of site-specific data, the made ground has been assessed in terms of its thickness and organic matter content. On this basis the ground gas regime has been assessed as Ciria Characteristic Situation 3, for which gas protection measures are required. This requirement will be confirmed by site specific monitoring.

Risk Assessment

The potential sources of contamination at the site and the implications with respect to development have been interpreted in accordance with the current government guidance on source-pathway-receptor risk assessment.

The investigations demonstrate that the former uses of the site have resulted in the Made Ground containing elevated heavy metals, asbestos fibres, and hydrocarbon contamination. These materials are considered for their potential to act as sources for a number of pollutant linkages.

The potential impacts of contamination sources have been considered with respect to the following receptors:

- Residents of future development,
- Controlled waters
- Construction workers,
- Adjacent land, and
- Infrastructure.

In each case the existence of a pollutant linkage requires a pathway by which the receptor could be exposed to the source. A qualitative assessment of risk is thus considered in the first instance with respect to the site in its current condition and is summarised in the sections below.

Residents of future development

Soil contamination (chemical)

Risks to future uses of the residential development are considered to exist from direct exposure to soils containing heavy metals and hydrocarbons. Exposure pathways include inadvertent ingestion, dust inhalation, consumption of home-grown produce and dermal contact. Approximately two-thirds of the site will be covered by the building footprints and areas of hard standing. All newly formed soft landscaped areas will implement a clean cover system. Provided that clean cover is placed to a suitable thickness the risk to the future residents of the site is considered to be LOW. In the absence of remediation, risks to future site users are considered to be MODERATE.

Asbestos

One sample of Made Ground detected asbestos fibres at trace concentrations (< 0.001 %). Currently, dispersed asbestos concentrations in soil which could generate airborne fibres is indicated to be low. The incidence of asbestos was detected in soils that are located below the proposed building footprint. A clean cover system will be adopted in all newly formed soft landscaped areas.

Provided that clean cover is placed to a suitable thickness the risk to the future residents of the site is considered to be LOW. In the absence of remediation, risks to future site users are considered to be MODERATE.

Hazardous Soil Gas/Vapours (including hydrocarbon vapours/radon)

For much of the surrounding environs, a preliminary Low Risk gas regime is indicated from previous monitoring data (as detailed in the IDOM CLA report). However, it is recognized that potentially hazardous gas generating ash and clinker deposits used for the land raising infill in the 1930s are present within the site. It is considered that the current risk to future residents is MODERATE based upon the lack of site derived data. This gas risk rating can be revised once site-specific monitoring has taken place following any post-demolition and grubbing out works or any planned remedial works.

The available soil data for Phase 1A, shows that hydrocarbon contamination is within the heavy range (C>16) and therefore would not be expected to present an undue vapour risk. PAH contamination within soils is not to be considered was not encountered at concentrations that are considered to present a vapour risk.

The Vapour Intrusion Screening outlined by The Society of Brownfield Assessment (SoBRA) in their document Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile contaminants in Groundwater (Figure 6, page 35) has been considered to determine if a risk is present from residual contamination. Where groundwater hydrocarbon contamination was encountered across the wider site, it was generally in the heavier range (C>16). It should be noted that groundwater hydrocarbon concentrations in the vicinity of Phase 1A were recorded at concentrations below conservative SOBRA derived generic assessment criteria (GAC).

SoBRA stipulate that the Lateral Inclusion Zone is 30 feet (9.1 m) from the edge of the petroleum vapour source. Under this definition, buildings are more than 50 m from the assumed plum area and former tank farm indicated on insert 6 in the IDOM CLA. Furthermore, Phase 1A is up gradient of these areas. As previously mentioned, Phase 1A is approximately 10 metres above the ground level of the wider site to the north and west. It is therefore considered that lateral vapor migration associated with groundwater contamination is not considered to present a significant risk.

Controlled Waters

The contamination identified at the site (metals and PAH compounds) is relatively immobile. Furthermore, the material has been in place since 1932. The potential for leachable contamination that may impact upon controlled waters to be present is considered to be low and in view of this the potential risk to controlled waters is also considered to be low.

Construction workers

Potentially, construction workers are initially at the greatest risk from exposure to hazardous contamination due to excavation works and during the handling of materials including imported soils.

Currently, chemical contamination levels indicate an overall low potential for contaminants to exceed occupational exposure levels where total dusts are kept within statutory limits. However, locally an increased risk could exist where highly elevated metals are present.

The known asbestos fibre concentration in the soil are unlikely to generate airborne fibre level in outdoor air which would breach the statutory control limit. However; a risk from airborne fibres is considered to exist from indoor air inhalation where contaminated soils are tracked back to site compounds, welfare facilities, offices and vehicles.

Adoption of appropriate Health and Safety procedures will ensure that risks to operatives from hazardous materials at the site are minimized. Dust levels must be kept within statutory limits.

By following the appropriate Health and Safety procedures and adhering to the strict materials handling protocols the risk to construction workers to exposure from contaminated materials is considered to be LOW.

Adjacent land

The contamination that has been identified at the site is not considered to be leachable with the ability to affect adjacent land. The risk of contamination to adjacent land from the subject site is considered to be VERY LOW.

It is considered that the considerable change in level (between Phase 1 and the wider site) and the distance between Phase 1A and areas where free product was encountered (in shallow soils or within the deep chalk) will precede lateral migration of vapours associated with groundwater contamination (from the wider site to Phase 1A).

Infrastructure

Elevated levels of zinc in the Made Ground mean it will provide a poor medium for establishing healthy plant growth.

It is recommended that the utility provider is consulted with respect to their requirements for water supply pipes as they apply strict guideline levels on use of polymeric pipes and may consider all Made Ground unsuitable for typical plastic pipe materials to be used.

Revised Conceptual Model

Following completion of phases 1 and 2 of the investigation and a qualitative risk assessment, the conceptual model for the site, with relation to pollutant linkages, has been updated. The revised model is presented in Table 5 below.

Table 5: Revised Conceptual Model

POSSIBLE POLLUTANT LINKAGE			RISK CHARACTERISATION
POTENTIAL SOURCES	PATHWAYS	RECEPTORS	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (current users)	Low risk identified The site currently disused and inaccessible to public.
	Ingestion and inhalation of contaminated soil and dust		
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (future residents)	Low risk identified The proposed development will entail a significant portion of the site being covered by the building footprints and hardstanding. Low risk if a clean cover system is implemented in all newly formed soft landscaping areas.
	Ingestion and inhalation of contaminated soil and dust		
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (construction workers)	Low risk identified If appropriate PPE and materials handling protocols to are put in place. No smoking, eating or drinking except in designated areas. Contractor Method Statement required.
	Ingestion and inhalation of contaminated soil and dust		
Asbestos (made ground)	Ingestion and inhalation of contaminated soil and dust	Human health (future residents)	Low risk identified The contaminated Made Ground will be covered by building footprints and a clean cover system is to be implemented in all newly formed soft landscaping cutting precluding access to the soils.
Contamination (all forms)	Vertical migration to aquifer	Controlled waters	Low risk identified No leachable contamination has been identified. The groundwater table is in excess of 25 m below the site ground level.
Contamination (all forms)	Horizontal migration to surface water	Controlled waters	Low risk identified No surface water features within 350 m of the site.
Hydrocarbons	Direct contact	Plastic water pipes	High risk identified Clean service runs may be required by the utility company.

POSSIBLE POLLUTANT LINKAGE			RISK CHARACTERISATION
POTENTIAL SOURCES	PATHWAYS	RECEPTORS	
Hazardous Gas/Vapours In soil	Ingress into buildings and voids	Human health (future residents and construction workers)	Moderate risk identified Potential hazardous gas generating ash and clinker fill identified within the site boundary. No site-specific monitoring data available.
Adjacent Land	Lateral migration of contaminants	Site and the surrounding land	Very low risk identified Identified contamination on site is not leachable and unlikely to affect adjacent land.

Preliminary Remediation Strategy

Building footprints and hardstanding areas will remove the pollution pathway and reduce the risk of exposure to the identified contamination

The following remediation activities are anticipated:

- Breaking out the concrete slabs and probing for obstructions in the footprint of the former factory buildings;
- Clean capping in all areas of newly formed soft landscaping. Clean capping should comprise a minimum 600 mm thickness composed of at least 150 mm topsoil and 450 mm subsoil.
- Gas protection measures will be required in new buildings to meet Ciria Characteristic Situation CS3.
- Consideration should be given to the use of upgraded services, subject to consultation with the utility providers.

A site-specific ground gas risk assessment is required to determine if ground gas protection measures need to be implemented. To achieve this, and given the size of the site, two boreholes will be installed into the made ground with monitoring undertaken on six occasions over a three-month period.

Remedial Method Statement

A potential risk to future site users has been identified. This section sets out the remedial measures to be adopted and the necessary verification.

In all gardens and soft landscaped areas, the developer shall ensure that made ground containing significant metals, PAH, TPH and asbestos contamination is covered by a suitable depth of clean cover.

The capping layer shall comprise 600 mm of clean validated soil to areas of private gardens (minimum 150

Any imported or site-won cover materials shall be validated by chemical analysis and assessment of provenance and approved in writing by Merebrook before they are brought to site at a frequency of one sample per 50 m³, with a minimum of three samples per source. The thickness of clean cover shall be checked in each garden.

This validation will be undertaken by Merebrook and requires ten working days ahead of CML to complete.

Soils for the formation of capping layers shall meet the criteria set out in Table 6, based on the SU4L values for residential land use:

Table 6: Criteria for Imported Materials

CONTAMINANT	UNITS	SCREENING LEVEL (SL)
Asbestos in soil	-	Not-detected
pH	-	>5 - <9
Arsenic	mg.kg ⁻¹	37
Cadmium	mg.kg ⁻¹	11
Chromium (total)	mg.kg ⁻¹	910
Hexavalent Chromium	mg.kg ⁻¹	6
Lead	mg.kg ⁻¹	200
Mercury	mg.kg ⁻¹	40
Nickel	mg.kg ⁻¹	180
Selenium	mg.kg ⁻¹	250
TPH Aliphatic >EC ₅ - EC ₆	mg.kg ⁻¹	42
TPH Aliphatic >EC ₆ - EC ₈	mg.kg ⁻¹	100
TPH Aliphatic >EC ₈ - EC ₁₀	mg.kg ⁻¹	27
TPH Aliphatic >EC ₁₀ - EC ₁₂	mg.kg ⁻¹	130
TPH Aliphatic >EC ₁₂ - EC ₁₆	mg.kg ⁻¹	1,00
TPH Aliphatic >EC ₁₆ - EC ₂₁	mg.kg ⁻¹	1,000
TPH Aliphatic >EC ₂₁ - EC ₃₅	mg.kg ⁻¹	1,000
TPH Aromatic >EC ₅ - EC ₇	mg.kg ⁻¹	70
TPH Aromatic >EC ₇ - EC ₈	mg.kg ⁻¹	130
TPH Aromatic >EC ₈ - EC ₁₀	mg.kg ⁻¹	34
TPH Aromatic >EC ₁₀ - EC ₁₂	mg.kg ⁻¹	74
TPH Aromatic >EC ₁₂ - EC ₁₆	mg.kg ⁻¹	140
TPH Aromatic >EC ₁₆ - EC ₂₁	mg.kg ⁻¹	260
TPH Aromatic >EC ₂₁ - EC ₃₅	mg.kg ⁻¹	1,000
Benzene	mg.kg ⁻¹	0.087
Toluene	mg.kg ⁻¹	130
Ethylbenzene	mg.kg ⁻¹	47
Xylene	mg.kg ⁻¹	26
Acenaphthene	mg.kg ⁻¹	210
Acenaphthylene	mg.kg ⁻¹	170
Anthracene	mg.kg ⁻¹	1,000
Benzo(a)anthracene	mg.kg ⁻¹	7.2

CONTAMINANT	UNITS	SCREENING LEVEL (SL)
Benzo(a)pyrene	mg.kg ⁻¹	2.2
Benzo(b)fluoranthene	mg.kg ⁻¹	2.6
Benzo(k)fluoranthene	mg.kg ⁻¹	320
Benzo(g,h,i)perylene	mg.kg ⁻¹	77
Chrysene	mg.kg ⁻¹	15
Dibenzo(a,h)anthracene	mg.kg ⁻¹	0.24
Fluoranthene	mg.kg ⁻¹	280
Fluorene	mg.kg ⁻¹	170
Ideno(1,2,3-c,d)pyrene	mg.kg ⁻¹	27
Naphthalene	mg.kg ⁻¹	2.3
Phenanthrene	mg.kg ⁻¹	95
Pyrene	mg.kg ⁻¹	620
PCB Congener 28	mg.kg ⁻¹	Not-detected
Copper	mg.kg ⁻¹	200
Zinc	mg.kg ⁻¹	300

A site-specific ground gas risk assessment is required to determine if ground gas protection measures need to be implemented. To achieve this, and given the size of the site, two boreholes will be installed into the made ground with monitoring undertaken on six occasions over a three-month period.

The results of the gas risk assessment will be used to determine the requirement for gas protection measures. These shall be approved by the Local Authority and incorporated into the building design.

In the absence of site-specific data, the made ground has been assessed in terms of its thickness and organic matter content. On this basis the ground gas regime has been assessed as Ciria Characteristic Situation 3, for which gas protection measures are required.

BS 8485: 2015 sets out the required gas score to be achieved by gas protection measures. For type A buildings (private residential dwellings) and Characteristic Situation CS3 a score of 4.5 is required. This will be achieved through a combination of the following measures:

1. Cast in *situ* monolithic ground bearing raft with reinforcement to control cracking and minimal service penetrations. (score 1.5 points).
2. Granular passive sub-floor dispersal layer with minimal fines (score 1.5 points).
3. Gas resistant membrane Gas resistant membrane meeting all of the following criteria (score 2 points):
 - Sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method)
 - Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions
 - Sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab)
 - Sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc).

- Capable, after installation, of providing a complete barrier to the entry of the relevant gas
- Verified in accordance with CIRIA C735.

Gas protection measures will be validated by an independent third party, with the membranes for each unit in Phase 1A inspected.

In addition to the measures set out above, the following must be adhered to:

- i. Excavation of contaminated soils and obstructions is to be carried out a controlled manner and the resulting excavations backfilled with either acceptable site derived fill, processed concrete / brick, remediated materials or suitable imported fill.
- ii. The backfilled material is to be placed in a controlled manner in order to prevent excessive future settlements which could affect roads, areas of hardstanding and services.
- iii. All geotechnical and earthworks operations shall be carried out in accordance with the relevant sections of the Specification for Highway Works (SHW) published in March 1998 by TSO/Highways Agency.
- iv. The supplier/contractor shall ensure that the handling and storage requirements of BS3882:2007 are met at all times until handover to Bellway or other groundworker
- v. All groundworkers shall ensure that topsoil under its control is stored and handled in accordance with the requirements of BS3882:2007.
- vi. As with any sampling exercise, it is possible that groundworks will discover conditions or soils different from those found to date. In this instance works will cease in the area of contamination and an appropriate course of remediation agreed with the Local Authority and Environment Agency.

Verification Plan

Samples will be collected at the frequencies set out above, with the results presented in the Final Validation Report.

In summary, this will provide the following details of the remedial works undertaken:

- i. Details of previously unidentified contamination and measures implemented to mitigate potential risks;
- ii. Details of contamination left in situ;
- iii. Records of inspection, sampling and testing;
- iv. A photographic record of key stages of works, for example the removal of the concrete slab
- v. Regulatory consents and permits;
- vi. Details of waste disposal, including examples of tip tickets;
- vii. Details of service trenches;
- viii. Details of gas protection measures and inspection records.
- ix. Records of materials re-use; and
- x. Records of on-site and laboratory and testing.

Waste Management and Suitability for Reuse

Where the development requires the excavation and disposal of soils it is recommended that the arisings are segregated based upon their origin and waste classification.

Materials, including waste soils which are not to be retained on site, should be removed and disposed of in accordance with all relevant statutes including the Environmental Protection Act 1990 as amended, The Controlled Waste Regulations 2012 as amended, The Waste Regulations 2011 as amended, The Hazardous Waste Regulations 2005 as amended, The Waste Management Regulations as amended and The Hazardous Waste (Miscellaneous Amendments) Regulations 2015.

Some reprofiling of the existing topography will be required within the surrounds of the proposed house plots. As a sustainable alternative to off-site disposal, it may be possible to re-use site-won soils within the proposed reprofiling of the site surroundings provided they are not grossly contaminated and deemed geotechnically

suitable. There must also be certainty of use within the scheme and the material should only be used in the quantity necessary for that use.

Provided these criteria are met, the re-use of site-won materials is unlikely to be deemed a waste activity. Production of a Materials Management Plan under the industry CL:AIRE Code of Practice on the Definition of Waste represents a robust method of demonstrating that the proposed re-use of material meets the criteria and is not liable for landfill tax.

The soils encountered in MWS404 at 1.40 m bgl may not be suitable for reuse within the reprofiling earthworks as it has a high organic content, making it highly compressible and a potential ground gas risk. It may, however, be suitable for use as general fill beneath the clean cover.

The physical and chemical properties of the Made Ground mean it will be unsuitable for use as clean cover.

Conclusions and Recommendations

The ground conditions encountered in the proposed house plots site comprised Made Ground to a depth of 6.00 m (20.00 m AOD) overlying superficial drift deposits of the Boyn Hill Gravel Member. The Seaford Chalk Formation bedrock is encountered from 11.50 m bgl (14.50 m AOD).

Sampling of the Made Ground within the three exploratory holes between 0.40 m bgl and 1.40 m bgl has demonstrated it to be impacted by heavy metals, PAH compounds and asbestos. Concentrations of lead, arsenic and PAH compounds exceeding the thresholds protective of human health were detected in MWS404 and MBH23 whilst asbestos was detected in MTP27. The soils in the vicinity of MWS404 would be classified as hazardous waste for disposal.

No groundwater was encountered during the completion of the exploratory holes.

For much of the surrounding environs, a preliminary Low Risk gas regime is indicated from previous monitoring data. However, it is recognized that potentially hazardous gas generating ash and clinker deposits used for the land raising infill in the 1930s are present within the site. As a result a requirement for gas protection measures has been assumed. This gas risk rating can be revised once site-specific monitoring has taken place following any post-demolition and grubbing out works or any planned remedial works.

Remedial measures including a clean cover system is required in all newly formed soft landscaped areas. The clean cover system is to comprise a minimum thickness of 600 mm comprising at least 150 mm of topsoil and 450 mm of subsoil.

It is recommended that an alternative foundation solution is considered, as the relative consistency of the soils will not support the proposed trench fill foundations. The installation of stone or concrete columns is determined to be a feasible option so long as they do not extend into the Chalk bedrock. Alternatively, piled foundations can be considered.

It is understood that deep borehole soakaways are proposed for Phase 1A. The proposed design will incorporate a sealed chamber to prevent egress of stored water other than through the deep borehole liner. This will also prevent any mixing with the surrounding made ground or ingress of any perched water. A bentonite seal will also be used installed around the borehole itself to prevent contamination of the underlying Boyn Hill Gravel. The IDOM CLA report highlighted several areas of hydrocarbon contamination within the deep chalk across the wider site, none of these relate to Phase 1A. It should be noted that groundwater flows in a north-north-westly direction, therefore these areas of deep groundwater contamination (within the chalk) will flow away from Phase 1A. Furthermore, ground level at Phase 1A is approximately 10 metres above that of the surrounding site to the west.

Subject: Proposed House Plots 52 to 54 Factory Road Ground Conditions
Our ref: L-17855cz-2.4.2-21-72-CJB Rev C
Page: 23/23



I trust the above and attached are suitable for your current requirements. Please do not hesitate to contact me if you have any queries.

Yours sincerely.

A handwritten signature in blue ink, appearing to be 'CB', is located below the 'Yours sincerely.' text.

Chris Bullen

For IDOM Merebrook

Enc. Bellway drawing EBB-BPTW-02-00-DR-A-013 Rev C04

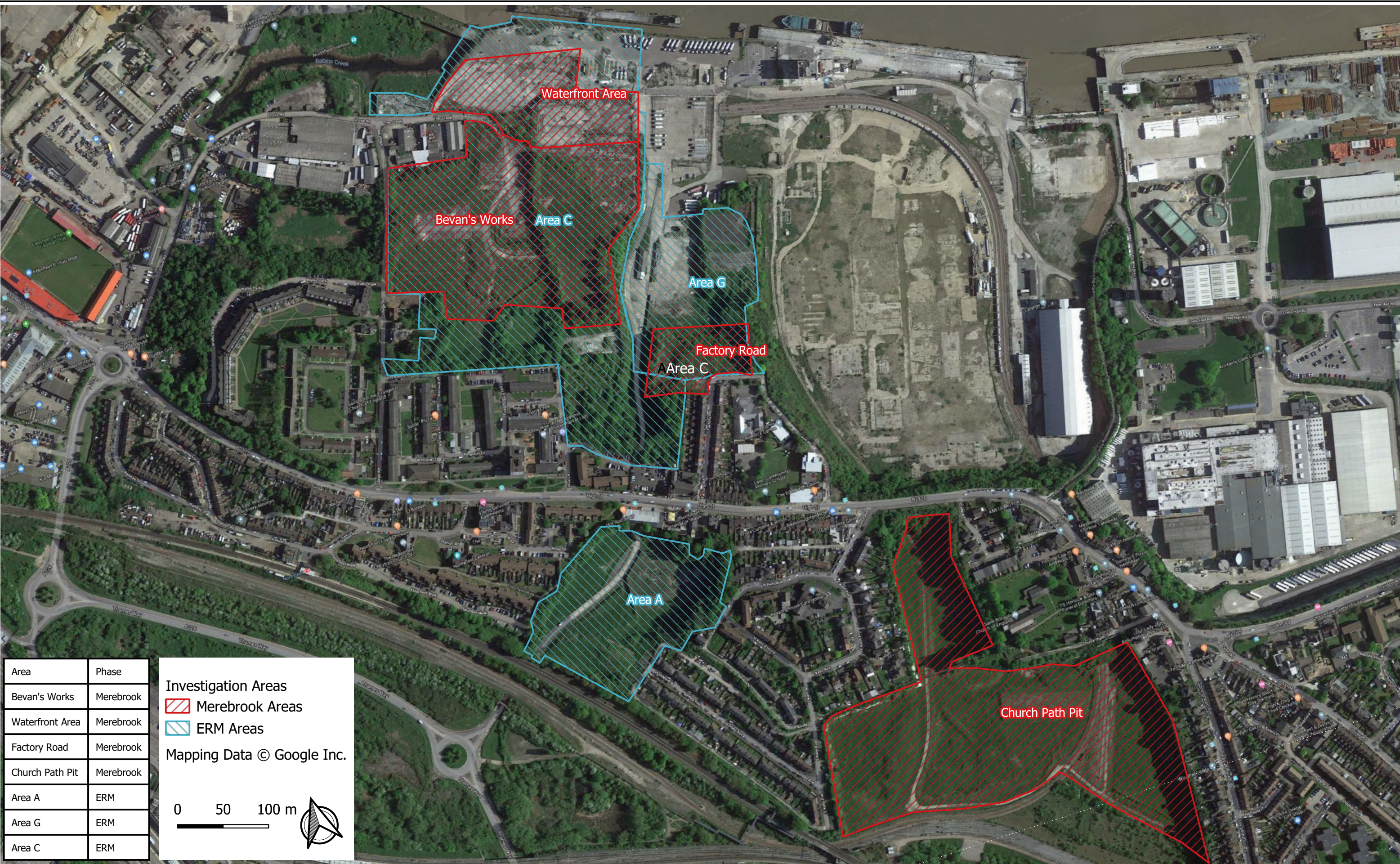
Phasing Plan

Historic Maps 1865 to 2020

Exploratory Hole Location Plan 17855cz-101-003

Exploratory Hole Logs MWS404, MTP27 and MBH23

Analytical Certificates 19-28658-3, 20-11138 and 21-51484



Area	Phase
Bevan's Works	Merebrook
Waterfront Area	Merebrook
Factory Road	Merebrook
Church Path Pit	Merebrook
Area A	ERM
Area G	ERM
Area C	ERM

Investigation Areas
Merebrook Areas
ERM Areas

Mapping Data © Google Inc.

0 50 100 m

		DATE	REV
			1
Job No. 17855cz		Drawn Chd	App'd
Drawing No. 1		Revision 1	
Scale Map Scaled		Date 01/03/2019	
Drawn SAM		Frame Dimensions (A3) 297x420 mm	
		Checked SAM	Approved SAM



- Key
- Phase 1a Reserved Matters Planning Application Boundary
 - Outline Planning Permission Boundary (App Ref: EDC/16/0004)
 - Based on Mixed Use Planning Application Boundary Ref: LA/00-052 Rev. 5
 - Approximate location of Flint Wall

Notes:

Do not scale. All dimensions are in millimetres unless otherwise stated. This drawing should be read in conjunction with all relevant project information and contract documentation. All dimensions to be checked prior to fabrication and/or commencement of works. All works to comply with all relevant legal standards, building regulations and warranty provider requirements. Report any discrepancies, if in doubt ask.

Rev	Status	Date	Description	Dwn	Chkd
CD1	A	22.05.20	Planning Issue.	JM	CD
CD2	A	14.09.20	Planning Issue. Amended following Planners' comments.	BH	CD
CD3	A	03.11.20	Planning Issue. Amended to retain existing wall.	BH	CD
CD4	A	27.11.20	Planning Issue. Landscape amended to Planners' comments.	BH	CD

Client:

Bellway

Client Name: Bellway

Project Name: Ebbsfleet Riverside - Phase 1a Reserved Matters

Drawing Name: Proposed Site Layout Plan

Drawing Number: EBB-BPTW-02-00-DR-A-0103	Rev: C04	Status: A
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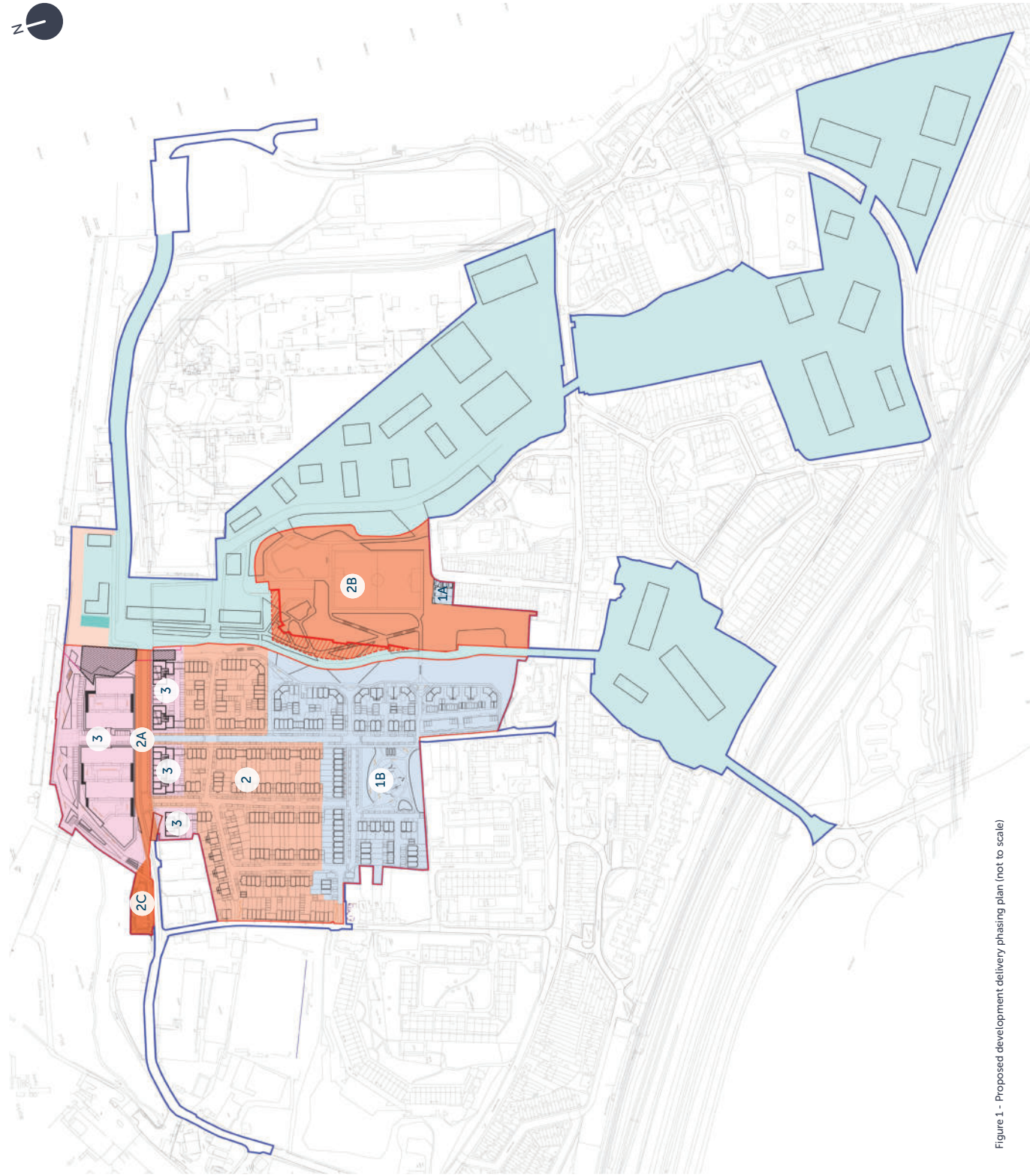
Project No: 20-088	RIBA Stage: 3	Drawn By: JM	Scale: 1:200 @ A1
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RESERVED MATTERS

40 Norman Road,
Greenwich, London
SE10 9QX
t 020 8293 5175
bptw.co.uk

**BP
TW**





Boundary Key

Approved Site Wide Boundary of
Permission EDC/16/0004

Land within Bellway's Ownership

Release of Protected Strip*

*The land hatched black is owned by Bellway, but is subject to a
covenant (imposed prior to grant of the outline consent) that it
cannot be used for residential use.

Protected Strip

Gatehouse Area

This land currently comprises part of the access to the
Employment Land.

Stopping-up Land

The stopping-up land is currently highway but an application to
stop up such land is in progress. The transfer to Bellway included
such land subject to the highway rights.

*Best estimate based on the approved **Mixed Use Planning
Application Boundary**. Ref: LAF00-052 Rev S (David Lock
Associates, 2015, PDF)

Building Programme Key

Residential Phase 1A – Factory Road

Residential Phase 1B – The Hive

Residential Phase 2 – College Road and
Central

Residential Phase 2A – Bus Road West

Residential Phase 2B – Playing pitch/
Bevan's Park

Residential Phase 2C – Robin Creek SUD

Residential Phase 3 – The Riverside

Employment land

MU2*

*Riverside Food and Drink Uses comprising up to 500 sqm
of Public House or Food and Drink Uses (A3/A4) as per
description of development on outline planning permission (ref:
EDC/16/0004)

Figure 1 - Proposed development delivery phasing plan (not to scale)

Site Details:

NORTHFLEET WORKS, THE
SHORE, NORTHFLEET,
GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1863-1865

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1865
Edition N/A
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Levelled N/A

Surveyed 1863
Revised 1863
Edition N/A
Copyright N/A
Levelled N/A

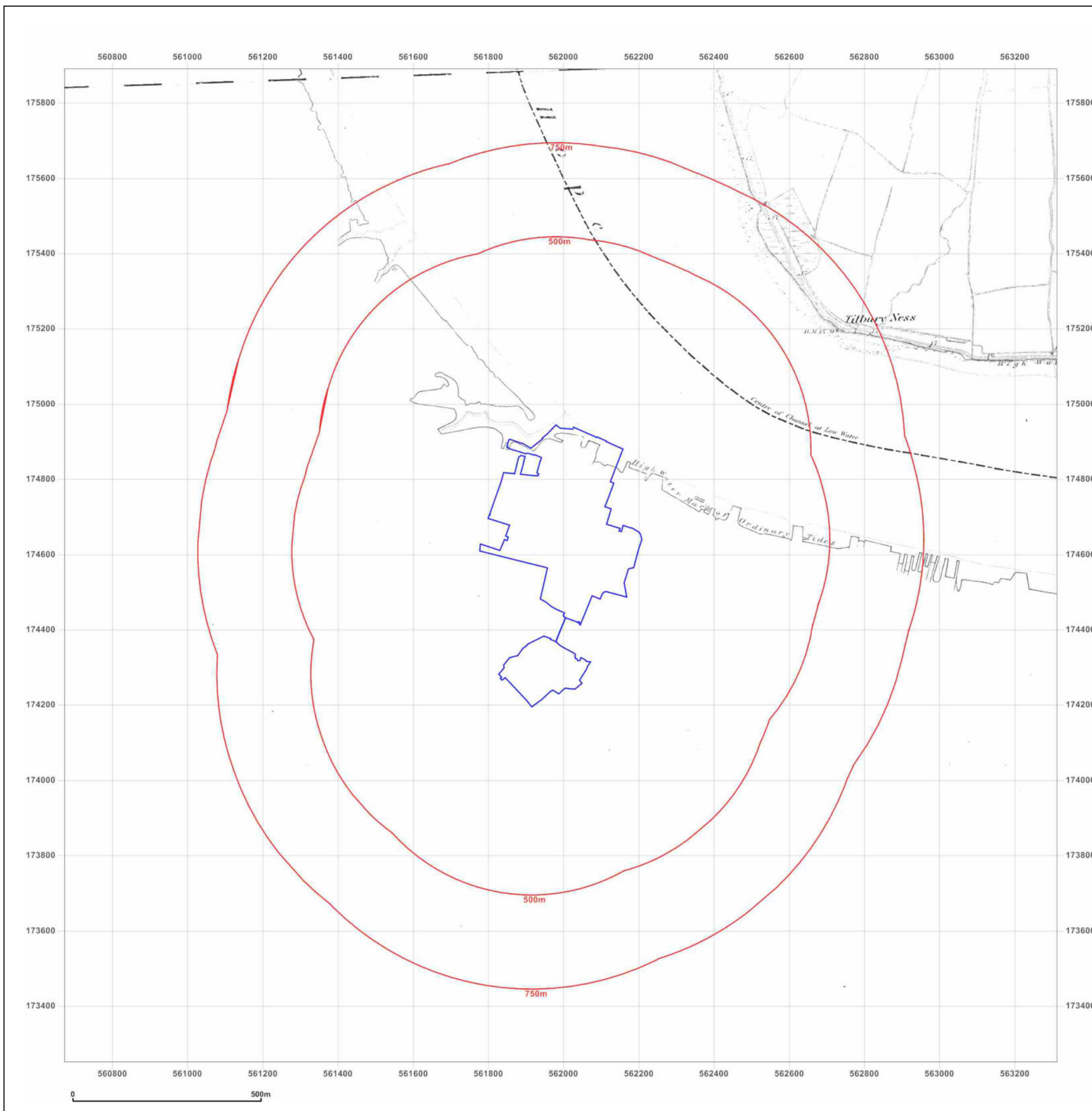


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Site Details:

NORTHFLEET WORKS, THE
SHORE, NORTHFLEET,
GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1865

Scale: 1:10,560

Printed at: 1:10,560



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

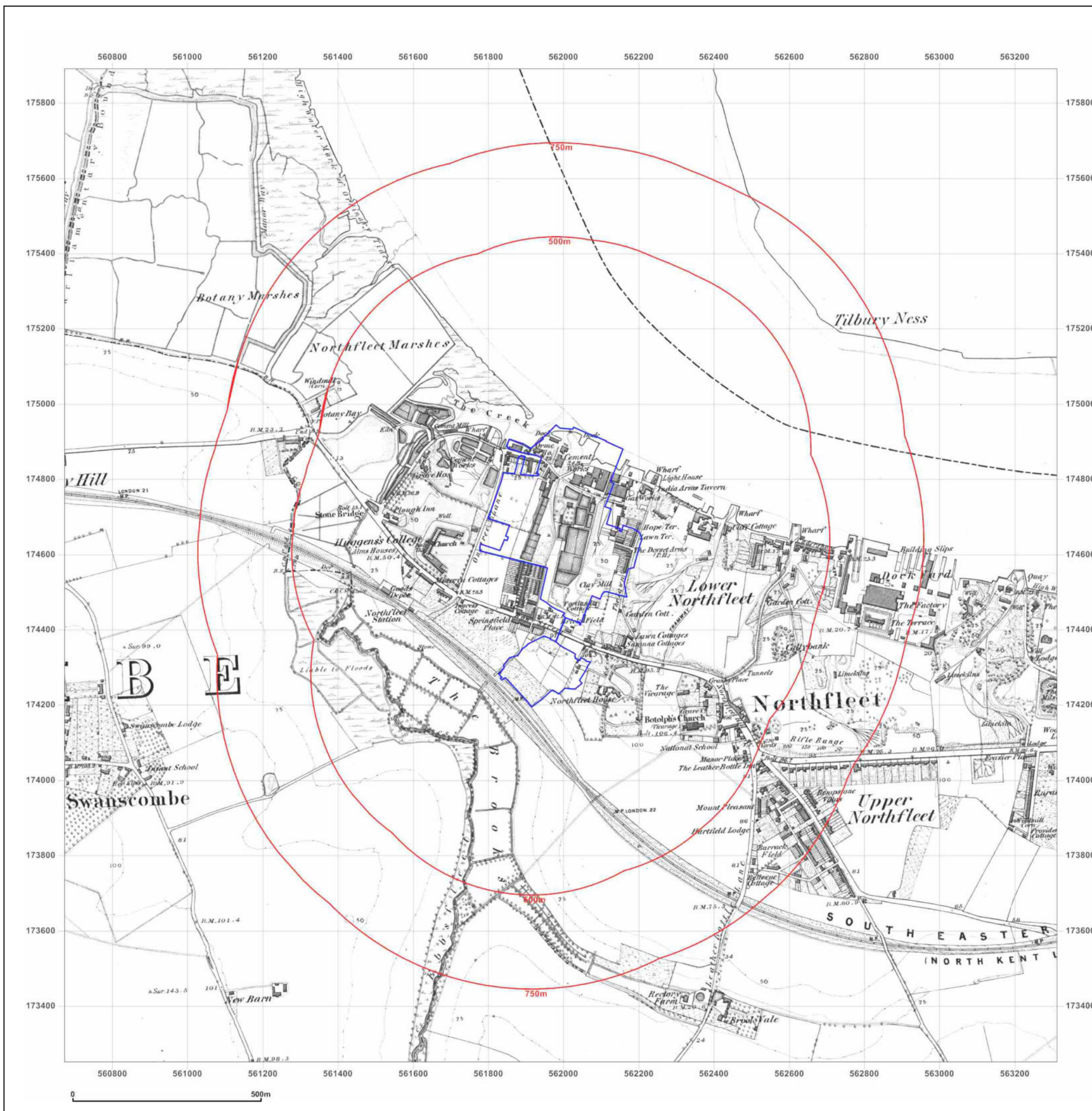


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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



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

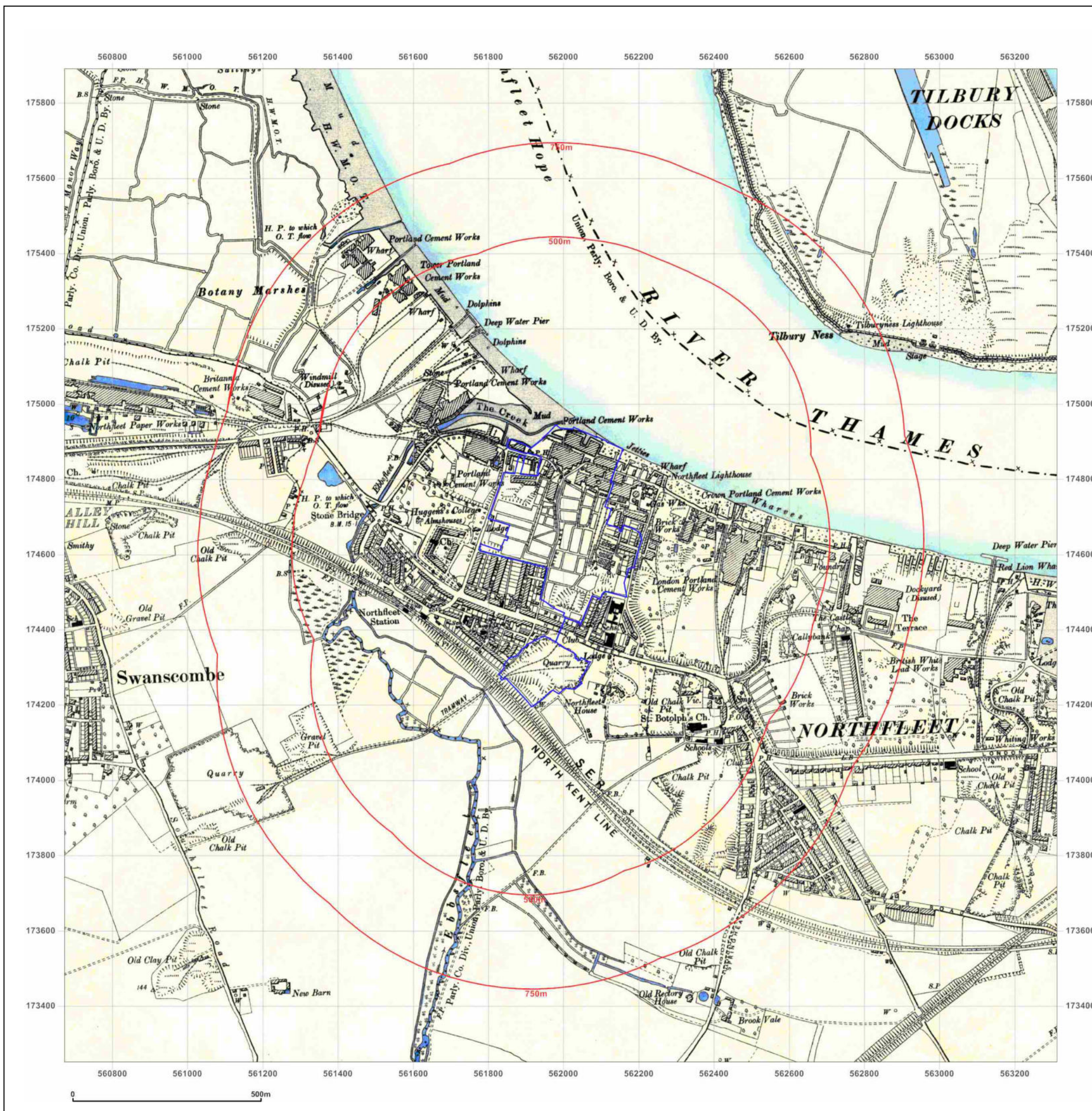


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



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

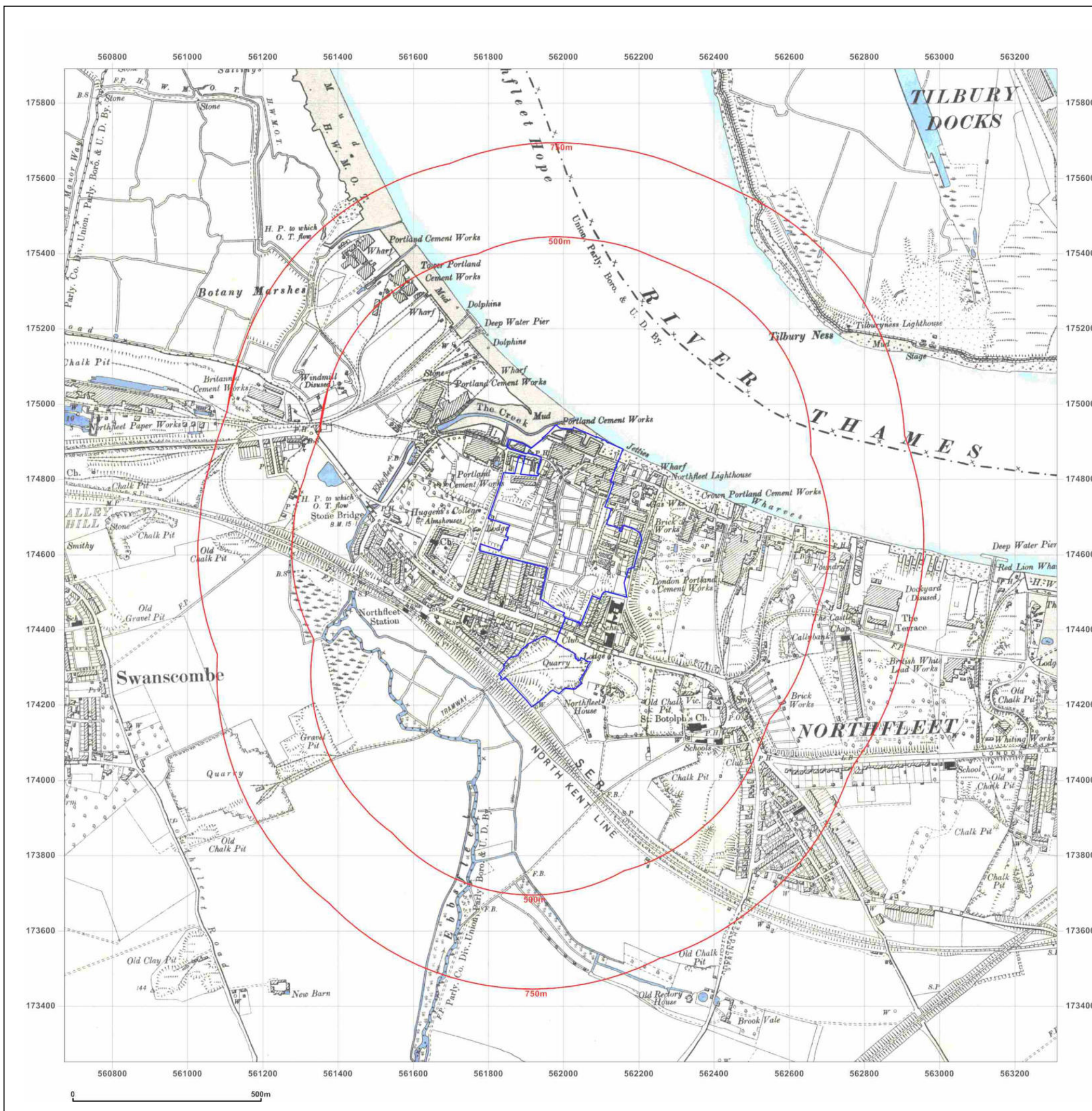


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1895-1898

Scale: 1:10,560

Printed at: 1:10,560



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

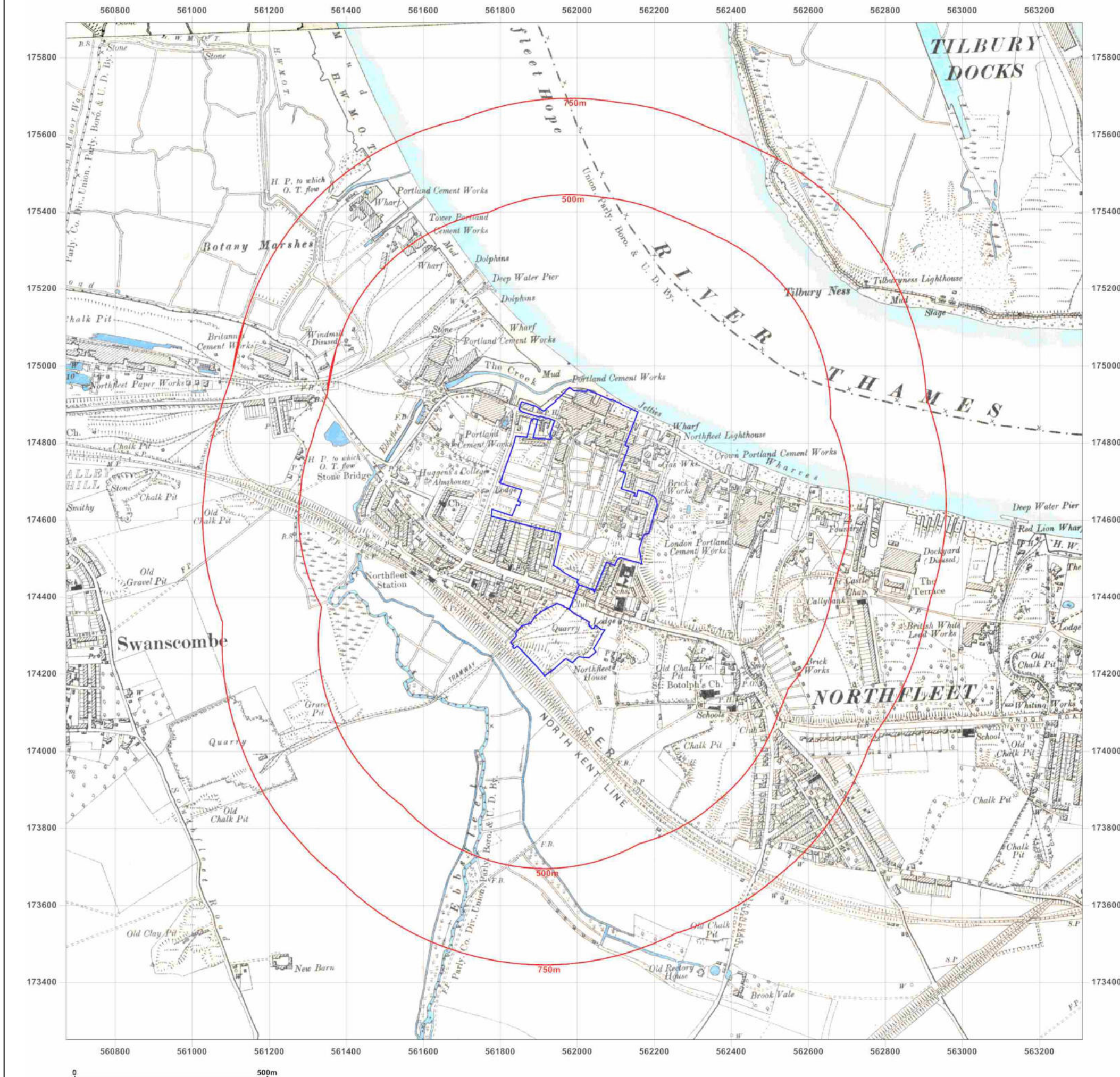


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1895-1898

Scale: 1:10,560

Printed at: 1:10,560



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

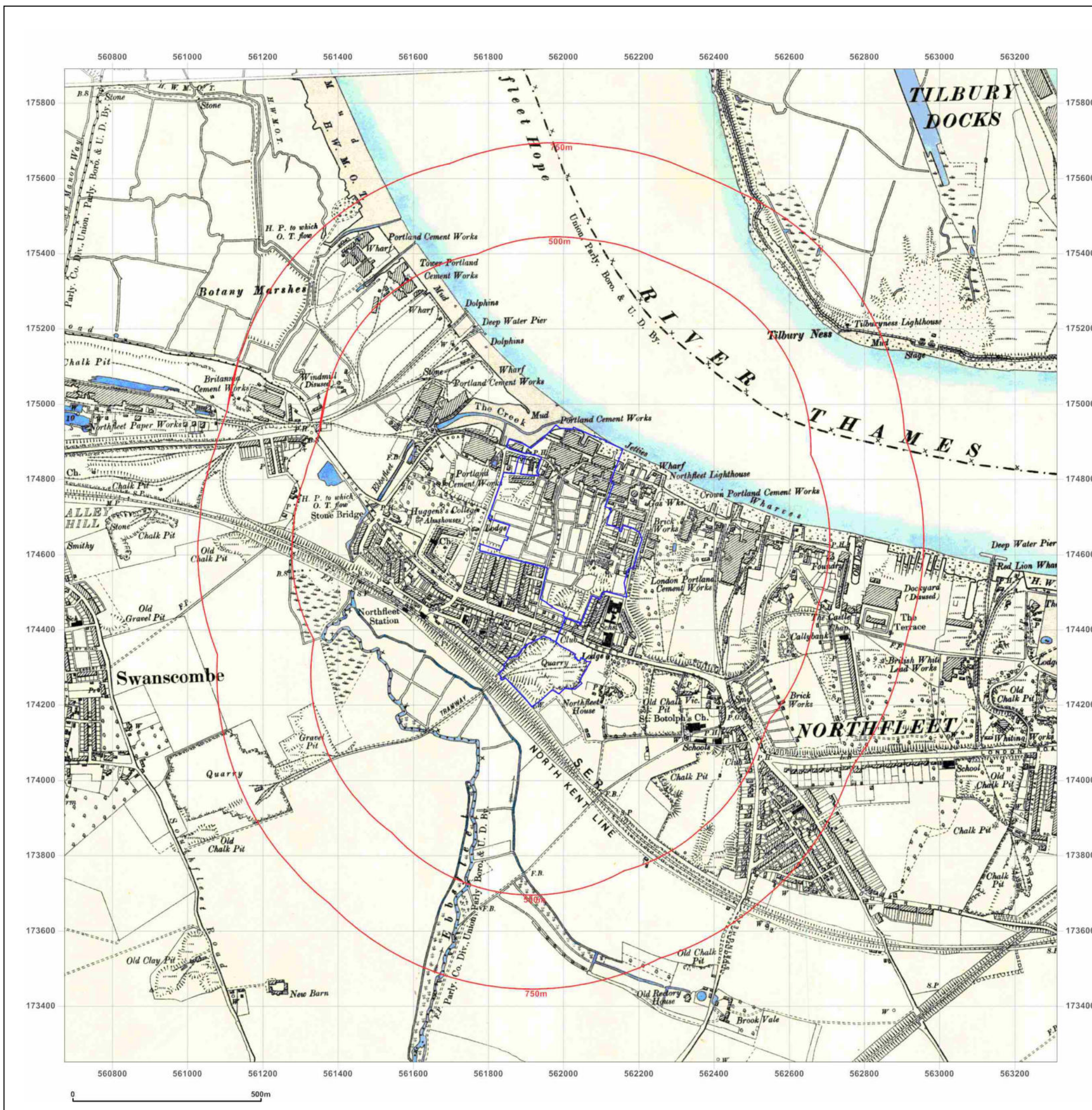


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1907

Scale: 1:10,560

Printed at: 1:10,560



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

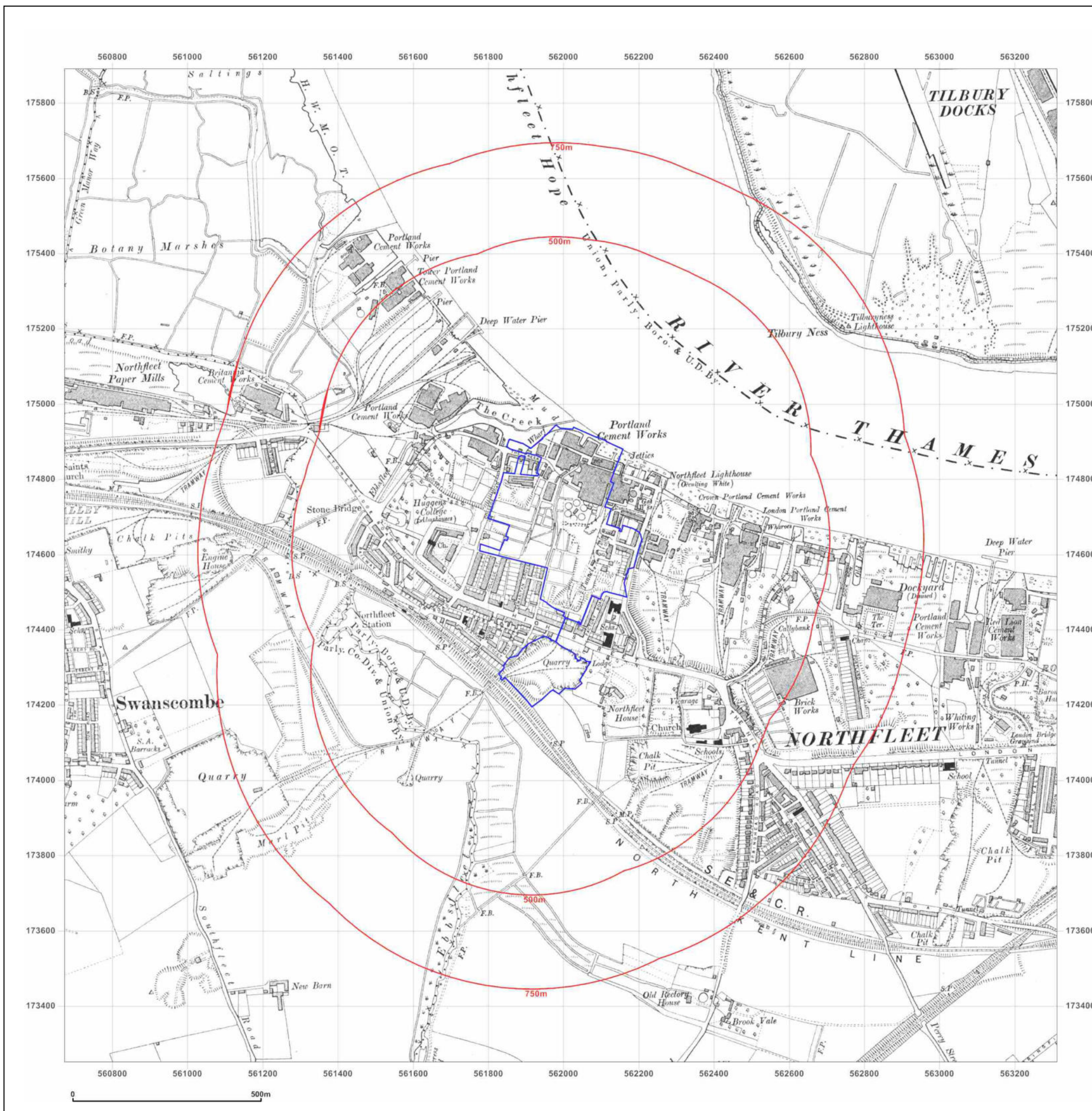


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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1916

Scale: 1:10,560

Printed at: 1:10,560



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

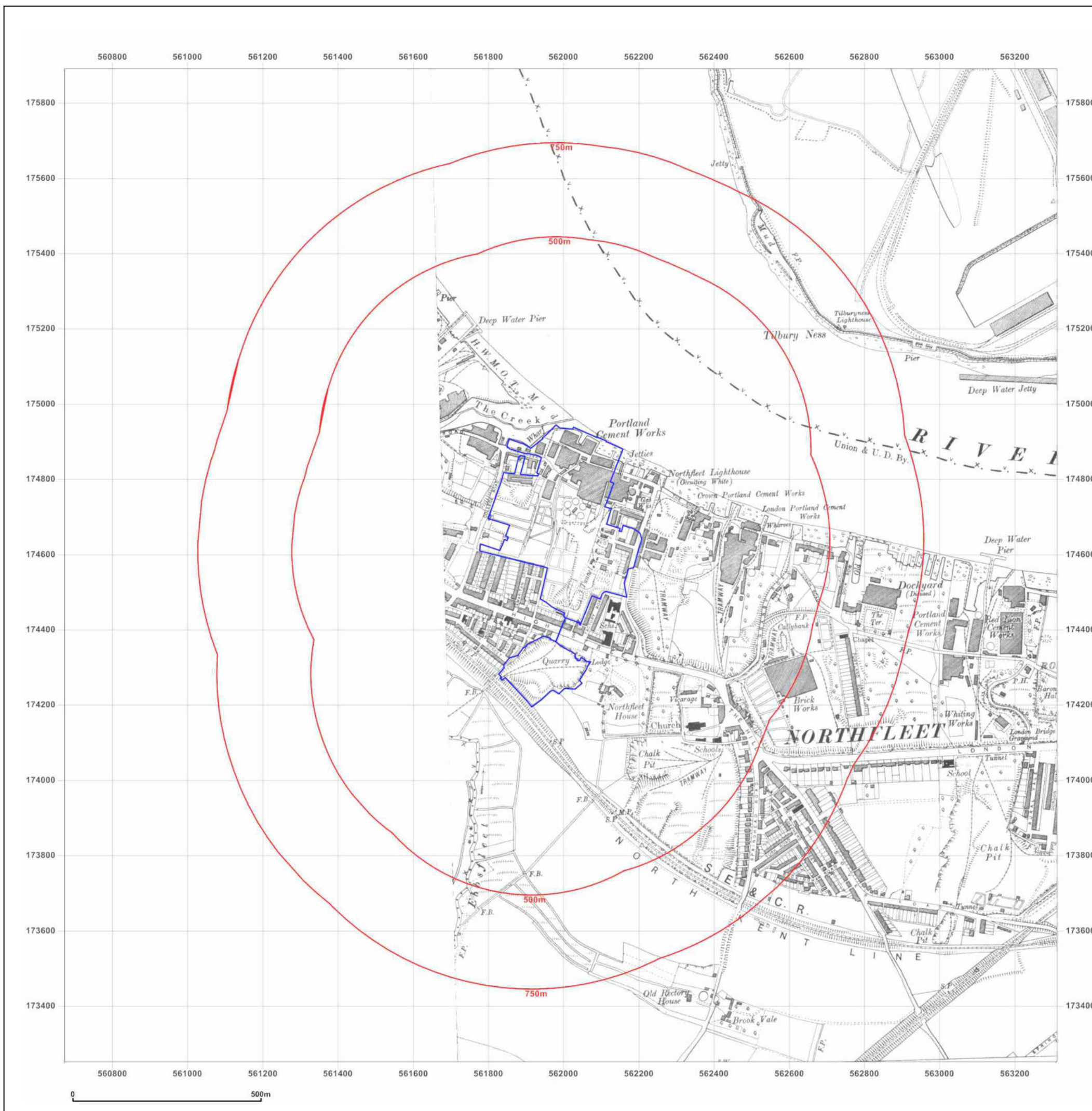


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1923

Scale: 1:10,560

Printed at: 1:10,560



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

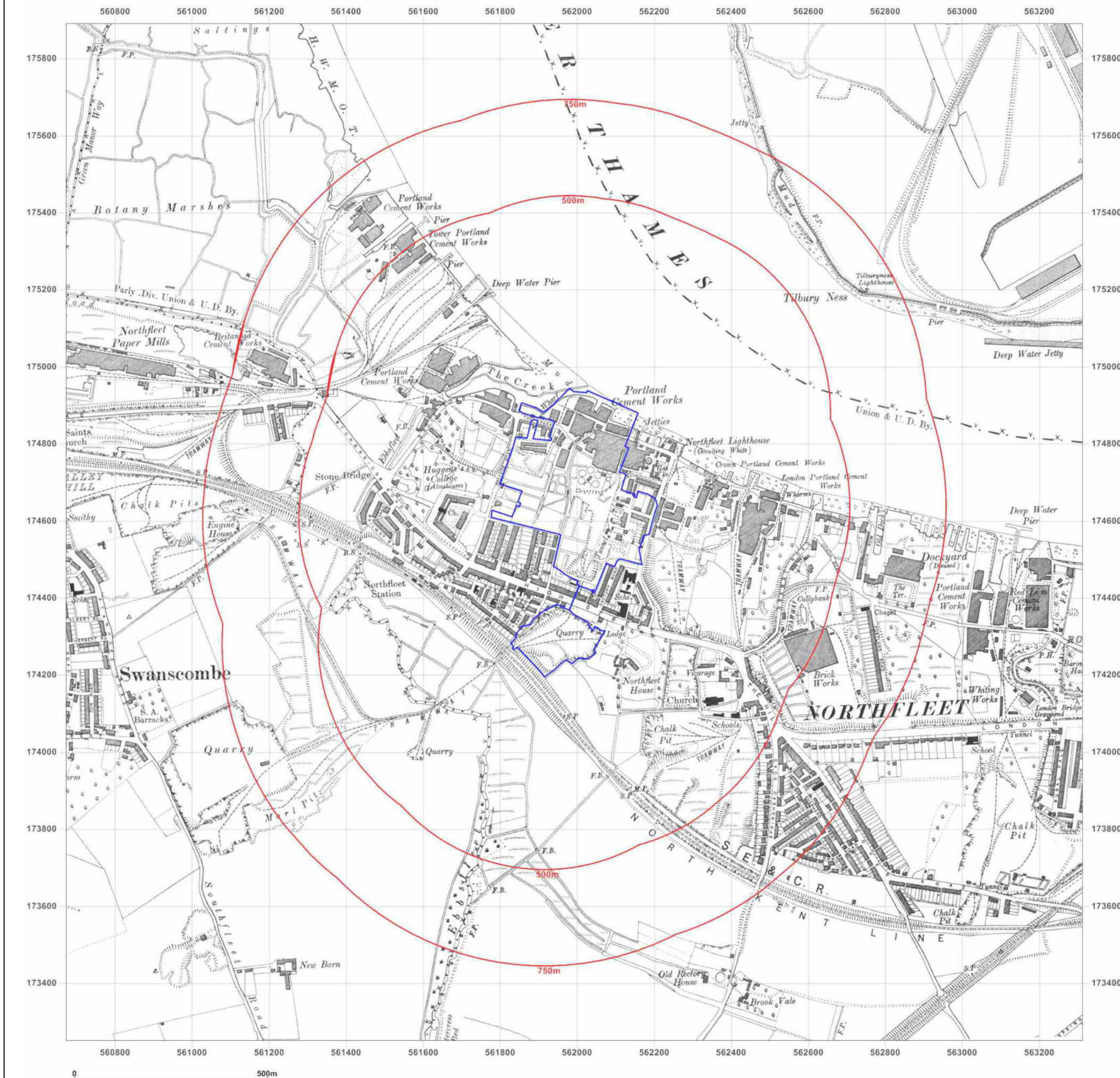


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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1923

Scale: 1:10,560

Printed at: 1:10,560



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

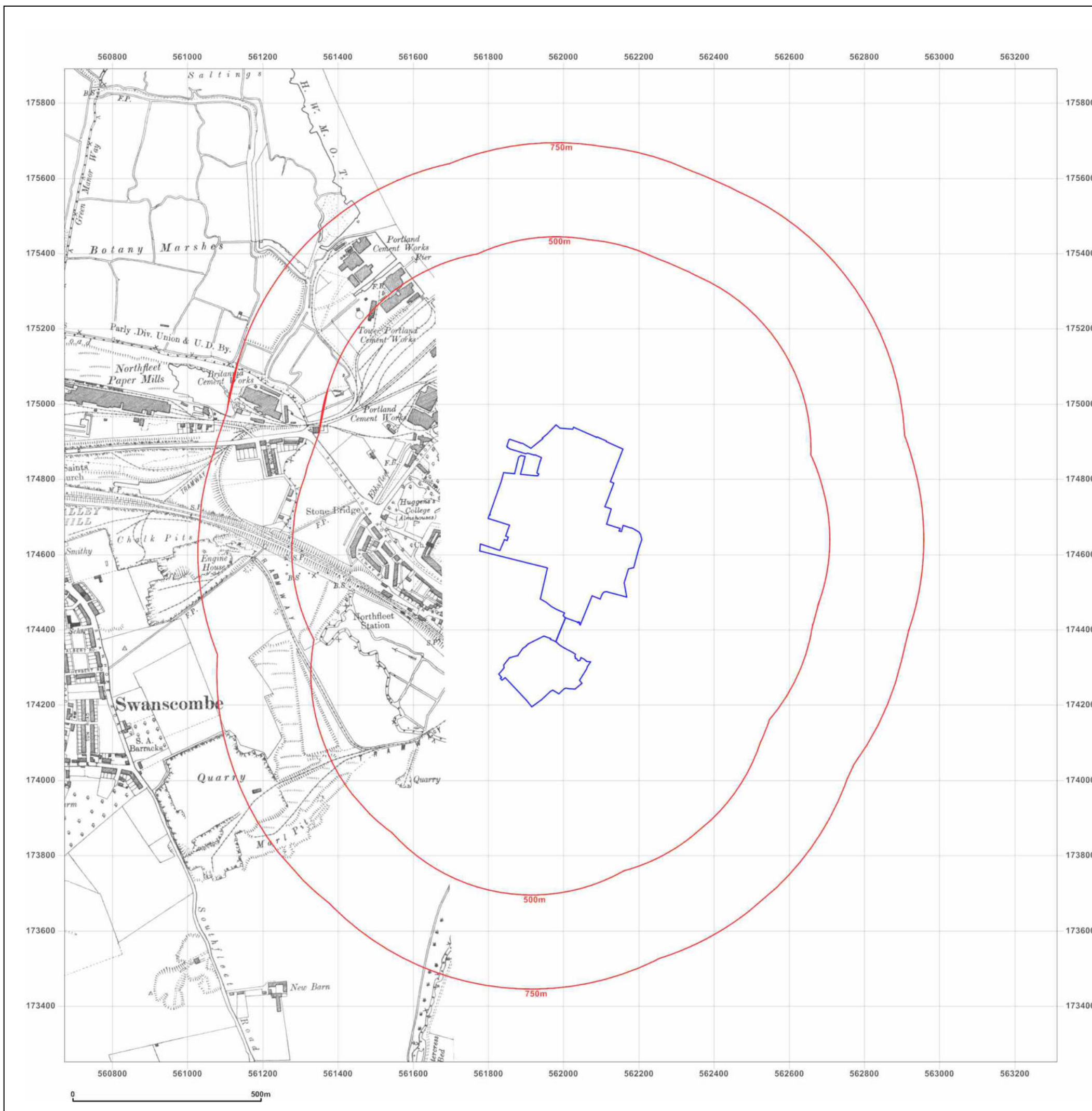


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1932

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1932
Edition N/A
Copyright N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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

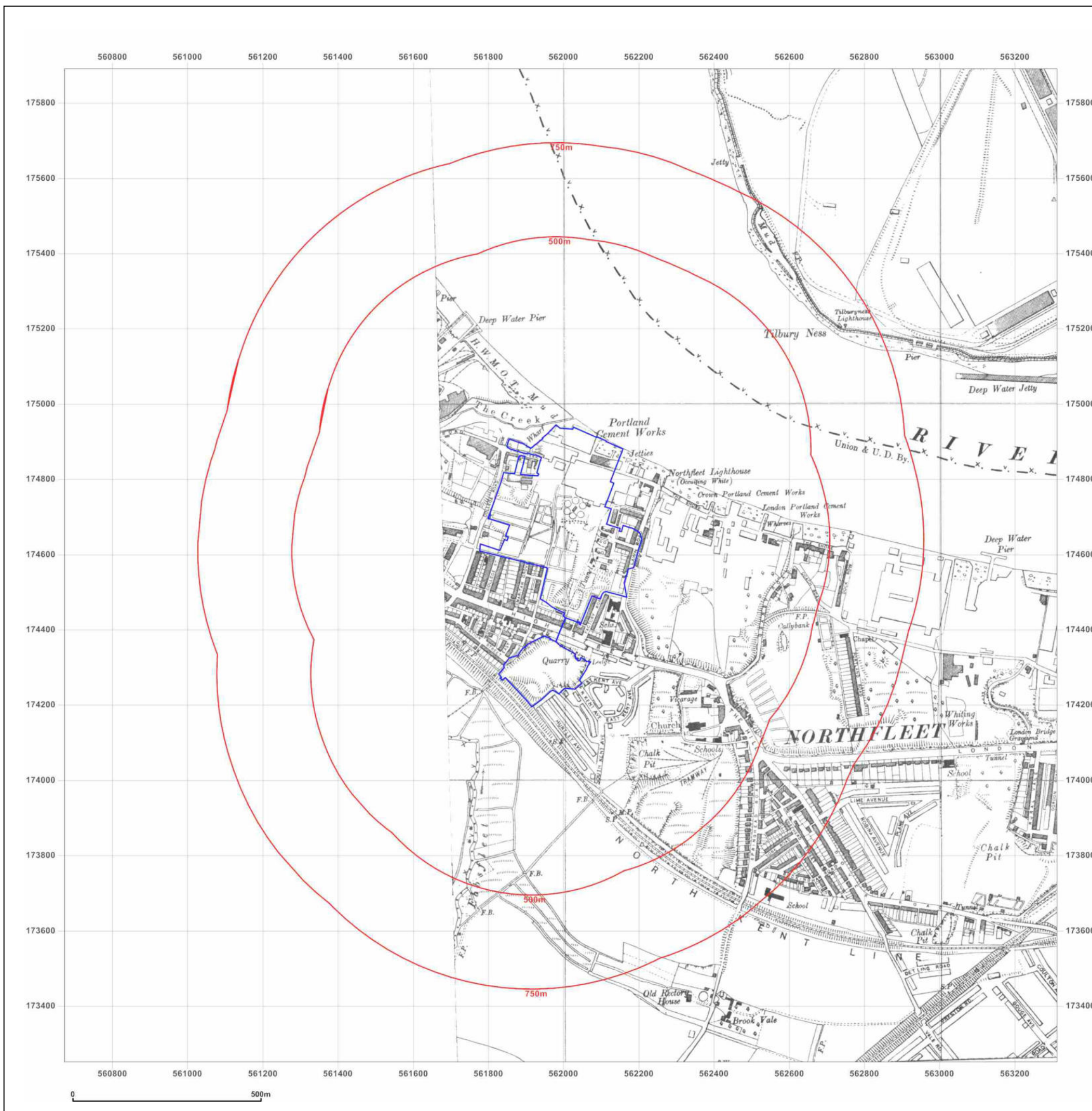


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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

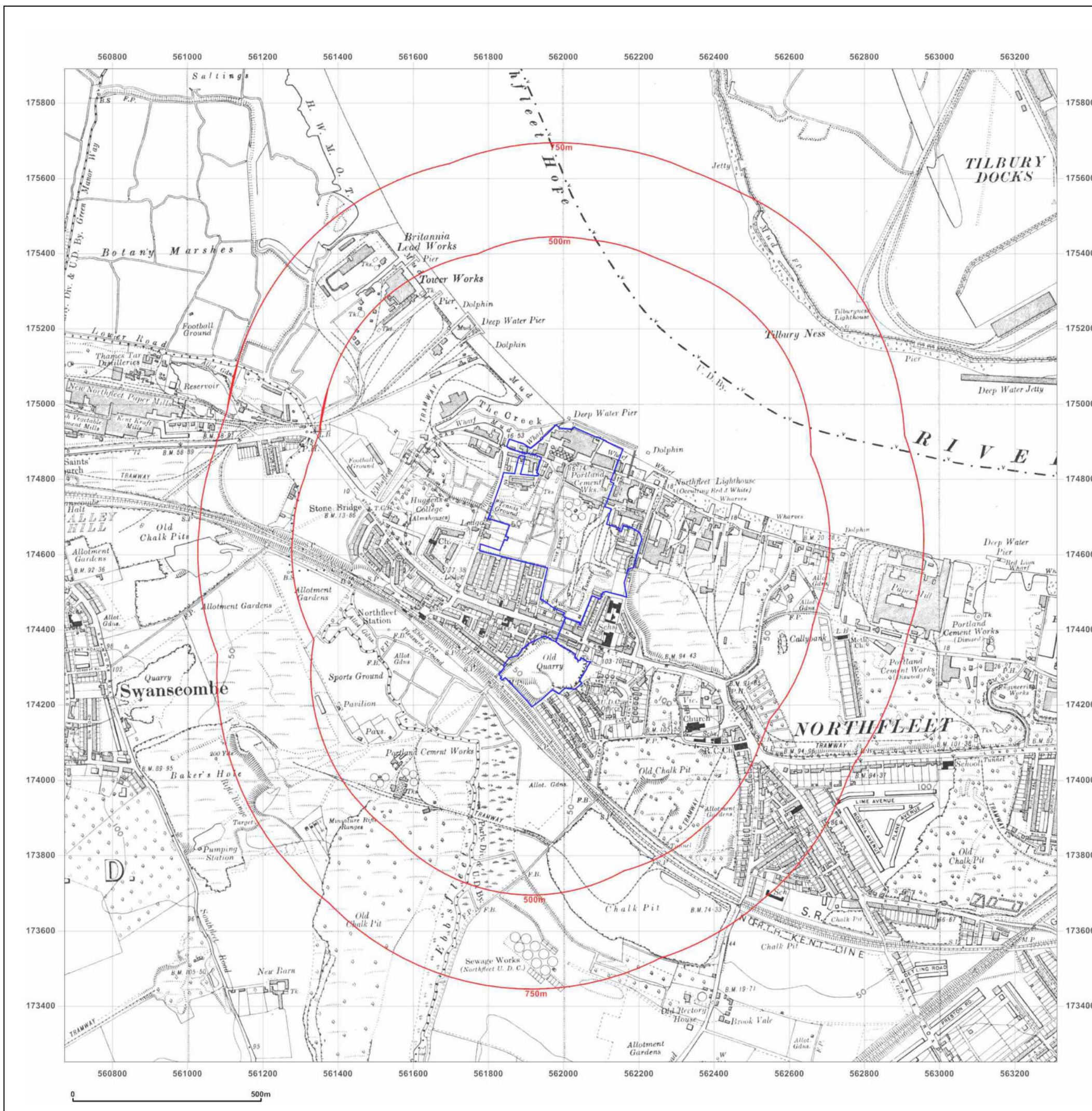


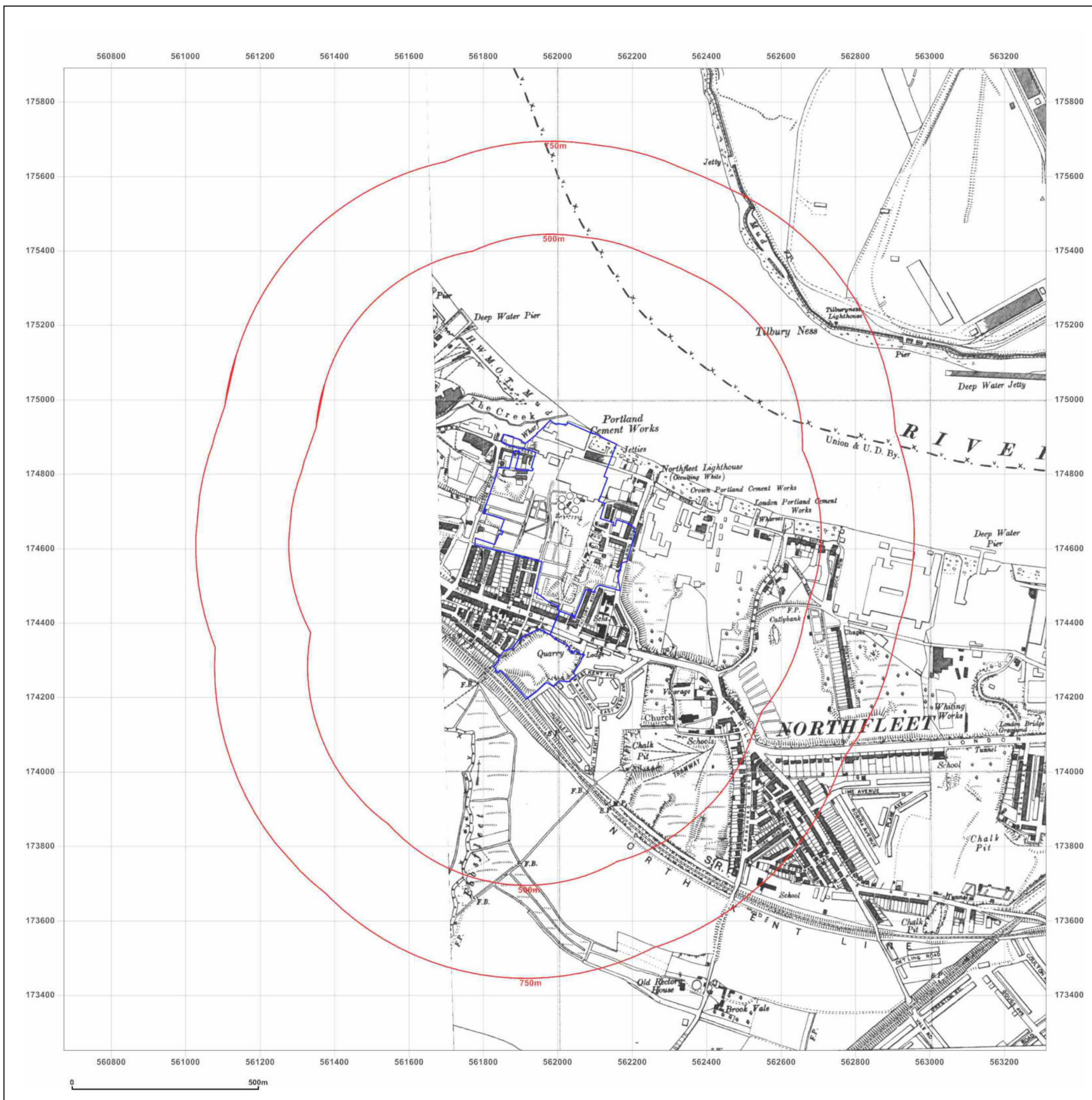
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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



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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: County Series

Map date: 1946

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1946
Edition N/A
Copyright N/A
Levelled N/A

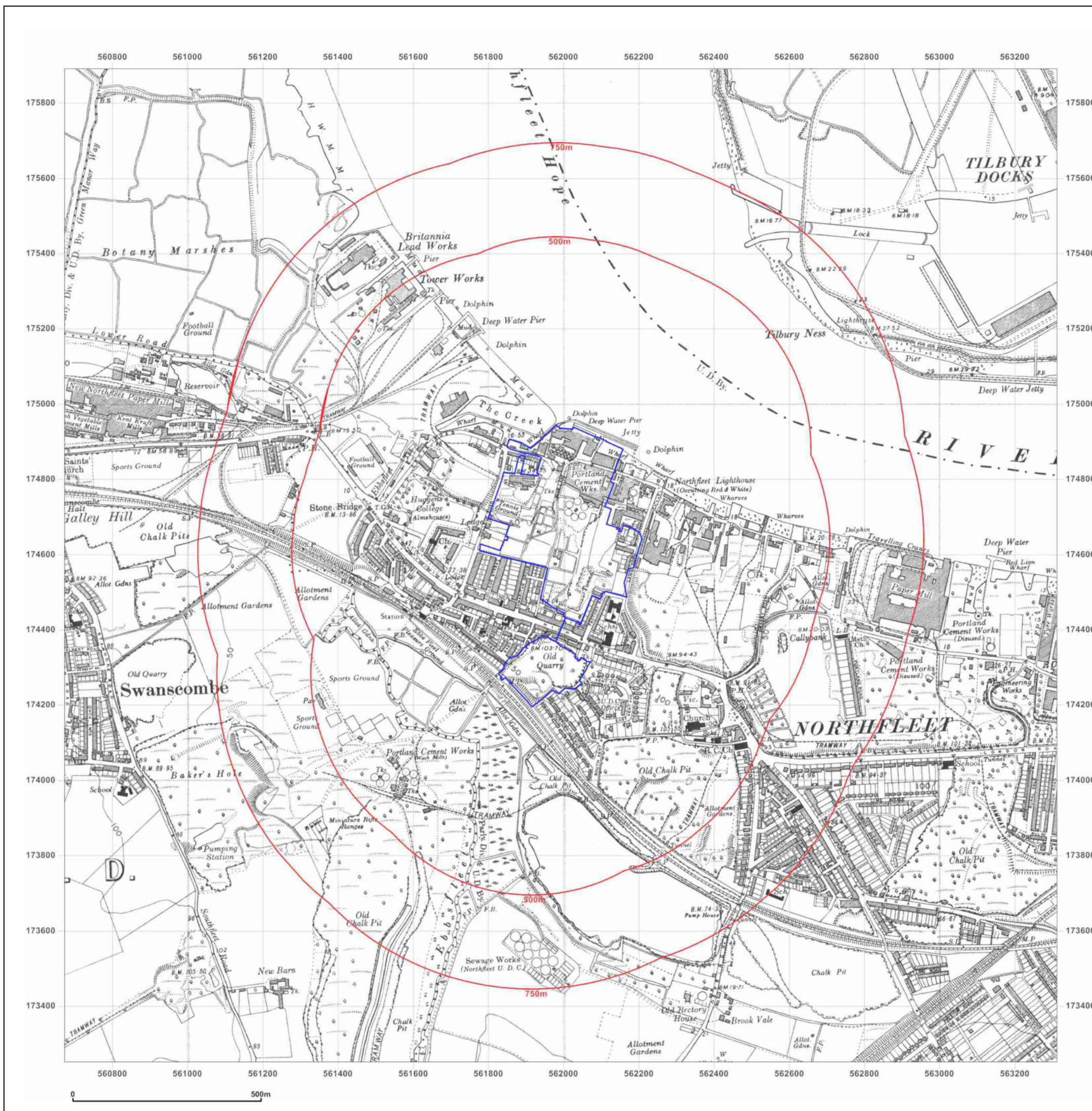


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: Provisional

Map date: 1955

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1864
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A

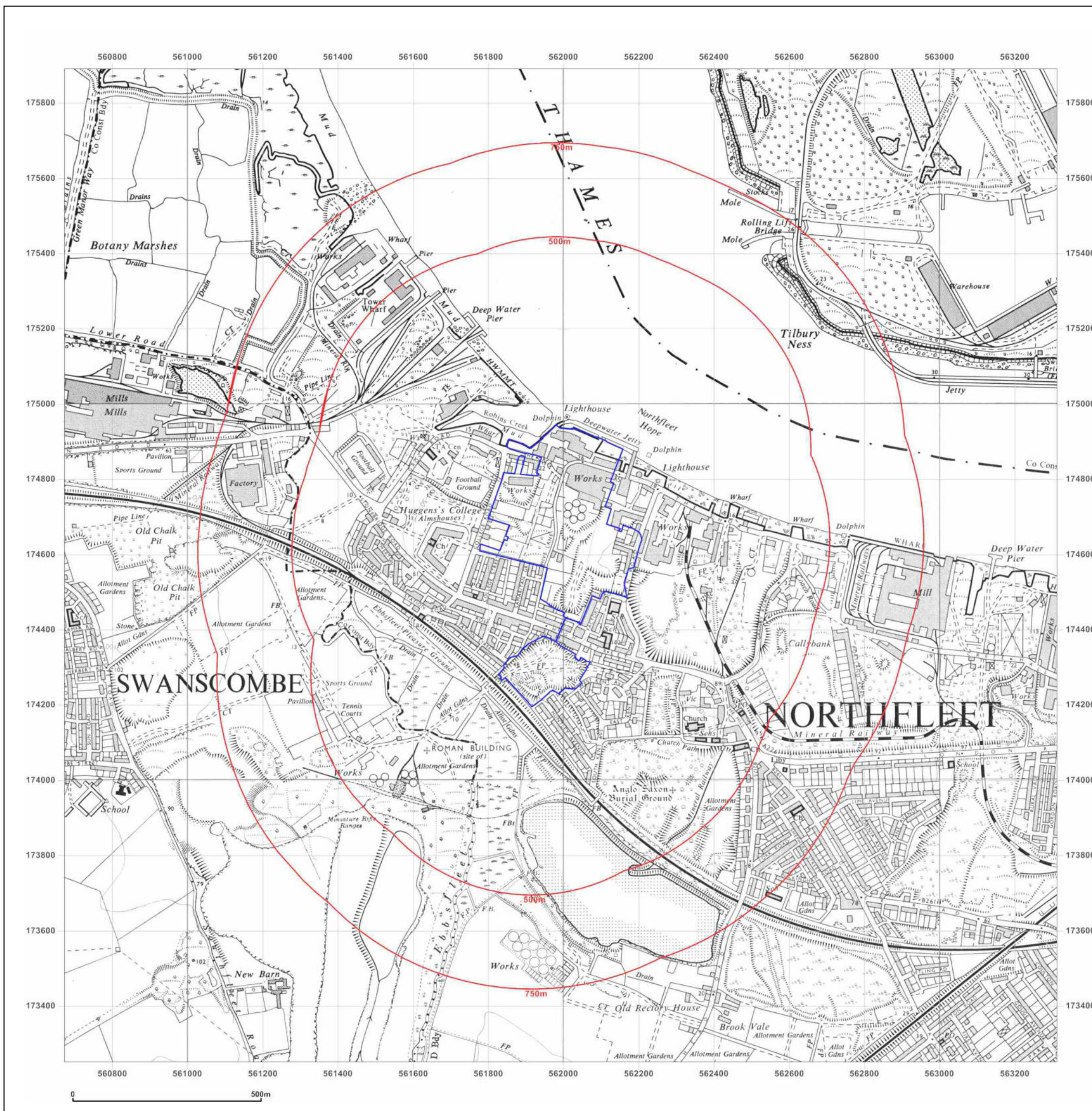


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: Provisional

Map date: 1966

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: National Grid

Map date: 1971-1973

Scale: 1:10,000

Printed at: 1:10,000



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

Surveyed 1971
Revised 1971
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: National Grid

Map date: 1977-1982

Scale: 1:10,000

Printed at: 1:10,000



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

Surveyed 1977
Revised 1977
Edition N/A
Copyright N/A
Levelled N/A

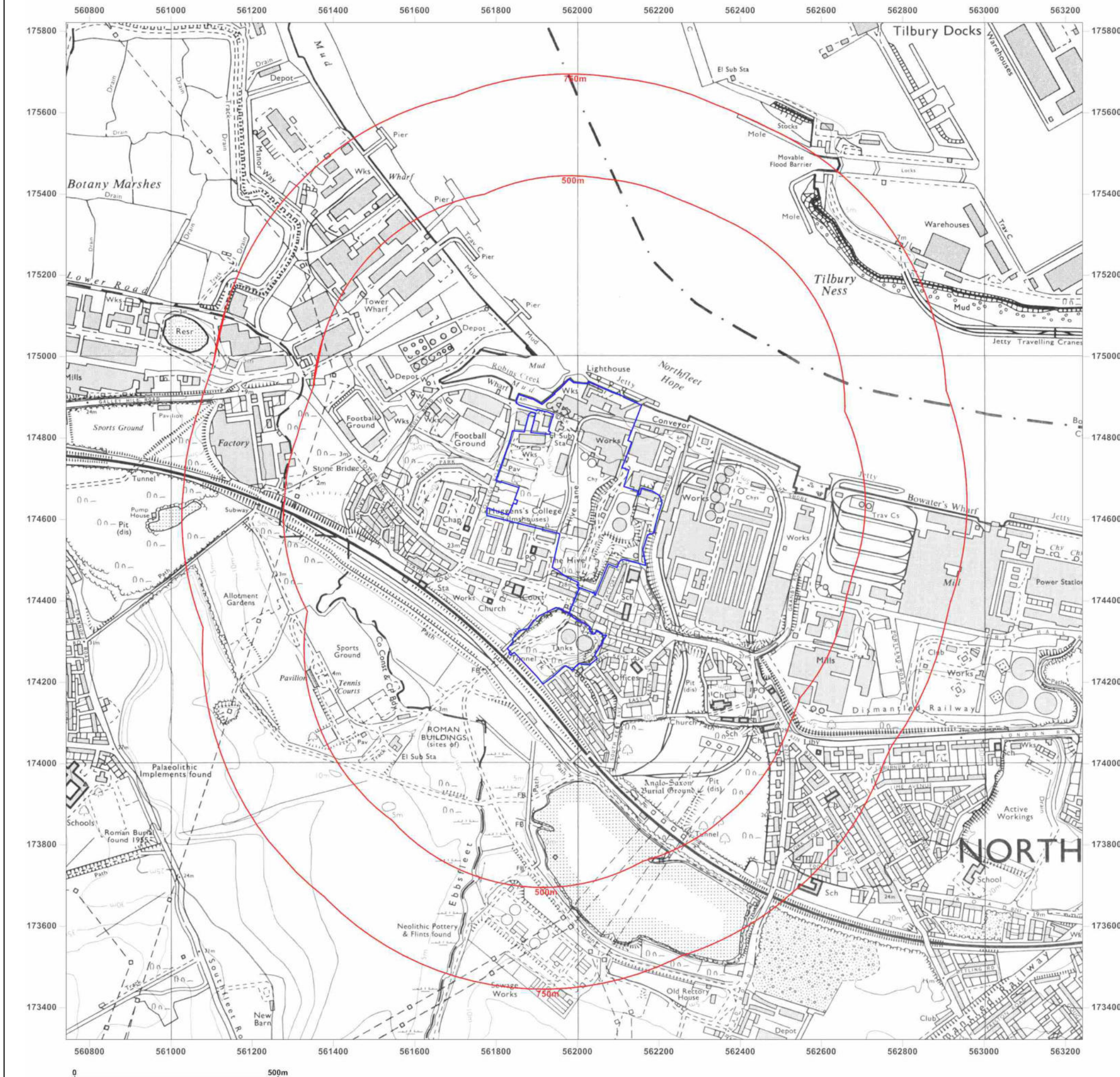


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: National Grid

Map date: 1990-1992

Scale: 1:10,000

Printed at: 1:10,000



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

Surveyed 1988
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A

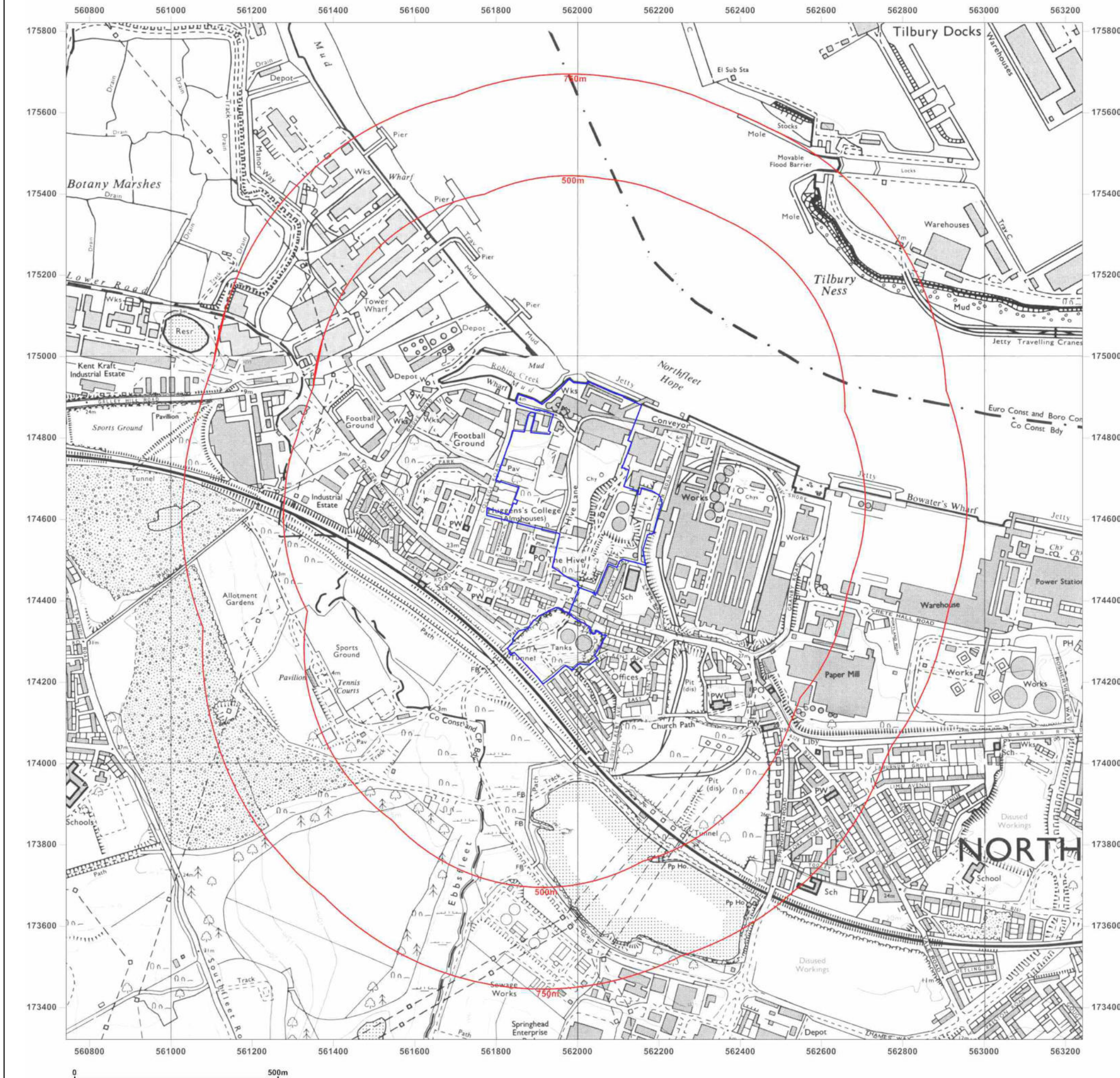


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: National Grid

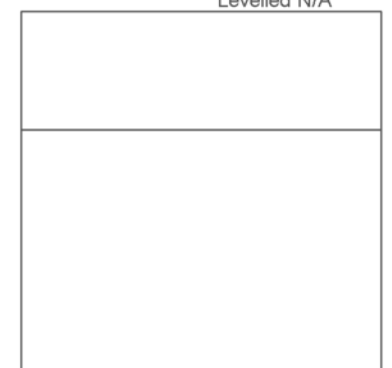
Map date: 1993

Scale: 1:10,000

Printed at: 1:10,000



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

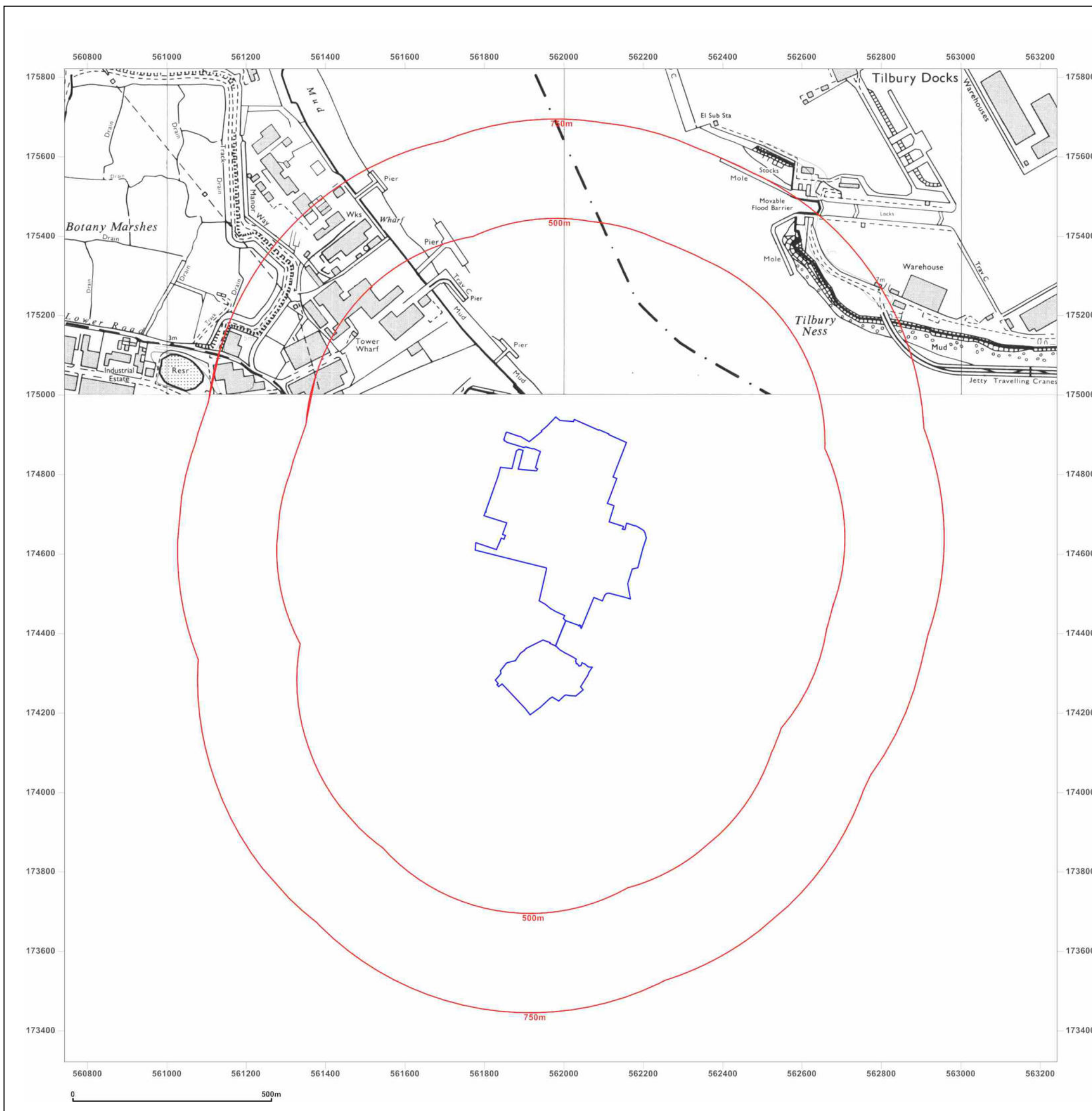


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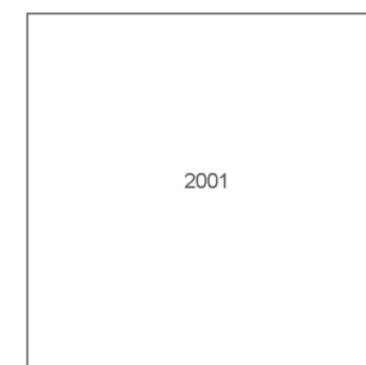
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Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000



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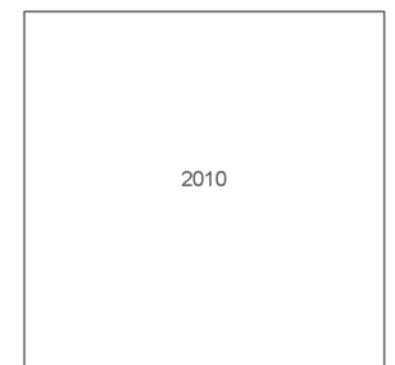
Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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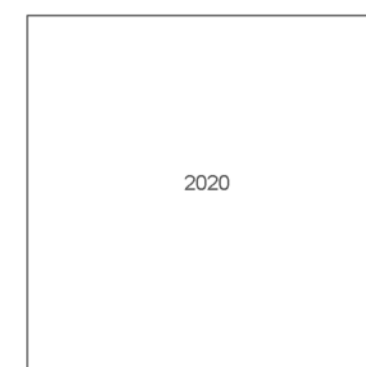
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Report Ref: HMD-154-6803395
Grid Ref: 561992, 174570

Map Name: National Grid

Map date: 2020

Scale: 1:10,000

Printed at: 1:10,000

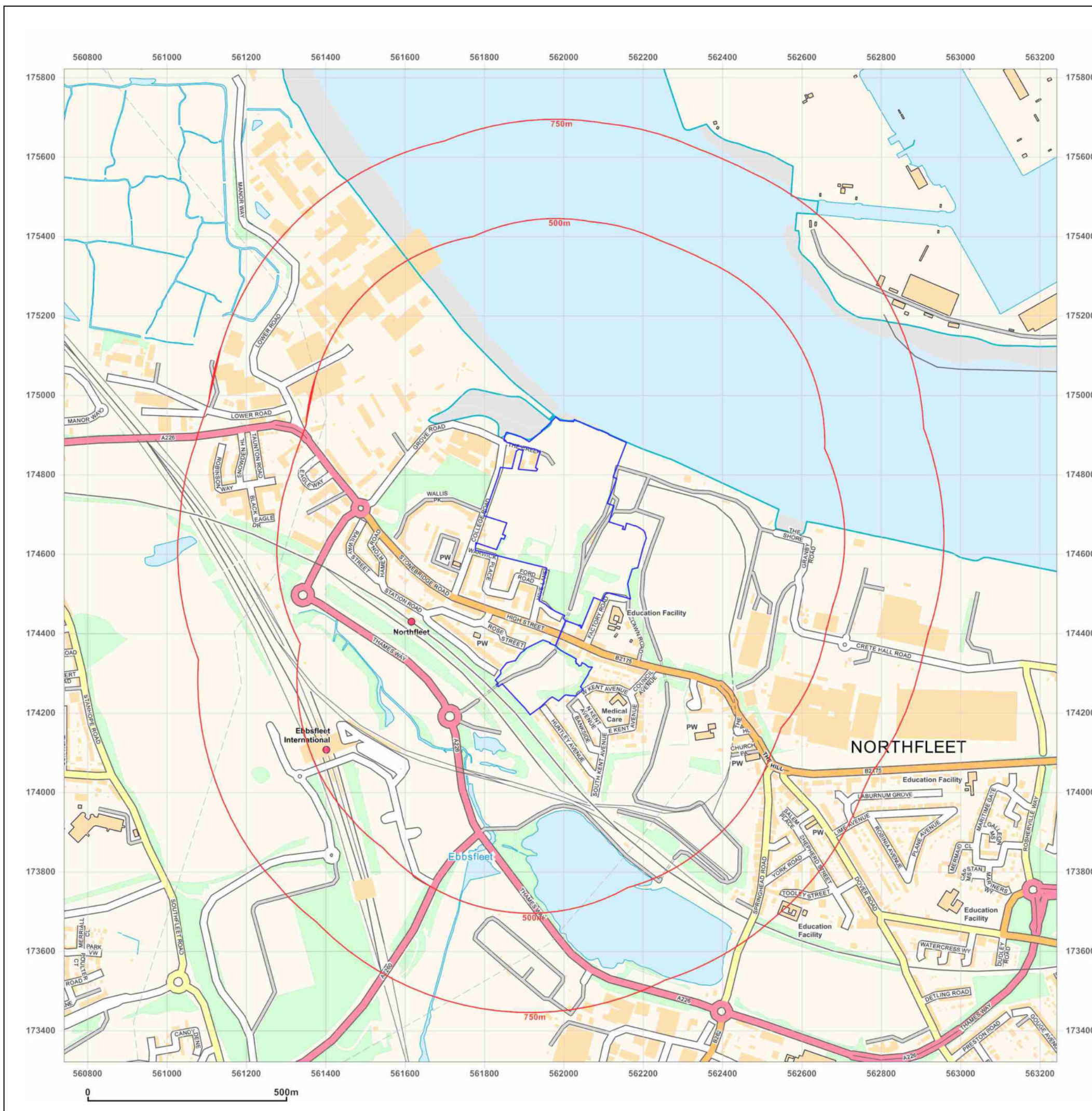


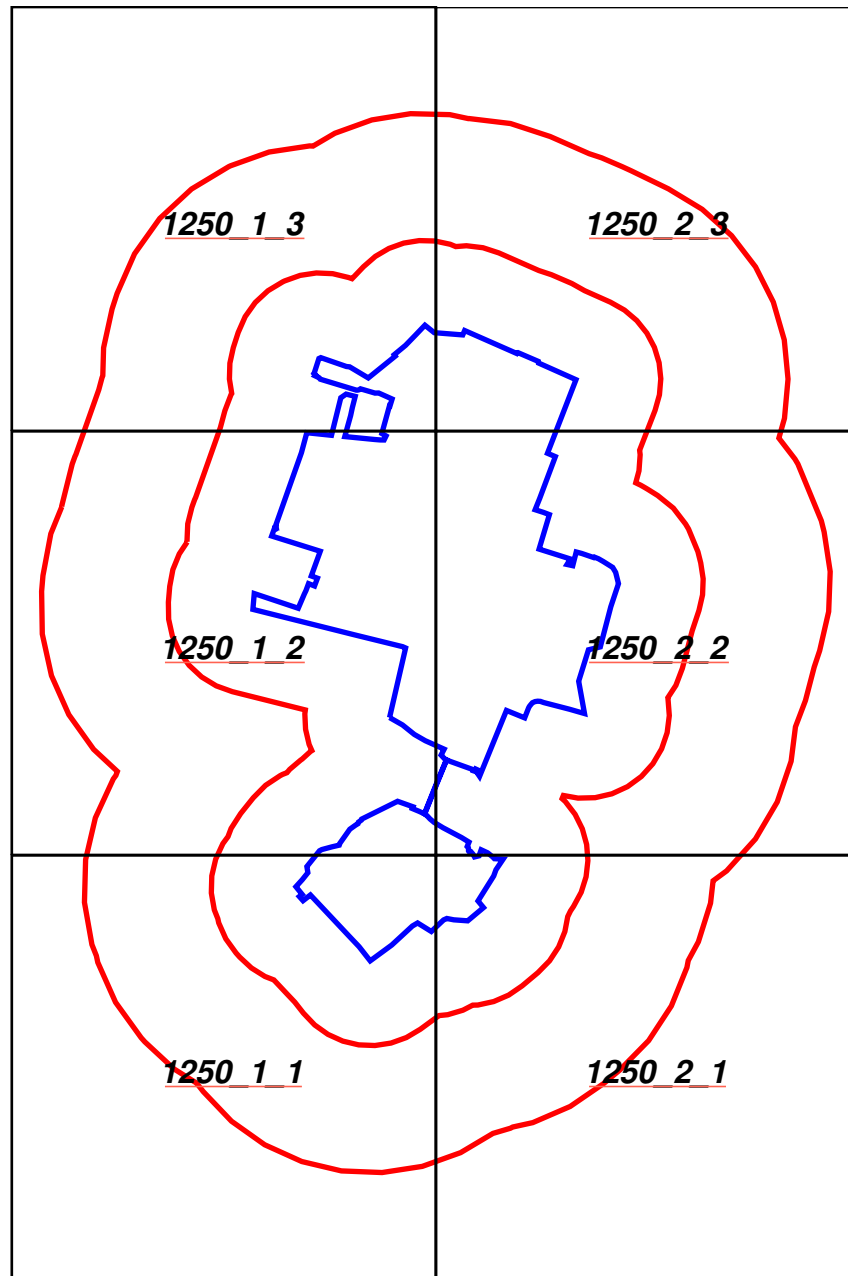
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_1
Grid Ref: 561741, 174069

Map Name: National Grid

Map date: 1952

Scale: 1:1,250

Printed at: 1:2,000



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

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

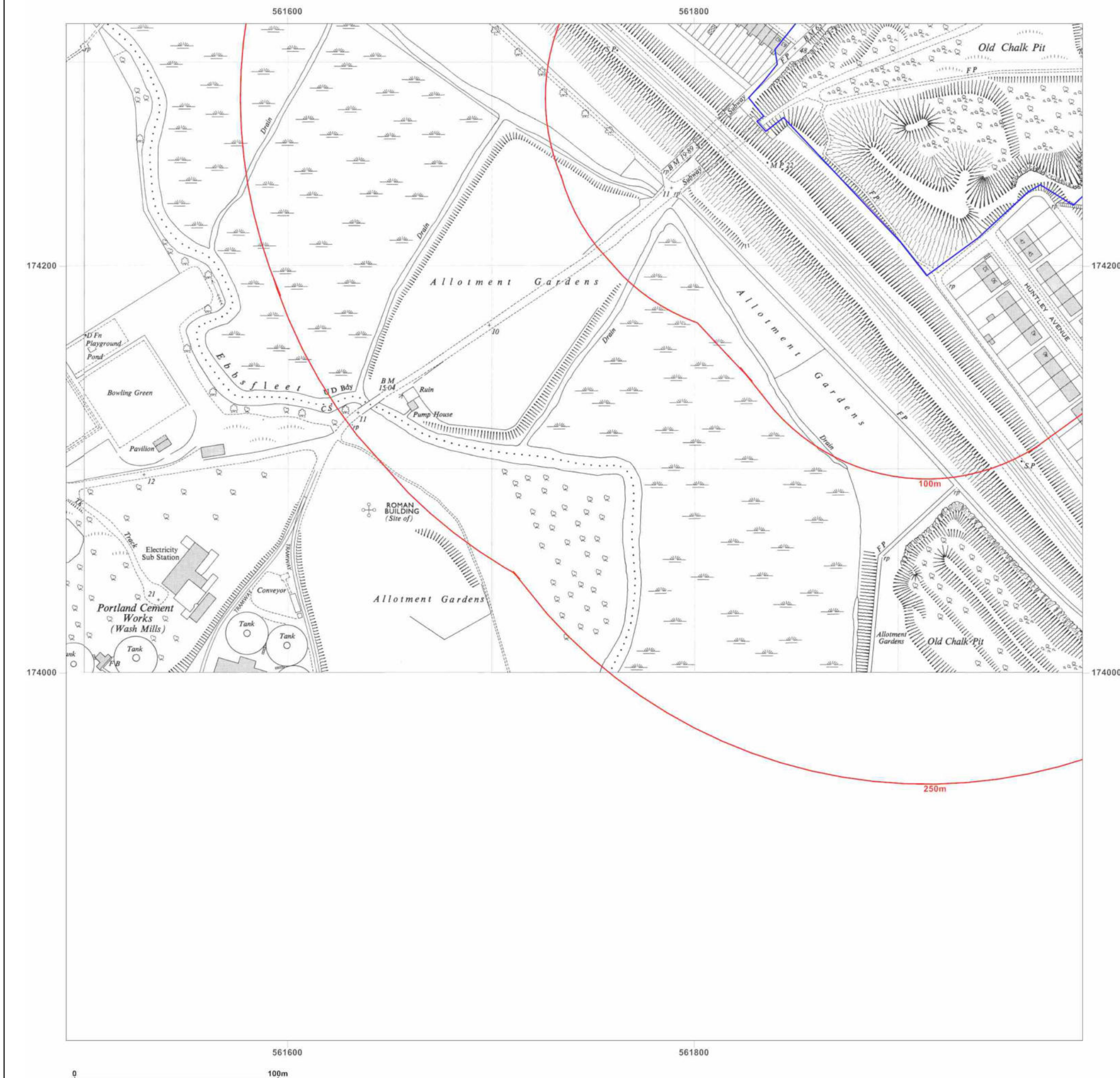


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Production date: 19 June 2020

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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_1
Grid Ref: 561741, 174069

Map Name: National Grid

Map date: 1953

Scale: 1:1,250

Printed at: 1:2,000



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

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

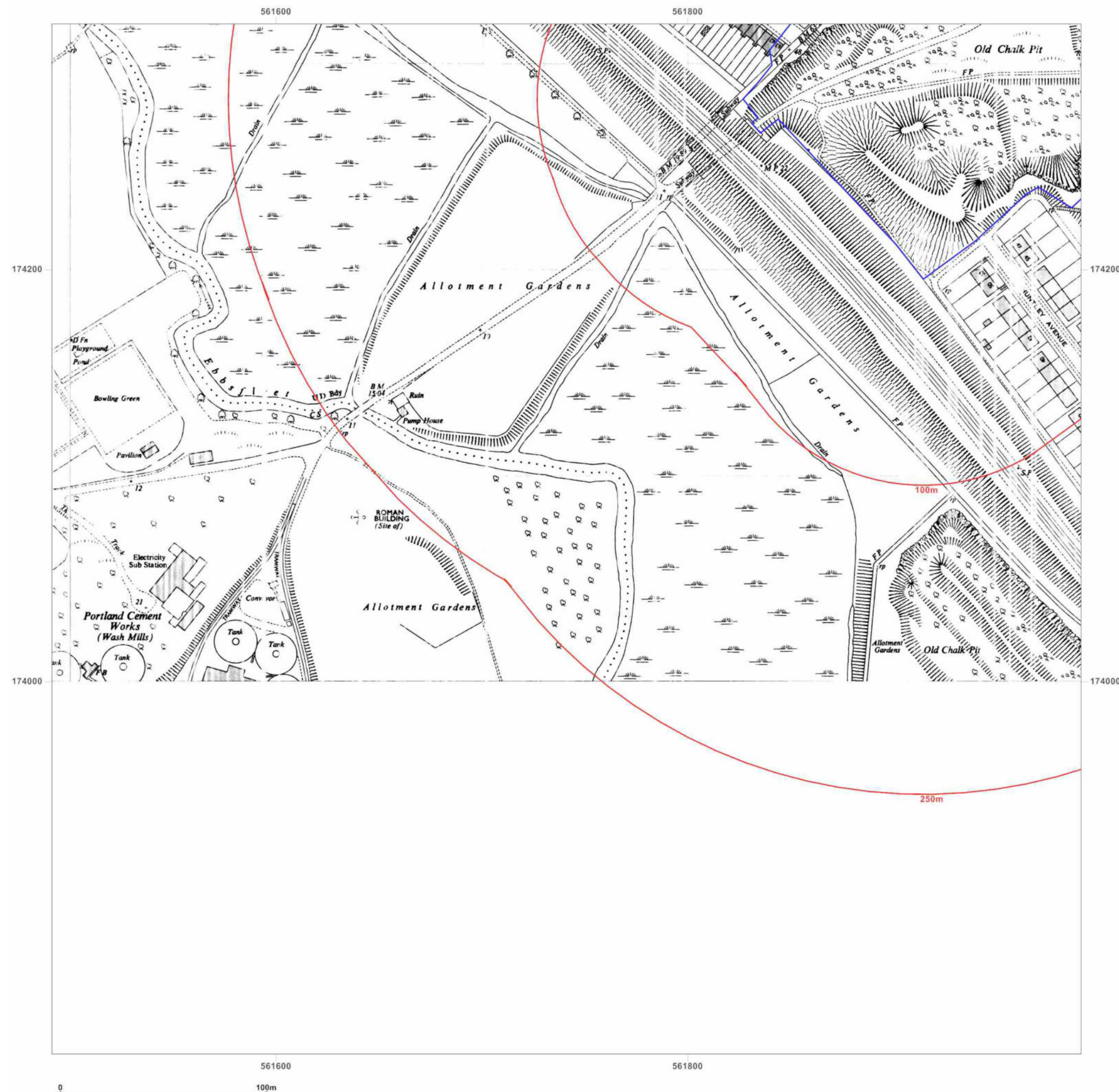


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Site Details:

NORTHFLEET WORKS, THE
SHORE, NORTHFLEET,
GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_1
Grid Ref: 561741, 174069

Map Name: National Grid

Map date: 1970-1972

Scale: 1:1,250

Printed at: 1:2,000



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

Surveyed 1952
Revised 1970
Edition N/A
Copyright 1970
Levelled 1956

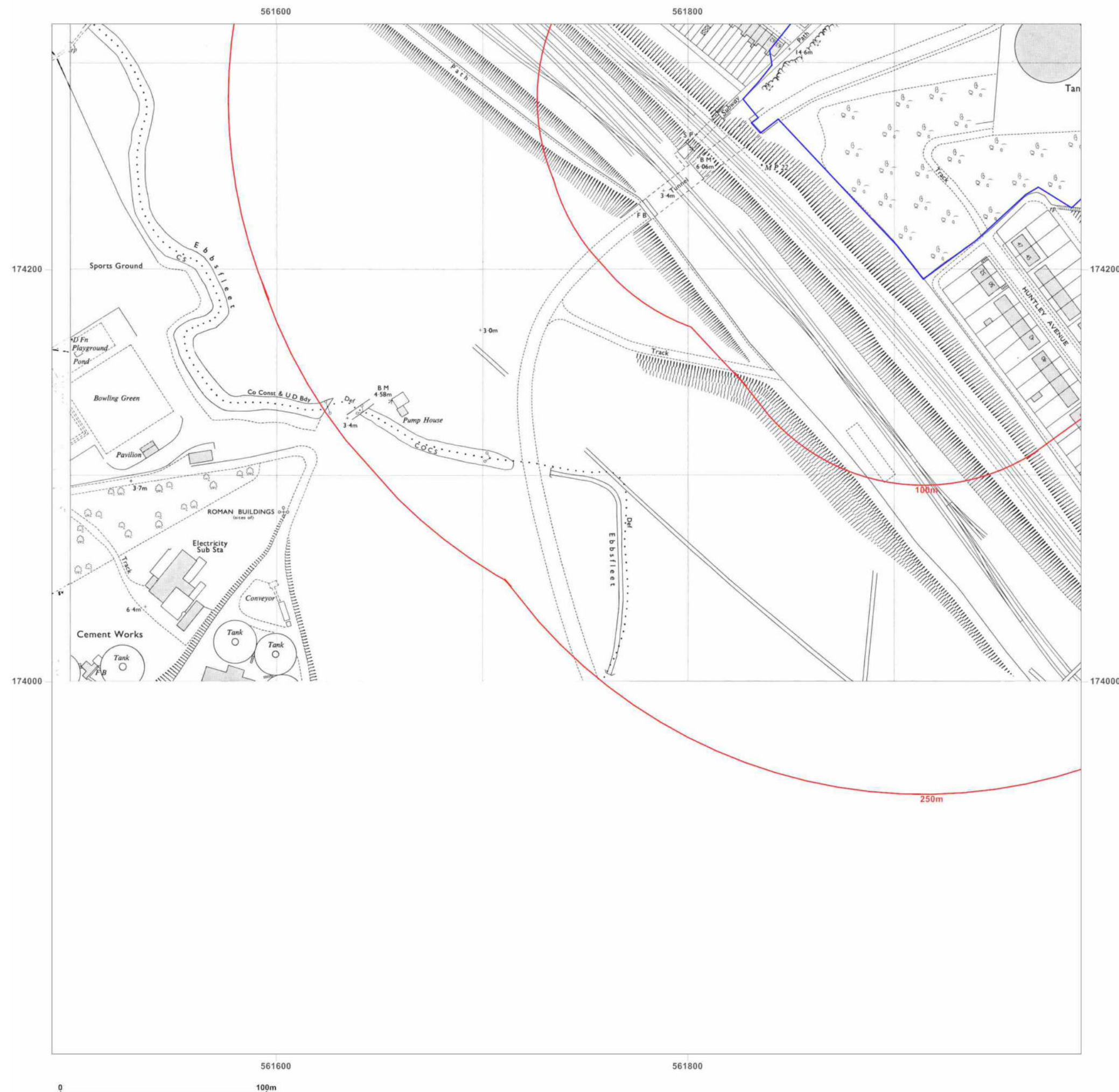


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Site Details:

NORTHFLEET WORKS, THE
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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_1
Grid Ref: 561741, 174069

Map Name: National Grid

Map date: 1973-1978

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952
Revised 1973
Edition N/A
Copyright 1973
Levelled 1952

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1978
Levelled 1956

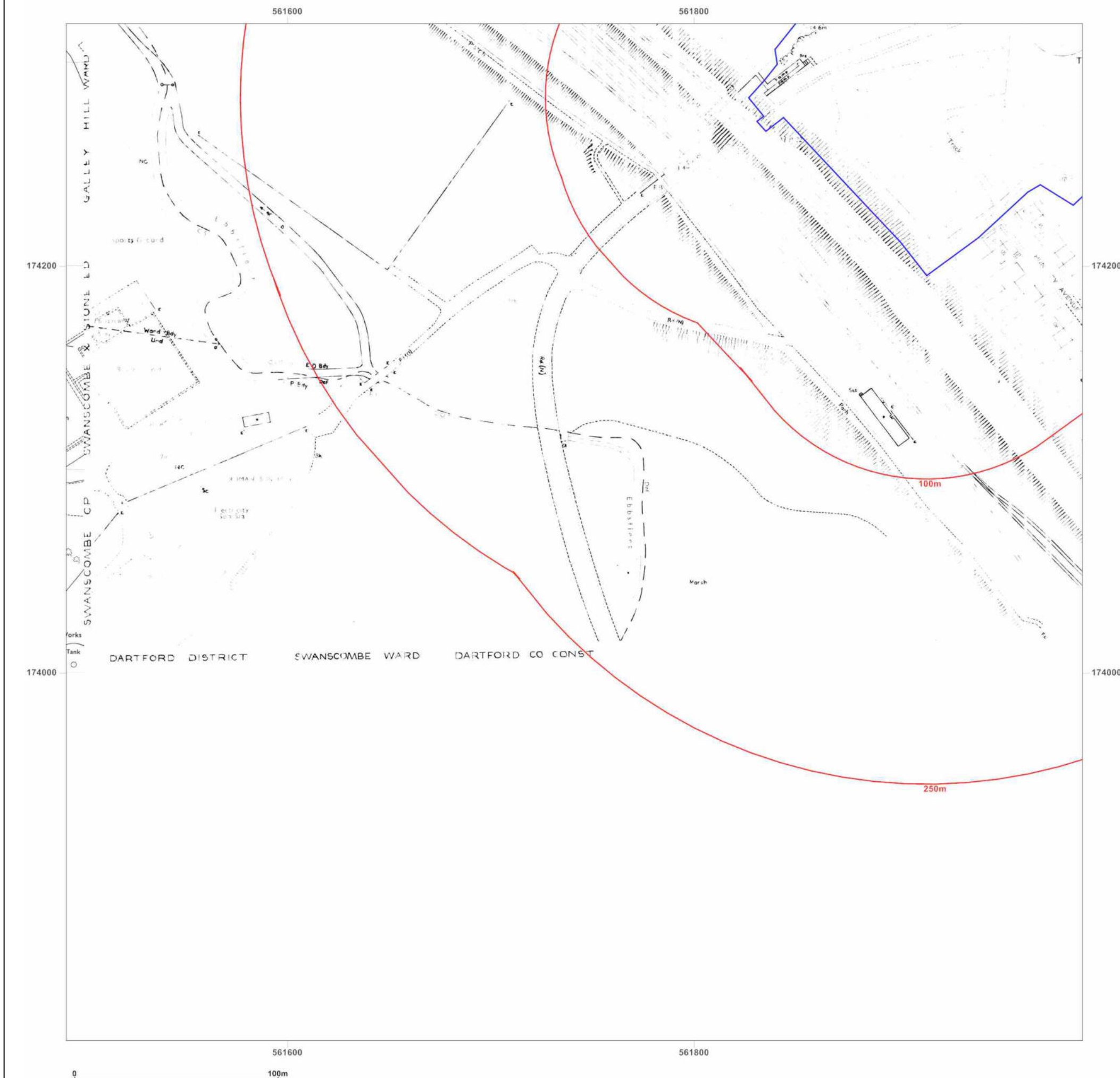


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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_1
Grid Ref: 561741, 174069

Map Name: National Grid

Map date: 1979

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1956
Revised 1979
Edition N/A
Copyright 1979
Levelled 1956

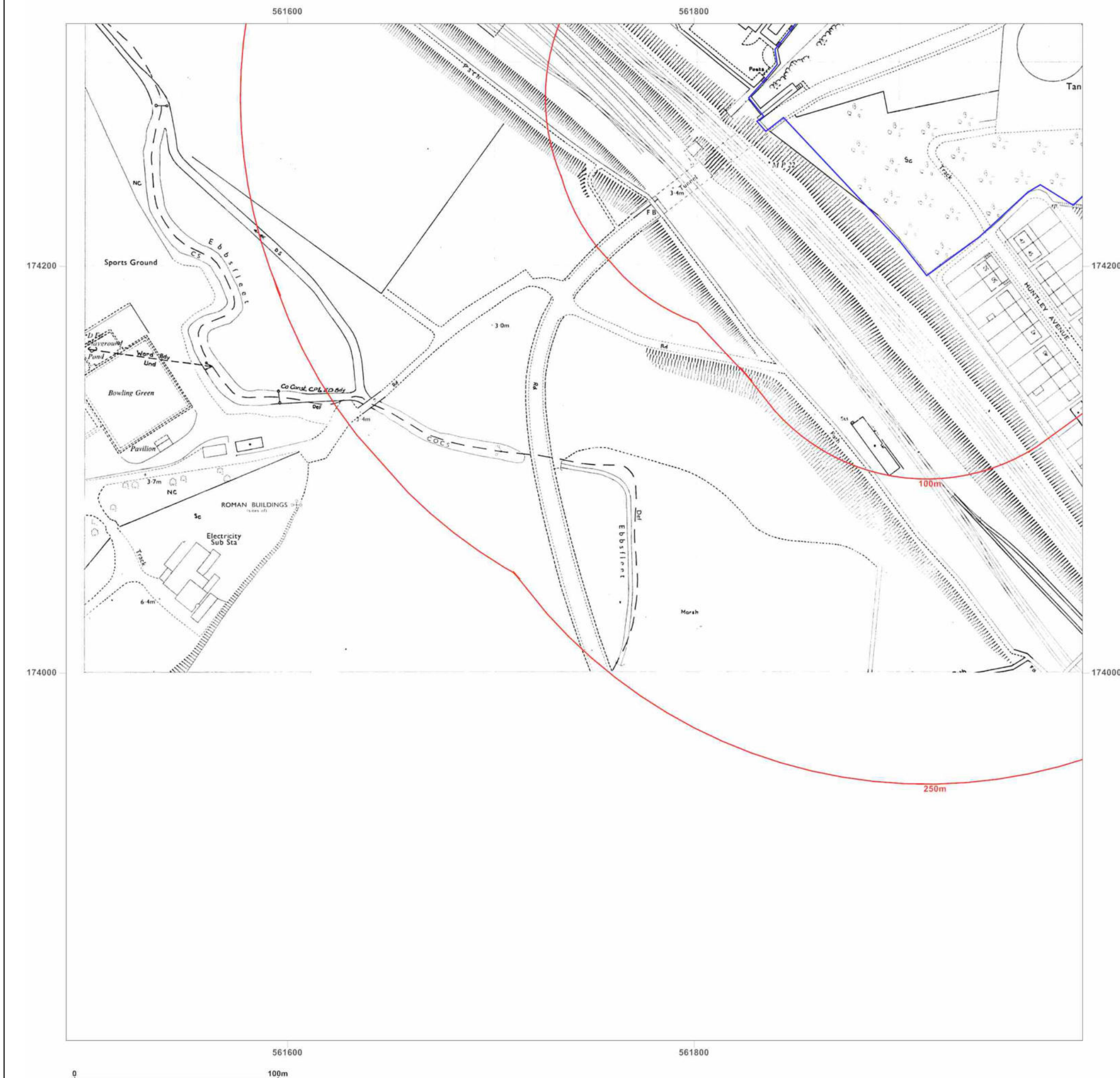


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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_1
Grid Ref: 561741, 174069

Map Name: National Grid

Map date: 1986

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1986
Levelled 1982

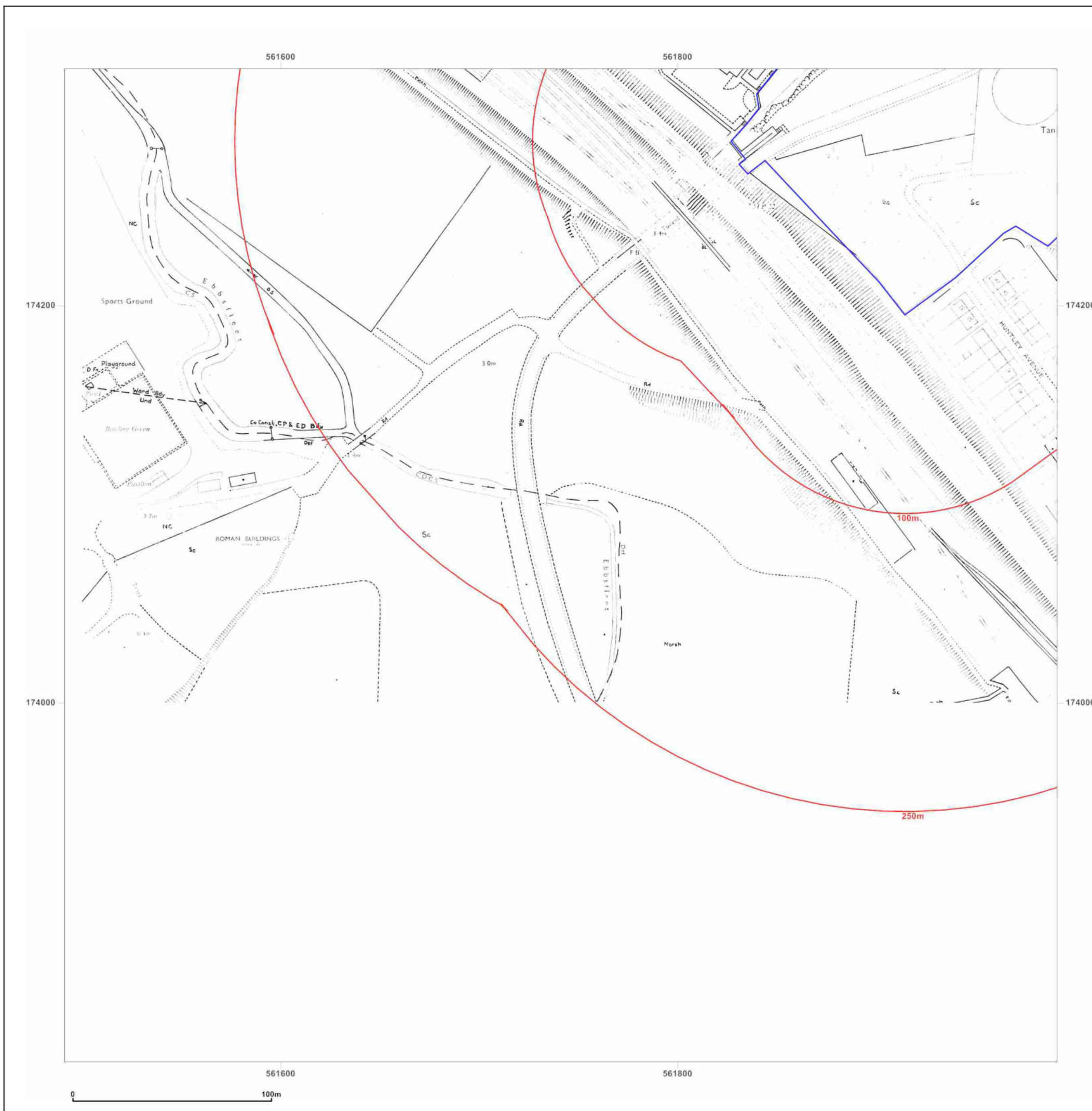


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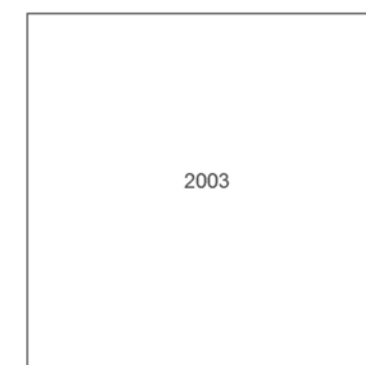
Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_1
Grid Ref: 561741, 174069

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250

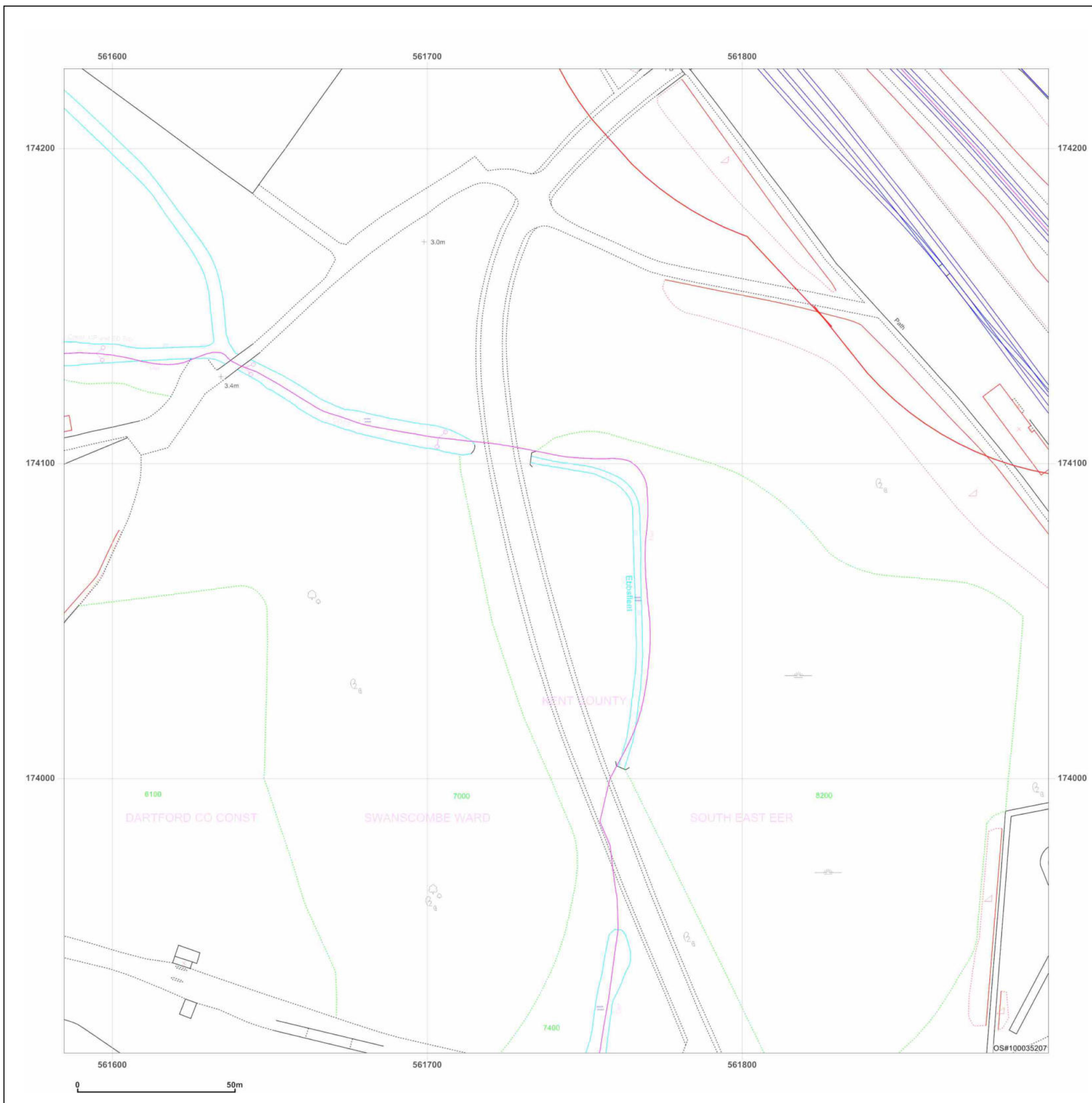


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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_2
Grid Ref: 561741, 174569

Map Name: National Grid

Map date: 1952

Scale: 1:1,250

Printed at: 1:2,000



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

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

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_2
Grid Ref: 561741, 174569

Map Name: National Grid

Map date: 1953

Scale: 1:1,250

Printed at: 1:2,000



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

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

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Site Details:

NORTHFLEET WORKS, THE SHORE, NORTHFLEET, GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_2
Grid Ref: 561741, 174569

Map Name: National Grid

Map date: 1970-1972

Scale: 1:1,250

Printed at: 1:2,000



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

Surveyed 1952
 Revised 1970
 Edition N/A
 Copyright 1970
 Levelled 1956

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

Surveyed 1952
 Revised 1970
 Edition N/A
 Copyright 1970
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Site Details:

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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_2
Grid Ref: 561741, 174569

Map Name: National Grid

Map date: 1973-1978

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952
 Revised 1973
 Edition N/A
 Copyright 1973
 Levelled 1956

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1977
 Levelled N/A

Surveyed 1952
 Revised 1973
 Edition N/A
 Copyright 1973
 Levelled 1952

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1978
 Levelled 1956

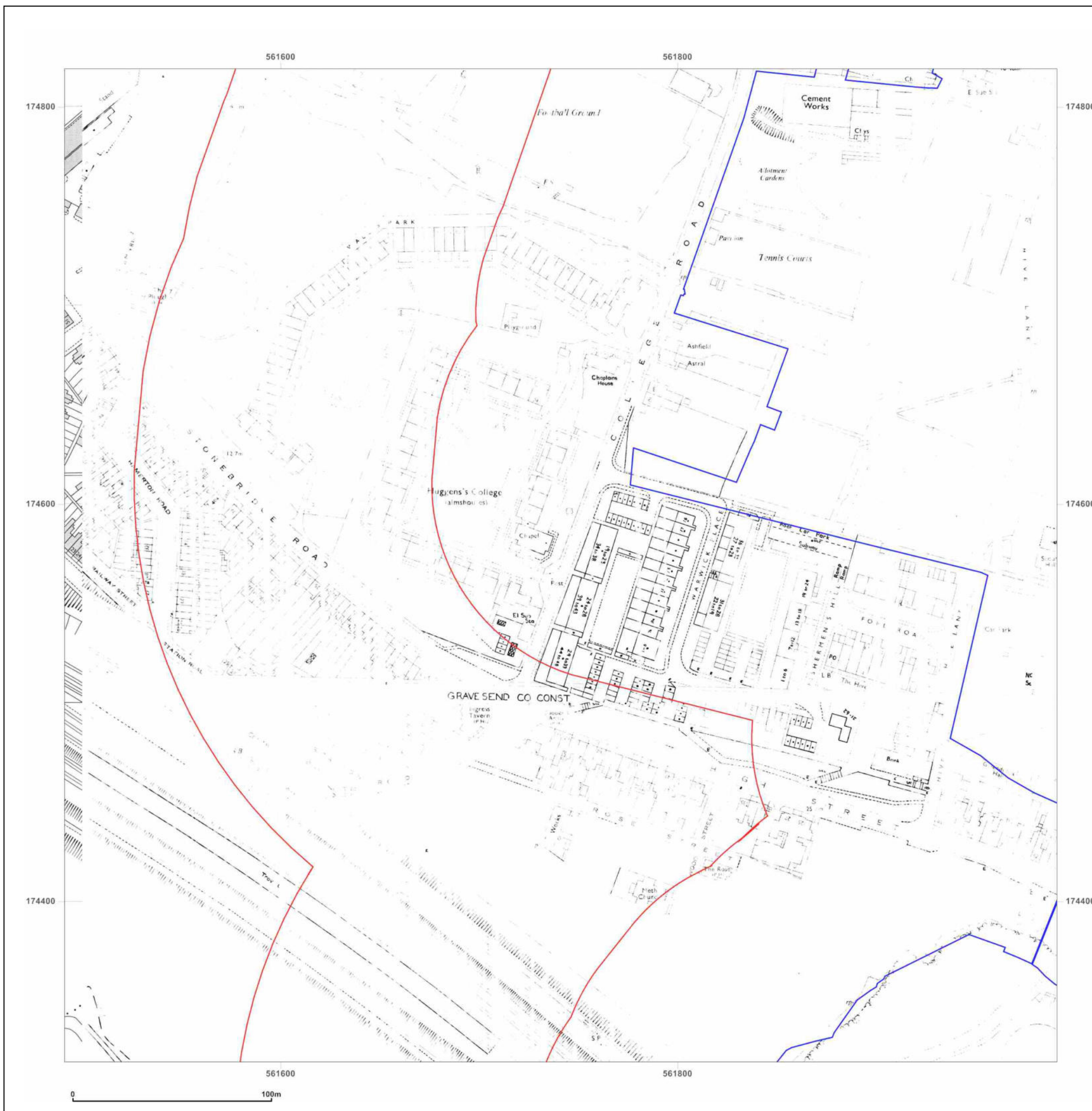


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_2
Grid Ref: 561741, 174569

Map Name: National Grid

Map date: 1986-1991

Scale: 1:1,250

Printed at: 1:2,000



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

Surveyed N/A
 Revised 1991
 Edition N/A
 Copyright 1991
 Levelled 1983

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1986
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_2
Grid Ref: 561741, 174569

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_3
Grid Ref: 561741, 175069

Map Name: National Grid

Map date: 1953

Scale: 1:1,250

Printed at: 1:2,000



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

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

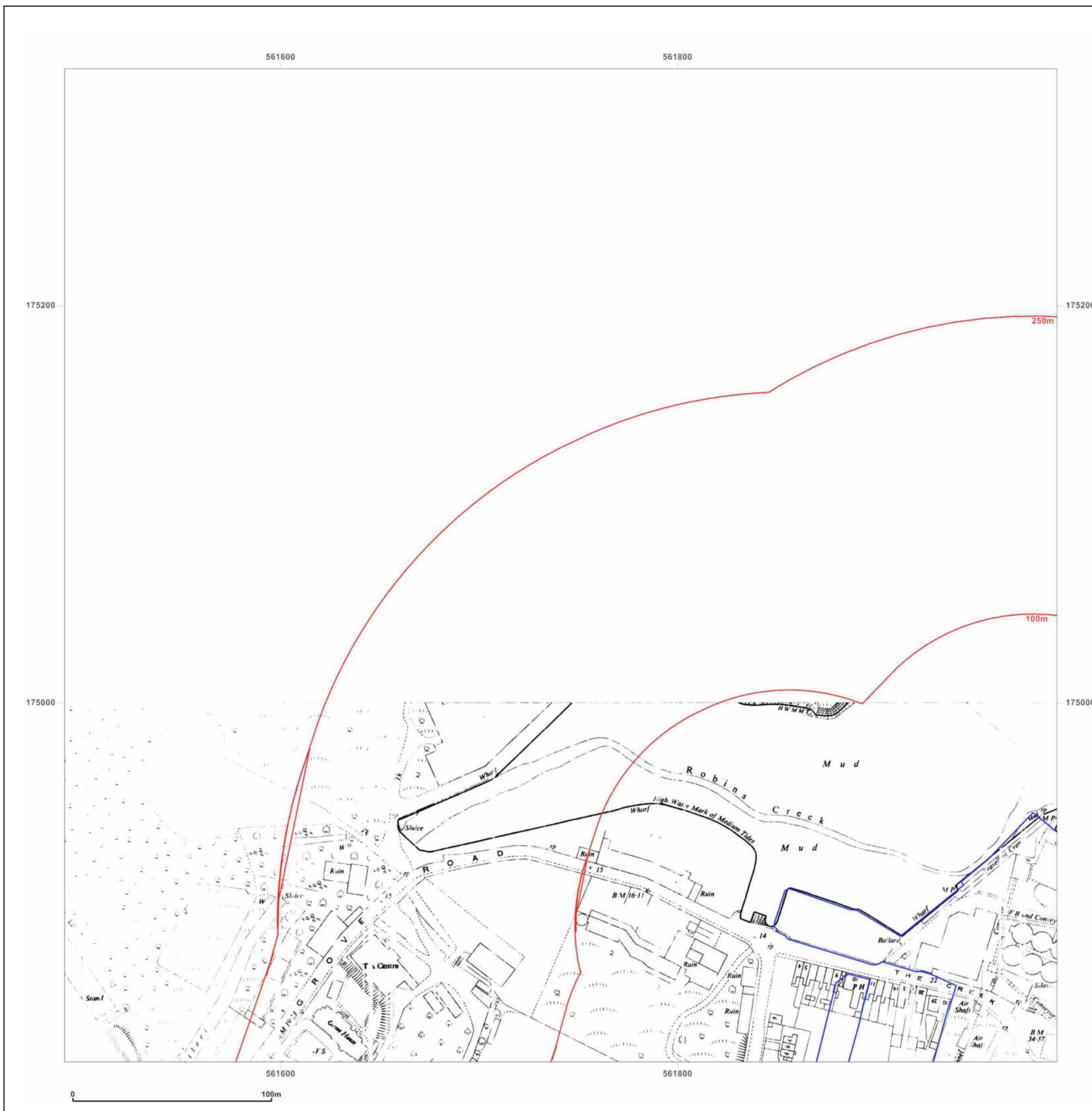


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_3
Grid Ref: 561741, 175069

Map Name: National Grid

Map date: 1973-1977

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952
Revised 1973
Edition N/A
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Surveyed N/A
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Copyright 1977
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_1_3
Grid Ref: 561741, 175069

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

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2003



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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_1
Grid Ref: 562241, 174069

Map Name: National Grid

Map date: 1952

Scale: 1:1,250

Printed at: 1:2,000



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

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

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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_1
Grid Ref: 562241, 174069

Map Name: National Grid

Map date: 1953

Scale: 1:1,250

Printed at: 1:2,000



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

Surveyed N/A
Revised N/A
Edition N/A
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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_1
Grid Ref: 562241, 174069

Map Name: National Grid

Map date: 1970-1972

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952
Revised 1970
Edition N/A
Copyright 1970
Levelled 1956

Surveyed 1952
Revised 1972
Edition N/A
Copyright 1972
Levelled 1956

Surveyed 1952
Revised 1971
Edition N/A
Copyright 1972
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_1
Grid Ref: 562241, 174069

Map Name: National Grid

Map date: 1978-1980

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1978
Levelled 1956

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1980
Levelled 1956

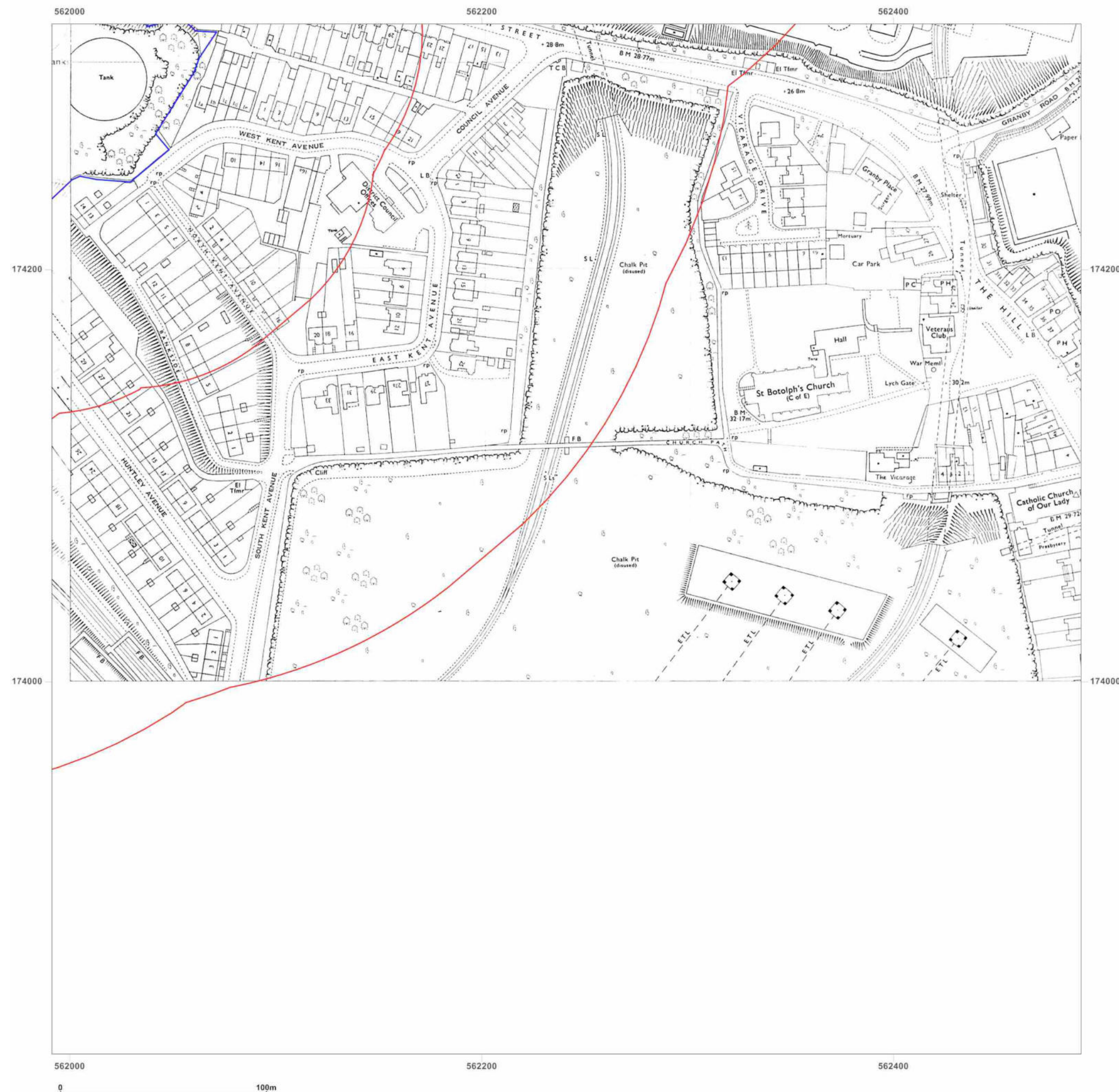


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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_1
Grid Ref: 562241, 174069

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

Printed at: 1:2,000



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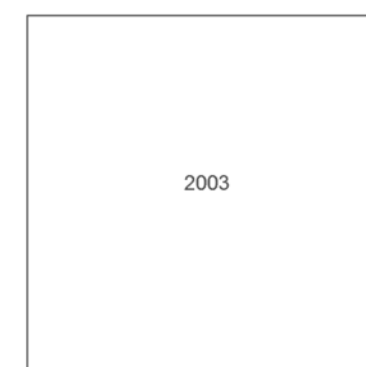
Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_1
Grid Ref: 562241, 174069

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_2
Grid Ref: 562241, 174569

Map Name: National Grid

Map date: 1952

Scale: 1:1,250

Printed at: 1:2,000



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

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

Surveyed 1952
Revised 1952
Edition N/A
Copyright N/A
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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_2
Grid Ref: 562241, 174569

Map Name: National Grid

Map date: 1953

Scale: 1:1,250

Printed at: 1:2,000



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

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

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

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

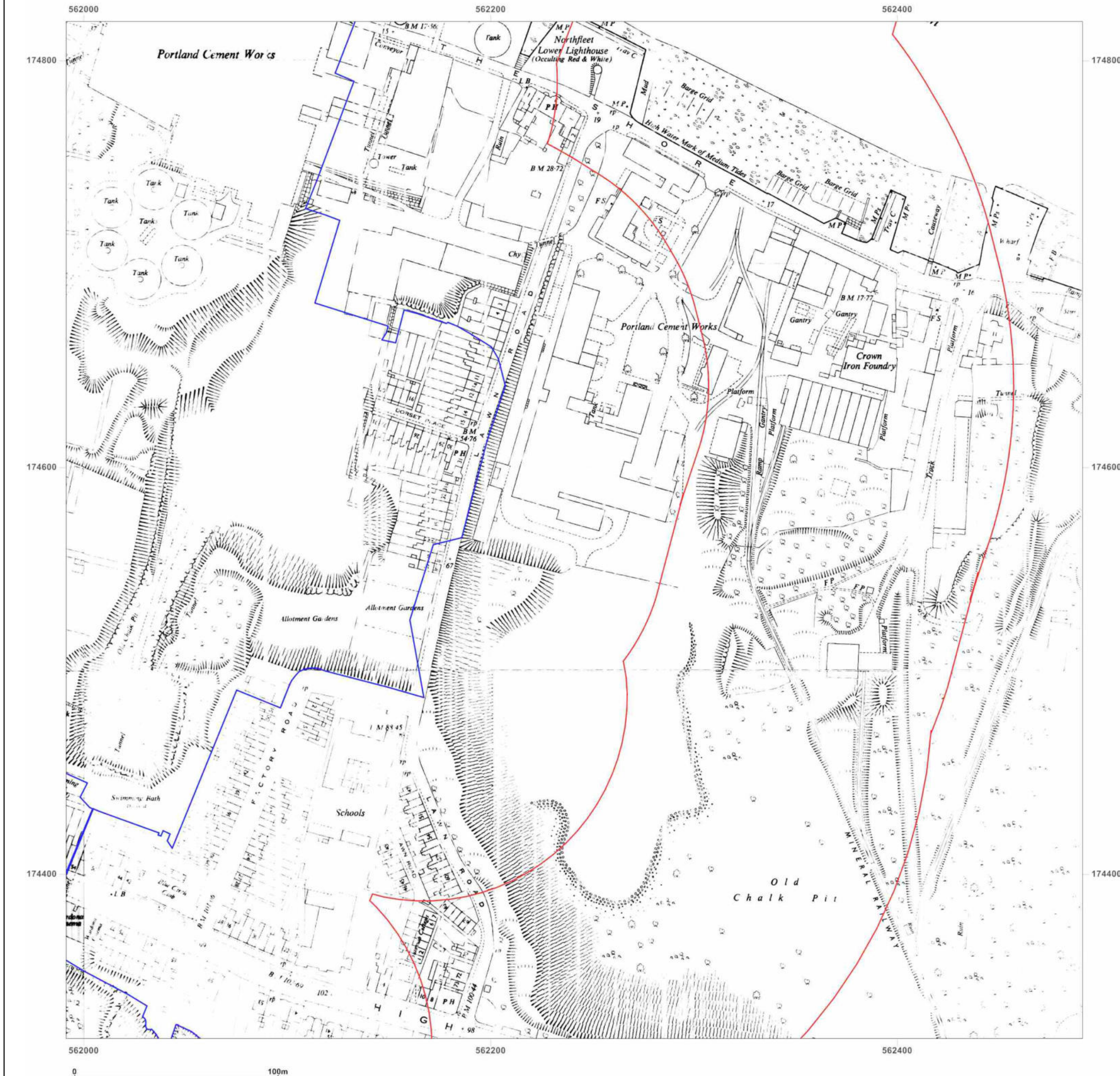


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Site Details:

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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_2
Grid Ref: 562241, 174569

Map Name: National Grid

Map date: 1970-1972

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952
 Revised 1970
 Edition N/A
 Copyright 1970
 Levelled 1956

Surveyed 1952
 Revised 1972
 Edition N/A
 Copyright 1972
 Levelled 1952

Surveyed 1952
 Revised 1970
 Edition N/A
 Copyright 1970
 Levelled 1956

Surveyed 1952
 Revised 1972
 Edition N/A
 Copyright 1972
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Site Details:

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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_2
Grid Ref: 562241, 174569

Map Name: National Grid

Map date: 1977-1980

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1977
 Levelled N/A

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1978
 Levelled 1952

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1978
 Levelled 1956

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1980
 Levelled 1956



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Site Details:

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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_3
Grid Ref: 562241, 175069

Map Name: National Grid

Map date: 1972-1977

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1977
Levelled N/A

Surveyed 1952
Revised 1972
Edition N/A
Copyright 1972
Levelled 1952

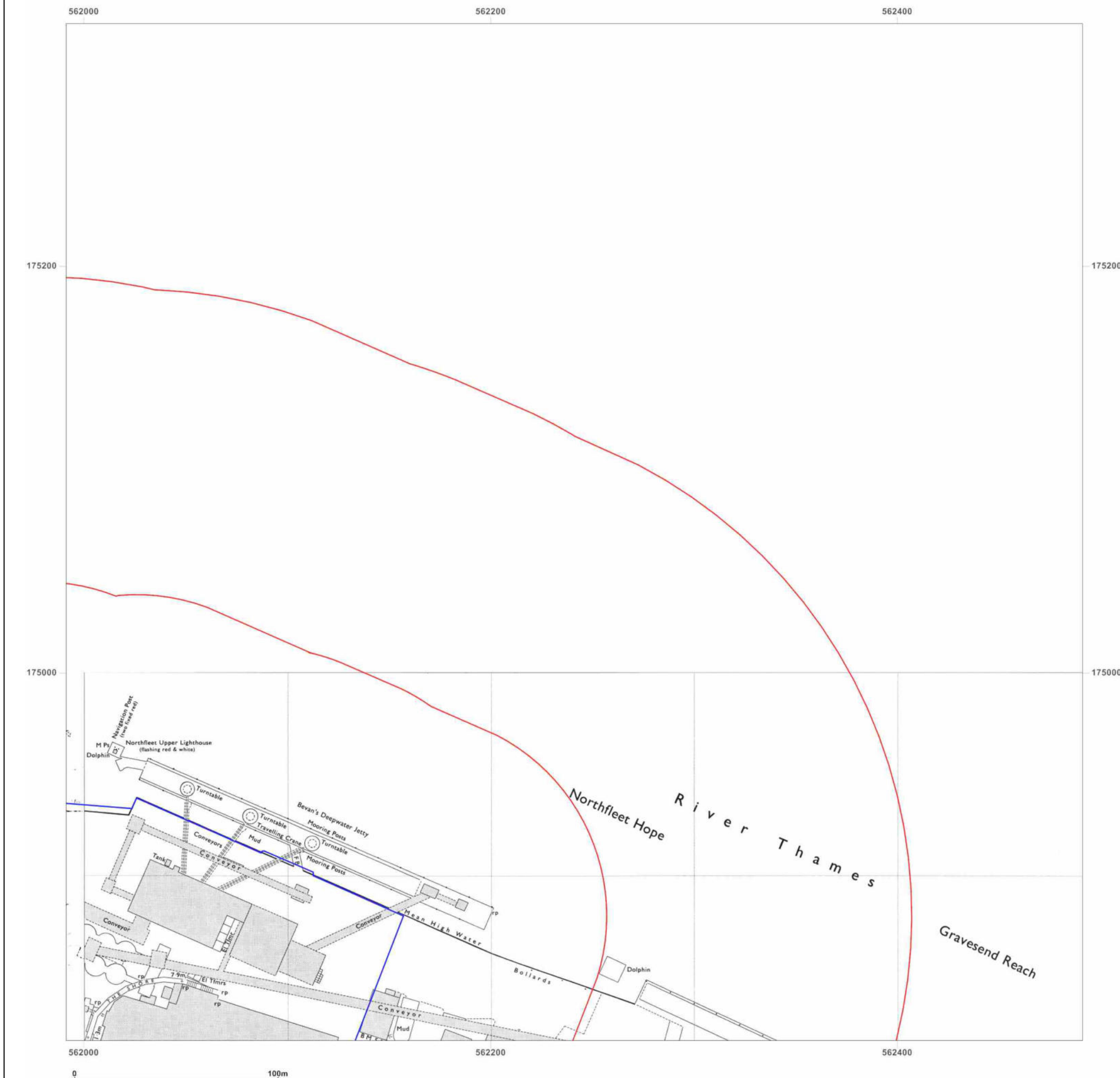


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Site Details:

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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_3
Grid Ref: 562241, 175069

Map Name: National Grid

Map date: 1978

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1978
Levelled 1952

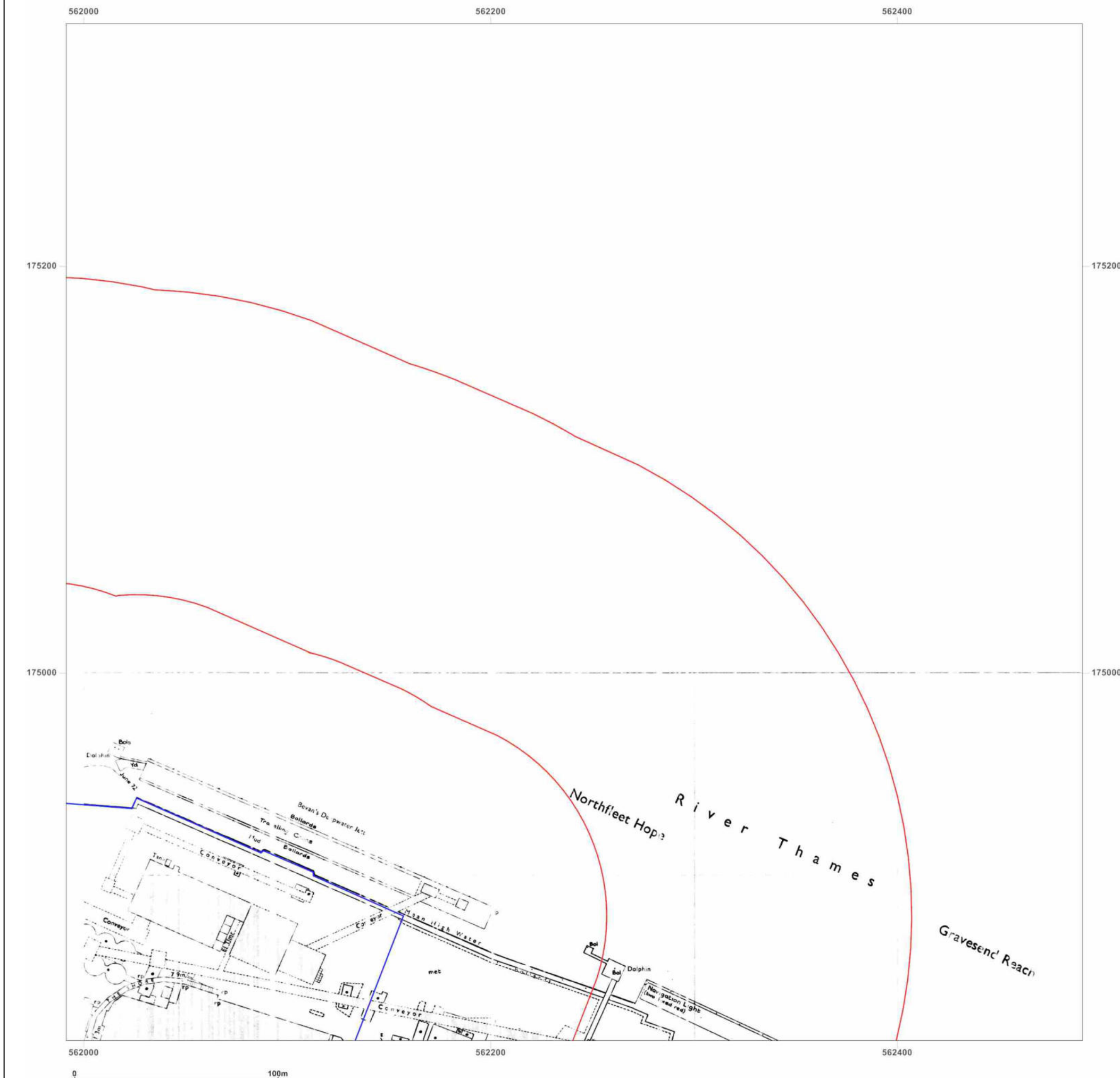


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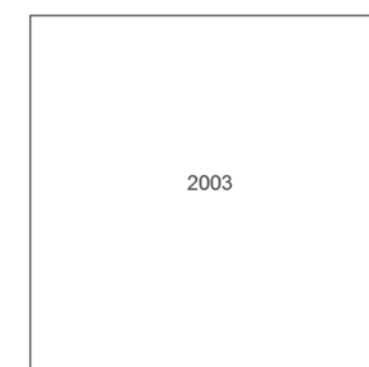
Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_1250scale_2_3
Grid Ref: 562241, 175069

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250

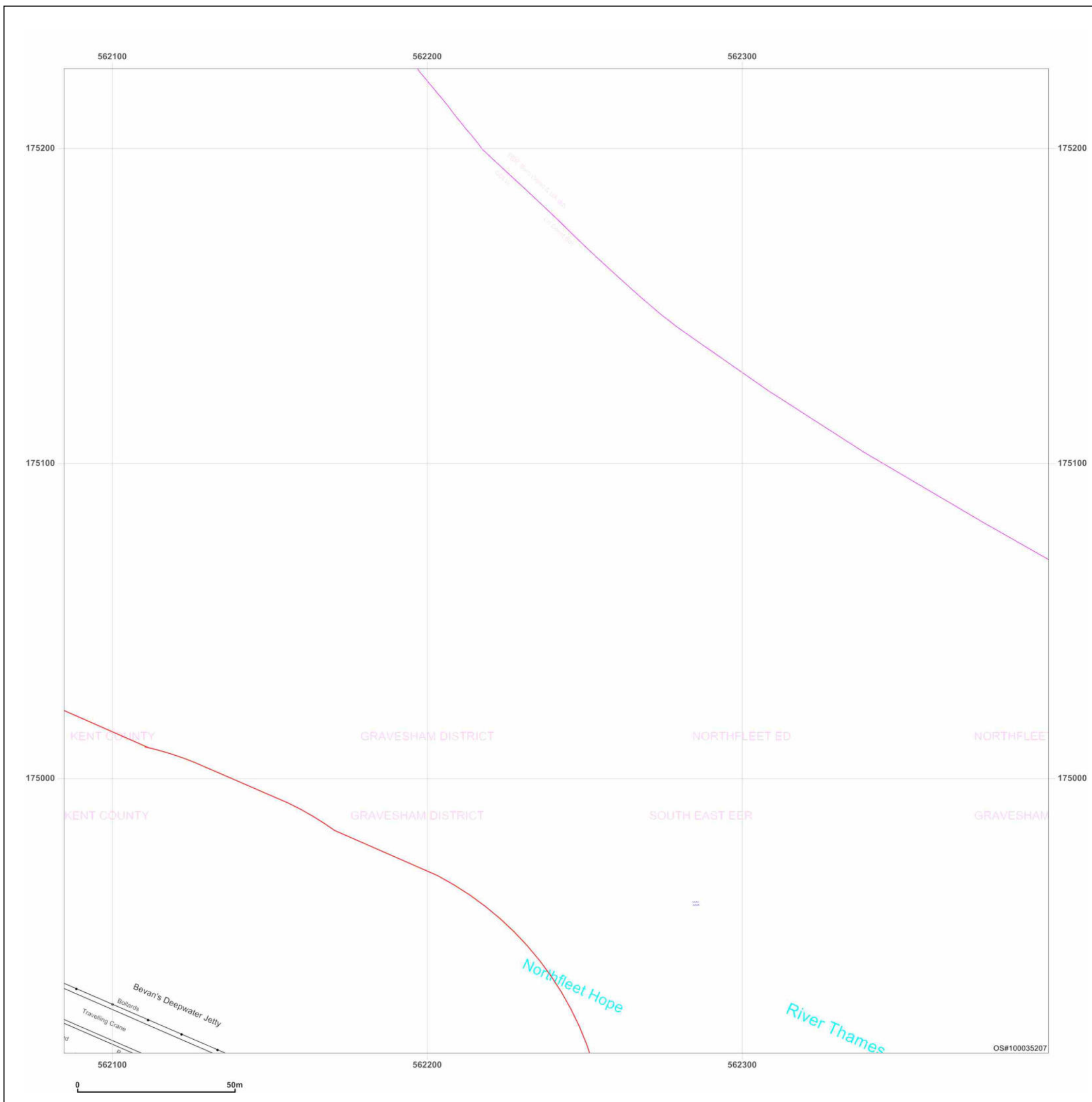


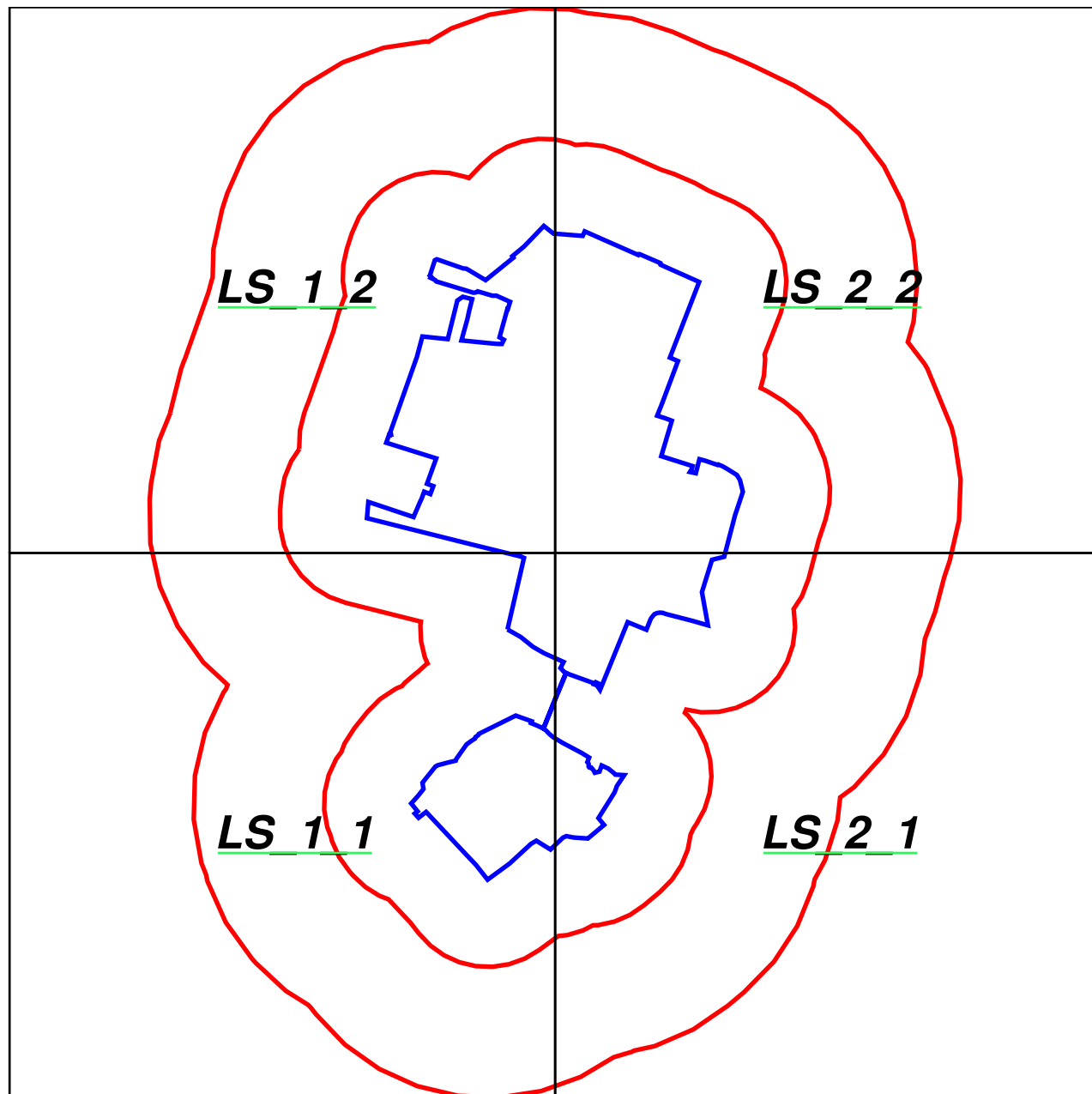
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_1
Grid Ref: 561679, 174257

Map Name: County Series

Map date: 1865

Scale: 1:2,500

Printed at: 1:2,500



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

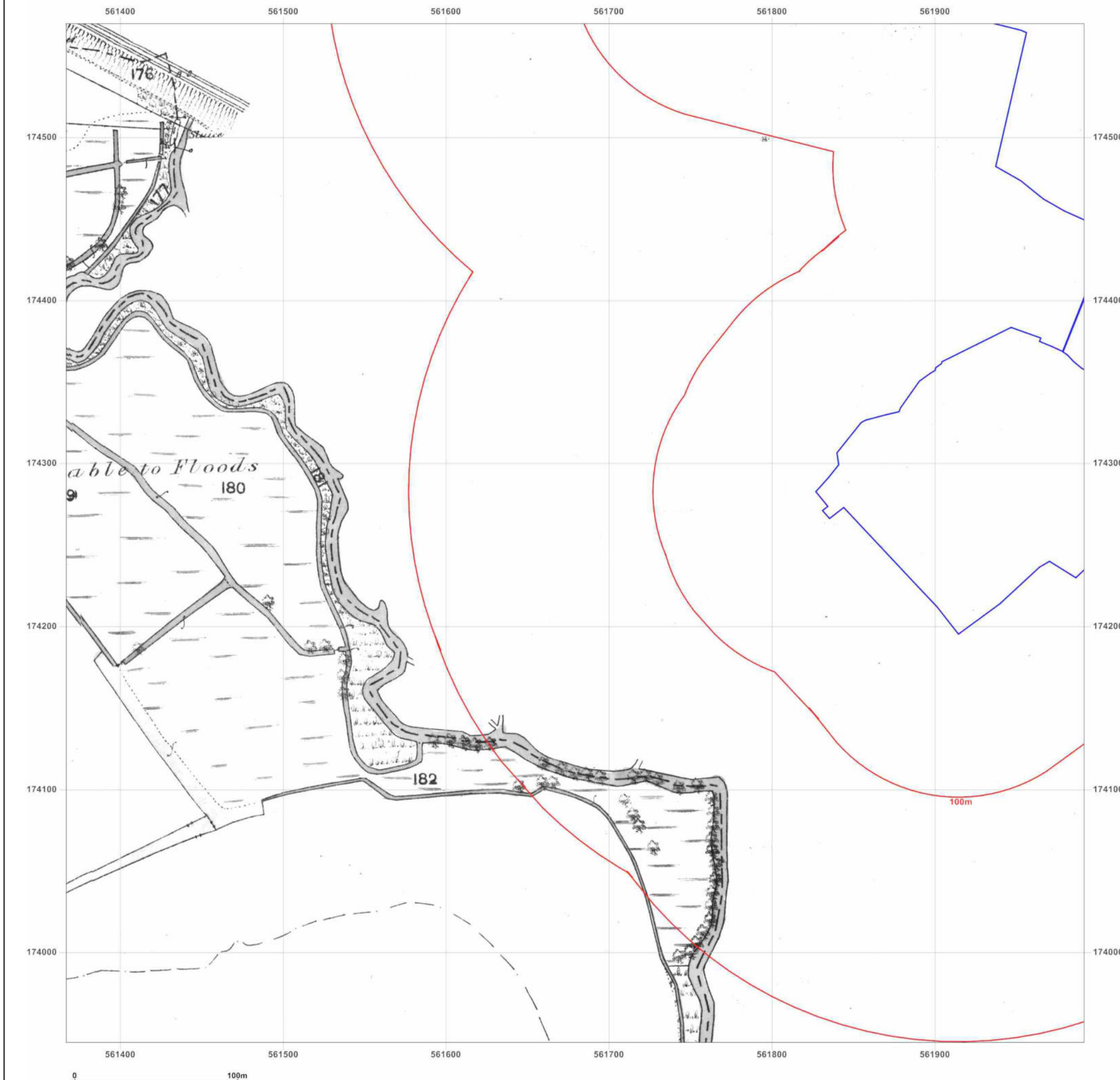


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_1
Grid Ref: 561679, 174257

Map Name: County Series

Map date: 1897

Scale: 1:2,500

Printed at: 1:2,500



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

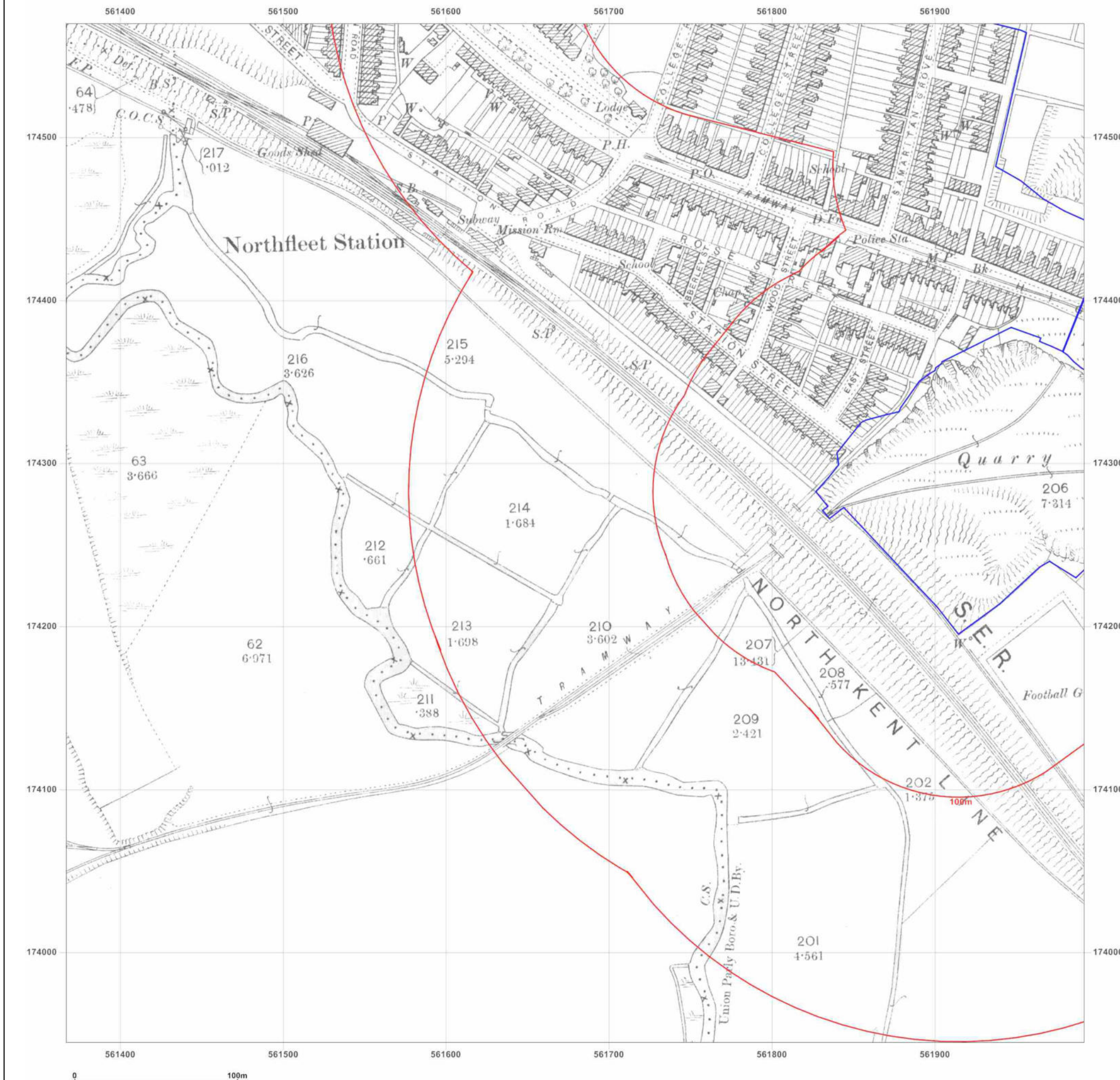


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_1
Grid Ref: 561679, 174257

Map Name: County Series

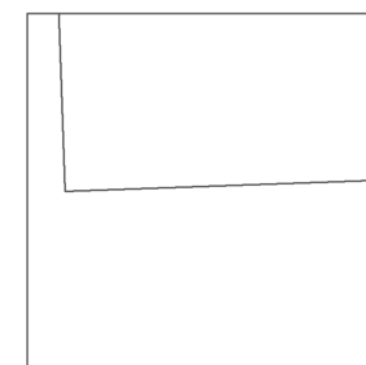
Map date: 1898

Scale: 1:2,500

Printed at: 1:2,500



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

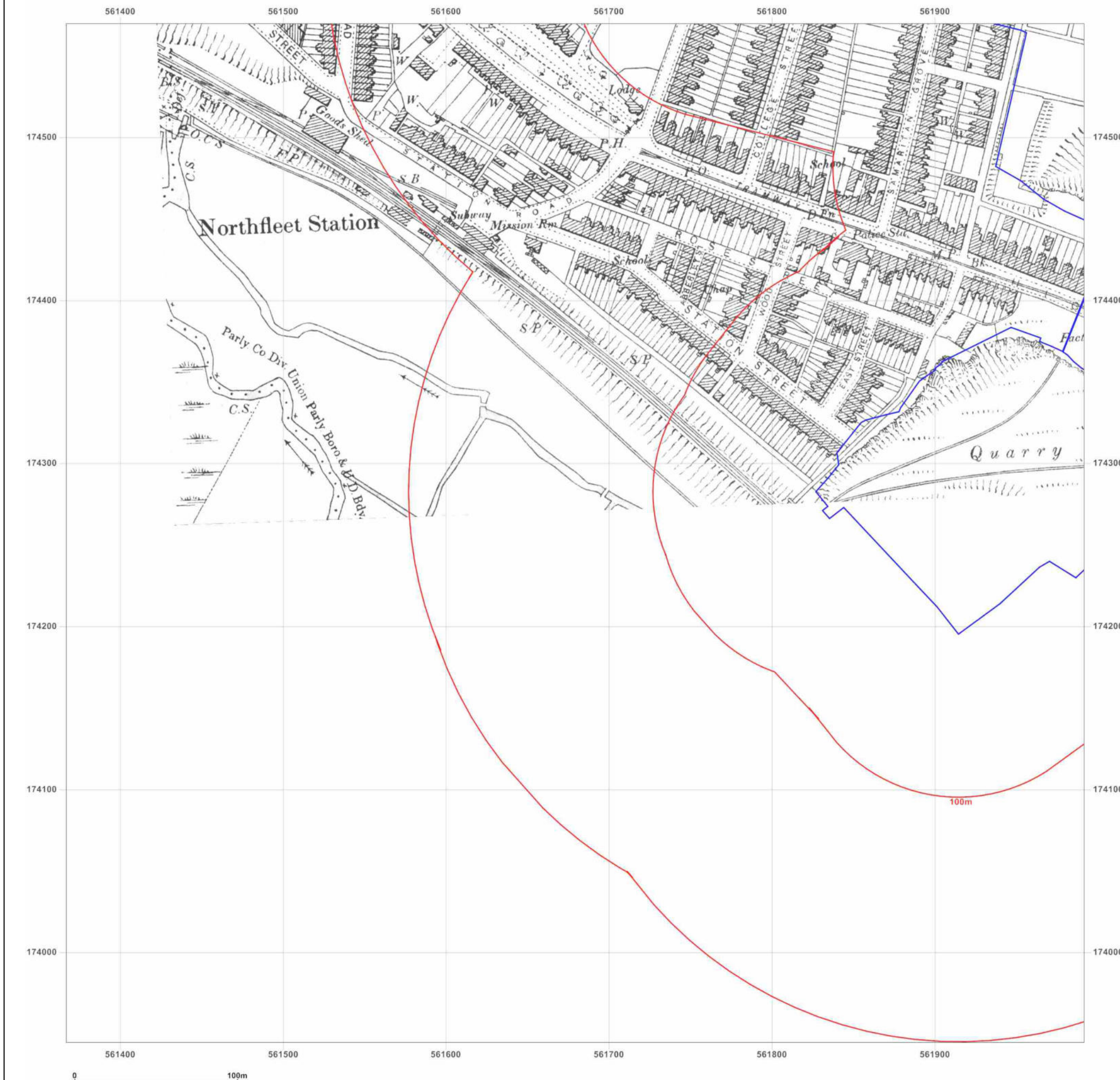


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_1
Grid Ref: 561679, 174257

Map Name: County Series

Map date: 1909

Scale: 1:2,500

Printed at: 1:2,500



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

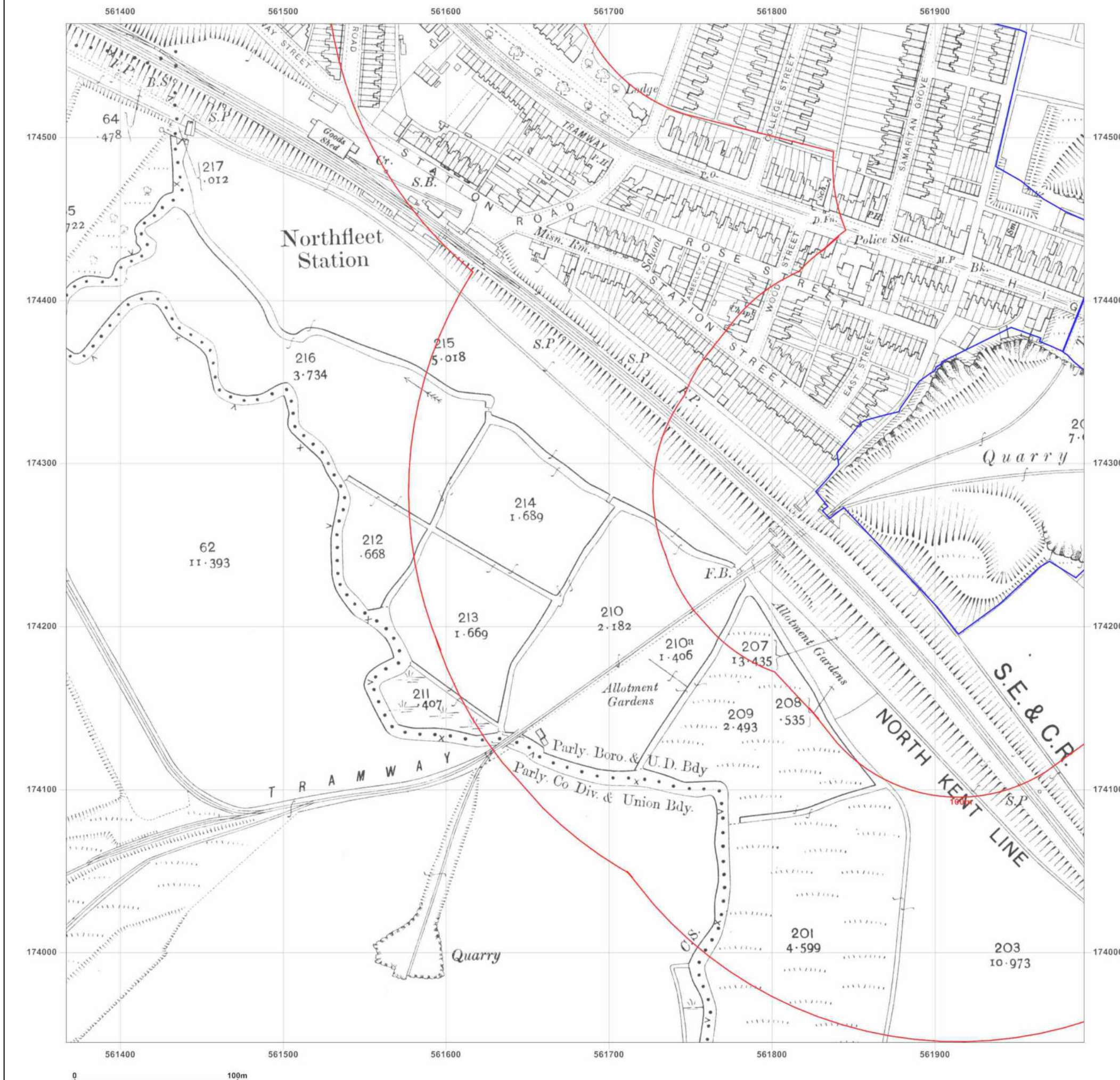


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_1
Grid Ref: 561679, 174257

Map Name: County Series

Map date: 1932

Scale: 1:2,500

Printed at: 1:2,500



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

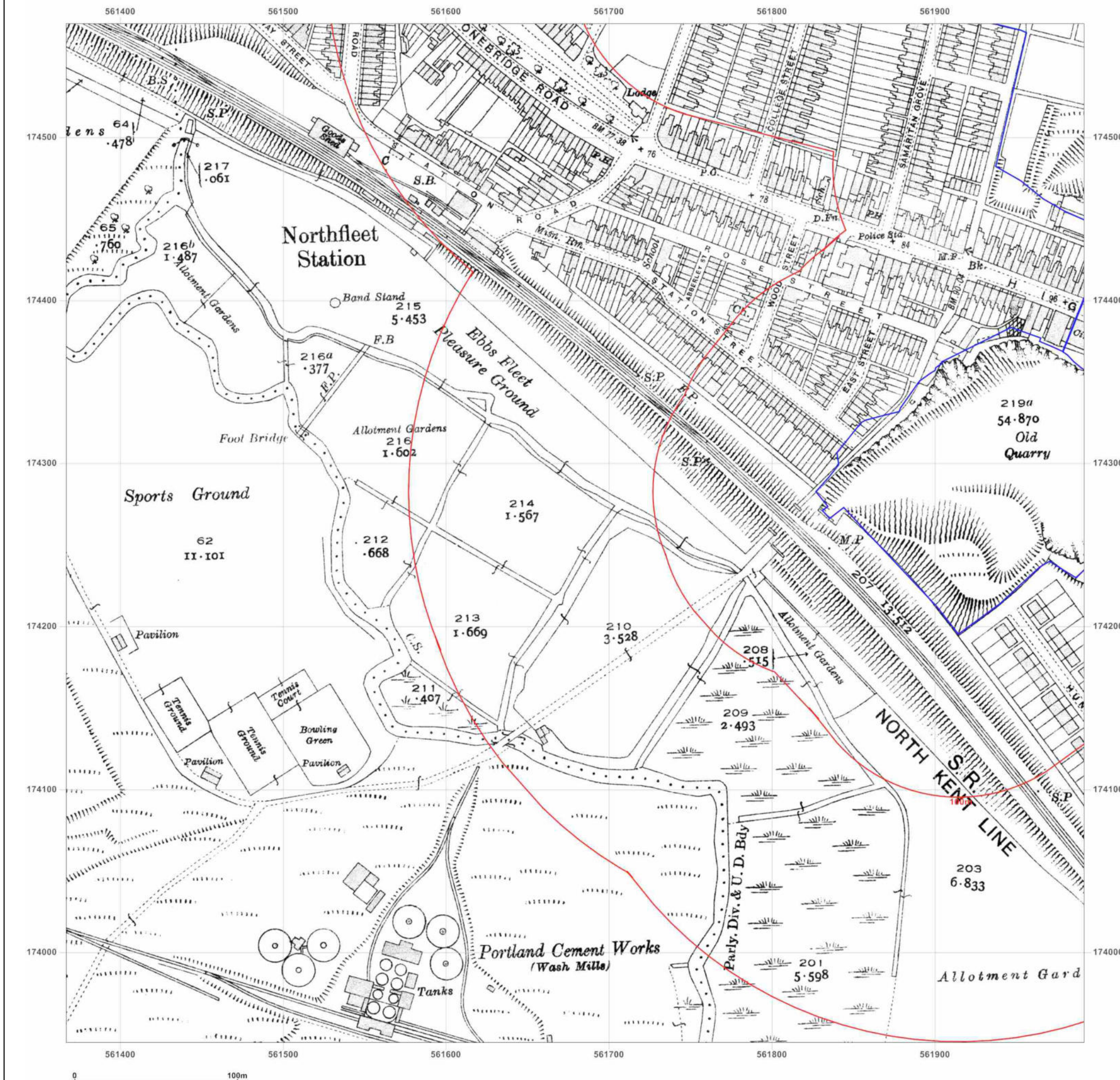


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_1
Grid Ref: 561679, 174257

Map Name: County Series

Map date: 1938

Scale: 1:2,500

Printed at: 1:2,500



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

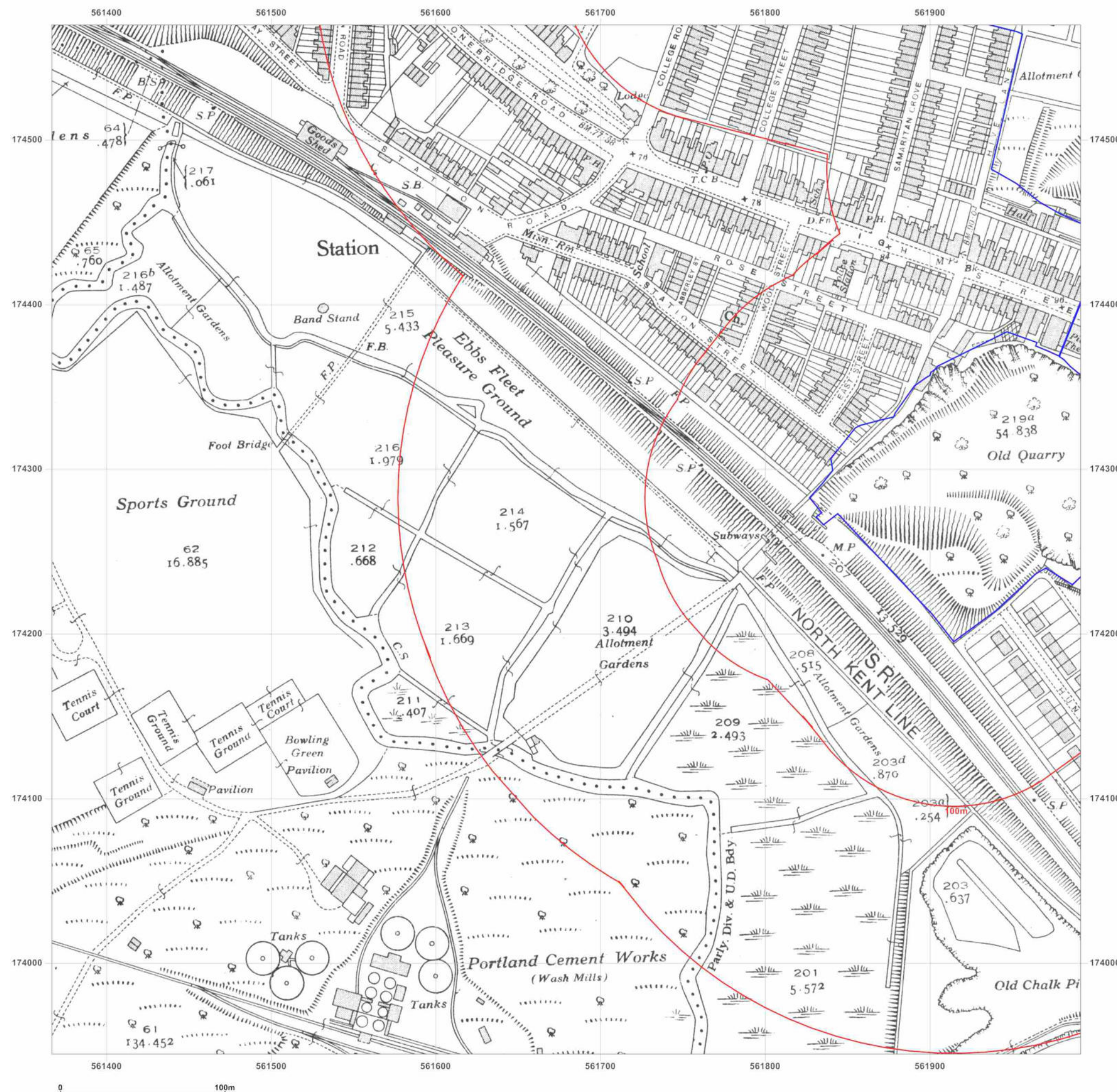


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_1
Grid Ref: 561679, 174257

Map Name: National Grid

Map date: 1952

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

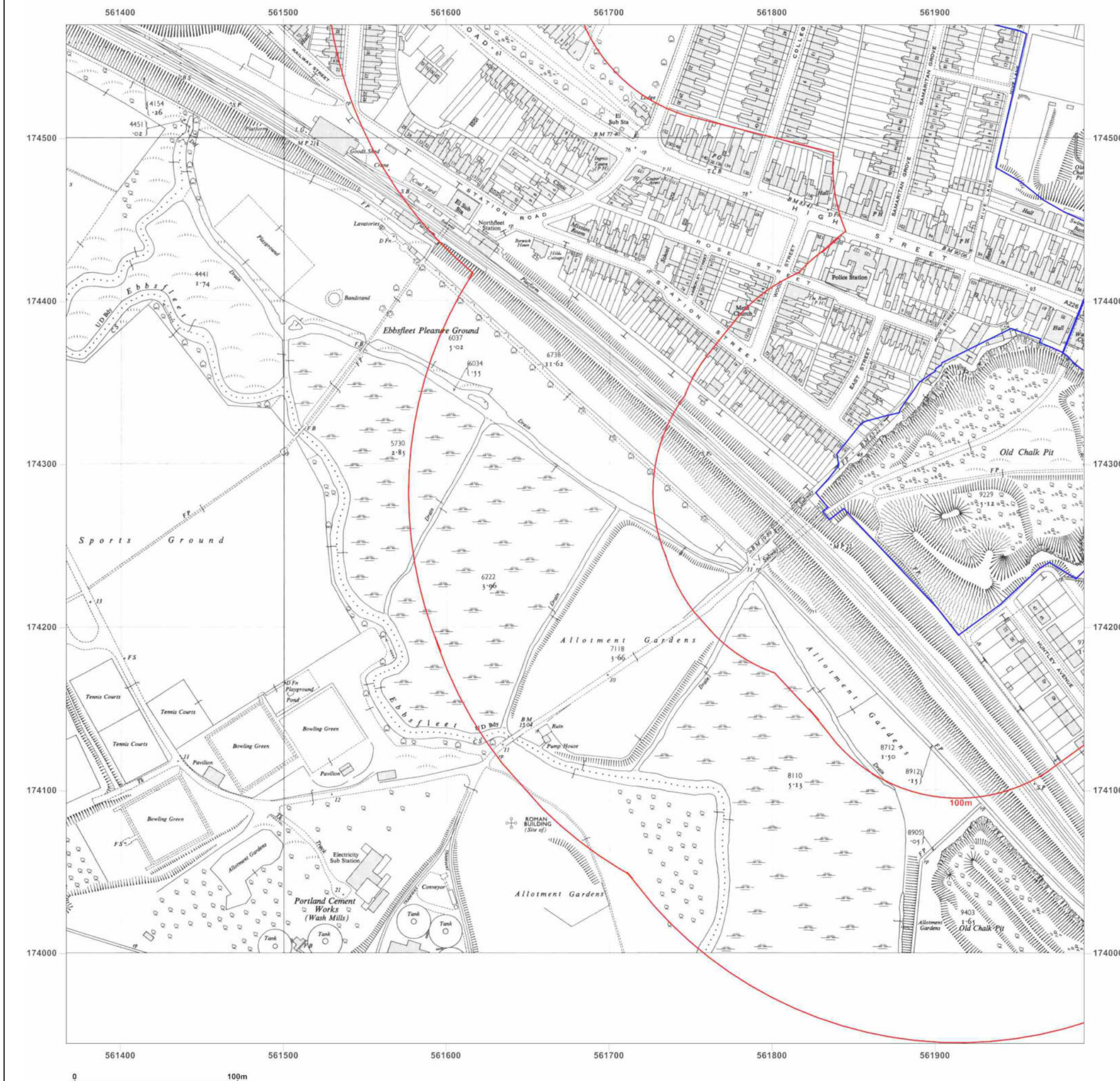


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: County Series

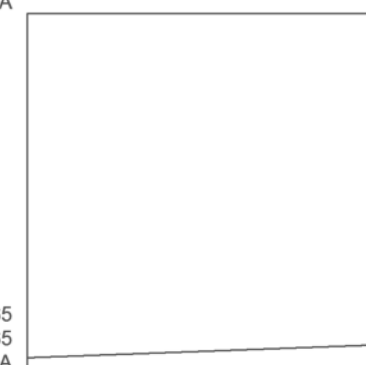
Map date: 1865

Scale: 1:2,500

Printed at: 1:2,500



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



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

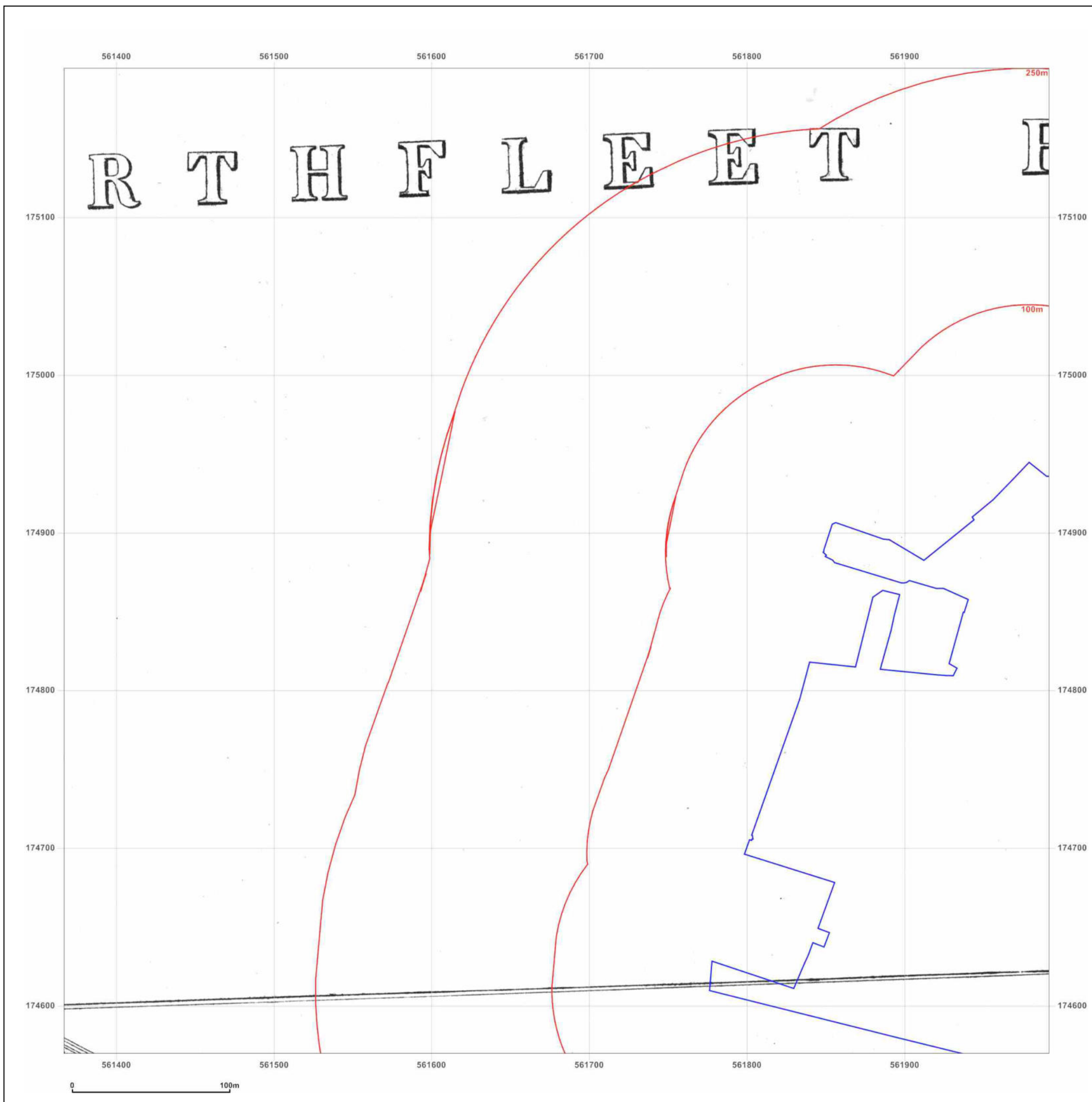


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: County Series

Map date: 1865

Scale: 1:2,500

Printed at: 1:2,500



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

Surveyed 1865
Revised 1865
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: County Series

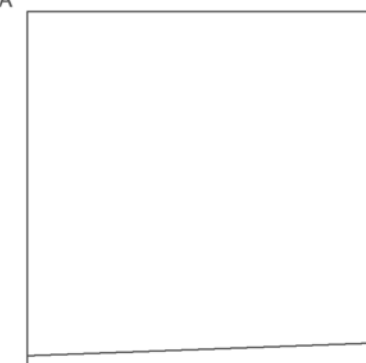
Map date: 1872

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1872
Revised 1872
Edition N/A
Copyright N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: County Series

Map date: 1897

Scale: 1:2,500

Printed at: 1:2,500



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

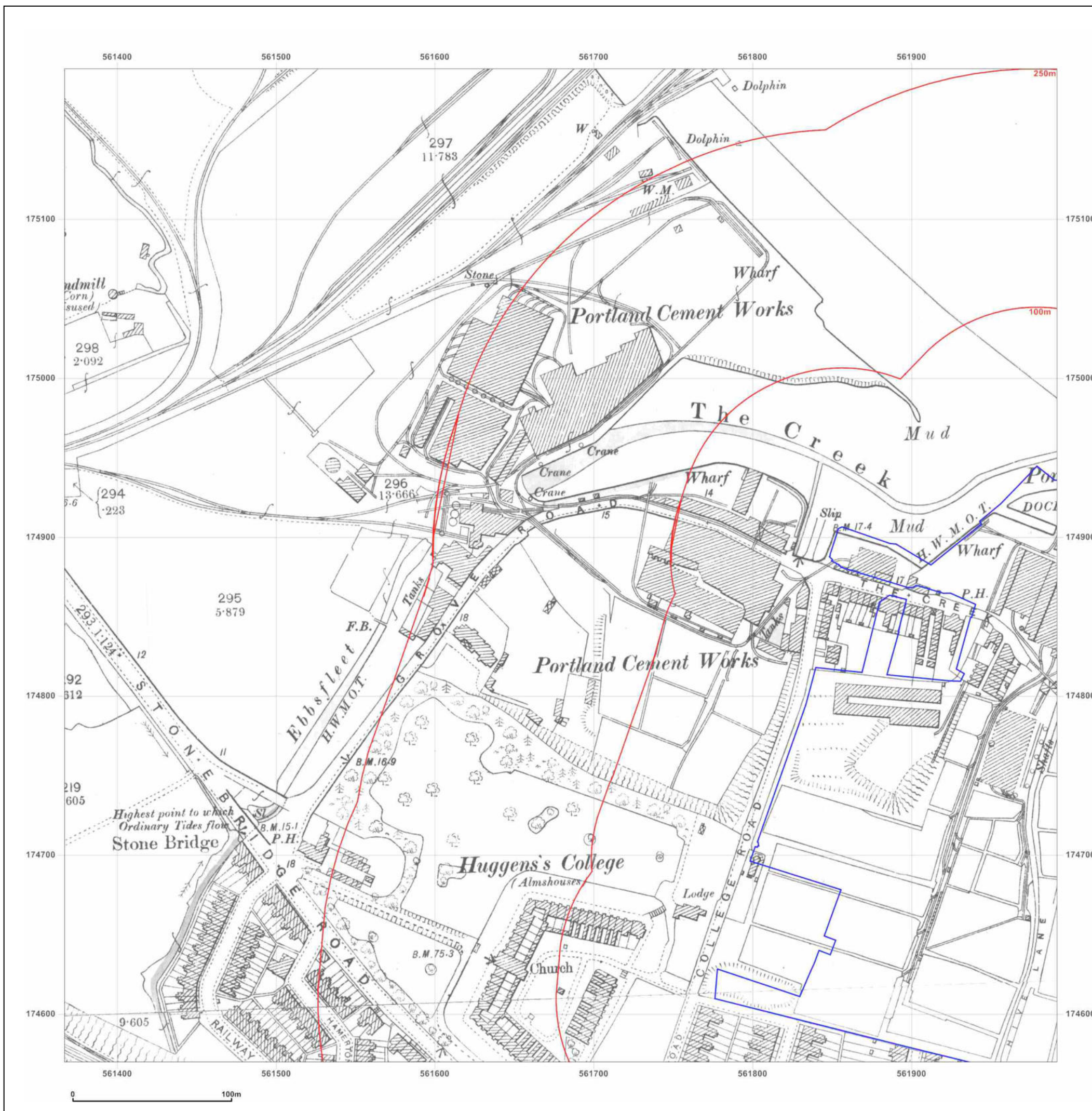


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: County Series

Map date: 1898

Scale: 1:2,500

Printed at: 1:2,500



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

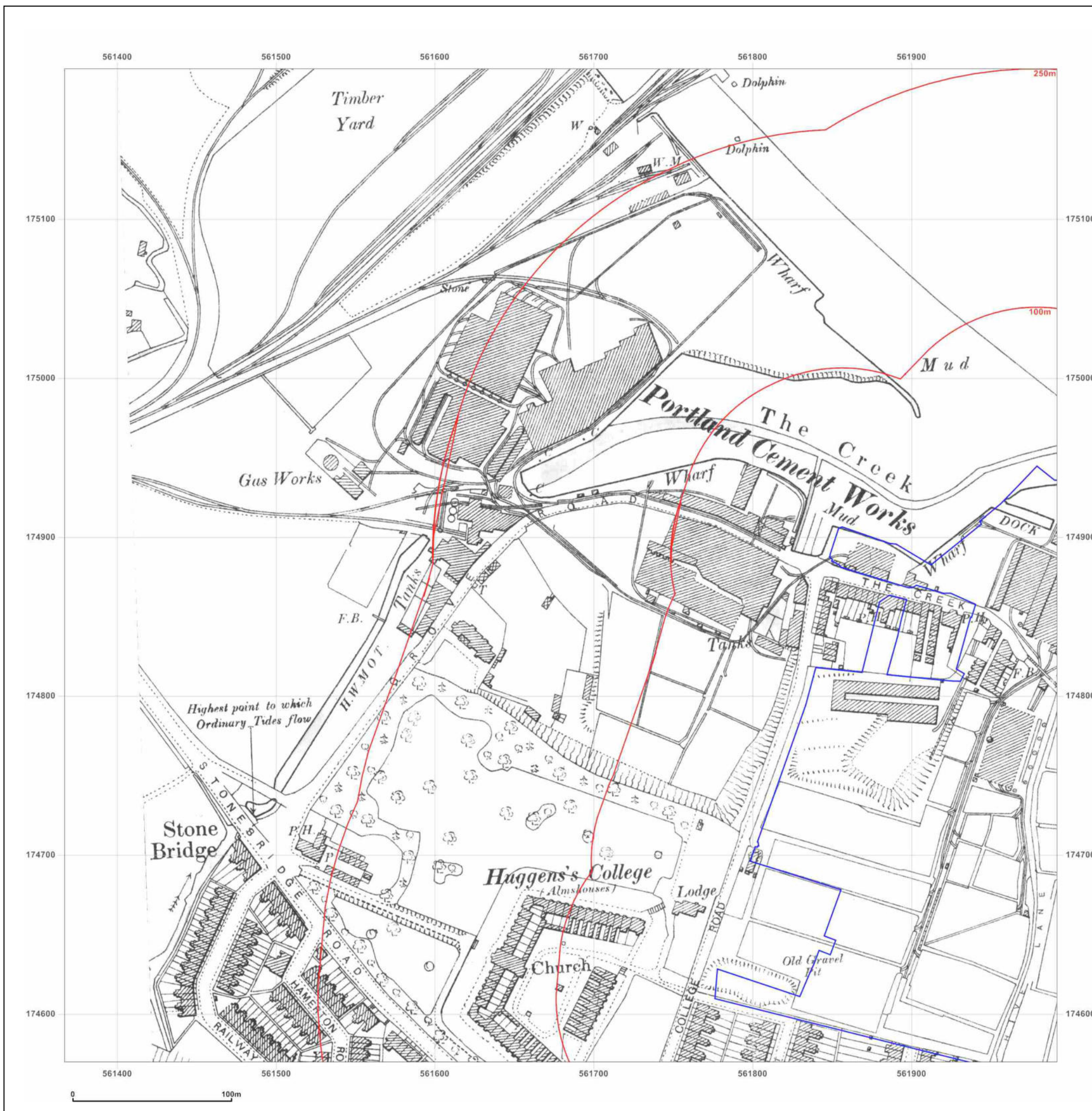


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: County Series

Map date: 1909

Scale: 1:2,500

Printed at: 1:2,500



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

Surveyed 1909
Revised 1909
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: County Series

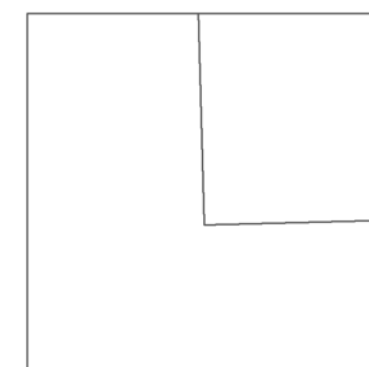
Map date: 1920

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1920
Revised 1920
Edition N/A
Copyright N/A
Levelled N/A



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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

Map date: 1952

Scale: 1:2,500

Printed at: 1:2,500



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

Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952



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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

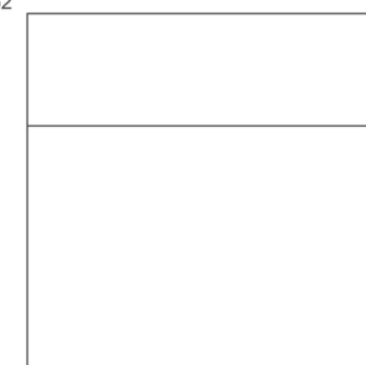
Map date: 1970

Scale: 1:2,500

Printed at: 1:2,500



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

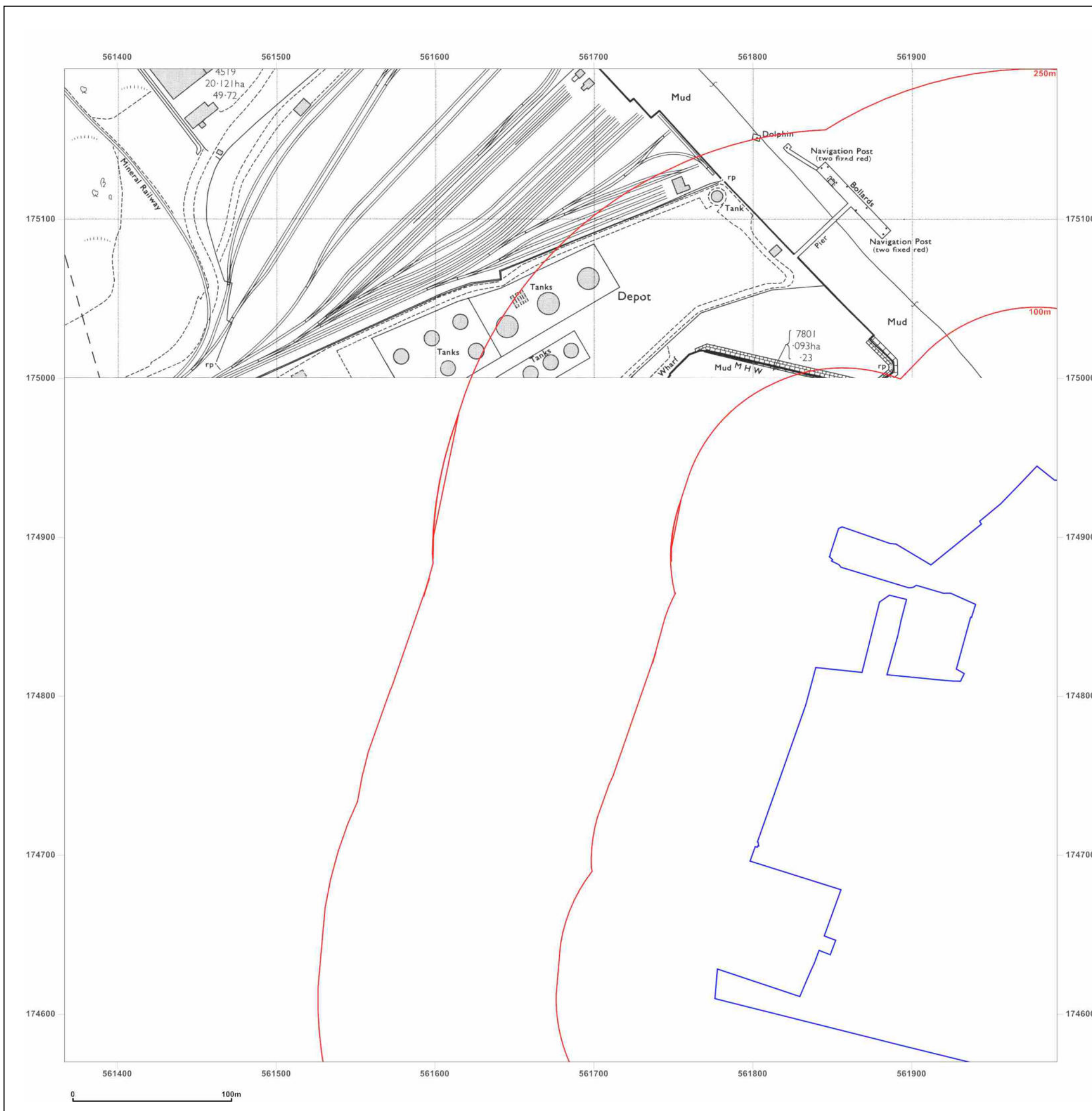


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

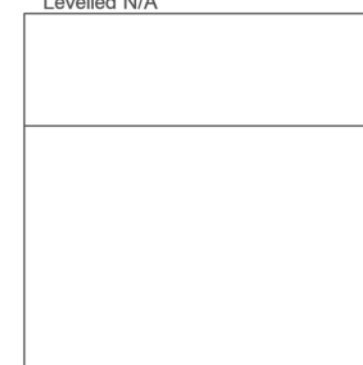
Map date: 1978

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1978
Revised 1978
Edition N/A
Copyright 1978
Levelled N/A

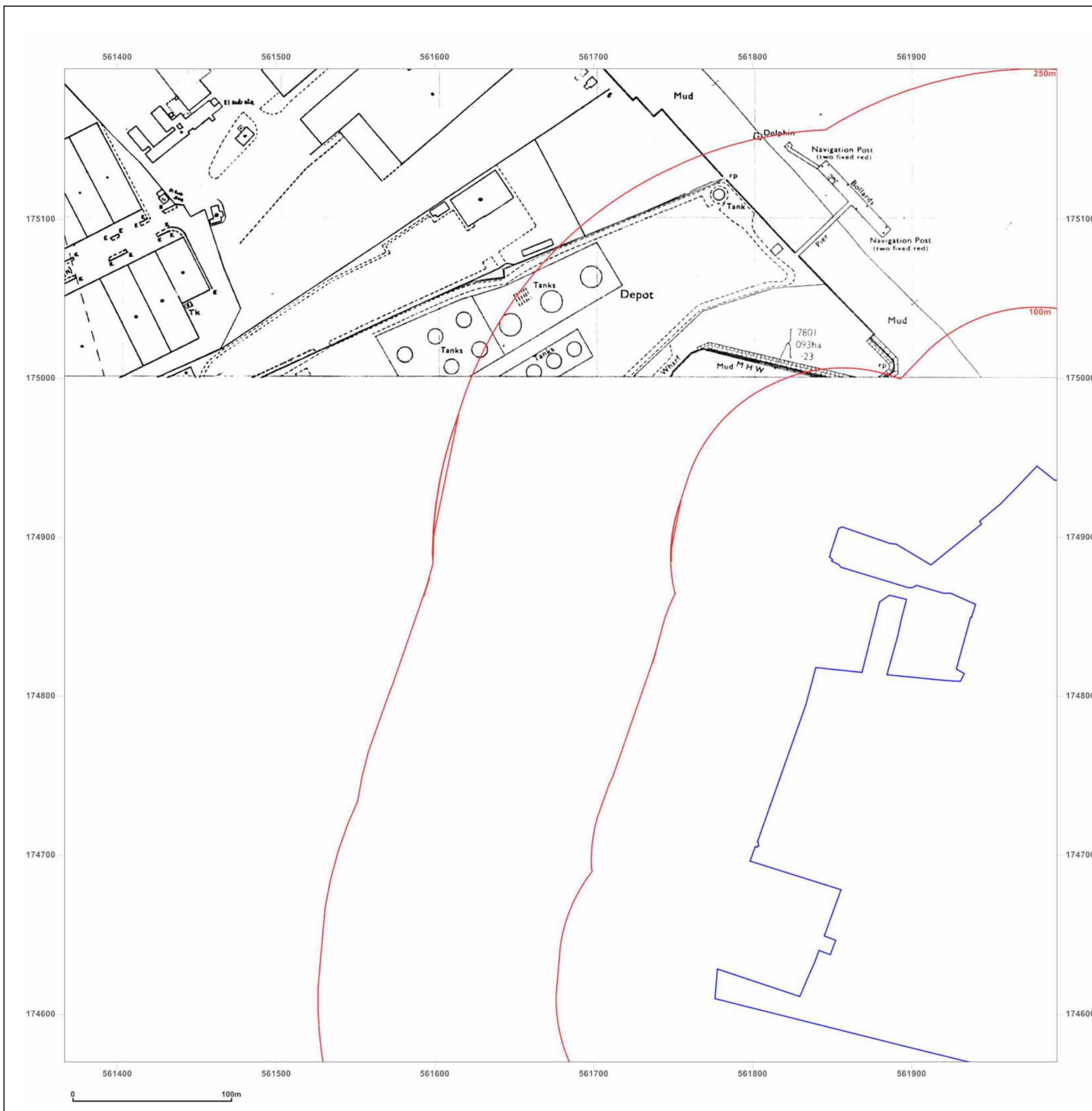


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

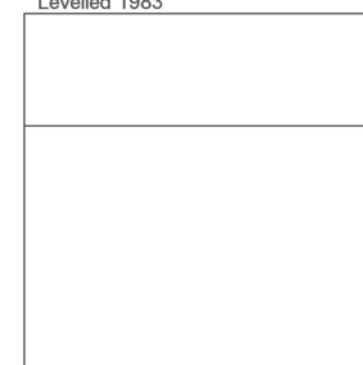
Map date: 1989

Scale: 1:2,500

Printed at: 1:2,500



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

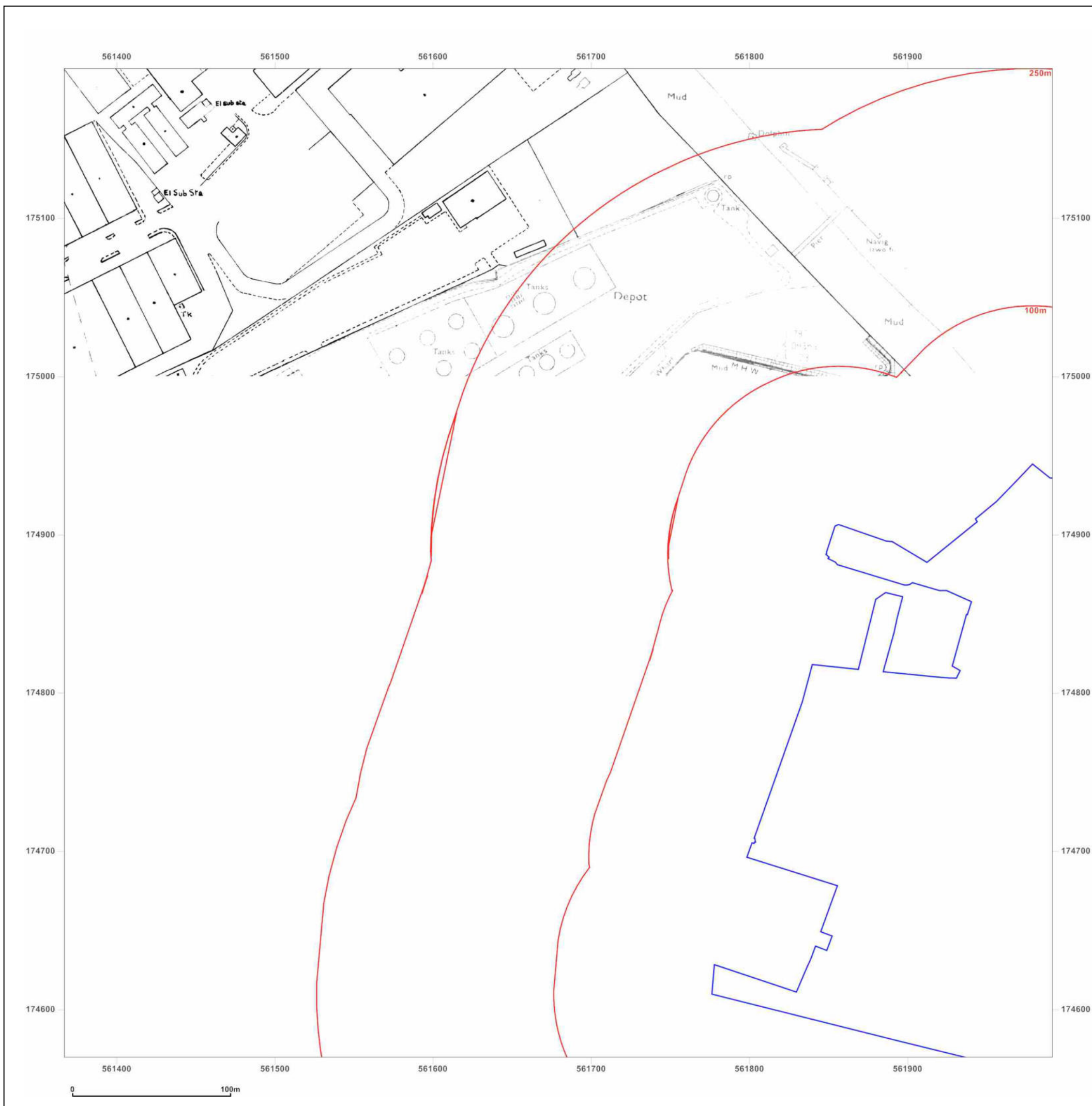


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

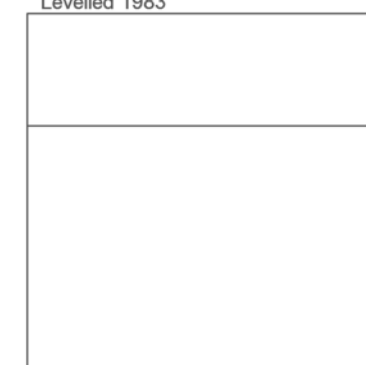
Map date: 1989

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1983
Revised 1989
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

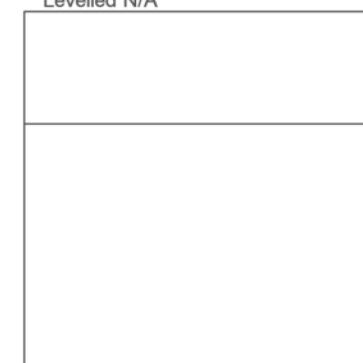
Map date: 1993

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

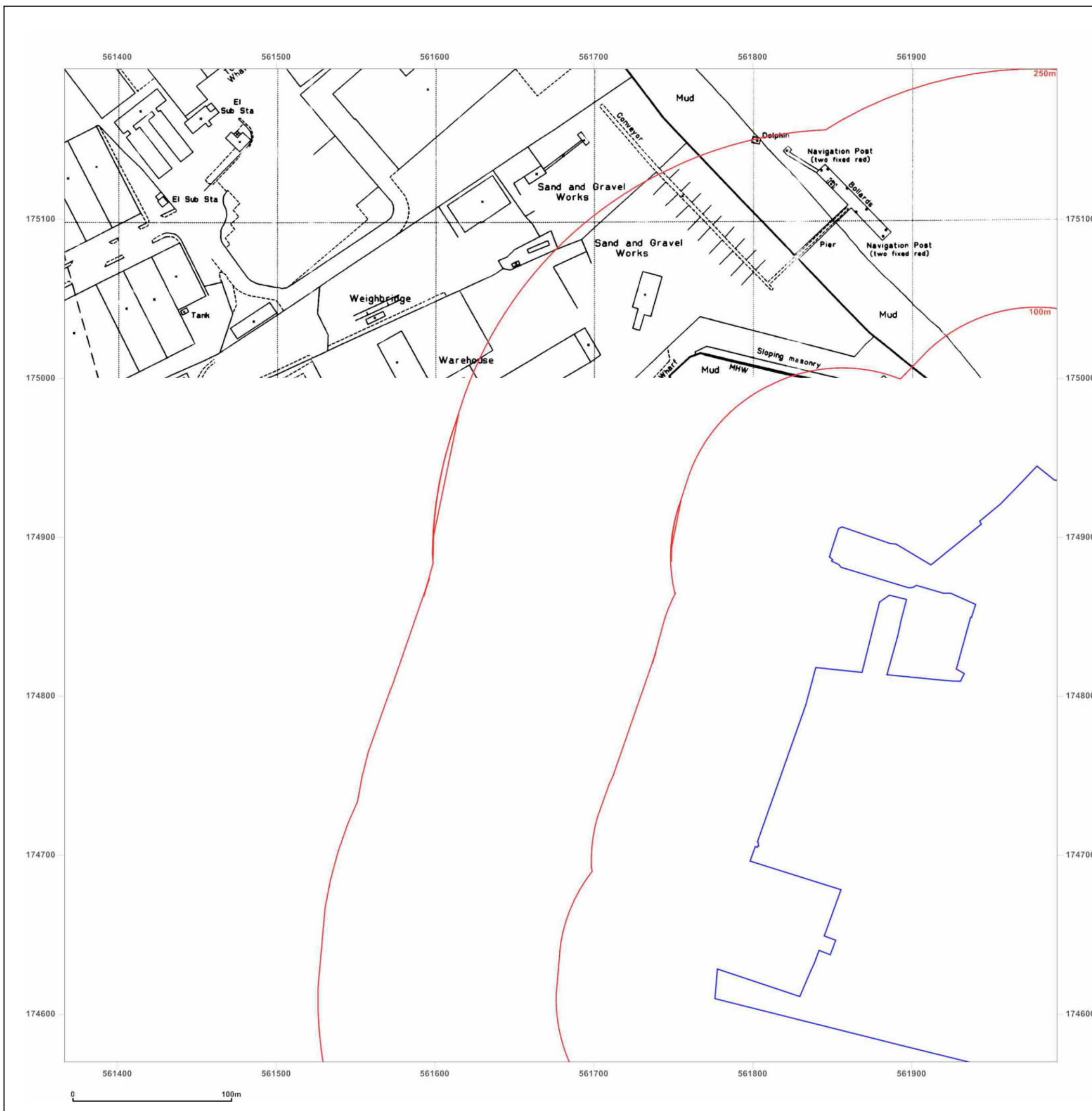


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

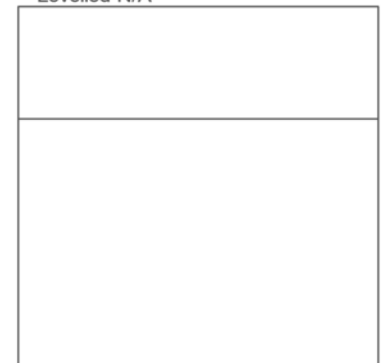
Map date: 1993

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

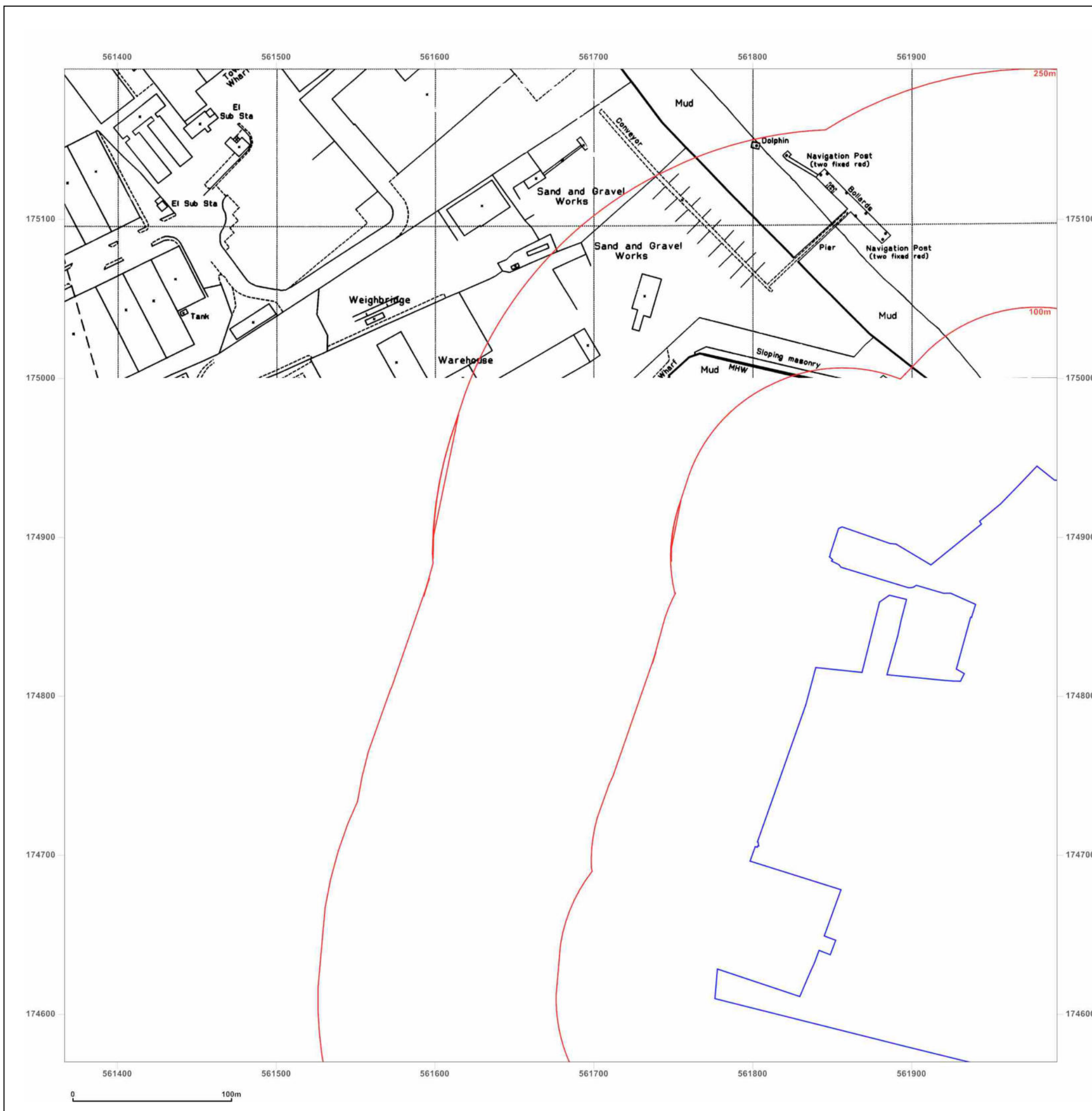


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

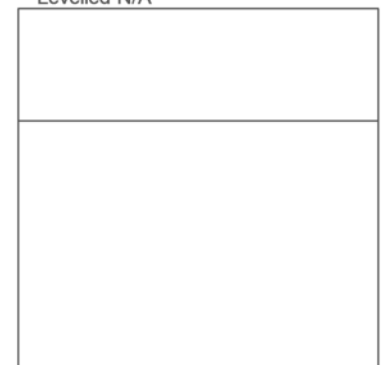
Map date: 1995

Scale: 1:2,500

Printed at: 1:2,500



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

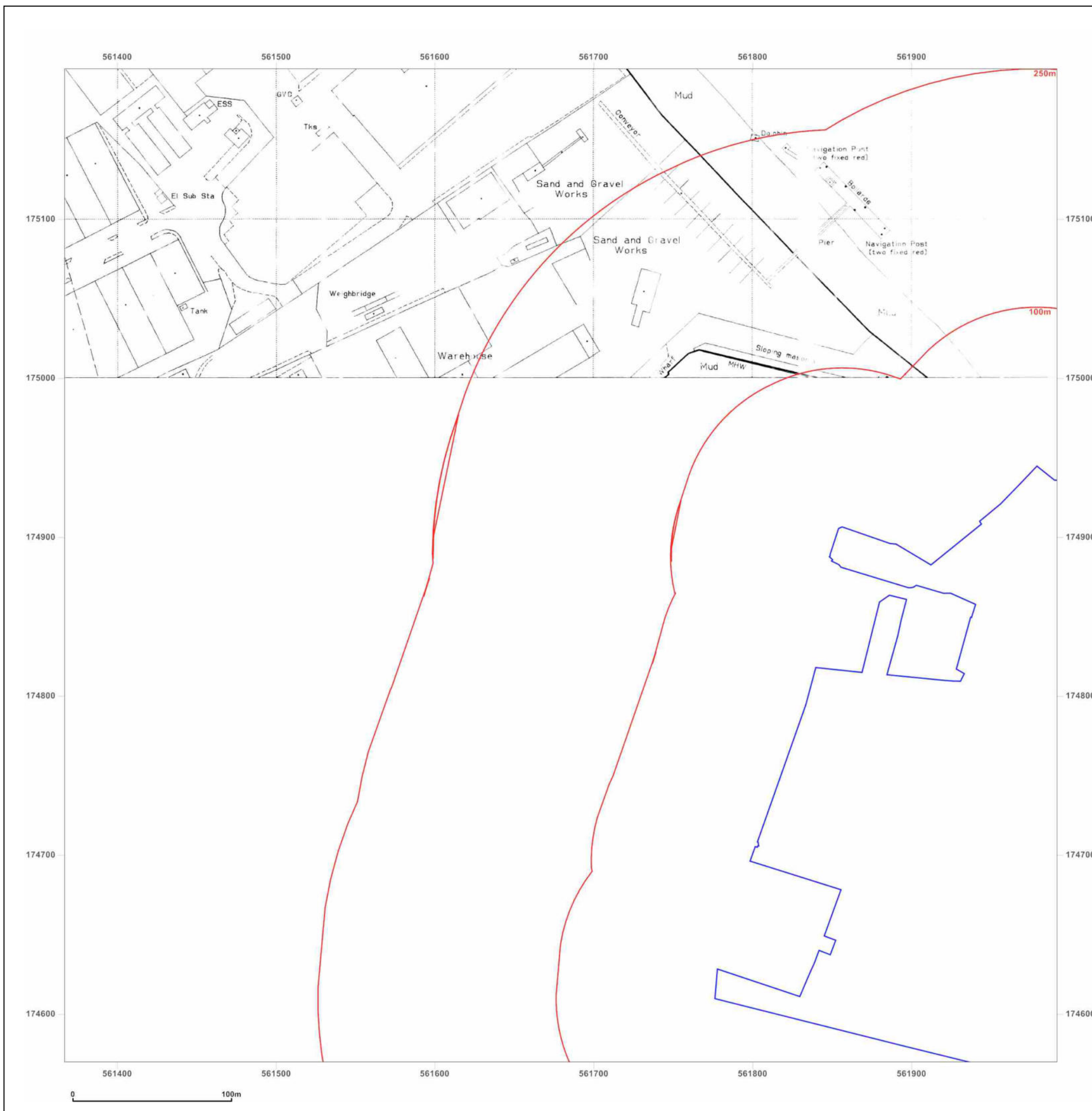


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Site Details:

NORTHFLEET WORKS, THE
SHORE, NORTHFLEET,
GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_1_2
Grid Ref: 561679, 174882

Map Name: National Grid

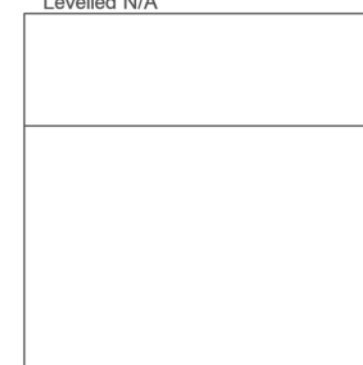
Map date: 1995

Scale: 1:2,500

Printed at: 1:2,500



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

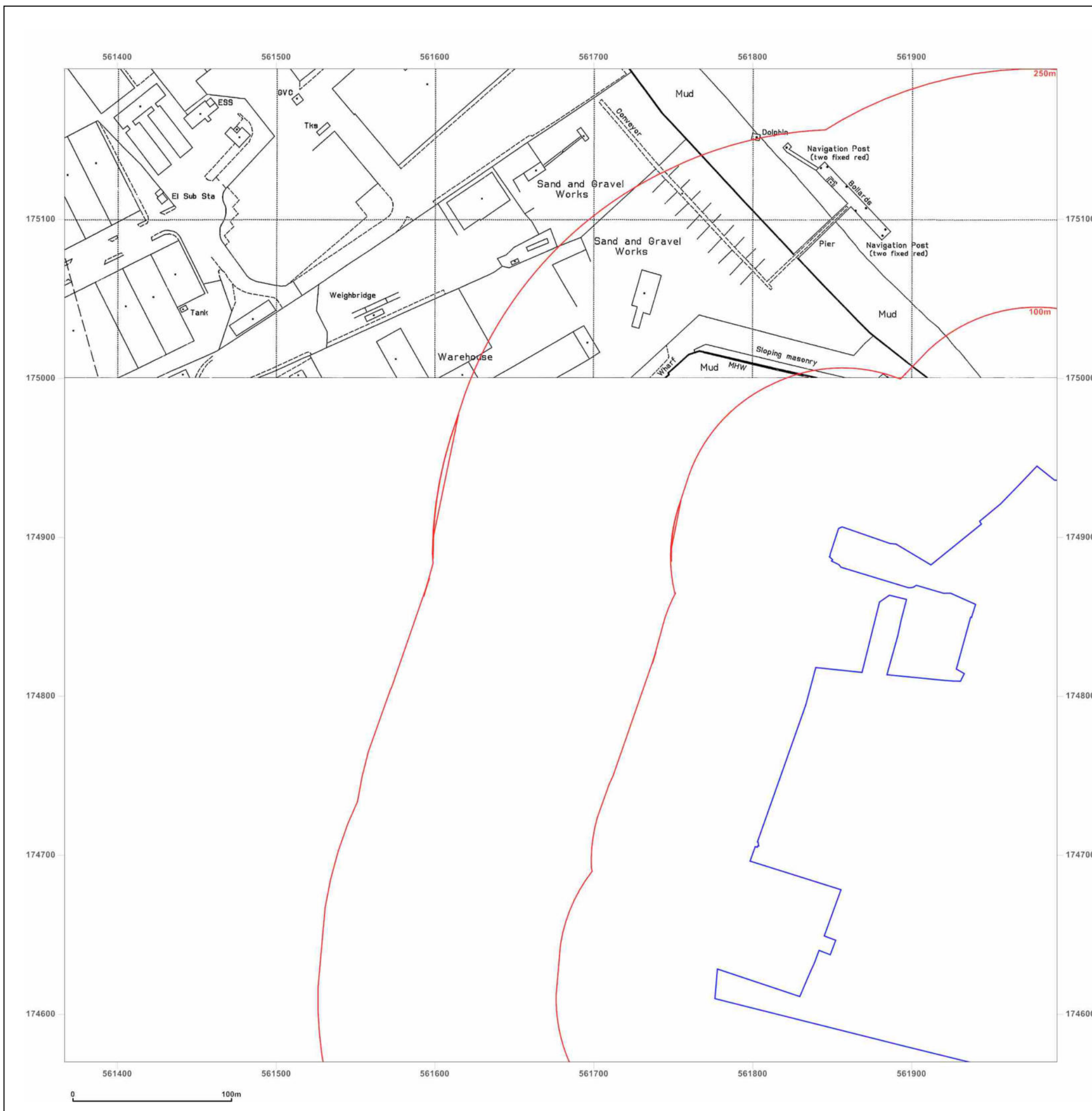


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

Map date: 1865

Scale: 1:2,500

Printed at: 1:2,500



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

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

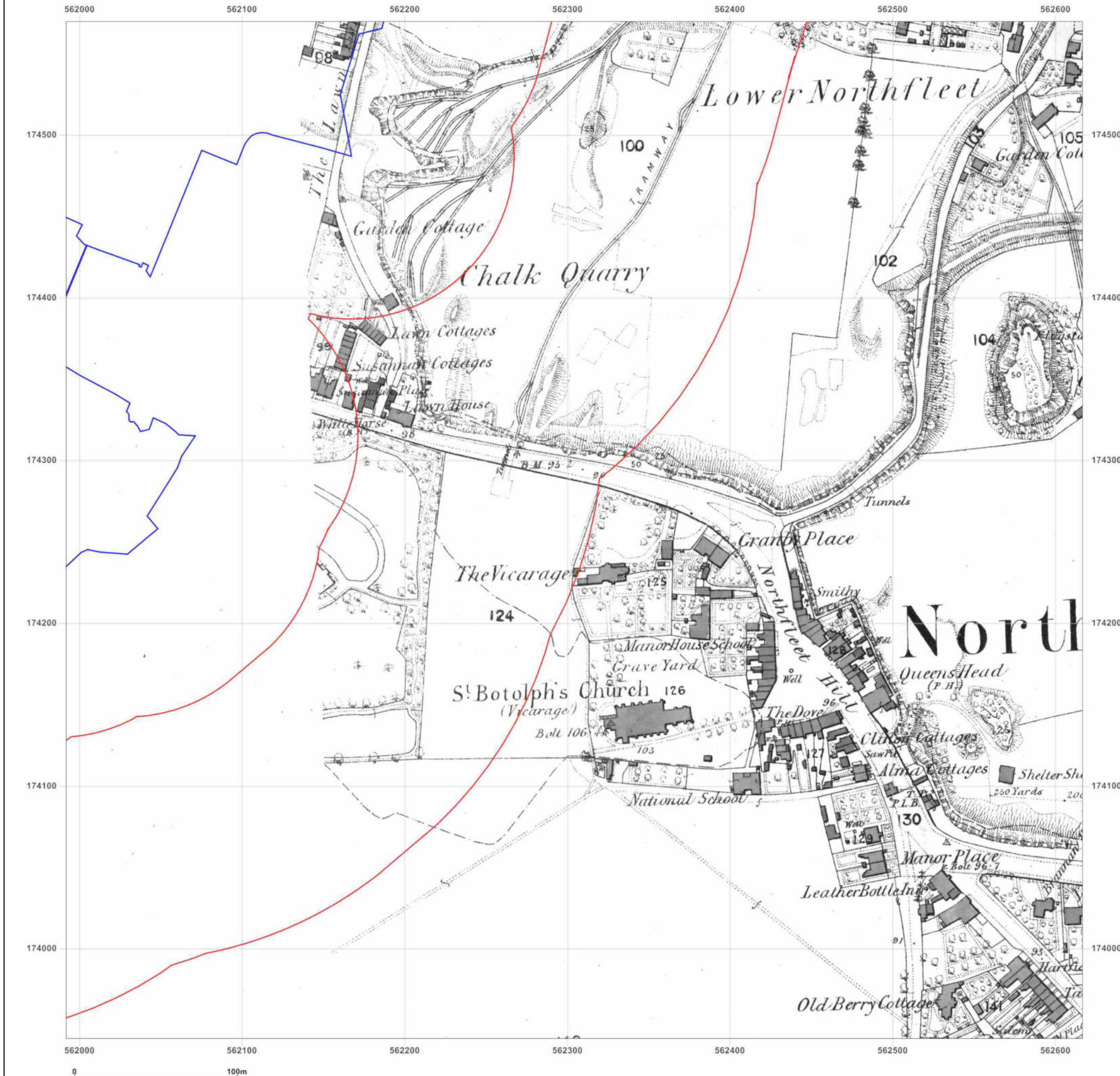


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

Map date: 1865-1866

Scale: 1:2,500

Printed at: 1:2,500



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

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

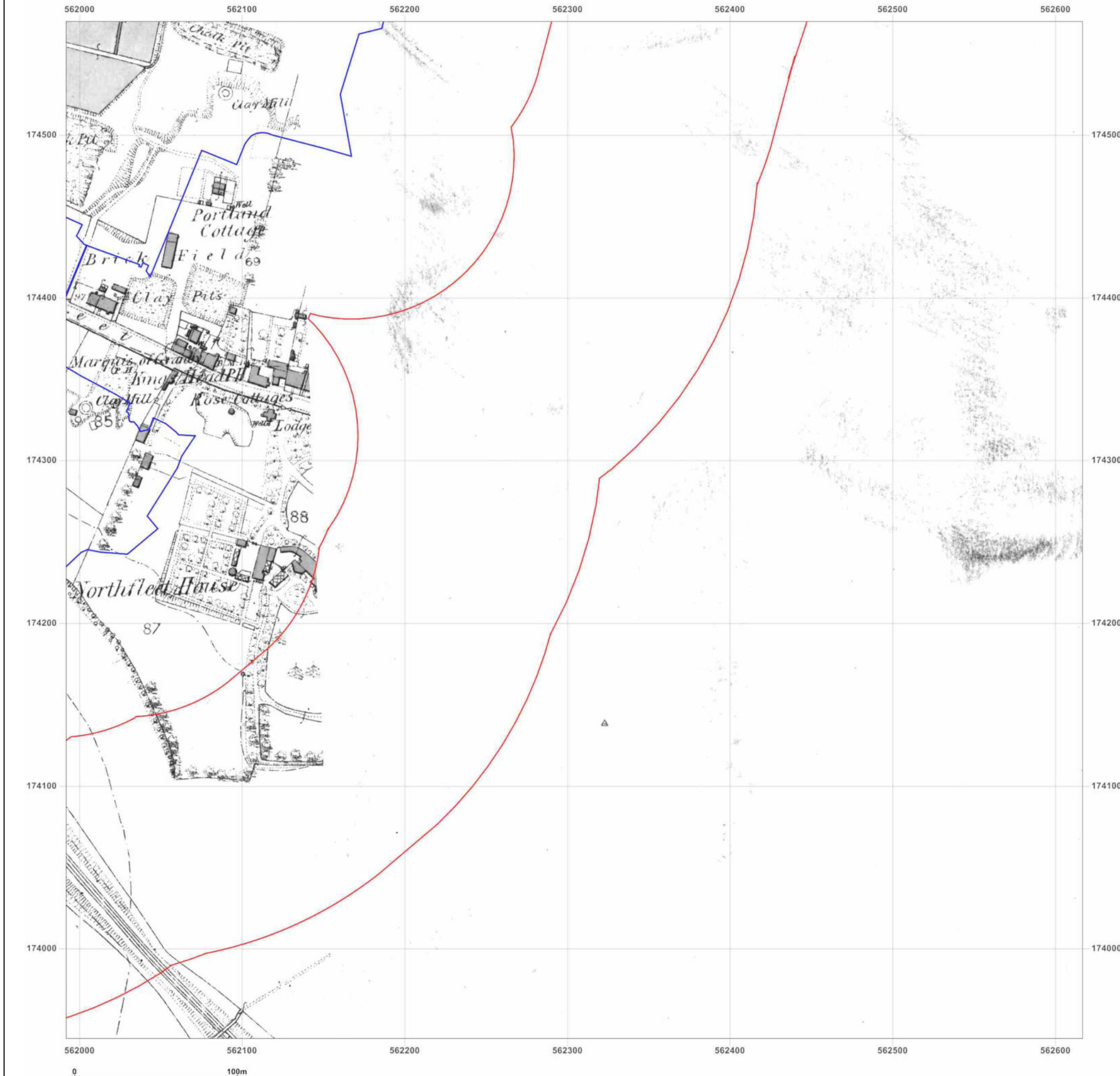


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

Map date: 1897

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1897
Revised 1897
Edition N/A
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Revised 1897
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

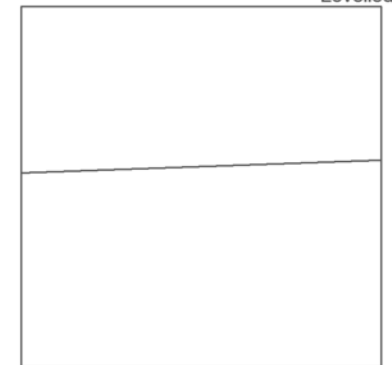
Map date: 1898

Scale: 1:2,500

Printed at: 1:2,500



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

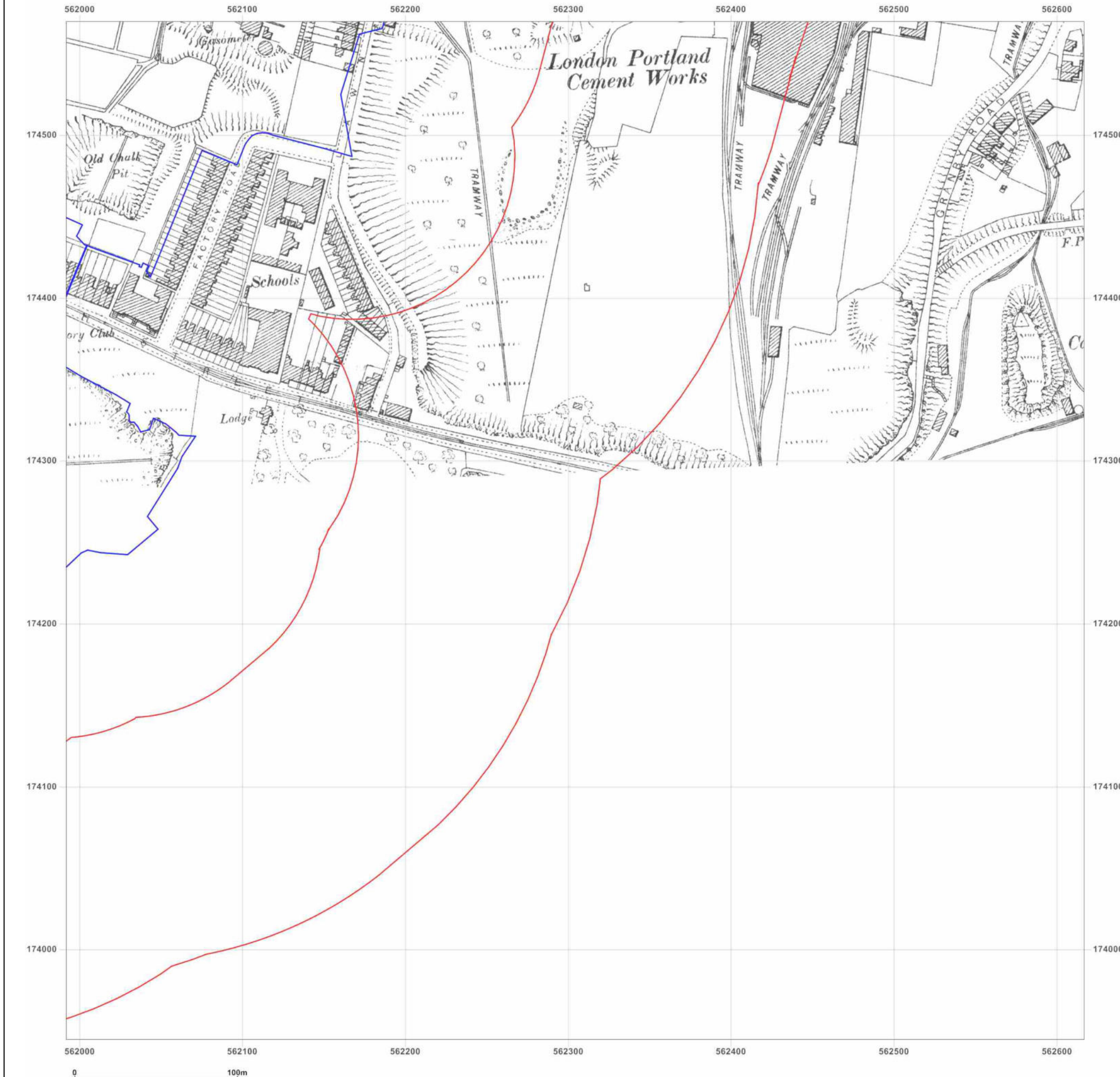


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

Map date: 1909

Scale: 1:2,500

Printed at: 1:2,500



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

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Revised 1909
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

Map date: 1932

Scale: 1:2,500

Printed at: 1:2,500



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

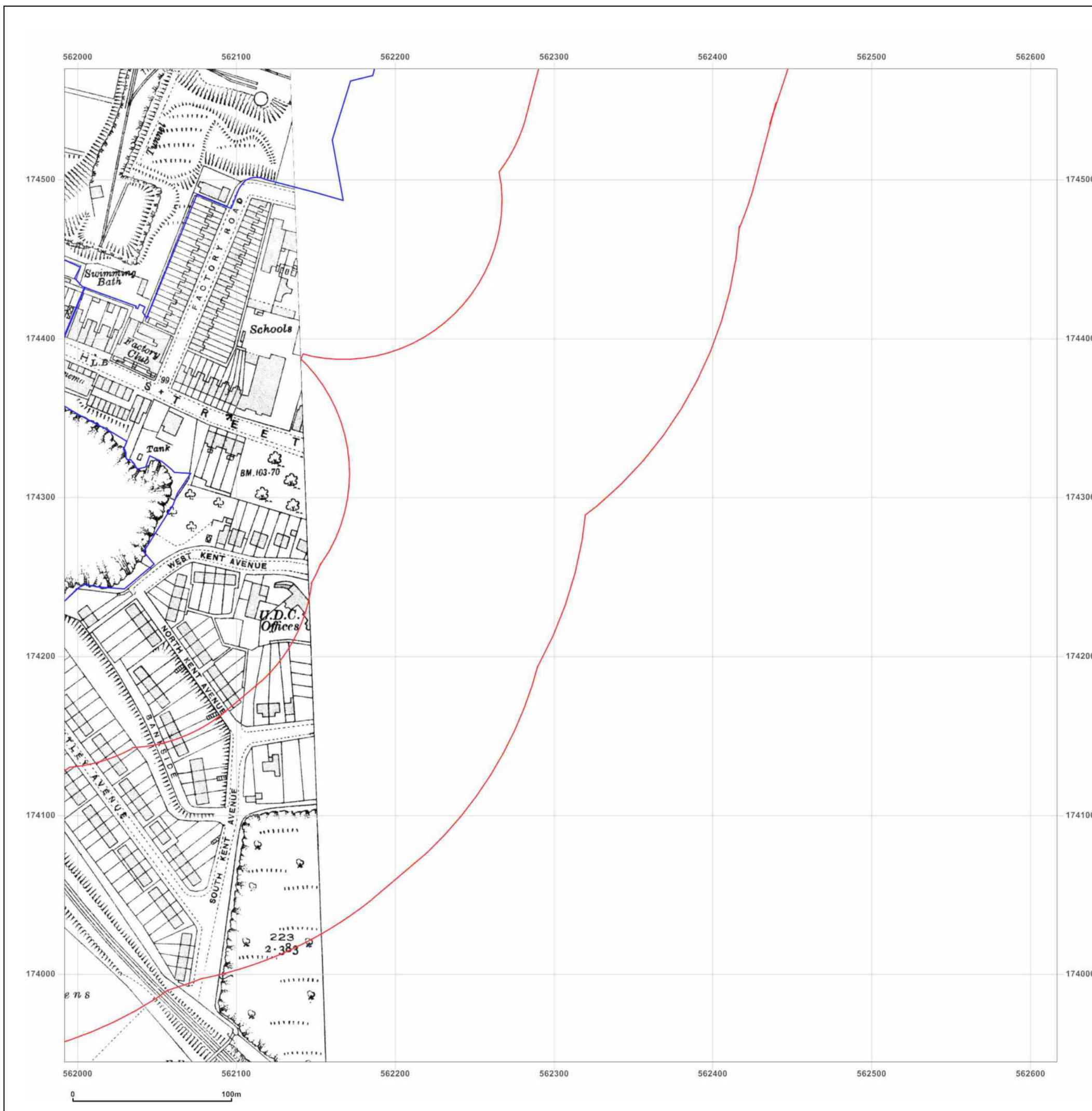


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Site Details:

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GRAVESEND, DA11 9AN

Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

Map date: 1933-1938

Scale: 1:2,500

Printed at: 1:2,500



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

Surveyed 1933
Revised 1933
Edition N/A
Copyright N/A
Levelled N/A

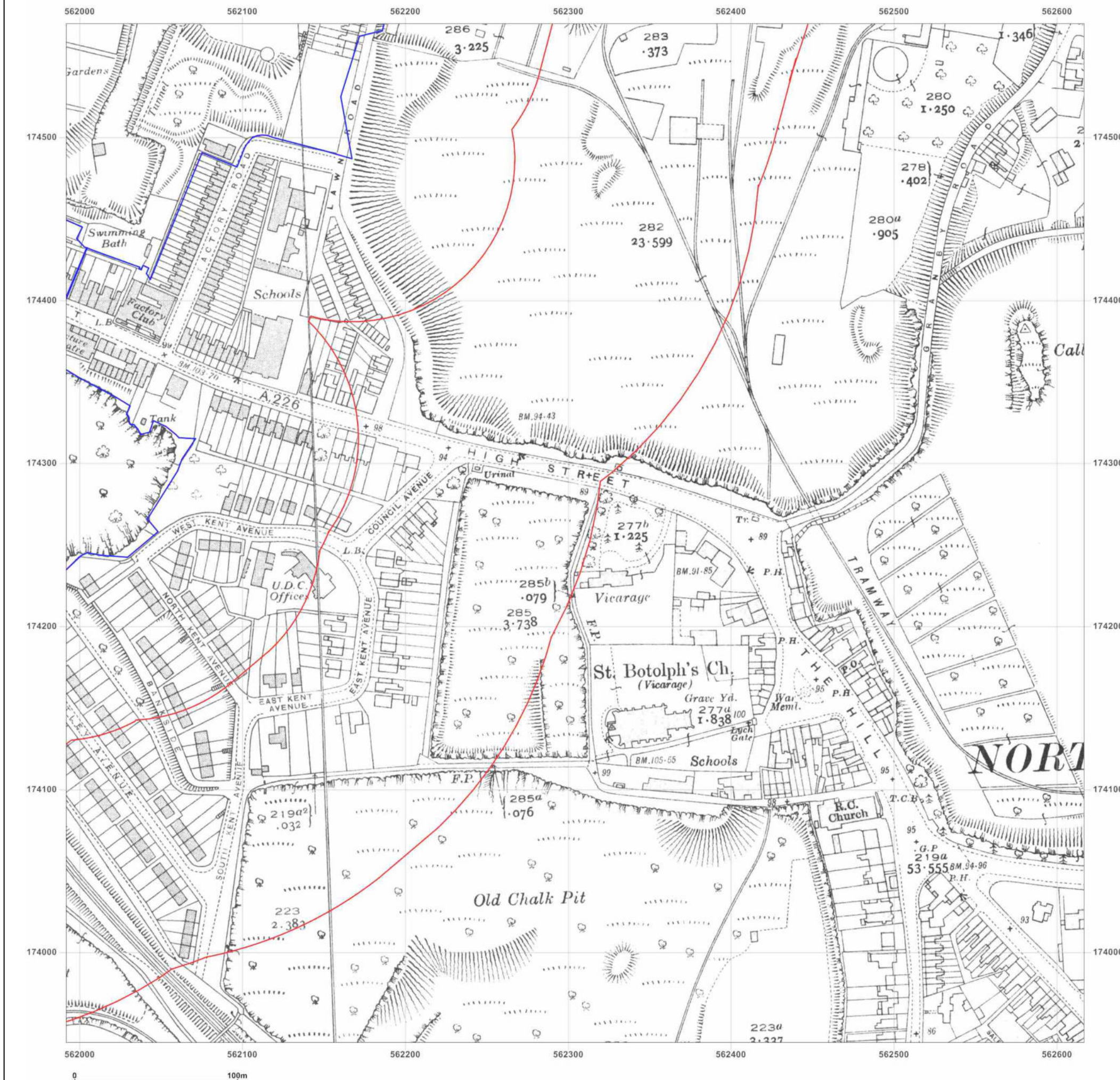


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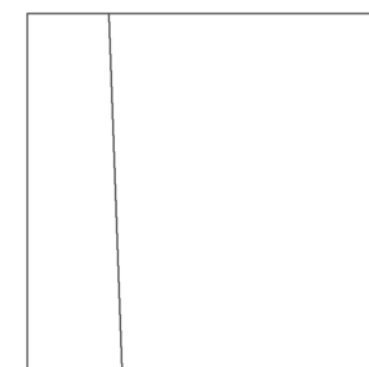
Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: County Series

Map date: 1939

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1939
Revised 1939
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: National Grid

Map date: 1952

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

Surveyed 1952
Revised 1952
Edition 1954
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_1
Grid Ref: 562304, 174257

Map Name: National Grid

Map date: 1961-1964

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1964
Revised 1964
Edition N/A
Copyright 1967
Levelled 1956

Surveyed 1961
Revised 1961
Edition N/A
Copyright 1961
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: County Series

Map date: 1897-1898

Scale: 1:2,500

Printed at: 1:2,500



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

Surveyed 1898
Revised 1898
Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: County Series

Map date: 1898

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1898
 Revised 1898
 Edition N/A
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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: County Series

Map date: 1909

Scale: 1:2,500

Printed at: 1:2,500



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

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

Surveyed 1909
Revised 1909
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Levelled N/A

Surveyed 1909
Revised 1909
Edition N/A
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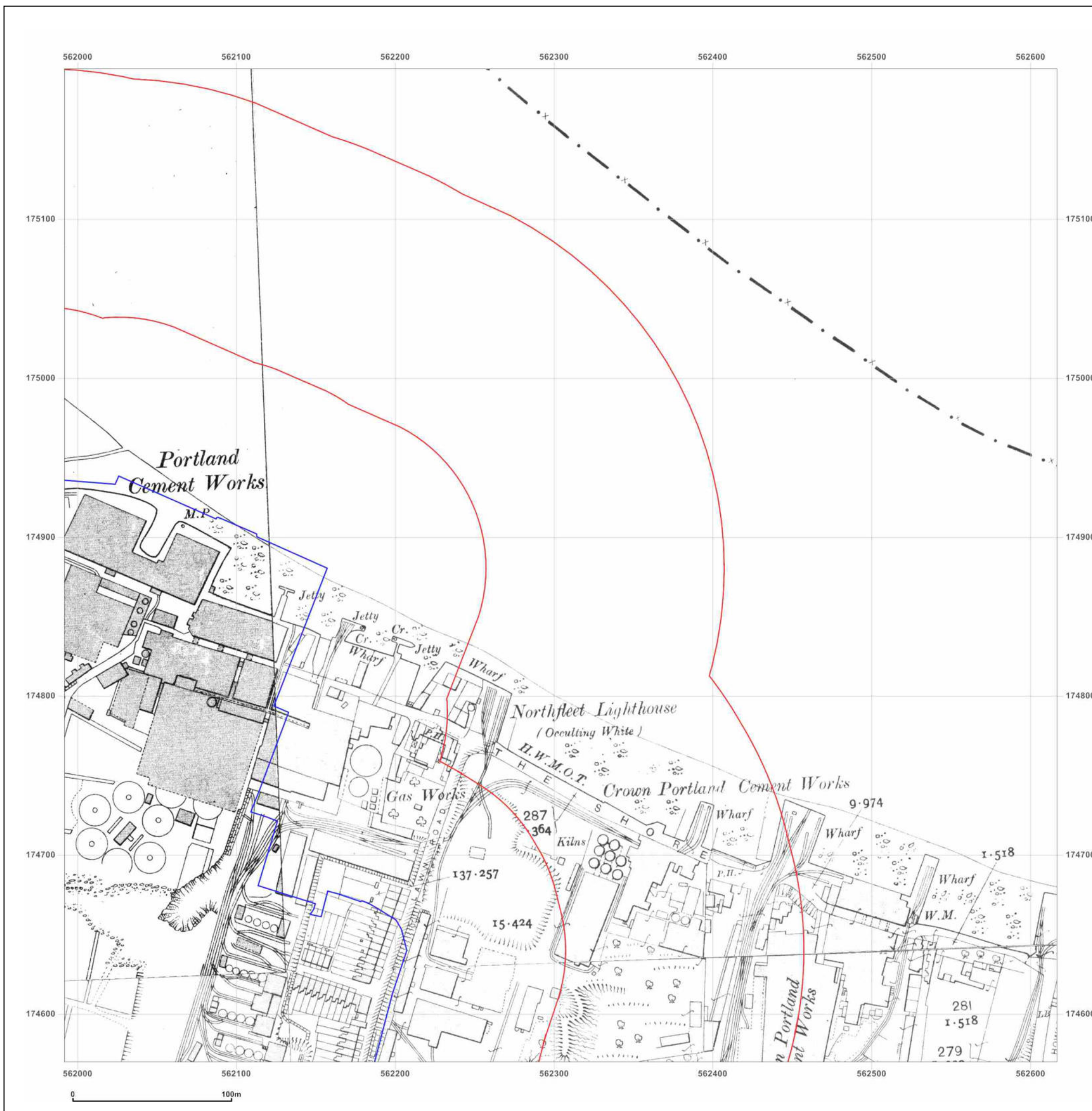


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: County Series

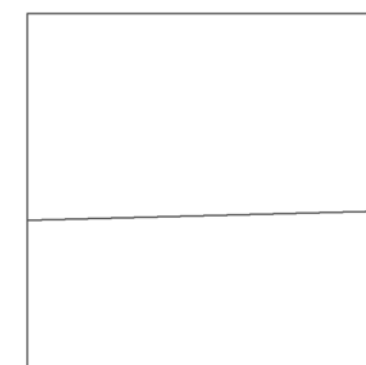
Map date: 1920

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1920
Revised 1920
Edition N/A
Copyright N/A
Levelled N/A

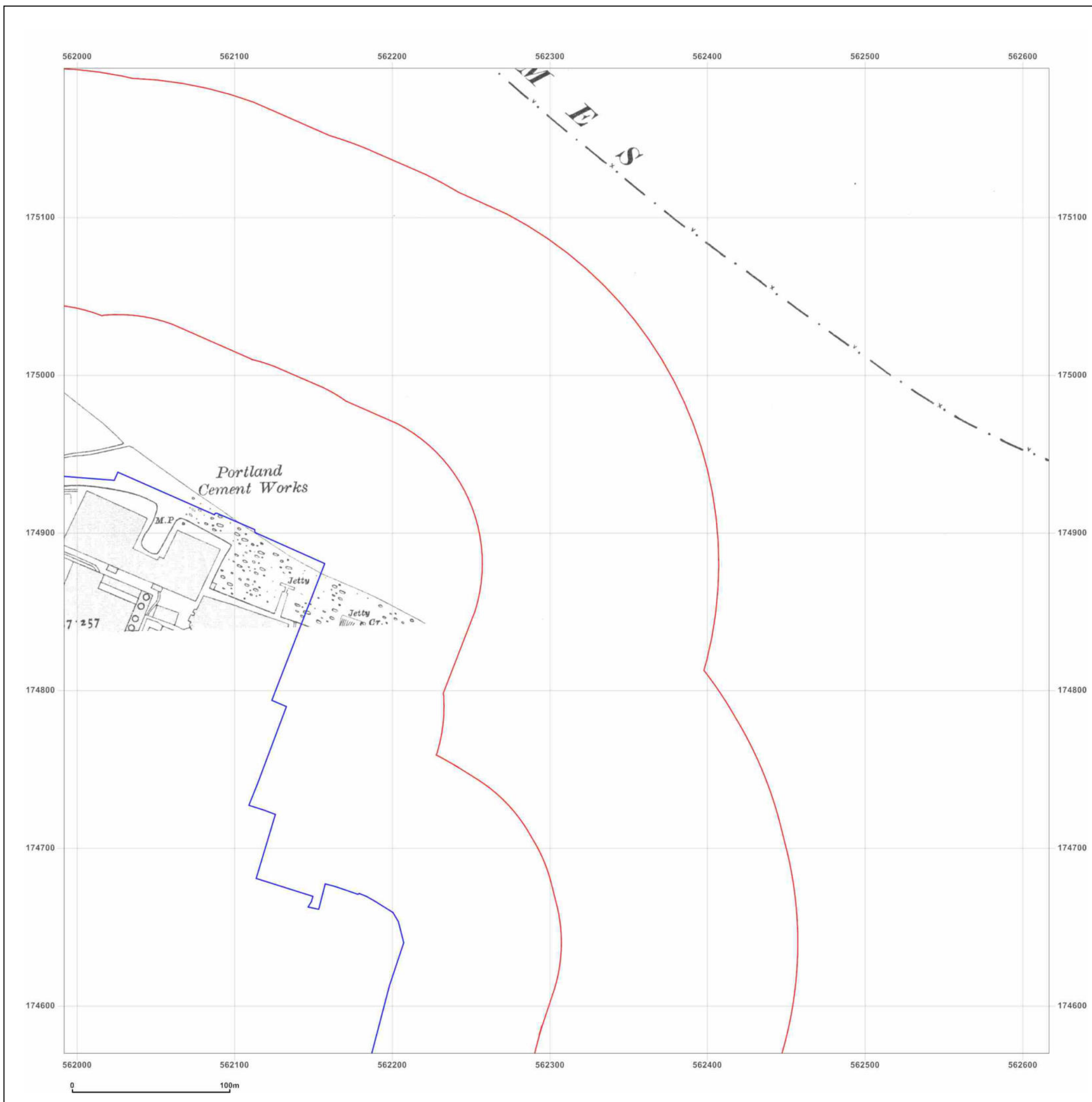


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: County Series

Map date: 1932-1933

Scale: 1:2,500

Printed at: 1:2,500



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

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

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

Surveyed 1933
Revised 1933
Edition N/A
Copyright N/A
Levelled N/A

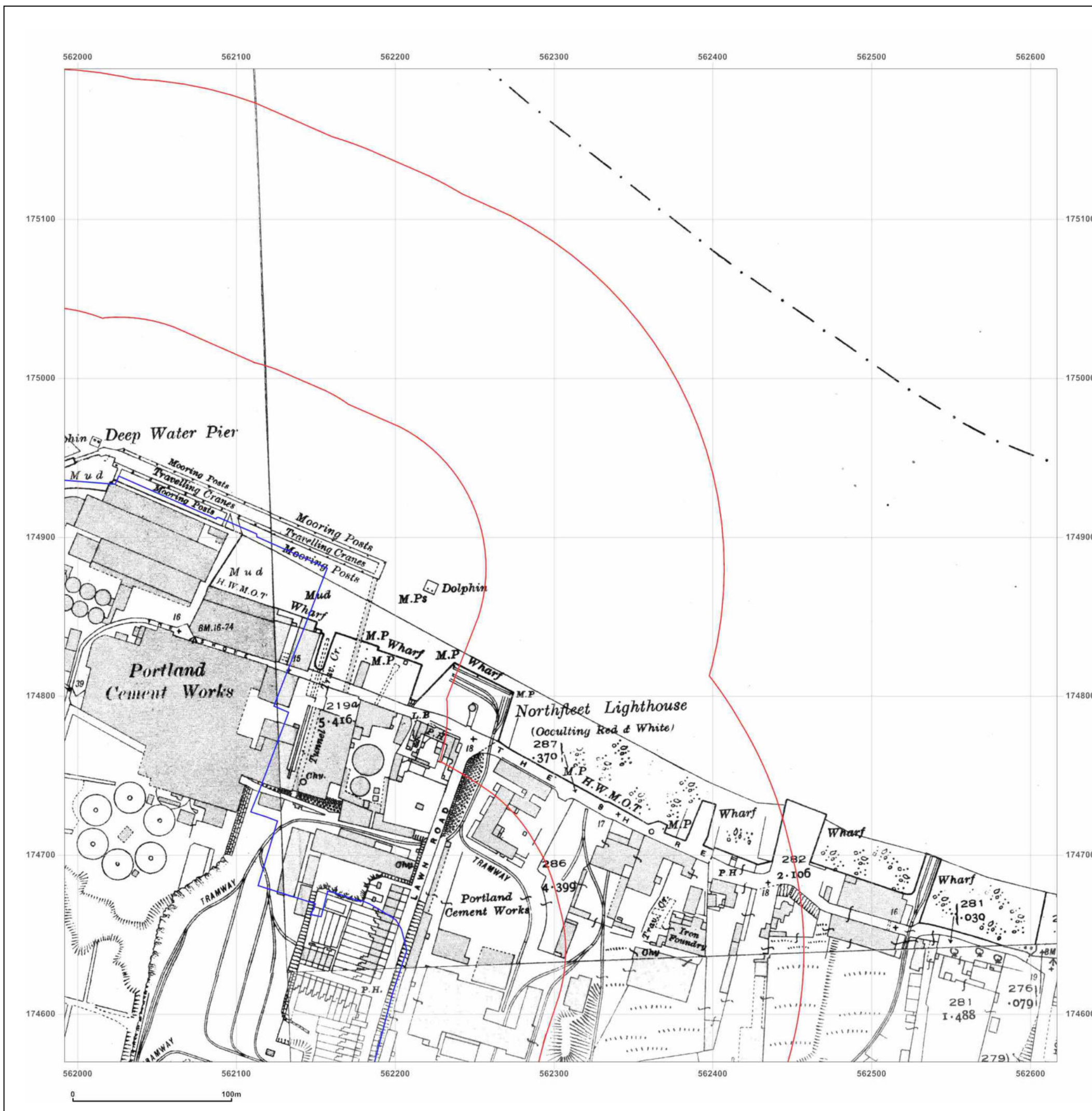


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: County Series

Map date: 1938-1939

Scale: 1:2,500

Printed at: 1:2,500



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

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

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

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

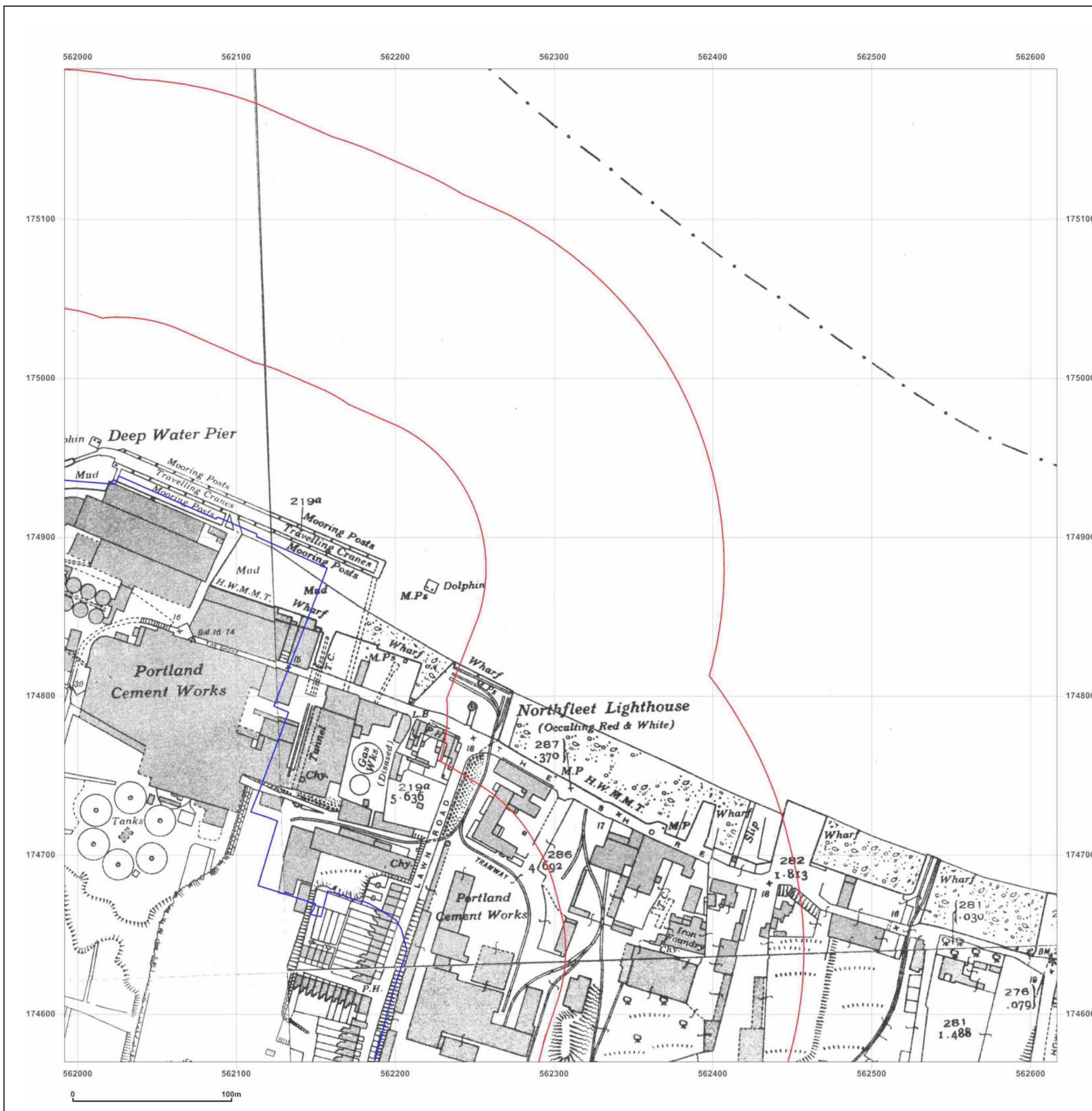


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: National Grid

Map date: 1951-1952

Scale: 1:2,500

Printed at: 1:2,500



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

Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

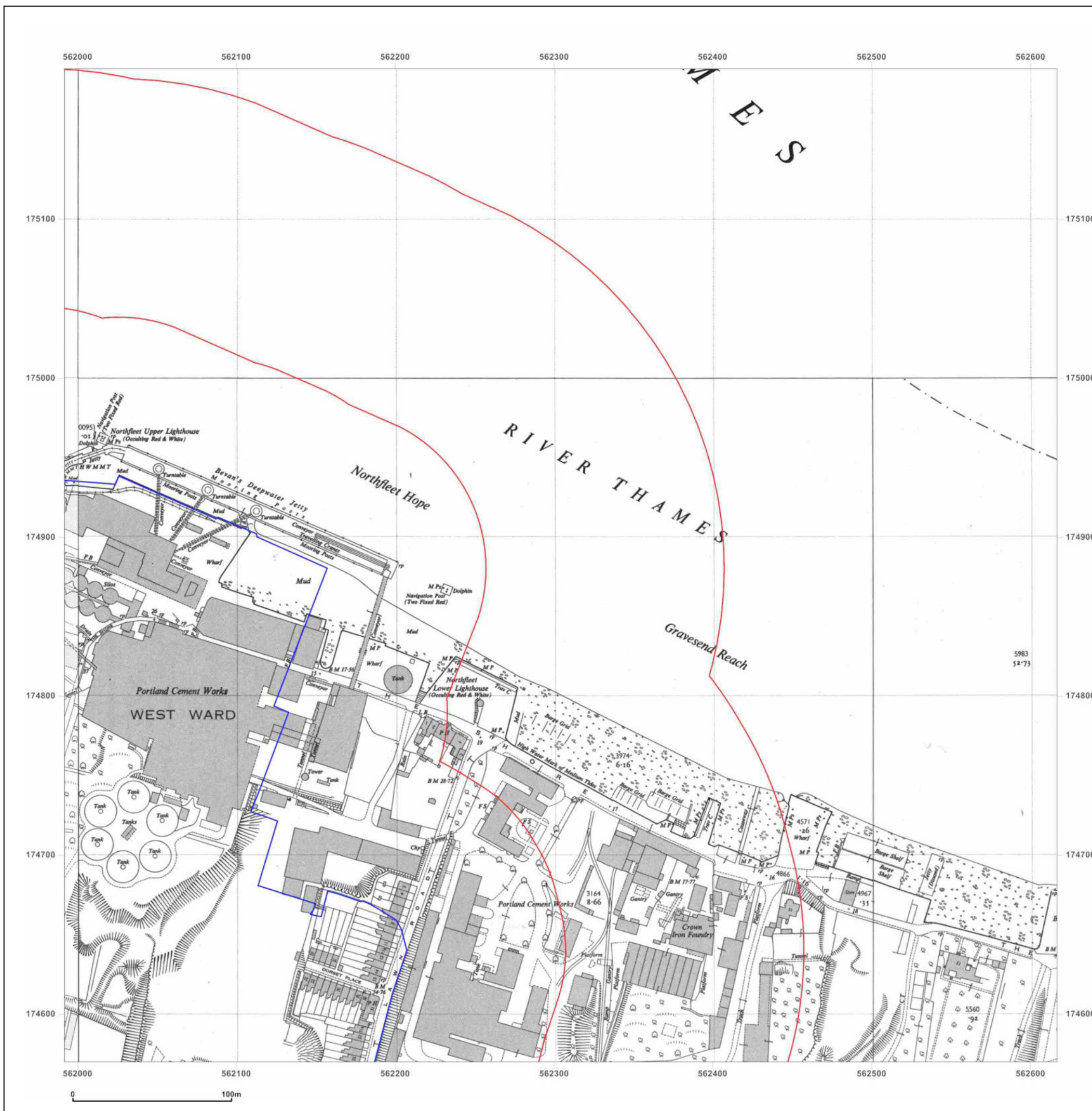


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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: National Grid

Map date: 1964

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1964
Revised 1964
Edition N/A
Copyright 1967
Levelled 1956



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Client Ref: 20-603-FDO-17855cz
Report Ref: HMD-154-6803395_LS_2_2
Grid Ref: 562304, 174882

Map Name: National Grid

Map date: 1970

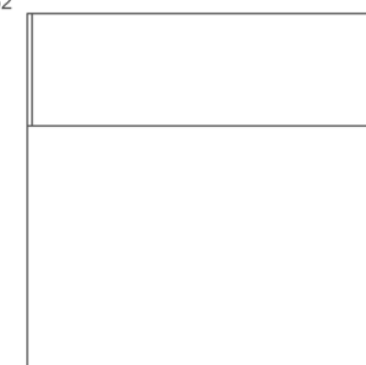
Scale: 1:2,500

Printed at: 1:2,500



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

Surveyed 1951
Revised 1970
Edition N/A
Copyright 1971
Levelled 1961

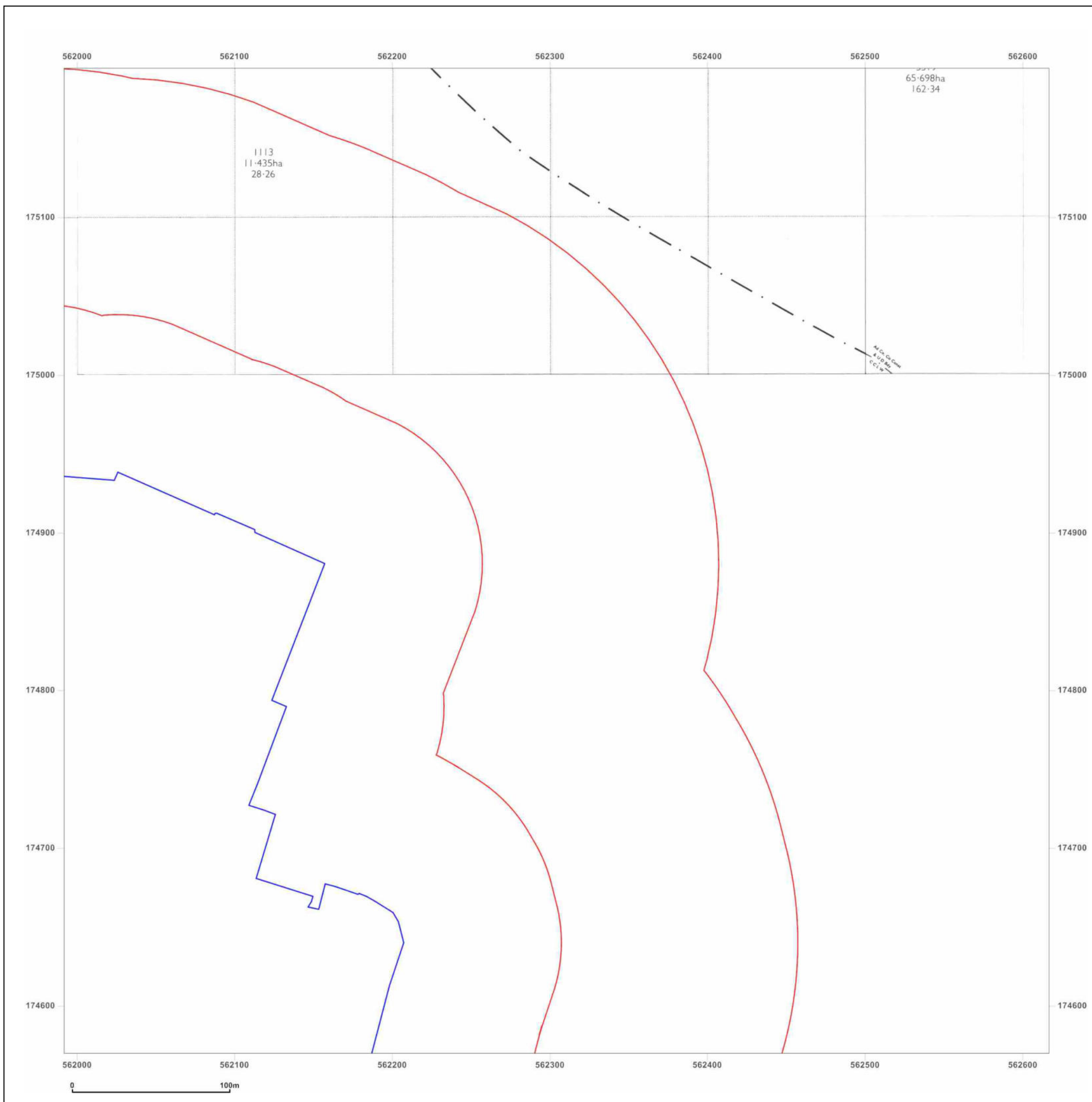


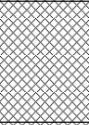
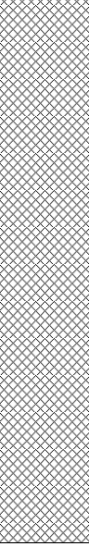
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IDOM						TRIAL PIT LOG		TrialPit No MTP27 Sheet 1 of 1		
Project Name: Northfleet Embankment				Project No. 17855cz		Co-ords: 562089.00 - 174501.00 Level:		Date 07/02/2019		
Location: Northfleet Embankment, Gravesend						Dimensions (m): 1.80		Scale 1:25		
Equipment: JCB 3CX Excavator						Depth 3.00		Logged SAM		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results							
	0.50	D,J		0.60			Concrete.			
	0.70	D,J					MADE GROUND: Orange brown gravelly slightly clayey SAND. Gravel is fine to coarse angular to rounded brick, chalk and concrete.			
	1.00	D,J		0.80		MADE GROUND: Black gravelly SAND. Gravel is fine to coarse angular roadstone and blacktop.				
	1.30	D,J		1.20		MADE GROUND: Brown gravelly very clayey SAND. Gravel is fine to coarse angular to subrounded brick, yellow brick, concrete and chalk.				
				3.00		End of Pit at 3.00m				
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample HSV = hand shear vane (kPa) PP = pocket penetrometer (kg.cm2) PID = photoionisation detector (ppm)				Stability Trial pit remained dry. Slightly unstable below 1.20 m bgl.			Remarks			

TRIAL PIT LOG

						Windowless Sample Log		Borehole No. MWS404 Sheet 1 of 1		
Project Name: Northfleet Embankment				Project No. 17855cz		Co-ords:		Scale 1:25		
Location: Gravesend						Level (m): 26.10		Logged By CJB		
Equipment: Premier 110 Tracked Windowless Sampler Rig						Dates: 14/01/2021		Checked By		
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.40	D,J		0.70	25.40		MADE GROUND comprising very dark grey, dark greyish brown and dark brownish grey sandy gravel/ gravelly sand. Sand is coarse. Gravels are fine to coarse angular to rounded flint, brick, ash and concrete.	1	
		1.00	SPT(C)	N=2 (1,0/1,0,0,1)	1.20	24.90		MADE GROUND comprising soft multicoloured gravelly clay with occasional cobbles of subangular concrete. Gravels are fine to coarse angular to rounded flint, concrete, chalk, brick and ash.		
		1.40	D,J					MADE GROUND comprising very loose very dark grey gravelly coarse sand of clinker. Gravels are fine to coarse angular clinker with occasional angular to rounded flint.		
		2.00	SPT(C)	N=4 (1,1/1,1,1,1)					2	
		3.00	SPT(C)	N=4 (1,0/1,1,1,1)	3.00	23.10		MADE GROUND comprising loose multicoloured slightly sandy gravel of fine to coarse angular brick fragments.	3	
					3.20	22.90		MADE GROUND comprising soft brown gravelly clay. Gravels are fine to coarse angular clinker with brick, flint and concrete.		
					3.50	22.60		MADE GROUND comprising very loose very dark grey gravelly coarse sand of clinker. Gravels are fine to coarse angular clinker with occasional angular to rounded flint.		
		4.00	SPT(C)	N=2 (1,1/1,0,1,0)					4	
					4.45	21.65				
		End of Borehole at 4.45m								5
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon) HSV = hand shear vane (kPa) PP = pocket penetrometer (kg.cm2) PID = photoionisation detector (ppm)						Remarks Coordinates and levels, where indicated, must not be used for design purposes. The designer is responsible for verifying all site and setting out dimensions. Level extrapolated from RLT Engineering drawing number 1803/05/1007 Rev A dated 08 January 2021.				

IDOM					Borehole Log			Borehole No.											
								MBH23											
								Sheet 1 of 4											
Project Name: Northfleet Embankment				Project No. 17855cz		Co-ords:			Scale 1:50										
Location: Gravesend					Level (m): 26.00			Logged By CJB											
Equipment: Dando 2000					Dates: 19/05/2020			Checked By											
Well	Wtr Strk	Sample and In Situ Testing			Coring				Depth (m)	Level (m)	Legend	Stratum Description							
		Depth (m)	Type	Results	FI	TCR	SCR	RQD											
		0.30	B						1.20	24.80		MADE GROUND comprising grey, greyish brown and brownish grey sandy gravel with occasional cobble size fragments of brick. Gravels are fine to coarse angular to rounded flint, concrete, brick and chalk.	1						
		0.50	B																
		1.00	B	N=7 (1,1/2,1,2,2)					2.00 - 2.45	D SPT(S)	N=6 (1,1/2,2,2,1)	4.00	22.00		MADE GROUND comprising soft brown, orangish brown and dark yellowish brown slightly sandy gravelly clay. Gravels are fine to coarse angular to rounded flint, charcoal, brick and ash.	2			
		1.20 - 1.65	D																
		1.20	SPT(S)	3.00 - 3.45					D SPT(S)	N=7 (1,1/2,2,1,2)	5.00	21.00		MADE GROUND comprising firm pale whiteish brown and very dark grey slightly sandy gravelly SILT. Gravels are fine to coarse angular to rounded flint, ash and clinker.	4				
		2.00	SPT(S)																
		4.00 - 4.45	D SPT(S)	N=5 (1,1/1,1,2,1)					5.00 - 5.50	D SPT(S)	N=6 (1,1/2,2,1,1)	6.00	20.00		MADE GROUND comprising loose very dark grey and dark greyish brown gravelly coarse sand. Gravels are fine to coarse angular to rounded flint, brick and ash.	5			
		4.00	SPT(S)																
		6.00 - 6.45	D SPT(S)	N=14 (2,2/3,3,4,4)					7.00	D	7.50 - 7.95	D SPT(S)	N=16 (2,3/3,4,4,5)	8.00	D	Medium dense orangish brown, dark yellowish brown and pale brown silty fine and medium SAND with occasional fine and medium subangular and subrounded flint gravel (RIVER TERRACE DEPOSITS - BOYN HILL GRAVEL MEMBER)	6		
		6.00	SPT(S)																
		7.00	D	9.00 - 9.45					D SPT(S)	N=17 (2,3/4,4,4,5)	10.00	D						Continued on Next Sheet	10
		7.50	SPT(S)																
		8.00	D																
		10.00	D																
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon)				HSV = hand shear vane (kPa) PP = pocket penetrometer (kg.cm2) PID = photoionisation detector (ppm) FI = fracture index TCR = total core recovery SCR = solid core recovery RQD = rock quality designation				Remarks Coordinates and levels, where indicated, must not be used for design purposes. The user is responsible for verifying all site and setting out dimensions. Hand excavated service inspection pit GL - 1.20 m. Casing - 200 mm GL - 10.5 m, 150 mm GL - 15.0 m.											

IDOM									Borehole Log				Borehole No.	
													MBH23	
													Sheet 3 of 4	
Project Name: Northfleet Embankment					Project No. 17855cz				Co-ords:				Scale 1:50	
Location: Gravesend									Level (m): 26.00				Logged By CJB	
Equipment: Dando 2000									Dates: 19/05/2020				Checked By	
Well	Wtr Strk	Sample and In Situ Testing			Coring				Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results	FI	TCR	SCR	RQD						
		21.00 - 21.45 21.00	D SPT(S)	N=28 (3,5/5,7,8,8)								CHALK recovered as off white, cream and pale brown slightly sandy gravelly SILT / silty slightly sandy GRAVEL. Clasts are weak to moderately weak low to medium density white with occasional orangish brown and yellowish brown oxidation spots and bands. Matrix is uncompact off white, pale whiteish yellow and pale whiteish brown with frequent orangish brown oxidation staining and soft brown clay infill. Occasional flints. (SEAFORD CHALK FORMATION)	21	
		22.00 - 22.45	D									Becoming paler with depth.	22	
		22.50	SPT(S)	N=31 (3,4/6,8,8,9)										23
		23.00	D											24
		24.00 - 24.45 24.00	D SPT(S)	N=32 (3,5/8,7,9,8)										25
		25.00	D											26
		25.50 - 25.95 25.50	D SPT(S)	N=34 (4,6/7,8,9,10)										27
		26.00	D											28
		27.00 - 27.45 27.00	D SPT(S)	N=38 (4,8/8,9,10,11)										29
		28.00	D											30
		28.50 - 28.95 28.50	D SPT(S)	N=33 (5,6/7,9,8,9)										
		29.00	D										White.	
	30.00 - 30.45	D										Continued on Next Sheet		
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon)				HSV = hand shear vane (kPa) PP = pocket penetrometer (kg.cm2) PID = photoionisation detector (ppm) FI = fracture index TCR = total core recovery SCR = solid core recovery RQD = rock quality designation				Remarks Coordinates and levels, where indicated, must not be used for design purposes. The user is responsible for verifying all site and setting out dimensions. Hand excavated service inspection pit GL - 1.20 m. Casing - 200 mm GL - 10.5 m, 150 mm GL - 15.0 m.						

IDom										Borehole Log				Borehole No.	
														MBH23	
														Sheet 4 of 4	
Project Name: Northfleet Embankment						Project No. 17855cz				Co-ords:				Scale 1:50	
Location: Gravesend										Level (m): 26.00				Logged By CJB	
Equipment: Dando 2000										Dates: 19/05/2020				Checked By	
Well	Wtr Strk	Sample and In Situ Testing			Coring				Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results	FI	TCR	SCR	RQD							
		30.00	SPT(S)	N=34 (5,6/8,9,9,8)					30.50	-4.50		CHALK recovered as off white, cream and pale brown slightly sandy gravelly SILT / silty slightly sandy GRAVEL. Clasts are weak to moderately weak low to medium density white with occasional orangish brown and yellowish brown oxidation spots and bands. Matrix is uncompact off white, pale whiteish yellow and pale whiteish brown with frequent orangish brown oxidation staining and soft brown clay infill. Occasional flints. (SEAFORD CHALK FORMATION)	31		
													32		
													33		
													34		
													35		
													36		
													37		
													38		
													39		
													40		
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon)				HSV = hand shear vane (kPa) PP = pocket penetrometer (kg.cm2) PID = photoionisation detector (ppm) FI = fracture index TCR = total core recovery SCR = solid core recovery RQD = rock quality designation				Remarks Coordinates and levels, where indicated, must not be used for design purposes. The user is responsible for verifying all site and setting out dimensions. Hand excavated service inspection pit GL - 1.20 m. Casing - 200 mm GL - 10.5 m, 150 mm GL - 15.0 m.							

HOLST & CO. LTD. TQ67SW-357

SITE INVESTIGATION DEPT.
5-7, NEW YORK ROAD 6200, 7444
LEEDS, 2

Contract No. 19007/F958

Borehole No. T2 (102)

Location Northfleet

Ground Level 92.68

Client A P C M Ltd

Date 4th June 1968

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	deg.	m.c %	γ lb/cu. ft.	N
Concrete		4"	4"	3'0"					12
Fill:- Bricks, soil and ashes		3'6"	3'2"	8'0"					30
Sand and gravel with flints and slight traces of clay		14'0"	10'6"	13'0"					25
				18'3"					22
				23'6"					
				28'6"					21
Chalk with flints		78'0"	33'9"						23
				39'0"					23
				44'0"					26
				49'3"					28
				54'6"					24
				60'0"					33
				65'6"					39

Water Struck at NONE ENCOUNTERED

Maximum Observed Water Level

Undisturbed Sample □
Disturbed Sample ○
Water Sample Δ
Penetration Test I

c = Cohesion
φ = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant

HOLST & CO. LTD. TQ67SW-374 SITE INVESTIGATION DEPT. 57, NEW YORK ROAD 6217, 7452 LEEDS, 2									
Contract No. _____				Borehole No. <u>F3</u>					
Location <u>Northfleet</u>				Ground Level _____					
Client _____				Date _____					
BOREHOLE LOG									
STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	φ deg.	m.c %	γ lb/cu. ft.	N
Concrete		9"	9"						
Fill: ashes & brick		1'-9"	1'-0"						
Firm light brown Clay.		9'-0"	7'-3"						
Firm light brown very sandy clay		19'-0"	10'-0"						
Sand & Gravel with flints.		25'-0"	6'-0"						
Water Struck at _____					Maximum Observed Water Level _____				
Undisturbed Sample ☐ Disturbed Sample ☐ Water Sample ☐ Penetration Test ☐					c = Cohesion φ = Angle of Internal Friction m.c = Moisture Content γ = Bulk Density N = Standard Penetration Value				
Water levels are subject to seasonal or tidal variation and should not be taken as constant									

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Analytical Report Number : 19-28658

Replaces Analytical Report Number : 19-28658, issue no. 2

Project / Site name:	Northfleet Embankment	Samples received on:	12/02/2019
Your job number:	17855CZ	Samples instructed on:	13/02/2019
Your order number:	19-S2-FDO-LABS	Analysis completed by:	04/03/2019
Report Issue Number:	3	Report issued on:	04/03/2019
Samples Analysed:	2 bulk samples - 43 soil samples		

Signed:

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153818	1153819	1153820	1153821	1153822
Sample Reference				MTP14	MTP16	MTP29	MPT29	MTP30
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.95	1.00	0.50	1.20	0.70
Date Sampled				04/02/2019	04/02/2019	04/02/2019	04/02/2019	04/02/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)								
	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	12	9.7	11	22	20
Total mass of sample received	kg	0.001	NONE	0.28	0.59	0.62	0.64	0.60

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	0.008
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	0.008

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	10.9	10.4	12.0	12.0	9.8
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.13	0.85	0.0055	0.014	0.83
Sulphide	mg/kg	1	MCERTS	9.1	2.0	< 1.0	< 1.0	7.8
Organic Matter	%	0.1	MCERTS	14	0.7	0.7	0.3	1.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	9.5	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	4.6	0.23	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.89	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.2	0.29	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.96	0.28	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.46	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.37	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	17.9	0.80	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.7	8.5	9.8	13	58
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.5	0.3	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	33	24	20	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	33	95	20	22	73
Lead (aqua regia extractable)	mg/kg	1	MCERTS	35	73	38	15	73
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	20	16	10	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.7	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	51	120	160	38	82

Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153818	1153819	1153820	1153821	1153822
Sample Reference	MTP14	MTP16	MTP29	MPT29	MTP30
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.95	1.00	0.50	1.20	0.70
Date Sampled	04/02/2019	04/02/2019	04/02/2019	04/02/2019	04/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	3.9	1.5	2.9	2.3	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	24	8.5	11	4.9	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	170	53	45	44	14
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	1100	160	350	580	160
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	1300	220	410	640	170

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	12	3.3	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	32	14	15	5.3	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	79	35	44	13	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	620	82	180	190	48
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	740	130	240	210	52

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-
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Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153823	1153824	1153825	1153826	1153827
Sample Reference				MTP30	MTP31	MTP17	MTP17	MTP17
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	0.60	0.50	0.90	1.30
Date Sampled				04/02/2019	04/02/2019	05/02/2019	05/02/2019	05/02/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.001	NONE	21	8.9	15	12	19
Total mass of sample received	kg	0.001	NONE	0.55	0.68	0.49	0.70	0.44

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	Chrysotile	Chrysotile & Amosite	-	Chrysotile & Amosite
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Detected	Detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	< 0.001	0.387	-	0.002
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	< 0.001	0.387	-	0.002

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.5	11.5	8.2	8.5	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	3	< 1	12
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.80	0.087	0.49	0.20	1.1
Sulphide	mg/kg	1	MCERTS	13	7.6	28	5.4	630
Organic Matter	%	0.1	MCERTS	1.6	2.3	3.8	0.4	9.4

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	2.7
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	3.9
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.22	< 0.05	0.81
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	10
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	11
Phenanthrene	mg/kg	0.05	MCERTS	0.24	0.31	2.1	< 0.05	78
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.56	< 0.05	20
Fluoranthene	mg/kg	0.05	MCERTS	0.28	0.40	3.5	< 0.05	92
Pyrene	mg/kg	0.05	MCERTS	0.29	0.42	3.8	< 0.05	97
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.6	< 0.05	76
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.4	< 0.05	59
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	4.0	< 0.05	81
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.5	< 0.05	42
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	3.1	< 0.05	65
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.0	< 0.05	25
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.55	< 0.05	8.8
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.4	< 0.05	26

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	0.81	1.13	27.8	< 0.80	696
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	34	9.9	20	4.9	58
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.7	20	0.8	61
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	43	95	29	210
Copper (aqua regia extractable)	mg/kg	1	MCERTS	98	47	920	21	900
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	61	1500	50	16000
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	2.1	< 0.3	4.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	20	150	21	1500
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	9.6
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	360	180	13000	430	42000

Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153823	1153824	1153825	1153826	1153827
Sample Reference	MTP30	MTP31	MTP17	MTP17	MTP17
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	0.60	0.50	0.90	1.30
Date Sampled	04/02/2019	04/02/2019	05/02/2019	05/02/2019	05/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.6	< 1.0	2.1	< 1.0	47
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	3.3	14	< 2.0	160
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	17	34	120	< 8.0	830
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	160	200	760	51	4500
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	180	240	890	53	5600

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	1.2	< 1.0	2.9	< 1.0	43
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.4	4.8	14	< 2.0	280
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	23	18	86	< 10	1800
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	110	120	640	< 10	4900
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	140	150	740	11	7000

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-
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Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153828	1153829	1153830	1153831	1153832
Sample Reference	MTP17	MTP18	MTP19	MTP19	MTP20
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	2.10	0.70	0.40	0.80	0.35
Date Sampled	05/02/2019	05/02/2019	05/02/2019	05/02/2019	05/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	17
Total mass of sample received	kg	0.001	NONE	0.37	0.53
				0.61	0.81
				0.81	0.51

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5	10.9	8.6	9.1	12.1
Total Cyanide	mg/kg	1	MCERTS	5	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.2	0.87	0.077	0.29	0.10
Sulphide	mg/kg	1	MCERTS	570	8.3	3.3	< 1.0	13
Organic Matter	%	0.1	MCERTS	4.3	< 0.1	4.3	0.3	2.1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.40	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.29	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.74	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	1.6	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	7.1	< 0.05	0.35	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	1.5	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	7.6	< 0.05	1.1	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	8.3	< 0.05	1.1	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.2	< 0.05	0.60	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	3.4	< 0.05	0.69	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	4.5	< 0.05	0.98	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	2.2	< 0.05	0.57	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.3	< 0.05	0.85	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.7	< 0.05	0.42	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.9	< 0.05	0.42	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	47.7	< 0.80	7.09	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	3.0	11	9.2	2.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	20	1.6	0.5	< 0.2	0.5
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	68	9.5	22	20	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	270	10	29	12	14
Lead (aqua regia extractable)	mg/kg	1	MCERTS	1200	51	73	16	28
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	130	11	20	18	11
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	13000	82	93	34	49

Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153828	1153829	1153830	1153831	1153832
Sample Reference	MTP17	MTP18	MTP19	MTP19	MTP20
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	2.10	0.70	0.40	0.80	0.35
Date Sampled	05/02/2019	05/02/2019	05/02/2019	05/02/2019	05/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	21	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	3.9	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	8.3	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	4.5	< 1.0	< 1.0	< 1.0	5.3
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	26	< 2.0	< 2.0	< 2.0	31
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	260	< 8.0	< 8.0	< 8.0	130
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	1700	< 8.0	< 8.0	< 8.0	2200
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	2000	< 10	< 10	< 10	2400

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	0.037	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	4.3	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	39	< 2.0	2.5	< 2.0	13
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	270	< 10	11	< 10	59
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	1200	< 10	20	< 10	1100
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1600	< 10	34	< 10	1200

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-
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Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153833	1153834	1153835	1153836	1153837
Sample Reference				MTP20	MTP20	MTP21	SP1	MTP22
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.65	0.50	None Supplied	0.20
Date Sampled				05/02/2019	05/02/2019	05/02/2019	05/02/2019	05/02/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Stone Content				%	0.1	NONE	< 0.1	< 0.1
Moisture Content				%	N/A	NONE	15	3.3
Total mass of sample received				kg	0.001	NONE	0.72	0.96

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.7	9.3	10.2	12.1	8.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.12	0.045	0.15	0.0093	0.046
Sulphide	mg/kg	1	MCERTS	9.6	< 1.0	8.3	< 1.0	10
Organic Matter	%	0.1	MCERTS	0.9	< 0.1	2.8	0.6	7.8

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.58
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.08
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.1
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.86
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.59
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.51
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.70
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.30
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.52
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	5.20
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.1	8.1	11	9.4	15
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.5	0.4	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	16	13	39	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	9.0	36	20	47
Lead (aqua regia extractable)	mg/kg	1	MCERTS	22	7.1	26	35	110
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	20	18	16	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	36	22	50	110	120

Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153833	1153834	1153835	1153836	1153837
Sample Reference	MTP20	MTP20	MTP21	SP1	MTP22
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.50	1.65	0.50	None Supplied	0.20
Date Sampled	05/02/2019	05/02/2019	05/02/2019	05/02/2019	05/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	8.6	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	28	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	95	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	130	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	5.9
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	11
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	16
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	33

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-
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Analytical Report Number: 19-28658
Project / Site name: Northfleet Embankment
Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153838	1153839	1153840	1153841	1153842
Sample Reference				MTP7	MTP7	MTP5	MTP4	MTP8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.50	0.05	0.05	0.60
Date Sampled				06/02/2019	06/02/2019	06/02/2019	06/02/2019	06/02/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	13	36	51	17
Total mass of sample received	kg	0.001	NONE	0.42	0.55	0.42	0.39	0.50

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5	8.3	8.2	7.6	8.4
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.061	0.38	0.076	0.046	0.025
Sulphide	mg/kg	1	MCERTS	18	2.4	19	9.2	< 1.0
Organic Matter	%	0.1	MCERTS	3.1	2.3	8.8	17	1.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.25	0.21	0.21	0.71	0.34
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.12	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.48	0.34	0.31	1.0	0.55
Pyrene	mg/kg	0.05	MCERTS	0.45	0.30	0.25	0.96	0.47
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.28	0.26	0.20	0.48	0.37
Chrysene	mg/kg	0.05	MCERTS	0.32	0.22	0.14	0.68	0.32
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.35	0.29	< 0.05	0.87	0.38
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.14	0.14	< 0.05	0.25	0.24
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.29	< 0.05	< 0.05	0.60	0.31
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.36	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.44	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	2.56	1.76	1.11	6.51	2.98
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	14	1.1	7.9	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.1	1.4	0.4	2.4	0.7
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	33	4.7	8.7	56
Copper (aqua regia extractable)	mg/kg	1	MCERTS	94	180	17	41	33
Lead (aqua regia extractable)	mg/kg	1	MCERTS	82	130	17	65	36
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	31	5.6	20	30
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	240	43	160	80

Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153838	1153839	1153840	1153841	1153842
Sample Reference	MTP7	MTP7	MTP5	MTP4	MTP8
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.60	1.50	0.05	0.05	0.60
Date Sampled	06/02/2019	06/02/2019	06/02/2019	06/02/2019	06/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	3.6	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	12	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	18	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	22	< 10	< 10	27	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	28	14	10	38	12

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-
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Analytical Report Number: 19-28658
Project / Site name: Northfleet Embankment
Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153843	1153844	1153845	1153846	1153847
Sample Reference				MTP3	MTP3	MTP3	MTP10	MTP10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.10	1.70	0.20	0.60
Date Sampled				06/02/2019	06/02/2019	06/02/2019	06/02/2019	06/02/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	20	16	17	16
Total mass of sample received	kg	0.001	NONE	0.48	0.60	0.39	0.56	0.71

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	Not-detected	-	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	8.3	6.9	7.7	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.12	0.096	0.14	0.031	0.074
Sulphide	mg/kg	1	MCERTS	13	< 1.0	20	< 1.0	< 1.0
Organic Matter	%	0.1	MCERTS	9.4	2.2	5.5	5.0	1.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.98	< 0.05	0.75	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.61	< 0.05	1.3	0.29	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.84	0.61	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.64	0.53	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.37	0.31	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.50	0.40	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.54	0.37	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.34	0.13	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	0.28	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.33	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.44	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.59	< 0.80	6.51	2.92	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.9	7.2	6.9	7.5	5.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.7	0.4	0.7	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	37	8.7	23	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	83	27	74	23	11
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	76	22	42	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	42	21	20	25	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	2.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	60	65	53	88	33

Analytical Report Number: 19-28658
Project / Site name: Northfleet Embankment
Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153843	1153844	1153845	1153846	1153847
Sample Reference	MTP3	MTP3	MTP3	MTP10	MTP10
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.20	1.10	1.70	0.20	0.60
Date Sampled	06/02/2019	06/02/2019	06/02/2019	06/02/2019	06/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.9	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	11	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	17	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	54	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	85	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	12	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	18	27	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	26	39	< 10

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	< 0.007	-	-	-	-
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Analytical Report Number: 19-28658
Project / Site name: Northfleet Embankment
Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153848	1153849	1153850	1153851	1153852
Sample Reference				MTP11	MTP2	MTP2	MTP1	MTP23
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.40	1.30	0.50	0.40
Date Sampled				06/02/2019	06/02/2019	06/02/2019	06/02/2019	07/02/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Stone Content				%	0.1	NONE	< 0.1	< 0.1
Moisture Content				%	N/A	NONE	15	21
Total mass of sample received				kg	0.001	NONE	0.61	0.53

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5	8.5	8.2	8.4	9.2
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.018	0.032	0.28	0.048	0.31
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.6
Organic Matter	%	0.1	MCERTS	0.7	0.6	1.6	1.4	3.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.2	4.3	4.5	5.9	37
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.2	0.7	0.5	0.5	0.7
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	16	27	36	35
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	10	12	18	100
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	10	15	21	89
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	43	11	19	18	73
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	30	43	53	210

Analytical Report Number: 19-28658
Project / Site name: Northfleet Embankment
Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153848	1153849	1153850	1153851	1153852
Sample Reference	MTP11	MTP2	MTP2	MTP1	MTP23
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.60	0.40	1.30	0.50	0.40
Date Sampled	06/02/2019	06/02/2019	06/02/2019	06/02/2019	07/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-
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Analytical Report Number: 19-28658
Project / Site name: Northfleet Embankment
Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1153853	1153854	1153855	1153856	1153857
Sample Reference	MTP23	MTP23	MTP24	MTP25	MTP27
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.70	2.30	0.90	2.50	0.70
Date Sampled	07/02/2019	07/02/2019	07/02/2019	07/02/2019	07/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	12	8.6
Total mass of sample received	kg	0.001	NONE	1.1	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	7.8	8.7	8.3	8.6
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.0	0.98	1.9	0.82	0.38
Sulphide	mg/kg	1	MCERTS	3.6	4.4	26	< 1.0	91
Organic Matter	%	0.1	MCERTS	0.6	0.9	1.3	1.9	7.9

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.21	0.21	< 0.05	< 0.05	0.31
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.32	0.54	0.39	< 0.05	0.25
Pyrene	mg/kg	0.05	MCERTS	0.29	0.41	0.36	< 0.05	0.25
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.28	0.23	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.26	0.20	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.20	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.17	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	0.82	2.07	1.18	< 0.80	0.81
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.2	10	7.4	10	15
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	< 0.2	1.1	0.7	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	19	21	21	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	46	110	23	140
Lead (aqua regia extractable)	mg/kg	1	MCERTS	43	56	260	48	52
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	23	16	16	58
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	92	68	140	58	47

Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153853	1153854	1153855	1153856	1153857
Sample Reference				MTP23	MTP23	MTP24	MTP25	MTP27
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70	2.30	0.90	2.50	0.70
Date Sampled				07/02/2019	07/02/2019	07/02/2019	07/02/2019	07/02/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	2.6	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	17	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	96	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	110	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	15	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	32	35	12	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	49	41	16	< 10

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-
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Analytical Report Number: 19-28658
Project / Site name: Northfleet Embankment
Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153858	1153859	1153860		
Sample Reference				MTP28	MTP28	MTP16 (2)		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.80	2.00	1.90		
Date Sampled				07/02/2019	07/02/2019	07/02/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)								
	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	18	16	16		
Total mass of sample received	kg	0.001	NONE	1.0	1.1	1.3		

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-		
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-		

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	7.6	10.3		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.2	1.9	1.0		
Sulphide	mg/kg	1	MCERTS	< 1.0	2.9	4.9		
Organic Matter	%	0.1	MCERTS	2.4	3.1	1.4		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.33		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80		
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	47	14		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.1	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	54	29	16		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	41	120	35		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	140	520	28		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	33	37	14		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	170	350	51		

Analytical Report Number: 19-28658
 Project / Site name: Northfleet Embankment
 Your Order No: 19-S2-FDO-LABS

Lab Sample Number				1153858	1153859	1153860		
Sample Reference				MTP28	MTP28	MTP16 (2)		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.80	2.00	1.90		
Date Sampled				07/02/2019	07/02/2019	07/02/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	7.0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	12	47	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	28	100	< 10		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	41	160	< 10		

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-		
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-		
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-		
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-		
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-		
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-		
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-		

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	-	-	-		
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Analytical Report Number: **19-28658**
Project / Site name: **Northfleet Embankment**
Your Order No: **19-S2-FDO-LABS**

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1153822	MTP30	0.70	106	Loose Fibres & Loose Fibrous Debris	Chrysotile	0.008	0.008
1153823	MTP30	1.20	103	Loose Fibres	Chrysotile	< 0.001	< 0.001
1153824	MTP31	0.60	128	Loose Fibres & Hard/Cement Type Material	Chrysotile	< 0.001	< 0.001
1153825	MTP17	0.50	107	Sheeting/Board Debris	Chrysotile & Amosite	0.387	0.387
1153827	MTP17	1.30	101	Bitumen	Chrysotile & Amosite	0.002	0.002
1153832	MTP20	0.35	103	Loose Fibres	Chrysotile	< 0.001	< 0.001
1153836	SP1		118	Loose Fibres	Chrysotile	< 0.001	< 0.001
1153857	MTP27	0.70	101	Loose Fibres	Chrysotile	< 0.001	< 0.001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number: 19-28658

Project / Site name: Northfleet Embankment

Lab Sample Number				1153861	1153862			
Sample Reference				MTP24	MTP28			
Sample Number				Suspected ACM	Suspected ACM			
Depth (m)				2.70	2.00			
Date Sampled				07/02/2019	07/02/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Bulk Analysis)								
				Units	Limit of detection	Accreditation Status		
Asbestos Identification Name				Type	N/A	ISO 17025	Chrysotile-Hard/Cement Type Material	Chrysotile-Hard/Cement Type Material



Analytical Report Number : 19-28658

Project / Site name: Northfleet Embankment

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1153818	MTP14	None Supplied	0.95	Black sand with rubble and gravel
1153819	MTP16	None Supplied	1.00	Brown clay and sand with gravel.
1153820	MTP29	None Supplied	0.50	Light grey sand with rubble.
1153821	MPT29	None Supplied	1.20	Grey rubble with concrete. **
1153822	MTP30	None Supplied	0.70	Brown loam and sand with rubble and brick.
1153823	MTP30	None Supplied	1.20	Brown clay and sand with rubble.
1153824	MTP31	None Supplied	0.60	Brown loam and sand with rubble.
1153825	MTP17	None Supplied	0.50	Brown loam and sand with gravel and vegetation.
1153826	MTP17	None Supplied	0.90	Light brown sand.
1153827	MTP17	None Supplied	1.30	Brown clay and sand with tar and vegetation.
1153828	MTP17	None Supplied	2.10	Brown sand with gravel and vegetation.
1153829	MTP18	None Supplied	0.70	Light brown rubble. **
1153830	MTP19	None Supplied	0.40	Brown loam and clay with gravel and vegetation.
1153831	MTP19	None Supplied	0.80	Brown clay and sand with gravel and vegetation.
1153832	MTP20	None Supplied	0.35	White clay and sand with chalk and gravel.
1153833	MTP20	None Supplied	0.50	Brown clay.
1153834	MTP20	None Supplied	1.65	Light brown sand with gravel.
1153835	MTP21	None Supplied	0.50	Light brown clay and sand with rubble and brick.
1153836	SP1	None Supplied	None Supplied	Grey loam and sand with rubble.
1153837	MTP22	None Supplied	0.20	Brown clay and loam with gravel and vegetation.
1153838	MTP7	None Supplied	0.60	Brown clay and loam with gravel and chalk.
1153839	MTP7	None Supplied	1.50	Brown clay and sand with rubble and brick.
1153840	MTP5	None Supplied	0.05	Brown clay and loam with gravel and vegetation.
1153841	MTP4	None Supplied	0.05	Brown clay and loam with gravel and vegetation.
1153842	MTP8	None Supplied	0.60	Grey clay and sand with chalk and vegetation.
1153843	MTP3	None Supplied	0.20	Black gravelly loam with clinker.
1153844	MTP3	None Supplied	1.10	Brown loam and clay with gravel and chalk.
1153845	MTP3	None Supplied	1.70	Brown clay and sand with gravel.
1153846	MTP10	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1153847	MTP10	None Supplied	0.60	Light brown clay and sand with gravel and chalk.
1153848	MTP11	None Supplied	0.60	Light brown clay and sand with gravel and chalk.
1153849	MTP2	None Supplied	0.40	Light brown clay and sand with gravel and chalk.
1153850	MTP2	None Supplied	1.30	Light brown clay and sand with gravel and chalk.
1153851	MTP1	None Supplied	0.50	Light brown clay and sand with gravel and chalk.
1153852	MTP23	None Supplied	0.40	Brown sandy clay with gravel.
1153853	MTP23	None Supplied	0.70	Brown clay and sand with gravel.
1153854	MTP23	None Supplied	2.30	Brown loam and sand with gravel.
1153855	MTP24	None Supplied	0.90	Brown loam and sand with gravel.
1153856	MTP25	None Supplied	2.50	Brown loam and sand with gravel.
1153857	MTP27	None Supplied	0.70	Brown loam and sand with gravel.
1153858	MTP28	None Supplied	0.80	Brown loam and clay with gravel and chalk.
1153859	MTP28	None Supplied	2.00	Brown loam and clay with gravel and brick.
1153860	MTP16 (2)	None Supplied	1.90	Brown loam and sand with gravel.

** Non MCERTS matrix.

Analytical Report Number : 19-28658

Project / Site name: Northfleet Embankment

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Bulks	Asbestos Identification in bulk material with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	W	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

Iss No 19-28658-3 Northfleet Embankment 17855CZ

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 19-28658

Project / Site name: Northfleet Embankment

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
MPT29		S	19-28658	1153821	c	Sulphide in soil	L010-PL	c
MPT29		S	19-28658	1153821	c	Total cyanide in soil	L080-PL	c
MTP14		S	19-28658	1153818	c	Sulphide in soil	L010-PL	c
MTP14		S	19-28658	1153818	c	Total cyanide in soil	L080-PL	c
MTP16		S	19-28658	1153819	c	Sulphide in soil	L010-PL	c
MTP16		S	19-28658	1153819	c	Total cyanide in soil	L080-PL	c
MTP17		S	19-28658	1153825	c	Total cyanide in soil	L080-PL	c
MTP17		S	19-28658	1153826	c	Total cyanide in soil	L080-PL	c
MTP17		S	19-28658	1153827	c	Total cyanide in soil	L080-PL	c
MTP17		S	19-28658	1153828	c	Total cyanide in soil	L080-PL	c
MTP18		S	19-28658	1153829	c	Total cyanide in soil	L080-PL	c
MTP19		S	19-28658	1153830	c	Total cyanide in soil	L080-PL	c
MTP19		S	19-28658	1153831	c	Total cyanide in soil	L080-PL	c
MTP20		S	19-28658	1153832	c	Total cyanide in soil	L080-PL	c
MTP20		S	19-28658	1153833	c	Total cyanide in soil	L080-PL	c
MTP20		S	19-28658	1153834	c	Total cyanide in soil	L080-PL	c
MTP21		S	19-28658	1153835	c	Total cyanide in soil	L080-PL	c
MTP22		S	19-28658	1153837	c	Total cyanide in soil	L080-PL	c
MTP29		S	19-28658	1153820	c	Sulphide in soil	L010-PL	c
MTP29		S	19-28658	1153820	c	Total cyanide in soil	L080-PL	c
MTP30		S	19-28658	1153822	c	Sulphide in soil	L010-PL	c
MTP30		S	19-28658	1153822	c	Total cyanide in soil	L080-PL	c
MTP30		S	19-28658	1153823	c	Sulphide in soil	L010-PL	c
MTP30		S	19-28658	1153823	c	Total cyanide in soil	L080-PL	c
MTP31		S	19-28658	1153824	c	Sulphide in soil	L010-PL	c
MTP31		S	19-28658	1153824	c	Total cyanide in soil	L080-PL	c
SP1		S	19-28658	1153836	c	Total cyanide in soil	L080-PL	c



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Analytical Report Number : 20-11138

Project / Site name:	Northfleet Embankment	Samples received on:	27/04/2020
Your job number:	17855CZ	Sample instructed/ Analysis started on:	27/05/2020
Your order number:	20-2-FDO-LABS	Analysis completed by:	02/06/2020
Report Issue Number:	1	Report issued on:	02/06/2020
Samples Analysed:	2 soil samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 20-11138-1 Northfleet Embankment 17855CZ

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The results included within the report relate only to the sample(s) submitted for testing.

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Analytical Report Number: 20-11138

Project / Site name: Northfleet Embankment

Your Order No: 20-2-FDO-LABS

Lab Sample Number				1518233	1518242			
Sample Reference				MTP202	MBH23			
Sample Number				None Supplied	None Supplied			
Depth (m)				1.05	1.00			
Date Sampled				27/04/2020	21/05/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	-	< 0.1			
Moisture Content	%	N/A	NONE	-	18			
Total mass of sample received	kg	0.001	NONE	-	0.51			

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-			
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected			
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.038	-			
Asbestos Quantification Total	%	0.001	ISO 17025	0.038	-			

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	8.8			
Total Cyanide	mg/kg	1	MCERTS	-	< 1			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.13			
Sulphide	mg/kg	1	MCERTS	-	14			
Organic Matter	%	0.1	MCERTS	-	1.4			

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0			
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	0.33			
Acenaphthylene	mg/kg	0.05	MCERTS	-	0.28			
Acenaphthene	mg/kg	0.05	MCERTS	-	0.90			
Fluorene	mg/kg	0.05	MCERTS	-	0.83			
Phenanthrene	mg/kg	0.05	MCERTS	-	13			
Anthracene	mg/kg	0.05	MCERTS	-	3.4			
Fluoranthene	mg/kg	0.05	MCERTS	-	28			
Pyrene	mg/kg	0.05	MCERTS	-	25			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	15			
Chrysene	mg/kg	0.05	MCERTS	-	11			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	13			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	7.6			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	12			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	6.1			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	1.6			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	7.0			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	144			
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	9.8			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2			
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	20			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	31			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	110			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	0.5			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	17			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	90			

Analytical Report Number: 20-11138

Project / Site name: Northfleet Embankment

Your Order No: 20-2-FDO-LABS

Lab Sample Number				1518233	1518242			
Sample Reference				MTP202	MBH23			
Sample Number				None Supplied	None Supplied			
Depth (m)				1.05	1.00			
Date Sampled				27/04/2020	21/05/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	< 1.0			
Toluene	µg/kg	1	MCERTS	-	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0			
o-xylene	µg/kg	1	MCERTS	-	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10			

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	4.3			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	92			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	180			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	280			



Analytical Report Number: 20-11138
Project / Site name: Northfleet Embankment
Your Order No: 20-2-FDO-LABS

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1518233	MTP202	1.05	156	Hard/Cement Type Material	Chrysotile	0.038	0.038

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number : 20-11138

Project / Site name: Northfleet Embankment

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1518233	MTP202	None Supplied	1.05	-
1518242	MBH23	None Supplied	1.00	Brown loam and clay with gravel.

Analytical Report Number : 20-11138

Project / Site name: Northfleet Embankment

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Iss No 20-11138-1 Northfleet Embankment 17855CZ

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The results included within the report relate only to the sample(s) submitted for testing.

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Sample Deviation Report



Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
MBH23		S	20-11138	1518242	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MBH23		S	20-11138	1518242	b	TPHCWG (Soil)	L088/76-PL	b



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Analytical Report Number : 21-51484

Project / Site name:	Northfleet Embankment	Samples received on:	18/01/2021
Your job number:	17855CZ	Samples instructed on/ Analysis started on:	18/01/2021
Your order number:	21-2-FDO-LABS	Analysis completed by:	25/01/2021
Report Issue Number:	1	Report issued on:	25/01/2021
Samples Analysed:	8 soil samples		

Signed: 

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-51484
Project / Site name: Northfleet Embankment
Your Order No: 21-2-FDO-LABS

Lab Sample Number				1739475	1739476	1739477	1739478	1739479
Sample Reference				MWS401	MWS401	MWS402	MWS402	MWS403
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	3.50	1.50	4.25	2.50
Date Sampled				14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	12	9.6	8.9	9.2
Total mass of sample received	kg	0.001	NONE	0.9	0.9	0.9	0.9	0.9

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.7	9.1	9.3	7.9	8.9
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivale	g/l	0.00125	MCERTS	0.17	0.11	0.048	2	0.052
Sulphide	mg/kg	1	MCERTS	6.7	33	9.6	49	17
Organic Matter	%	0.1	MCERTS	1.1	1	1.4	1.5	0.8

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.4
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.37
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.1	0.41	0.52	2.9
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.97	0.38	0.49	2.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.67	< 0.05	0.43	1.8
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.68	< 0.05	0.32	1.3
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.94	< 0.05	0.48	1.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.44	< 0.05	0.18	0.69
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.73	< 0.05	0.35	1.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.5	< 0.05	0.19	0.76
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.67	< 0.05	0.29	1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	6.68	< 0.80	3.25	16.2
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.6	15	13	16	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	< 0.2	< 0.2	0.6	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	9.4	9.4	11	16	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	30	49	41	85	68
Lead (aqua regia extractable)	mg/kg	1	MCERTS	90	140	170	130	120
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	14	18	25	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	72	84	66	140	110

Analytical Report Number: 21-51484
 Project / Site name: Northfleet Embankment
 Your Order No: 21-2-FDO-LABS

Lab Sample Number				1739475	1739476	1739477	1739478	1739479
Sample Reference				MWS401	MWS401	MWS402	MWS402	MWS403
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	3.50	1.50	4.25	2.50
Date Sampled				14/01/2021	14/01/2021	14/01/2021	14/01/2021	14/01/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.4	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	8	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	29	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	110	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	140	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.7	< 1.0	1.9
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	2.7	7.1	< 2.0	6.8
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	12	11	< 10	18
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	59	27	< 10	62
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	73	47	< 10	89

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-51484
Project / Site name: Northfleet Embankment
Your Order No: 21-2-FDO-LABS

Lab Sample Number				1739480	1739481	1739482
Sample Reference				MWS403	MWS404	MWS404
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				5.00	0.40	1.40
Date Sampled				14/01/2021	14/01/2021	14/01/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	6.7	14
Total mass of sample received	kg	0.001	NONE	0.9	0.9	0.9

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	7.3	9.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivale	g/l	0.00125	MCERTS	0.19	0.51	0.66
Sulphide	mg/kg	1	MCERTS	4.4	57	39
Organic Matter	%	0.1	MCERTS	0.2	5	8.2

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	1.4	1.4
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	1.8	0.68
Fluorene	mg/kg	0.05	MCERTS	< 0.05	1.4	0.78
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	31	9.7
Anthracene	mg/kg	0.05	MCERTS	< 0.05	5.8	2
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	78	21
Pyrene	mg/kg	0.05	MCERTS	< 0.05	66	19
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	47	14
Chrysene	mg/kg	0.05	MCERTS	< 0.05	31	9.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	46	18
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	24	5.9
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	42	15
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	19	8.3
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	4.9	2.3
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	23	11

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	422	138
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7	32	69
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	3.8	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	34	37	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	93	87
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	510	250
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	41	43
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	52	1100	570

Analytical Report Number: 21-51484
Project / Site name: Northfleet Embankment
Your Order No: 21-2-FDO-LABS

Lab Sample Number				1739480	1739481	1739482
Sample Reference				MWS403	MWS404	MWS404
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				5.00	0.40	1.40
Date Sampled				14/01/2021	14/01/2021	14/01/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Monoaromatics & Oxygenates						
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	2.3	21
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	32	63
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	190	240
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	220	330

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	4.4	4.2
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	17	11
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	210	64
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	700	270
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	930	350

U/S = Unsuitable Sample I/S = Insufficient Sample

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1739475	MWS401	None Supplied	0.5	Grey loam and clay with chalk.
1739476	MWS401	None Supplied	3.5	Grey loam and clay with chalk.
1739477	MWS402	None Supplied	1.5	Grey loam and clay with chalk.
1739478	MWS402	None Supplied	4.25	Grey loam and clay with chalk and gravel.
1739479	MWS403	None Supplied	2.5	Grey loam and clay with chalk and gravel.
1739480	MWS403	None Supplied	5	Brown clay.
1739481	MWS404	None Supplied	0.4	Brown loam and sand with gravel.
1739482	MWS404	None Supplied	1.4	Brown loam and sand with gravel.

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Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report



Analytical Report Number : 21-51484

Project / Site name: Northfleet Embankment

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
MWS401	None Supplied	S	1739475	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS401	None Supplied	S	1739475	b	TPHCWG (Soil)	L088/76-PL	b
MWS401	None Supplied	S	1739476	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS401	None Supplied	S	1739476	b	TPHCWG (Soil)	L088/76-PL	b
MWS402	None Supplied	S	1739477	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS402	None Supplied	S	1739477	b	TPHCWG (Soil)	L088/76-PL	b
MWS402	None Supplied	S	1739478	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS402	None Supplied	S	1739478	b	TPHCWG (Soil)	L088/76-PL	b
MWS403	None Supplied	S	1739479	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS403	None Supplied	S	1739479	b	TPHCWG (Soil)	L088/76-PL	b
MWS403	None Supplied	S	1739480	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS403	None Supplied	S	1739480	b	TPHCWG (Soil)	L088/76-PL	b
MWS404	None Supplied	S	1739481	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS404	None Supplied	S	1739481	b	TPHCWG (Soil)	L088/76-PL	b
MWS404	None Supplied	S	1739482	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS404	None Supplied	S	1739482	b	TPHCWG (Soil)	L088/76-PL	b