GEOENVIRONMENTAL ASSESSMENT
BILLET ROAD - PARCELS A AND E
ROMFORD
BELLWAY HOMES LTD
GEA-21912S-20-241
FEBRUARY 2022

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Current Document Details

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Document Revisions

Rev	Date	Author	Approved	Issued	Remarks
0	19/06/20	CAH	SE	CAH	-
A	07/07/20	CAH	SE	CAH	Updated with geotechnical laboratory results
B	17/02/22	CAH	SE	RJG	Parcels Renamed

Report issued from

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EXECUTIVE SUMMARY

A Geo-Environmental Assessment was requested by Bellway Homes Ltd. The purpose of the assessment was to provide geotechnical assessment and identify any contamination associated with former land use at Billet Road - Parcels A and E, Romford which might impact on the site's purchase and redevelopment.

SITE DETAILS	
Approximate site area	2.33 ha
Current/previous use	The site is currently in use as an industrial business, commercial business, residential home and vehicle storage.
Proposed use	The proposed development comprises residential homes with private gardens and areas of public open space.
PHASE 1 NON-INTRUSIVE INVESTIGATION	
Expected geology	There is made ground anticipated on site. The superficial deposits are expected to be the Boyn Hill Gravel Member underlain by a bedrock of London Clay Formation.
Groundwater	The Boyn Hill Gravel Member is a Secondary A Aquifer. The London Clay Formation is an unproductive stratum. The site is not in a groundwater Source Protection Zone.
Surface water	There are no surface water receptors within the vicinity of site. The site has a low risk of clearwater flooding.
Other	The site is recorded as being used for landfill between 1970 and 1973.
PHASE 2 EXPLORATORY INVESTIGATION	
Ground Conditions	Subsurface ground conditions were consistent with the published geology.
Contamination	Concentrations of zootoxic metals, phytotoxic metals and organic compounds exceeded the screening level for private residential homes with private gardens in the soils. Concentrations of organic compounds in the groundwater exceeded the drinking water regulations. Concentrations of methane are such that ground gas protection measures will be required.
Geotechnical issues	The site had a variable thickness of made ground underlain by superficial soils of variable strength / relative density.
RECOMMENDATIONS	
Geotechnical	The sites variable nature of shallow soils will preclude the use of shallow foundations, therefore ground improvement or piles will need to be adopted. A CBR value of < 2 % should be assumed for the preliminary design of roads and hardstanding, whilst ground floor slabs should be suspended.
Remediation	Remediation will be necessary to manage the potential risks to controlled waters, further assessment will be required to fully define this, but is likely to require the removal of impacted soils and potentially some groundwater treatment.

	Clean cover will be required in areas of soft landscaping and it will be necessary to incorporate gas protection measures into new buildings. Upgraded water pipes are also likely to be required.
Waste classification	The majority of soils would be classified as non-hazardous waste for disposal. However, one sample would be classed as a hazardous waste for disposal due to high hydrocarbon concentrations.

SECTION 1 INTRODUCTION

1.1 Bellway Homes Ltd proposes to purchase and redevelop an area of land located on Billet Road, Romford for residential development purposes. The proposed development comprises residential homes with private gardens and some areas of public open space. Idom Merebrook Limited (IDOM) has been commissioned by Bellway Homes Limited to undertake preliminary site investigation works and to advise on the geo-environmental implications of the purchase and redevelopment of the site for the proposed end use.

1.2 The objectives of the investigation are to:

i. Assess surface and sub-surface ground conditions present at the site;

ii. Identify hazards associated with ground contamination which may place constraints on the site and the proposed development;

iii. Evaluate the risks associated with any identified hazards;

iv. Provide preliminary recommendations for the mitigation of any significant risks identified; and

v. Provide preliminary geotechnical recommendations

1.3 A Phase 1 (Non-intrusive Investigation) and a Phase 2a (Preliminary Exploratory Investigation) have been undertaken for the subject site.

1.4 This report presents the findings of the geo-environmental investigation and provides an interpretation of the geo-environmental conditions that exist at the site. The contaminative status of 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. This report uses a Tier 1 risk assessment to ascribe a conservative qualitative appraisal of the hazards associated with the site.

1.5 This report has been prepared for Bellway Homes Ltd for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Bellway Homes Ltd and Merebrook as to the extent to which the findings may be appropriate for their use.

SECTION 2 PHASE 1 (NON-INTRUSIVE INVESTIGATION)

2.1 INTRODUCTION

2.1.1 The non-intrusive investigation has been conducted with reference to the documents and sources detailed in Table 1 below:

Table 1: Published Data and Information Sources

SOURCE DATA	GROUNDSURE DATA
BGS 1:50,000 Series Geological Sheet 257	Ordnance Survey (OS) historical maps scaled at 1:10,560, 1:10,000, 1:2,500 and 1:1,250 dated 1864 – 2020.
BGS Geology of Britain 1:50,000 online maps	Water abstraction, discharge and pollution data
Radon: guidance on protection measures for new dwellings	Registered waste management sites
Environment Agency (EA) online data maps	Mining records and natural ground stability data
UK National Air Quality Archive, online	Protected areas of environmentally sensitive land use or conservation
Planning Records Google Maps	Other relevant designations and/or authorisations and Trade Directory entries

2.1.2 The above sources are all authoritative and it is believed that they are reasonably reliable. However, independent verification of the information supplied has not necessarily been carried out and Merebrook cannot be held liable for inaccuracies or deficiencies in the information.

2.2 SITE LOCATION AND SETTING

2.2.1 The site is located to the south of Billet Road, Romford, RM6 5PP.

2.2.2 The site occupies an area of approximately 2.33 hectares and is located at National Grid Reference 547258, 189499. The site layout is shown on drawing 21912s-304-001 presented in Appendix 1 of this report.

2.2.3 The site boundaries are as follows:

i. To the north the site is bounded by Billet Road, beyond which there are agricultural fields; and,

ii. To the east, south and west the site is surrounded by an open unused field.

2.2.4 The site is currently in use as an industrial area, used for; storage, a workshop, a scaffolding company and car storage. The east of site is a residential home and private commercial business.

2.2.5 Surface contamination was identified in the form of scrap metal and other waste deposits across site. There were also examples of hydrocarbon spillage on the site surface.

2.2.6 The field to the west of site was covered with waste including brick, plastic, metal, cloth, household rubbish, tools, concrete and tile.

2.3 SITE HISTORY

2.3.1 The site history, based on a review of the historic and current maps, dating from 1864 to 2020 is summarised below. Potentially contaminative land uses are shown in **bold**. Copies of key maps used in this review are provided in Appendix 2.

Table 2: Summary of the key features shown on historic maps

DATA SOURCE	SITE / SURROUNDINGS
1871- 1896 (1:2,500 scale).	Site: The site is an open field with Hainault House to the north. There are some footpaths through the site.
	Surroundings: Red House Farm is adjacent to the north of site. There is a public house 100 m along Billet Road to the east. There are several farms in the surrounding areas. There is a "smithy" 350 m to the east.
1914 - 1939 (1:2,500 scale).	Site: The site remains the same.
	Surroundings: There has been a small amount of residential development along Billet Road to the west of site. There is a recreational sports area adjacent to the east of site. There is Harrow public house 520 m to the north east. The smithy is no longer identified on the map. To the south west there is "**Isolation Hospital**" 750 m away and an **asylum** 850 m.
1962 – 1969 (1:10,000 scale).	Site: The site remains the same.
	Surroundings: There has been residential development 100 m to the east of site. The Isolation Hospital and Asylum are now referred to as "**Chadwell Heath Hospital**" and "**Goodmayes Hospital**" respectively.
1972 – 1975 (1:10,000 scale).	Site: The site remains unchanged.
	Surroundings: A technical college has been built 500 m to the south west.
1992 – 1995 (1:1,250 scale).	Site: Hainault House has been developed, adding several residential buildings to the site and a fence around what is now referred to as parcels A and E. The site now matches its current state.
	Surroundings: There has been continued residential development to the east of site.
2001 – 2020 (1:10,000 scale).	Site: The site has remained largely the same. There is a separation between Hainault House and the main open field of the site. There has been some evidence of soil movement and hardstanding on the site.

DATA SOURCE	SITE / SURROUNDINGS
	Surroundings: The south western hospitals are now referred to as **King George's Hospital**.

2.3.2 In summary, historic plans show that the site has remained largely undeveloped, apart from some expansion to the Hainault House buildings (1992). The surrounding land has undergone typical residential development, with several hospitals built to the south west and some nearby public houses, east along Billet Road.

2.3.3 There are no clear uses of the site or the surrounding land that indicate potential sources of contamination. There is a potential for made ground on site.

2.3.4 Given the nature of the historical mapping process (scale, representation of conditions at discrete time intervals frequency *etc*.), any such maps and plans may not provide a comprehensive account of a site's history. Identification of pertinent land uses and associated potentially contaminative activities, may therefore be absent from mapping records.

2.4 GEOLOGY

2.4.1 The published geological map indicates the presence of superficial drift deposits of the Boyn Hill Gravel Member comprising sand and gravel with possible lenses of silt, clay or peat. The member is typically poorly sorted and predominantly composed of flints with some vein quartz.

2.4.2 The underlying bedrock geology comprises the London Clay Formation which consists of a blue and grey clay with occasional silt and sand.

2.4.3 There are three relevant historical borehole logs:

i. TQ48NE32 (75 m east): This location consists of four trial pits. The trial pits encountered topsoil and made ground between depths of 0.3 and 0.6 metres below ground level (m bgl). Underlying the topsoil and made ground there was a dense brown sand and gravel to depths of between 2.4 and 3.6 m bgl. Two of the trial pits encountered the London Clay Formation (stiff blue and grey clay or stiff blue clay) at depths of 2.4 m bgl.

ii. TQ48NE118 (70 m south): Topsoil was encountered to a depth of 0.3 m bgl, underlain by silty clay (to 2.9 m bgl), dense gravel with some sand (to 3.2 m bgl) and firm grey and brown mottled gravelly clay (to 4.0 m bgl).

iii. TQ48NE16 (550 m east): London Clay Formation was encountered at a depth of 12.8 m bgl, followed by Woolwich and Reading beds at a depth of 44.2 m bgl and finally the Thanet Sand (or Reading Beds) from a depth of 51.2 m bgl to 59.7 m bgl.

2.4.4 The Groundsure database indicates the presence of unknown / unclassified made ground across the majority of the site.

2.4.5 The site is referenced as a historical landfill site which operated between 1970 and 1973.

2.5 HYDROGEOLOGY

2.5.1 The superficial Boyn Hill Gravel Member is a Secondary A Aquifer.

2.5.2 The London Clay Formation is an unproductive stratum.

2.5.3 The site does is not within a Source Protection Zone.

2.5.4 There are two relevant groundwater abstractions within 1 kilometre of the site:

i. Goodmayes Hospital (935 – 994 m SW) for the purposes of commercial, industrial and public services; and,

ii. Seven Kings Pumping Station (948 m S) for the purposes of potable water supply.

2.5.5 Neither of these groundwater abstraction sites are currently active and therefore are unlikely to be at risk from any site-sourced contamination.

2.6 HYDROLOGY

2.6.1 There is a minor inland body of water located 159 m south east of site. The site is surrounded by numerous small non-tidal inland drains or streams that feed into the Seven Kings Water to the west.

2.6.2 There is one surface water abstraction licence within 1 km of the site located 588 m north west for Aldborough Hall Farm for the purposes of spray irrigation. This licence is no longer active.

2.6.3 The Groundsure database identifies no risk of surface flooding on the site.

2.6.4 There is a low risk of groundwater flooding for the site.

2.7 CURRENT SITE ISSUES

2.7.1 Potentially significant environmental issues have been investigated within relevant distances of the site, based on the database of records supplied by Groundsure. These relate to the following searches:

i. Water discharge or pollution incidents within 250 m of the site;

ii. Waste management sites within 250 m of the site;

iii. Statutory authorisations within 50 m of the site;

iv. Trade directory entries of possible contaminative use within 50 m of the site;

v. Special protection or conservation areas within 50 m of the site; and

vi. Any other relevant issues.

2.7.2 Potentially significant environmental issues identified by the above searches are summarised in Table 3 below.

Table 3: Potentially significant environmental issues

ENVIRONMENTAL CATEGORY	DESCRIPTION
Water discharge or pollution incidents within 250 m	Trade discharges – mineral workings (91 m east) 15/01/1970 until 01/10/1996 into a tributary of Mayesbrook River.
Waste management sites within 250 m	The site acted as a landfill between 1970 and 1973.
Statutory authorisations within 50 m	None.
Trade directory entries of possible contaminative use within 50 m	None.
Special protection or conservation areas within 50 m	None.

2.7.3 Whilst a pollution incident has been, it ceased in 1996 and therefore is not considered a significant issue to the site and is included no further.

2.8 INDICATIVE GROUND STABILITY HAZARDS

2.8.1 There is a moderate risk of shrink swell clays on site. Allowance should be made to mitigate and test for the risk of shrink swell clays.

2.8.2 There is a very low risk of running sands, compressible deposits, collapsible deposits and landslides. No action is recommended as necessary.

2.8.3 There is a negligible risk of ground dissolution of rocks.

2.9 RADON GAS

2.9.1 The site does not lie within a radon affected area as defined by the former Health Protection Agency, now Public Health England (< 1 % of houses are above the action level). Guidance issued by the Buildings Research Establishment (BRE-211) indicates that no protective measures are necessary.

2.10 AIR QUALITY

2.10.1 The site lies within a designated Air Quality Management Area (AQMA) for Redbridge Council. The AQMA was declared on the 31st December 2003 for Nitrogen Dioxide and Particulate Matter PM_{10} and is still active.

2.11 ECOLOGY

2.11.1 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 in order to identify any ecological receptors that might be relevant to the contamination risk assessment for the site. There are no species or habitats considered to be potentially relevant ecological receptors.

2.12 PREVIOUS INVESTIGATIONS

2.12.1 There are no known previous investigations for the site.

2.13 PRELIMINARY CONCEPTUAL SITE MODEL AND RISK ASSESSMENT

2.13.1 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*.

2.13.2 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.

2.13.3 Potential sources of contamination to the site are identified as the following:

i. Landfill made ground – The Groundsure has identified a part of the site as being used for landfill between 1970 and 1973. This has the potential to be a source of landfill gases, hydrocarbons, heavy metals and asbestos containing materials;

ii. Other made ground – there is a potential for made ground on site, with a potential for various contaminants including landfill gas, heavy metals and hydrocarbons; and,

iii. The site has been used for industrial work to the north west and as car storage. This has the potential to provide a source of hydrocarbons, asbestos and heavy metals.

2.13.4 Potential pathways for contamination to reach receptors is by the following:

i. Horizontal migration to the adjacent residential homes;

ii. Vertical migration to the underlying Secondary A Aquifer;

iii. Dermal contact / ingestion of airborne dust and contaminated soils; and,

iv. Uptake of contaminants into homegrown produce in private gardens.

2.13.5 Potential receptors for contamination are as follows:

i. Future residents of residential homes;

ii. Construction workers for the site; and,

iii. The underlying Secondary A Aquifer within the Boyn Hill Gravel Member.

SECTION 3 SITE INVESTIGATION RATIONALE

3.1 INTRODUCTION

3.1.1 A site investigation rationale has been devised in accordance with the findings of the Phase 1 investigation and the resultant preliminary conceptual site model and risk assessment. Priority contaminants were identified as hydrocarbons, heavy metals and potential asbestos containing materials.

3.1.2 Intrusive sampling locations were selected on the basis of providing broad spatial coverage of the site to ascertain the extent to which the site has been used as landfill. Areas where cars have been stored have also been targeted.

3.1.3 Investigation coverage was constrained by access. For the western field, only hand pits were possible. The east no access was possible due to currently being in use as a residential home.

3.2 SITE INVESTIGATION METHODS

3.2.1 An intrusive investigation was carried out by IDOM on 21 to 22 May 2020 and comprised the following scope of work:

i. One cable percussion borehole (MBH01) to 20.0 metres below ground level (m bgl);

ii. Three hand pits (MHP01 to MHP03) to 0.5 m bgl; and,

iii. Ten shallow windowless sample probe holes (MWS01 to MWS09a) to a depth of 5.0 m bgl.

3.2.2 Exploratory hole locations are indicated on drawing 21912s-304-001 in Appendix 1. Logging of exploratory holes was undertaken by an IDOM Officer. Exploratory hole logs are contained in Appendix 3.

3.2.3 Light cable percussion equipment was used to advance borehole MBH01. Standard Penetration Tests (SPTs) were performed at approximate 1 metre intervals. The tests involved driving a steel cone tipped series of rods into the ground over a distance of 450 mm using the repeated blows of a 63.5 kg weight allowed to free fall

over a distance of 760 mm. The total number of blows required for the final 300 mm penetration (the 'N' value) is recorded on the window sample logs.

3.2.4 A monitoring pipe was installed in MBH01, with slotted pipe to a depth of 1.5 m bgl and plain pipe to a depth of 5.0 m bgl to form a response zone within the made ground.

3.2.5 A tracked windowless sampling rig was used to advance MWS01 to MWS09a. This comprised a rig-mounted drop hammer to drive a hollow steel barrel into the ground. The barrel is recovered along with a removable plastic sleeve, which lines the barrel and holds a core of soil which is retracted for logging and sampling. SPTs were performed at approximate 1 m intervals in all windowless sample holes.

3.2.6 Monitoring pipe was installed within exploratory holes MWS03, MWS06 and MWS07 to form a response zone within the made ground using slotted and plain pipe.

3.2.7 The western field was inaccessible to vehicles. Subsequently hand pits were excavated to assess the sub-surface conditions to a maximum depth of 0.50 m bgl. Hand tools were used to advance the pits (MHP01 to MHP03).

3.2.8 Representative soil samples were taken from various depths and strata to assess the contaminative status of the site. Soil samples were submitted to an MCERTS/ UKAS accredited laboratory for chemical analysis of a broad suite of potential contaminants. The results are provided in Appendix 4.

3.2.9 A programme of geotechnical laboratory testing was performed on selected soil samples obtained from the boreholes, comprising classification and strength tests. Chemical testing was also undertaken to assess the aggressiveness of the ground with respect to buried concrete. The results are provided in Appendix 5.

SECTION 4 GROUND CONDITIONS

4.1 SURFACE GROUND CONDITIONS

4.1.1 The majority of the site is covered by hardstanding and gravel hardstanding. In the centre and to the west of site there is a field. The centre field is covered by heavy vegetation. is an open field without vegetation but with a large amount of waste (brick, concrete, plastic, paper, glass, wood and metal tools).

4.2 SUB-SURFACE GROUND CONDITIONS

4.2.1 Encountered sub-surface ground conditions were consistent with the published geology

4.2.2 A summary of the ground conditions encountered is presented in Table 4, whilst a more detailed assessment of the strata is contained in the following sections of the report.

Table 4: Summary of Sub-surface Ground Conditions

STRATA	DEPTH TO TOP RANGE (m bgl)	THICKNESS RANGE (m)
Topsoil	0.00	0.20 – 0.60
Made Ground	0.00 – 0.60	0.70 - 4.90
Boyn Hill Gravel Member	0.80 – 4.90	3.40 – 3.90
London Clay Formation	4.80 – 5.40	Base not proven.

4.2.3 **Topsoil**

4.2.3.1 Topsoil was stiff greyish brown slightly gravelly sandy clay with fine to coarse flint gravels and abundant organic material.

4.2.3.2 There was no visual or olfactory evidence of contamination in the topsoil.

4.2.4 **Made Ground**

4.2.4.1 The majority of the site was underlain by made ground. Made ground generally comprised of stiff orangish brown slightly gravelly sandy clay with fine to coarse flint, brick and concrete gravels and common organic material.

4.2.4.2 Some deeper examples of made ground were encountered (MWS01 and MWS06) comprising soft to very soft greenish black slightly gravelly clay with a strong hydrocarbon odour.

4.2.4.3 Visual contamination was encountered in several forms:

i. MBH01: brick and concrete

ii. MWS01: brick, concrete, plastic and paper.

iii. MWS06: Brick, concrete, glass, wood, paper, wood chip and bituminous material.

4.2.4.4 MWS01, MWS06 and MWS07 all had a strong hydrocarbon odour.

4.2.4.5 SPTs carried out within the predominantly cohesive made ground revealed 'N' values typically ranging from 0 to 14, indicating the presence of very soft to firm (extremely low to medium strength) ground conditions. In MWS07, an SPT 'N' value of 20 was recorded at a depth of 1.0 m bgl, indicating stiff, high strength conditions.

4.2.5 **Boyn Hill Gravel Member**

4.2.5.1 The superficial deposits were Boyn Hill Gravel Member comprising orangish brown slightly silty sandy gravel. The gravels were fine to coarse subangular to subrounded

flint with rare flint cobbles. There were occasional lenses of soft pale grey, blackish green and yellowish brown slightly gravelly sandy clay.

4.2.5.2 There were no examples of olfactory or visual contamination within the Boyn Hill Gravel Member.

4.2.5.3 Groundwater was encountered at depths between 1.80 and 2.30 m bgl.

4.2.5.4 An Atterberg Limits test carried out on a single sample of clay indicates that the soil can be classified as clay of low plasticity. A plasticity index value of 15 % was recorded for the soil, and in accordance with NHBC guidelines, this soil is of low volume change potential. A moisture content of 18 % was also determined for the sample.

4.2.5.5 Sieve analysis carried out on a single sample of granular soil described the material as black and grey clayey sandy gravel.

4.2.5.6 SPTs performed within the Boyn Hill Gravel Member were found to be highly variable. Within the granular deposits, 'N' values generally ranged from 2 to 31, indicating very loose to dense conditions. Locally, SPT 'N' values of 50 and > 50 revealed very dense conditions. SPTs performed within cohesive superficial deposits recorded 'N' values in the range 0 to 9, indicating the presence of very soft to firm (extremely low to medium strength) ground conditions.

4.2.6 **London Clay Formation**

4.2.6.1 The site was underlain by a bedrock of London Clay Formation. London Clay Formation comprised bluish grey slightly sandy clay with fine grained sand.

4.2.6.2 No examples of visual or olfactory contamination were encountered within the London Clay Formation.

4.2.6.3 No groundwater was encountered within the London Clay Formation.

4.2.6.4 Atterberg Limits tests carried out on two samples of London Clay indicate that the soil can be classified as clay of very high plasticity. The plasticity index of the soil was found to range between 40 and 44 %, and in accordance with NHBC guidelines, this soil is of high volume change potential. Moisture contents were also determined and ranged from 29 to 31 %.

4.2.6.5 Triaxial tests were performed on three undisturbed samples of clay obtained from depths of between 7.5 and 13.5 m bgl in the borehole. The tests revealed average undrained shear strengths ranging from 75 to 156 kN/m². These results are indicative of stiff and very stiff (high and very high strength) ground conditions.

4.2.6.6 SPTs performed in the London Clay recorded 'N' values of between 12 and 24, indicating firm and stiff (medium and high strength) conditions.

SECTION 5 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

5.1 FOUNDATIONS

5.1.1 The proposed development comprises low-rise residential houses with private gardens, parking, areas of public open space and associated infrastructure.

5.1.2 The ground investigation revealed ground conditions consisting of variable thicknesses of made ground, including topsoil (0.7 – 4.9 m thick) underlain by superficial deposits of Boyn Hill Gravel (3.4 – 3.9 m thick). Below these deposits the London Clay Formation was encountered at depths of between 4.8 and 5.4 m bgl.

5.1.3 SPTs undertaken within the predominantly cohesive made ground and cohesive superficial deposits revealed ground conditions ranging from very soft to firm (extremely low to medium strength) in nature. The granular superficial deposits were found to range from very loose to dense in nature. SPTs performed in the London Clay recorded firm and stiff (medium and high strength) ground conditions.

5.1.4 The site investigation has revealed highly variable and generally weak ground conditions within the upper 4 – 5 m and as such, will not be suitable for traditional shallow foundations. Therefore, alternative foundation solutions, such as ground improvement or piles, will need to be adopted.

5.1.5 Consideration could be given to employing ground improvement techniques (vibro-stone columns) at the site. Stone columns could be installed along the lines of all load bearing walls and keyed into the underlying competent London Clay to depths of around 6 m in order to provide a more uniform founding medium. This would enable strip footings to be constructed on the improved ground at depths of around 1 m. Allowable bearing pressures of around 100 kN/m² are likely to be achievable for footings up to 1 m wide. Light mesh reinforcement will need to be incorporated into all footings constructed on vibro-treated ground. Due to the locally dense nature of the granular soils, an element of pre-boring may be required. In order to assess the suitability of using ground improvement a specialist contractor should ideally be invited to attend site to view the ground conditions for themselves.

5.1.6 If ground treatment is not deemed economically or technically suitable for the development or does not yield the required allowable bearing pressures for the imposed building loads, then a piled foundation solution should be adopted.

5.1.7 It is envisaged that either driven or bored / Continuous Flight Auger (CFA) piles could be adopted at the site. Driven piles could possibly be utilised as they have the advantage that no arisings are generated, however, the effects of noise / vibrations are likely to be an issue given the proximity of the existing residential development.

5.1.8 The advantage of using bored / CFA piles is the low noise / vibration of the system, however, arisings are generated by bored / CFA piles. Piles would need to be taken through the made ground and superficial deposits to found within the underlying

competent London Clay. Minimum pile lengths of around 10 m will be required at the site.

5.1.9 It is recommended that the advice of a specialist contractor be sought in order to determine the most appropriate / cost effective system and to advise on pile diameters, depths and safe working capacity. A guide to safe working loads for individual bored / CFA piles of varying diameter is presented in the table below. Pile calculations have been based on assessing skin friction and end bearing resistance in the undisturbed natural strata. No allowance has been made at this stage for any potential drag down (negative skin friction). This should be assessed and allowed for by the designer.

5.1.10 The calculations assume a pile penetrating into the stiff natural clay, whilst no contribution from existing fill materials or superficial deposits has been allowed for. A factor of safety of 2.6 has been applied to the calculated ultimate capacities. Greater safe working capacities would be achievable if piles were taken to greater depth thereby benefiting from increased skin friction contribution and possible greater end bearing resistance. As discussed, these values are for guidance purposes only and should be verified by a specialist contractor. In addition, the safe working loads given are for individual isolated piles. The group effect should be assessed during the design stage.

Table 5: Safe Working Capacities for bored / CFA Piles

Pile Diameter (mm)	Safe Working Capacity (kN)
300	100
450	165
600	245

5.2 EXCAVATIONS AND GROUNDWATER

5.2.1 Based on the ground conditions observed at the site, any shallow excavations have the potential to become unstable in the short term, therefore, if man-entry is required, excavations should be supported by shoring or otherwise battered back to a safe angle in order to protect the workforce from possible collapse.

5.2.2 Old foundations and any buried structures associated with existing buildings should be removed and the resulting excavations backfilled with suitable granular fill.

5.2.3 Groundwater was encountered during the intrusive investigation in three locations at depths of between 1.8 and 2.3 m bgl. In view of this, it is considered possible that

groundwater ingress will occur in shallow excavations, therefore, provision for dewatering during the construction period should be considered.

5.3 FLOOR SLABS

5.3.1 In view of the variable thicknesses of made ground across the site, it is recommended that suspended floor slabs are adopted for the proposed development.

5.4 BURIED CONCRETE

5.4.1 Recommendations given in BRE Special Digest 1:2005 *"Concrete in aggressive ground"* have been followed in order to give recommendations with respect to buried concrete.

5.4.2 Water soluble sulphate analysis was carried out on fourteen soil samples obtained from depths of between 0.1 and 13.0 m bgl with soil pH determination also carried out on these samples. Water soluble sulphate contents ranged between 0.023 and 1.7 g/l. In accordance with BRE guidelines the characteristic value is calculated by determining the mean of the highest 20 % of results. In this case the characteristic value is 1.0 g/l. On this basis the Design Sulphate Class is DS-2.

5.4.3 The pH values in the soil samples varied between 6.7 and 10.4. The mean of the lowest 20 % of values is 7.2 which represents the characteristic value. Mobile groundwater conditions have been assumed and on this basis the Aggressive Chemical Environment for Concrete (ACEC) class for the site is AC-2.

5.5 ROADS AND PAVED AREAS

5.5.1 For preliminary design purposes it is recommended that a California Bearing Ratio (CBR) value of < 2 % is assumed for the made ground. Once the positions of proposed roads and areas of hardstanding have been finalised, testing could be undertaken to determine an appropriate design CBR value.

5.6 SOAKAWAYS

5.6.1 The recent ground investigation has revealed variable thicknesses of made ground across the site, whilst groundwater strikes were recorded in the upper 2.0 – 2.5 m. Therefore, the soils are not considered to be suitable for the use of shallow soakaways at the site.

SECTION 6 ENVIRONMENTAL ASSESSMENT

6.1 SOIL QUALITY

6.1.1 A total of ten soil samples were submitted to the laboratory for chemical analysis, including one sample from natural ground and nine samples from made ground. The laboratory chemical analysis certificates are contained in Appendix 4. The results of the analysis are summarised in Table 6.

6.1.2 An initial screening exercise has been undertaken whereby contaminant concentrations recorded in soils have been assessed against *Suitable for Use Levels* (S4ULs) published in 2015 by LQM/CIEH[1]. These precautionary screening levels are designed to be representative of minimal risk to human health in a number of land use scenarios. In this report S4ULs have been selected for a residential land use where the possibility of consumption of homegrown produce exists and assuming a soil organic matter of 1 %. For lead the DEFRA Category 4 Screening Level[2] has been used as this is based on updated toxicological data and a low risk to human health.

6.1.3 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.

Table 6: Summary of Soils Chemical Analysis Results

CONTAMINANT	UNITS	MAX	MEAN	No of Tests	SCREENING LEVEL (SL)	No > SL*
HUMAN HEALTH RISK ASSESSMENT						
Asbestos in soil	-	Detected	-	5	Detected	1
pH	-	10.40	8.48	10	5 – 9	1
Arsenic	$mg.kg^{-1}$	17	11.06	10	37	0
Cadmium	$mg.kg^{-1}$	0.7	0.31	10	11	0
Chromium (total)	$mg.kg^{-1}$	58	29.73	10	910	0
Hexavalent Chromium	$mg.kg^{-1}$	4	4	10	6	0
Lead	$mg.kg^{-1}$	240	106.36	10	200	1
Mercury	$mg.kg^{-1}$	0.9	0.56	10	40	0
Nickel	$mg.kg^{-1}$	53	24.3	10	130	0
Selenium	$mg.kg^{-1}$	1	1	10	250	0
TPH Aliphatic >EC_5 - EC_6	$mg.kg^{-1}$	0.001	0.001	10	42	0
TPH Aliphatic >EC_6 - EC_8	$mg.kg^{-1}$	0.001	0.001	10	100	0
TPH Aliphatic >EC_8 - EC_{10}	$mg.kg^{-1}$	0.001	0.001	10	27	0
TPH Aliphatic >EC_{10} - EC_{12}	$mg.kg^{-1}$	1	1	10	130	0
TPH Aliphatic >EC_{12} - EC_{16}	$mg.kg^{-1}$	6	2.77	10	1100	0
TPH Aliphatic >EC_{16} - EC_{21}	$mg.kg^{-1}$	19	9.7	10	65000	0
TPH Aliphatic >EC_{21} - EC_{35}	$mg.kg^{-1}$	77	18.7	10	65000	0
TPH Aromatic >EC_5 - EC_7	$mg.kg^{-1}$	0.001	0.001	10	70	0
TPH Aromatic >EC_7 - EC_8	$mg.kg^{-1}$	0.001	0.001	10	130	0
TPH Aromatic >EC_8 - EC_{10}	$mg.kg^{-1}$	0.001	0.001	10	34	0
TPH Aromatic >EC_{10} - EC_{12}	$mg.kg^{-1}$	3.2	1.22	10	74	0
TPH Aromatic >EC_{12} - EC_{16}	$mg.kg^{-1}$	60	9.21	10	140	0

[1] Nathanail, C. P., McCaffrey, C., Gillett, A. G., Ogden, R. C. and Nathanail, J. F. 2015. *The LQM/CIEH S4ULs for Human Health Risk Assessment*. Land Quality Press, Nottingham. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3100. All rights reserved. Including August 2015 nickel update.

[2] SP1010 *Development of Category 4 Screening Levels Main Report* (Dec 2013) and SP1010 *Policy Companion Document* (Mar 2014).

CONTAMINANT	UNITS	MAX	MEAN	No of Tests	SCREENING LEVEL (SL)	No > SL*
HUMAN HEALTH RISK ASSESSMENT						
TPH Aromatic >EC_{16} - EC_{21}	$mg.kg^{-1}$	230	48.9	10	260	0
TPH Aromatic >EC_{21} - EC_{35}	$mg.kg^{-1}$	690	203.6	10	1100	0
Benzene	$mg.kg^{-1}$	0.001	0.001	10	0.087	0
Toluene	$mg.kg^{-1}$	0.001	0.001	10	130	0
Ethylbenzene	$mg.kg^{-1}$	0.001	0.001	10	47	0
Xylene	$mg.kg^{-1}$	0.002	0.002	10	56	0
Acenaphthene	$mg.kg^{-1}$	1.1	0.248	10	210	0
Acenaphthylene	$mg.kg^{-1}$	0.9	0.17	10	170	0
Anthracene	$mg.kg^{-1}$	3.5	0.934	10	2400	0
Benz(a)anthracene	$mg.kg^{-1}$	10	2.767	10	7.2	0
Benzo(a)pyrene	$mg.kg^{-1}$	8	2.519	10	2.2	3
Benzo(b)fluoranthene	$mg.kg^{-1}$	9	2.758	10	2.6	3
Benzo(ghi)perylene	$mg.kg^{-1}$	4.1	1.372	10	320	0
Benzo(k)fluoranthene	$mg.kg^{-1}$	5.2	1.464	10	77	0
Chrysene	$mg.kg^{-1}$	5.8	1.732	10	15	0
Dibenz(ah)anthracene	$mg.kg^{-1}$	1	0.317	10	0.24	3
Fluoranthene	$mg.kg^{-1}$	22	5.859	10	280	0
Fluorene	$mg.kg^{-1}$	1.5	0.343	10	170	0
Indeno(123-cd)pyrene	$mg.kg^{-1}$	3.3	1.127	10	27	0
Naphthalene	$mg.kg^{-1}$	0.05	0.05	10	2.3	0
Phenanthrene	$mg.kg^{-1}$	13	2.931	10	95	0
Pyrene	$mg.kg^{-1}$	20	5.329	10	620	0
Phenol	$mg.kg^{-1}$	1	1	10	120	0
PHYTOTOXICITY RISK ASSESSMENT						
	Units	**Max**	**Mean**	**No of Test**	**Screening Level (SL)**	**No > SL**
Copper	$mg.kg^{-1}$	370	94.3	10	200	1
Nickel	$mg.kg^{-1}$	53	24.3	10	110	0
Zinc	$mg.kg^{-1}$	380	152	10	300	1

Notes: * Number of samples exceeding screening level nd = not detected

6.1.4 **Zootoxic Metals (harmful to human health)**

6.1.4.1 Concentrations of lead were in exceedance of screening levels at MWS01 (1.30 m bgl).

6.1.5 **Phytotoxic Metals (harmful to plant health)**

6.1.5.1 Concentrations of copper and zinc were in exceedance of screening levels at MWS03 (0.10 m bgl).

6.1.6 **Organic Contaminants**

6.1.6.1 Concentrations of benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene were all in exceedance of screening levels at MWS04 (0.10 m bgl), MWS06 (1.50 m bgl) and MWS09a (2.80 m bgl).

6.1.7 **Inorganic Contaminants**

6.1.7.1 Chrysotile and Amosite asbestos were detected at MWS01 (1.80 m bgl) and subsequently quantified. Quantification testing of the asbestos returned trace amounts (< 0.001 %).

6.1.8 **Summary**

6.1.8.1 The made ground contained concentrations of Lead, Copper, Trace quantities of asbestos, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(a,h)anthracene in exceedance of screening levels for residential homes with private gardens.

6.1.8.2 Lead concentrations encountered at MWS01 (1.30 m bgl) can be related to the made ground in that location, which was visually impacted with plastic, paper and had a strong hydrocarbon odour. The lead contamination is considered to have occurred as a result of this underlying landfill which represents a moderate risk to receptors.

6.1.8.3 Concentrations of copper at MWS03 (370 $mg.kg^{-1}$, 0.10 m bgl) were only slightly above the screening levels (200 $mg.kg^{-1}$). Zinc concentrations (380 $mg.kg^{-1}$) were also only slightly above screening levels (300 $mg.kg^{-1}$). This represents a moderate risk from phytotoxic metals to receptors.

6.1.8.4 The natural ground had concentrations of benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene (MWS09a) greater than the screening level for residential homes with private gardens. This indicates that the contamination source from the made ground has impacted the underlying Boyn Hill Gravel Member.

6.2 **GROUNDWATER**

6.2.1 Groundwater level monitoring and sampling was undertaken on two occasions. Resting waters levels were recorded at 1.10 – 2.20 m bgl.

6.2.2 Samples were submitted to the laboratory for analysis of a typical contamination suite (reference: 20-12443-1). Screening levels for groundwater have been derived from the Maximum Allowable Concentrations (MAC) in the Water Supply (Water Quality) Regulations 2010 where prescribed, or for those determinands not included, the 1989 regulations. The laboratory chemical analysis certificate is contained in Appendix 6 and groundwater level data is contained in Appendix 5. A summary of groundwater contaminant concentrations is contained in Table 7.

Table 7: Summary of Groundwater Chemical Analysis Results

CONTAMINANT	UNITS	MAX	MEAN	SCREEN LEVEL (SL)	>SL*
pH	-	7.1	6.95	6.5**	0
Arsenic	µg.l^{-1}	2.42	0.925	10	0
Cadmium	µg.l^{-1}	0.02	0.02	5	0
Chromium (total)	µg.l^{-1}	5.4	5.25	50	0
Copper	µg.l^{-1}	0.5	0.5	2000	0
Lead	µg.l^{-1}	0.7	0.425	10	0
Mercury	µg.l^{-1}	0.05	0.05	1	0
Nickel	µg.l^{-1}	2.1	1.225	20	0
Selenium	µg.l^{-1}	2.6	1.975	10	0
Zinc	µg.l^{-1}	2.8	1.1	5000	0
Cyanide	µg.l^{-1}	12	10.5	50	0
Sulphate	mg.l^{-1}	243	85.0	250	0
TPH	µg.l^{-1}	6725	2168.25	10	3
BTEX	µg.l^{-1}	1255.9	314.975	-	1 (xylene)
PAH (total)	µg.l^{-1}	12.64	4.435	-	0
PAH****	µg.l^{-1}	0.04	0.04	0.1	0
Benzo(a)pyrene	µg.l^{-1}	0.01	0.01	0.01	0
Naphthalene	µg.l^{-1}	7.51	2.5275	-	0
Phenols	µg.l^{-1}	11	10.25	0.5	1

Notes: * Samples exceeding screen level
** Minimum value applies (i.e. most acid)
*** Not detected above screening level
*** sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene & indeno(1,2,3-cd)pyrene

6.2.3 TPH (Total) concentrations were in exceedance of Water Supply Regulations (2016) for MWS06, MWS07 and MBH01. TPH (Total) concentrations at MWS03 were below the screening level of detection.

6.2.4 Xylene concentrations were in exceedance of Drinking Water Quality Regulations for MWS06.

6.2.5 Phenol concentrations were in exceedance of Water Supply Regulations (2016) at MWS06. All other concentrations of phenol were below the screening level of detection.

6.2.6 Groundwater has been identified to be contaminated by hydrocarbons. This aligns with the soil hydrocarbon contamination, indicating that the made ground on site may be acting as a source of hydrocarbon contamination.

6.3 HAZARDOUS GAS

6.3.1 Gas monitoring has been undertaken on two occasions – 28th May and 3rd June 2020. Levels of methane, carbon dioxide and oxygen were recorded in each standpipe, together with associated parameters including borehole flow and ambient air pressure. The results of these gas monitoring rounds are contained in Appendix 7.

6.3.2 The monitoring rounds were undertaken at barometric pressures ranging from 1006 to 1036 mb. Positive flow was not recorded. Methane (CH_4) was detected at a maximum of 41.8 % by volume (% v/v), carbon dioxide (CO_2) was detected to a maximum of 5.3 % v/v with a corresponding depleted oxygen concentration of 12.7 % v/v.

6.3.3 Methane concentrations of 41.8 % v/v and 15.7 % v/v were recorded at MWS07 and MWS06. The response zones for these installations were built within the made ground.

6.4 WASTE CLASSIFICATION, OFF-SITE DISPOSAL OR RE-USE

6.4.1 Waste Considerations

6.4.1.1 A WM3 assessment of the made ground indicates that MWS05 (0.10 m bgl) is the only example of hazardous waste. This is related to elevated TPH (Total) concentrations measured within the soil. Hazardous Waste Assessments are included in Appendix 4. All other tested samples have returned non-hazardous results.

6.4.1.2 Only trace quantities of chrysotile and amosite asbestos were detected at MWS01 (1.80 m bgl).

6.4.1.3 Natural as-dug arisings (excluding topsoil) could be classed as inert waste without the requirement for WAC testing.

6.4.2 WAC testing for soils (MWS03, 0.80 m bgl) destined for landfill indicate the soils, and those of a matching description, would be potentially suitable for inert waste landfill. However, acceptance of waste into landfill is subject to the landfill operator.

6.4.2.1 Materials, including waste soils which are not to be retained on site, should be removed and disposed of in accordance with all relevant statues 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 2006, The Environmental Permitting Regulations 2016* as amended and *The Hazardous Waste (Miscellaneous Amendments) Regulations 2015*.

6.4.2.2 It is a requirement of these regulations that waste sent to landfill should have been subject to measures to reduce the amount of waste, reduce harmful or hazardous properties and facilitate recycling. These requirements may be satisfied by measures

such as segregation and screening of wastes to recover suitable fill and material for crushing, segregation of inert materials and putrescible wastes.

6.4.3 **Re-use Considerations**

6.4.3.1 As a sustainable alternative to off-site disposal, it may be possible to re-use site-won soils provided the following criteria are met:

i. Use of the material will not create an unacceptable risk of pollution to the environment or harm to human health;

ii. The material must be chemically and geotechnically suitable without further treatment;

iii. There must be certainty of use within the scheme;

iv. Material should only be used in the quantity necessary for that use.

6.4.3.2 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.

SECTION 7 RISK ASSESSMENT

7.1 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.

7.2 The investigations demonstrate that the former uses of the site have resulted in the following contamination issues:

i. made ground that is likely to be landfill acting as a source of phytotoxic metals, heavy metals and hydrocarbons;

ii. hydrocarbon contamination of the made ground, natural ground and groundwater; and,

iii. methane generation from the made ground.

7.3 These are considered for their potential to act as sources for a number of pollutant linkages.

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

i. The general public and present site users,

ii. Residents of future development,

iii. Groundwater,

iv. Surface water,

v. Construction workers,

vi. Adjacent land, and

vii. Infrastructure.

7.5 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.

7.6 **The general public and present site users**

7.6.1 The site is currently used for private business, industrial business and as a residential home. The site is predominantly covered in hardstanding.

7.6.2 The risk to current site users is considered to be low.

7.7 **Residents of future development**

7.7.1 Soil contamination (chemical)

7.7.1.1 Contamination within the made ground includes; hydrocarbons, lead, copper and zinc concentrations greater than the screening level for residential homes with private gardens. There were also visual examples of contamination within the shallow made ground in the form of plastic, metal, brick and concrete.

7.7.1.2 Contamination within the made ground has the potential to be taken up by homegrown produce in private gardens. The risk to future residents for the site is considered to be moderate.

7.7.2 Asbestos

7.7.2.1 Only one example of trace quantities of Amosite and Chrysotile asbestos was encountered within the made ground.

7.7.2.2 Therefore, the risk from asbestos is considered to be low.

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

7.7.3.1 NHBC guidance has been followed to assess the recorded soil gas and flow conditions. Calculations are presented in Appendix 8.

7.7.3.2 Gas installations within the made ground at MWS06 and MWS07 have returned methane concentrations of 15.7 and 41.8 % v/v respectively. There was no recorded flow. The borehole logs for these locations and depths recorded a strong

hydrocarbon odour and sheen. It is considered reasonable that the made ground is the source of the methane gas.

7.7.3.3 Following this, the gas risk for the site is considered to be red (or high).

7.8 **Controlled waters**

7.1.1 TPH (Total) concentrations were in exceedance of Water Supply Regulations (2016) for MWS06, MWS07 and MBH01. At MWS06 Xylene concentrations were in exceedance of Drinking Water Quality Regulations and Phenol concentrations were in exceedance of Water Supply Regulations (2016).

7.8.2 It is considered to be likely that the source of the organic contamination is from the landfill material on site.

7.8.3 The site overlies the Boyn Hill Gravel Member which is a Secondary A Aquifer. It is expected that any landfill, which may be acting as the source of the hydrocarbon contamination, will be in direct hydraulic continuity with the Boyn Hill Gravel Members Aquifer.

7.8.4 The risk to controlled waters is considered to be moderate.

7.9 **Construction workers**

7.9.1 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. Providing that dust levels are kept within statutory limits and appropriate health and safety procedures are adhered to during the construction phase, the levels of chemical contamination recorded to date are not considered to present an acute risk to human health.

7.10 **Adjacent land**

7.10.1 Concentrations in exceedance of screening levels have been encountered in the shallow groundwater of site and it is expected that the landfill is in direct contact with the Boyn Hill Gravel Member Secondary A Aquifer. Following this, it is considered to be likely that horizontal migration of contaminants could occur to the adjacent land.

7.10.2 The risk to adjacent land from on-site contamination is considered to be moderate.

7.10.3 No source of off-site contamination was identified, therefore the risk from off-site derived contamination is considered to be low.

7.11 **Infrastructure**

7.11.1 Zinc and copper contamination were encountered within the made ground of MWS03. As this is the only example of phytotoxic contamination, and the concentrations are only marginally above the screening level this is not considered to be a significant risk. Therefore, the risk to plant life is considered to be low.

7.11.2 Limited contamination with the potential to permeate polymeric services has been identified by this investigation, however it is recommended that the utility provider is consulted with respect to their requirements for water supply pipes.

7.11.3 Utility companies apply strict guideline levels on use of polymeric pipes and may consider all made ground unsuitable for typical plastic pipe materials to be used.

SECTION 8 UPDATED CONCEPTUAL MODEL

8.1 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 8 below.

Table 8: 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** Limited potential for contaminated soils to affect current site users due to hardstanding on site.
	Ingestion and inhalation of contaminated soil and dust	Human health (current users)	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (construction workers)	**Moderate risk identified** Made ground which contains hazardous contamination concentrations.
	Ingestion and inhalation of contaminated soil and dust	Human health (construction workers)	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (future residents)	**Moderate risk identified** Contamination with the potential to be up-taken into homegrown produce encountered on site.
	Ingestion and inhalation of contaminated soil and dust	Human health (future residents)	
Asbestos (made ground)	Ingestion and inhalation of contaminated soil and dust	Human health (future residents and construction workers)	**Low risk** No examples of asbestos containing material above trace quantities.
Contamination (all forms)	Vertical migration to aquifer	Controlled waters	**Moderate risk identified** Contamination in made ground expected to be in continuity with the underlying Secondary A Aquifer.
Contamination (all forms)	Horizontal migration to surface water	Controlled waters	**Low risk identified** No surface waters in the vicinity.
Hydrocarbons	Direct contact	Plastic water pipes	**Moderate risk identified** Hydrocarbon contamination above concentrations across site.
Hazardous Gas/Vapours In soil	Ingress into buildings and voids	Human health (future residents and construction workers)	**High risk identified** Elevated concentrations of methane on site with an identifiable source within the made ground. NHBC recommends Red level of risk.

POSSIBLE POLLUTANT LINKAGE			RISK CHARACTERISATION
POTENTIAL SOURCES	PATHWAYS	RECEPTORS	
Adjacent Land	Horizontal Migration	Homegrown produce of adjacent residents	**Moderate Risk Identified** Made ground contamination could migrate to Secondary A Aquifer vertically and travel horizontally to the surrounding residential homes.

SECTION 9 PRELIMINARY REMEDIATION STRATEGY

9.1 The identified risks at the site can be mitigated by removal of either the source, pathway or receptor. With reference to the conceptual model for the site a remediation strategy, based on source or pathway removal, has been designed.

9.2 The proposed development is for residential homes with private gardens and some areas of public open space.

9.3 Following an assessment of the site investigation and chemical data, the following remediation methods are considered necessary to make the site suitable for its proposed use:

i. Clean cover in areas of soft landscaping;

ii. Remediation protective of controlled waters is likely to be required, this will potentially include the treatment of soil and groundwater. A Detailed Qualitative Risk Assessment and further investigation is required to inform the extent of remediation protective of groundwater; and,

iii. A post removal / remediation gas monitoring programme.

9.4 Clean Capping

9.4.1 Clean capping will be required in areas of private residential gardens. This should comprise 150 mm topsoil and 450 mm subsoil to form a minimum 600 mm clean capping layer. It is also recommended that the clean cover is underlain by a geotextile membrane.

9.4.2 Clean capping will be required in areas of public soft landscaping. This should comprise 150 mm topsoil and 150 mm subsoil to form a minimum 300 mm clean capping layer. It is also recommended that the clean cover is underlain by a geotextile membrane.

9.4.3 Material imported for the formation of domestic gardens and landscaped areas should be obtained from a validated source. The validation should incorporate an assessment of the provenance of the material and chemical analysis.

9.4.4 In addition to information provided by the topsoil/subsoil supplier, validation testing shall be carried out by IDOM as set out below.

9.4.5 Once placed, the thickness of the clean capping and placement of the geotextile membrane shall be verified by a hand-dug pit.

9.4.6 Validation of the chemical quality of clean cover shall be obtained at a rate of one sample per 250 cubic metres or 1 in 4 gardens, whichever is greater.

9.4.7 A validation report will present the above date for clean cover placed in private garden areas including provenance, chemical quality and depths placed. The validation report will be provided to the Local Authority and the Environment Agency (EA) upon completion of the development.

9.5 Detailed Qualitative Risk Assessment

9.5.1 It is recommended that a detailed qualitative risk assessment is undertaken to better characterise the contamination situation on site. This will then be followed by a remediation method statement that will outline how to effectively mitigate and remove the contamination risk. This will include:

i. an assessment of contamination within the made ground;

ii. an assessment of contamination within the natural soils;

iii. a groundwater assessment using a P20 model;

iv. criteria for clean cover chemical concentration on the site;

v. Methods with which to effectively mitigate the contamination risks; and,

vi. Clean-up criteria for the site to obtain at which point it will be considered suitable for use.

9.6 Potential risks to construction workers have been identified and the adoption of appropriate Health and Safety procedures will ensure that risks to operatives from hazardous materials at the site are minimised. Operatives should not be allowed to eat, drink or smoke on site except in designated areas and should be required to wash all exposed skin at the end of each shift. Operatives should be informed of the potential hazards at the site and should be required to report any observations of suspect material.

9.7 Materials, including waste soils which are not to be retained on site, should be removed and disposed of in accordance with all relevant statues 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 2006, The Environmental Permitting Regulations 2016* as amended and *The Hazardous Waste (Miscellaneous Amendments) Regulations 2015*.

9.8 It is recommended that this report is submitted to the regulators (Local Authority EHO and Planners, Environment Agency Planning Liaison and NHBC) for approval prior to commencement of the works.

9.9 Any observations of ground conditions atypical of those already described should be reported to IDOM immediately so that an assessment of appropriate action can be made.

SECTION 10 CONCLUSIONS

10.1 A Phase 2 site investigation has been undertaken on the site south of Billet Road, Romford referred to as Parcel A and E.

10.2 An assessment of the Groundsure database indicates the potential for landfill on the site, from between 1970 and 1973. The site has remained relatively unchanged apart from an expansion of the residential home on the site to add an industrial area. The surrounding area has undergone typical residential development.

10.3 Subsurface ground conditions were consistent with published geology. The superficial deposits are Boyn Hill Gravel underlain by a bedrock of London Clay Formation. The Boyn Hill Gravels were overlain by made ground and the surface was capped with hardstanding. Landfill like material was identified within the made ground.

10.4 In view of the variable nature of made ground and superficial deposits at the site, traditional shallow foundations will not be suitable. Therefore, options including ground improvement and piles will need to be adopted.

10.5 A CBR value of < 2% should be assumed for the preliminary design of roads and hardstanding, whilst ground floor slabs should be suspended.

10.6 Contamination with the potential to impact receptors has been identified on site, this includes:

i. Heavy metal and hydrocarbon contamination in the made ground with the potential to impact future site users;

ii. Hydrocarbon contamination in the groundwater with the potential to impact the underlying Secondary A Aquifer;

iii. Localised phytotoxic contamination with the potential to impact future plant growth;

iv. Hydrocarbon contamination with the potential to impact structural development; and,

v. Hazardous gas generation from the made ground with the potential to impact future residential properties

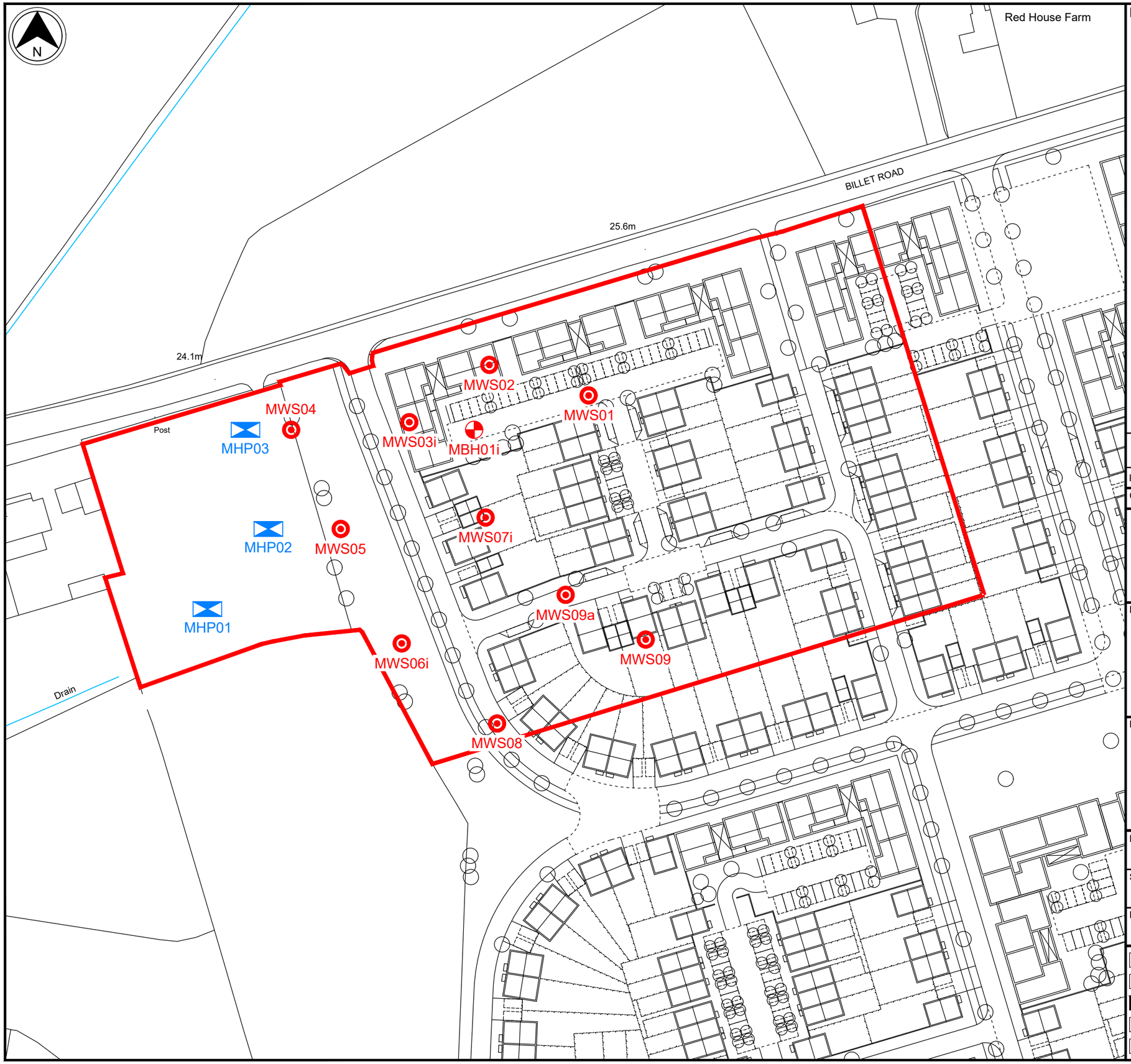
10.7 Remedial actions proposed to make the site suitable for the end use are for:

i. Clean capping in areas of private gardens and public soft landscaping;

ii. A Detailed Qualitative Risk Assessment; and,

iii. A post removal / remediation ground gas monitoring programme.

APPENDIX 1 ▪ Drawings



Legend

- Site boundary
- MWSref — Merebrook window sample with location reference
- MBHrefi — Merebrook borehole with location reference and installed
- MWSrefi — Merebrook window sample with location reference and installed
- MHPref — Merebrook hand dug pit with location reference

First Issue	09-06-2020	JB	CAH	CAH
Issue Details	Dwn	Chd	App'd

Client: PRELIMINARY

Bellway Homes Ltd

Project: Billet Road - Site A/E

Dwg Title: Exploratory Holes Locations

Dwg No.	Revision
21912s-304-001	-

Scale	Date	Frame Dimensions mm
1:1000	June 2020	(A3) 392 x 277

Drawn	Checked	Approved
JB	CAH	CAH

London
Kent
Manchester
Stirling

IDOM

Cromford Mills, Mill Lane, Matlock, Derbyshire DE4 3RQ
t: +44(0)1773 829 988 e: info.derbyshire@idom.com

APPENDIX 2 ▪ Historical Plans

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1864**

Scale: 1:2,500

Printed at: 1:2,500

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

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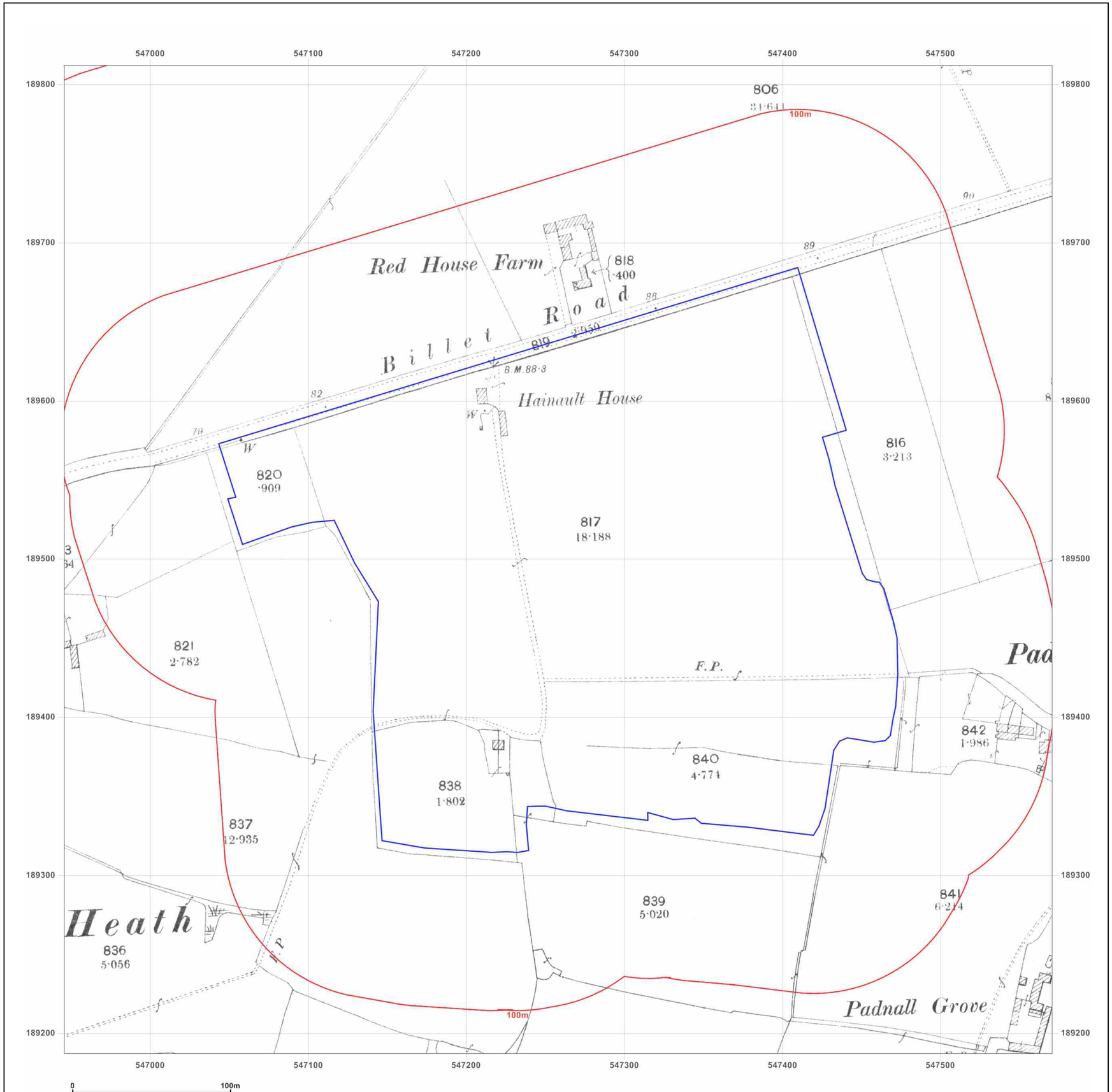

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1896**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1862
Revised 1895
Edition 1896
Copyright N/A
Levelled N/A

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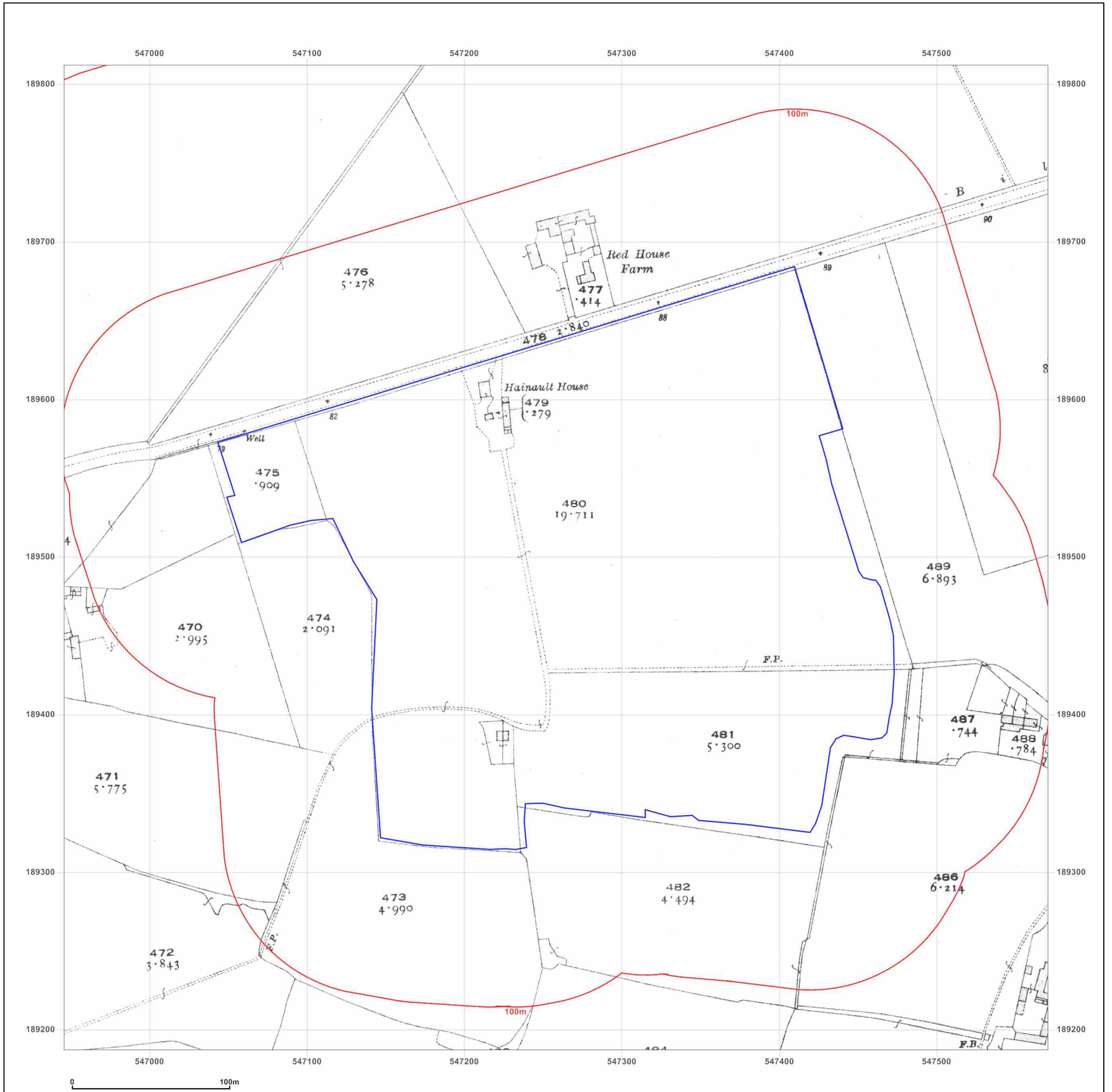

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1920**

Scale: 1:2,500

Printed at: 1:2,500

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

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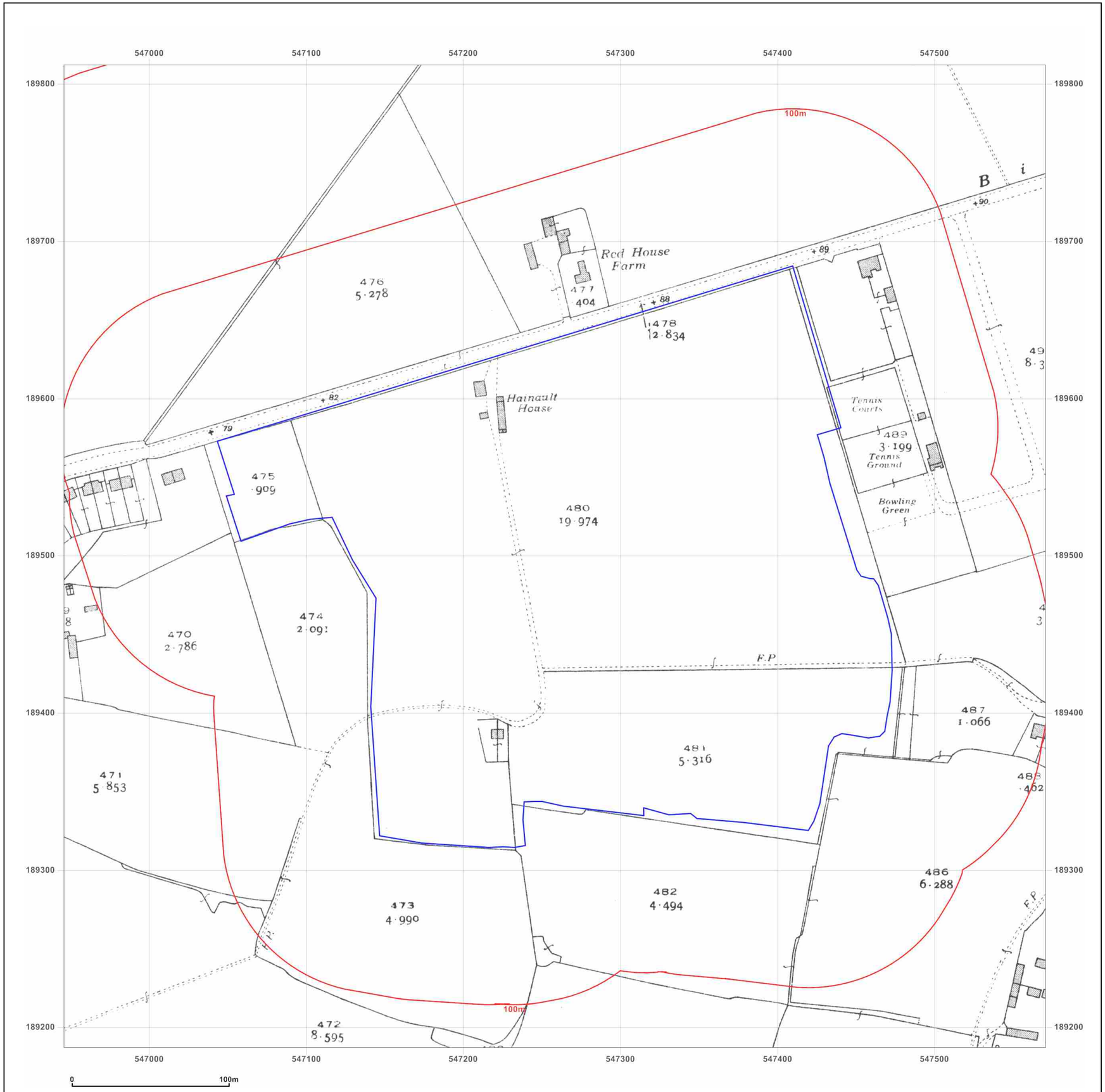

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1939**

Scale: 1:2,500

Printed at: 1:2,500

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

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Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1962**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1962
Revised 1962
Edition 1964
Copyright 1964
Levelled 1961

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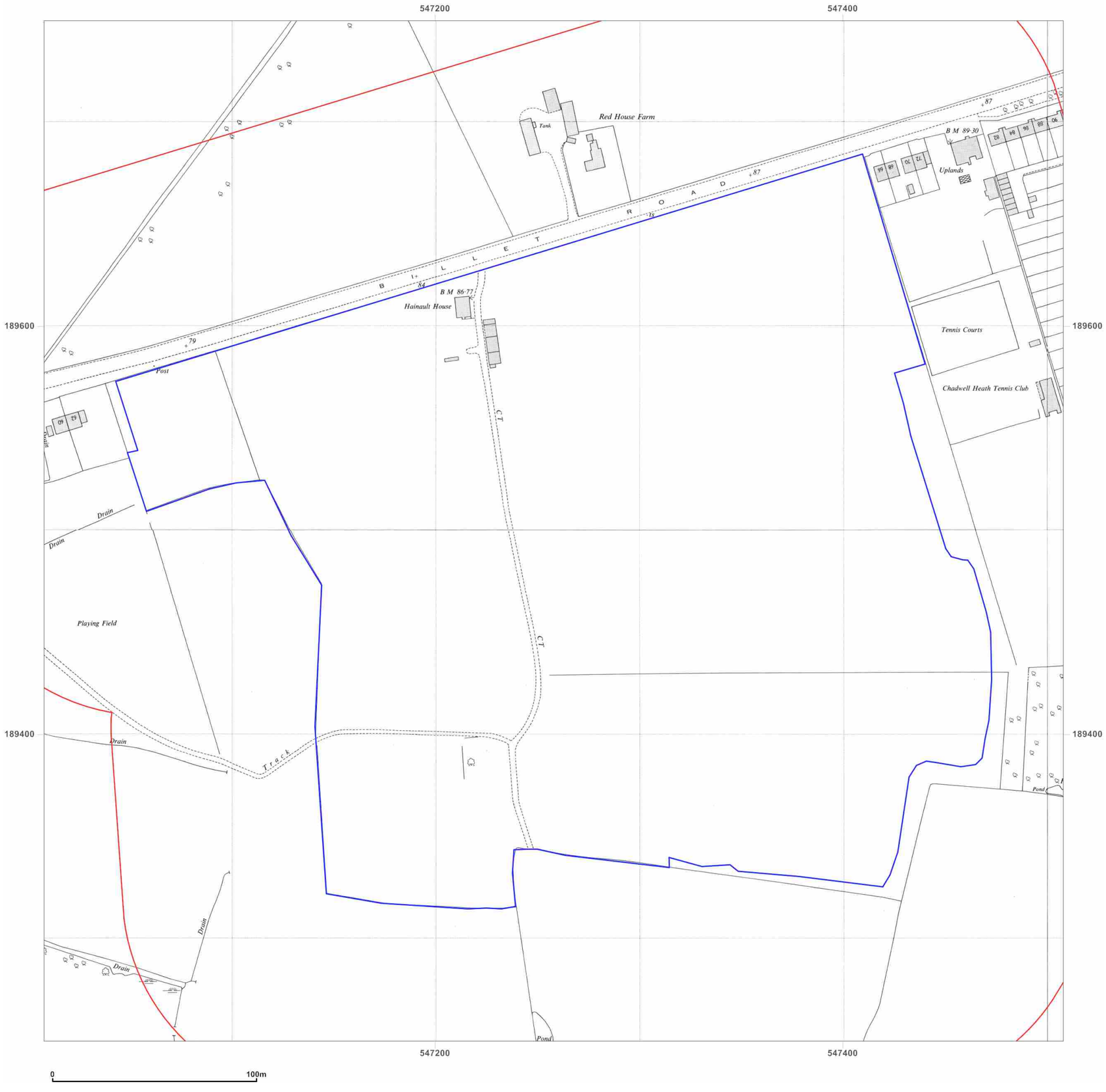

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1963**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1962 Revised 1962 Edition N/A Copyright 1963 Levelled 1961	Surveyed 1962 Revised 1962 Edition N/A Copyright 1963 Levelled 1961
Surveyed 1962 Revised 1962 Edition N/A Copyright 1963 Levelled 1961	Surveyed 1962 Revised 1962 Edition N/A Copyright 1963 Levelled 1961

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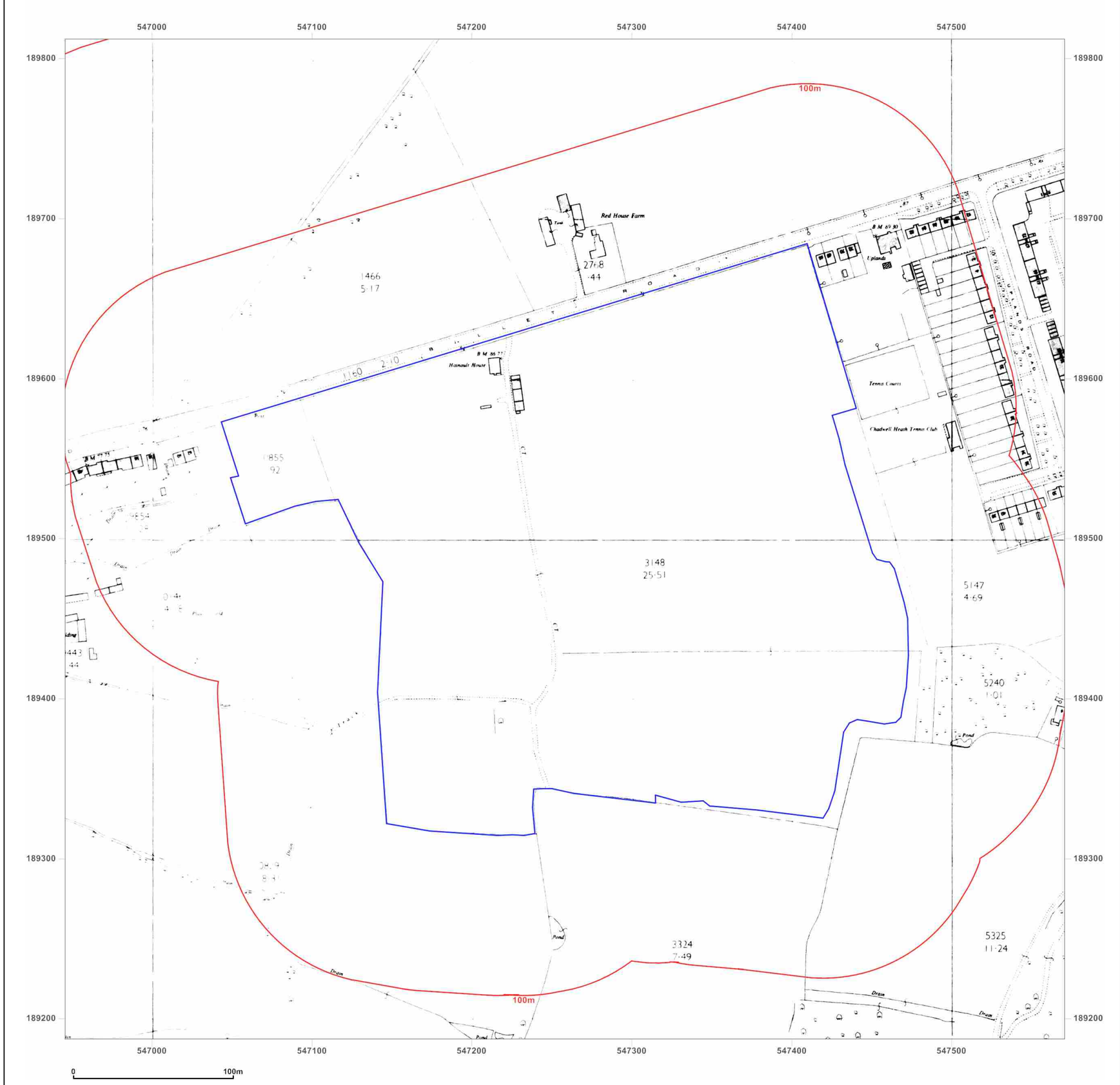

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1964**

Scale: 1:2,500

Printed at: 1:2,500

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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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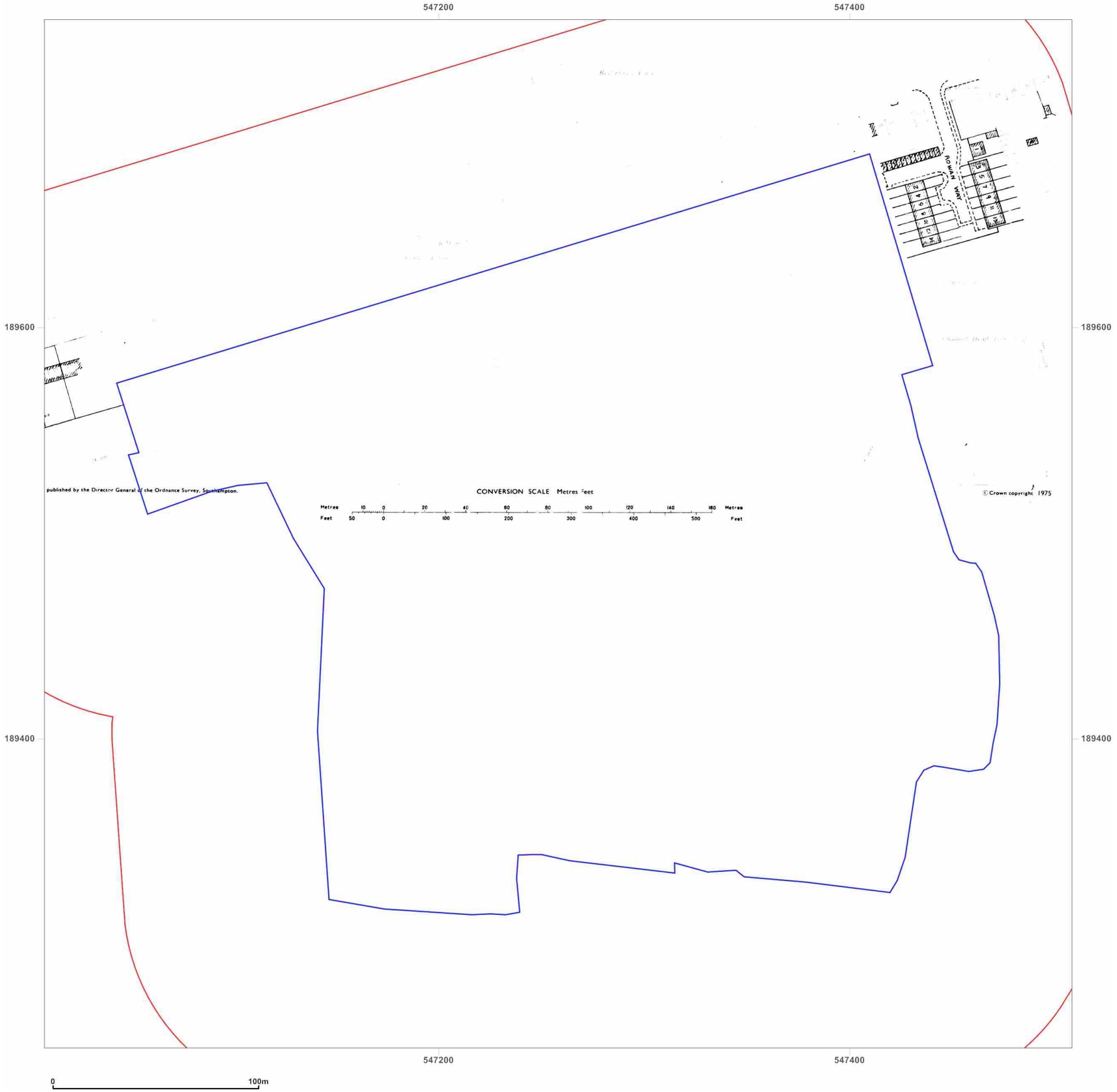

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1975-1977**

Scale: 1:1,250

Printed at: 1:2,000

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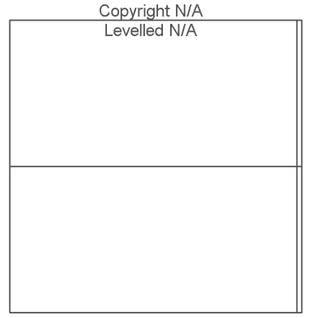
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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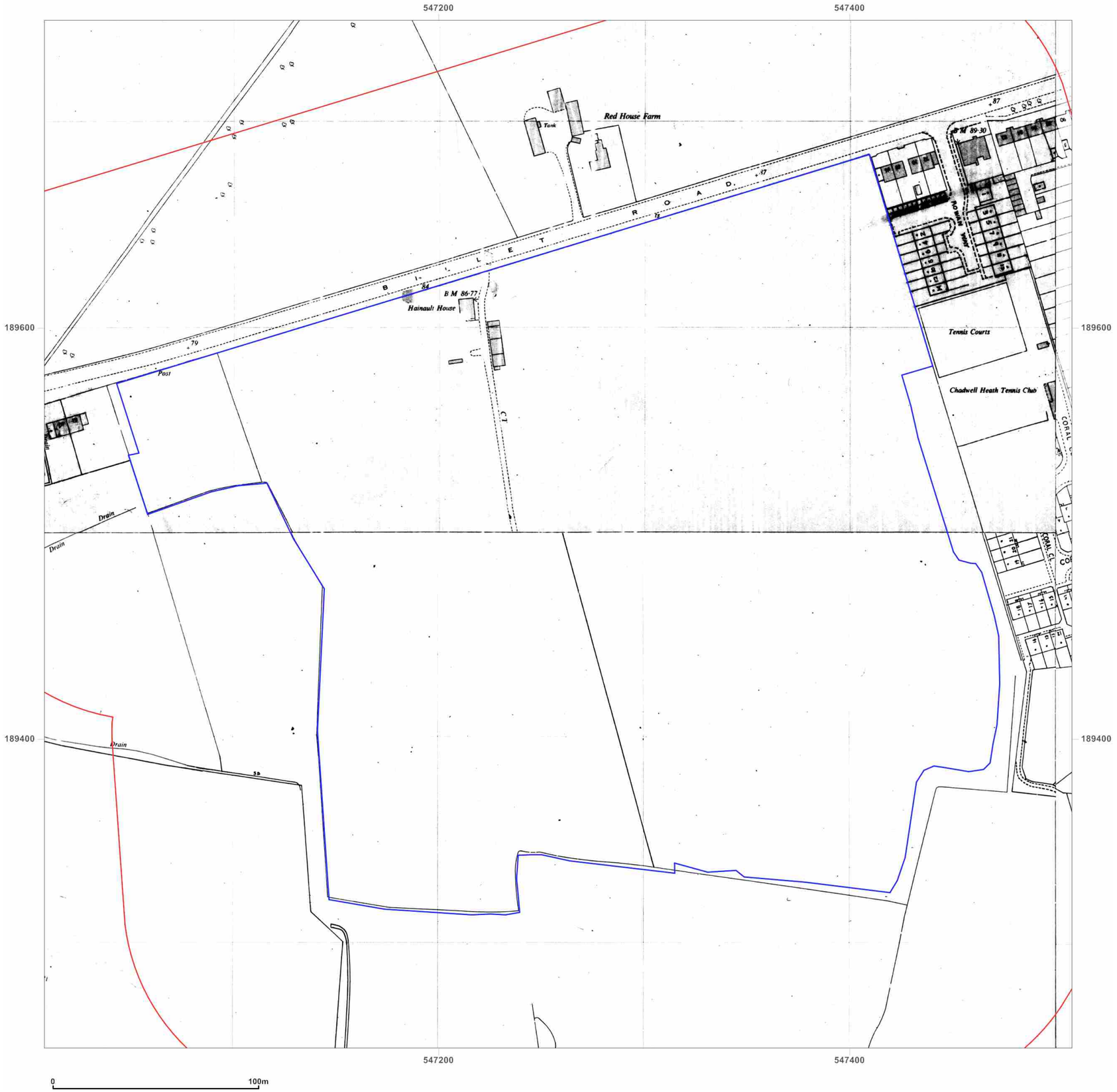

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1977-1981**

Scale: 1:1,250

Printed at: 1:2,000

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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 1981 Levelled 1961
Surveyed N/A Revised N/A Edition N/A Copyright 1981 Levelled 1964	Surveyed 1979 Revised 1979 Edition N/A Copyright N/A Levelled 1960

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Groundsure INSIGHTS

Site Details:

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Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1979-1981**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1979
Revised 1979
Edition N/A
Copyright N/A
Levelled 1961

Surveyed 1962
Revised 1980
Edition N/A
Copyright 1981
Levelled 1960

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Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1991**

Scale: 1:1,250

Printed at: 1:2,000

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

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

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

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

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Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:1,250

Printed at: 1:2,000

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

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

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Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:1,250

Printed at: 1:2,000

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

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

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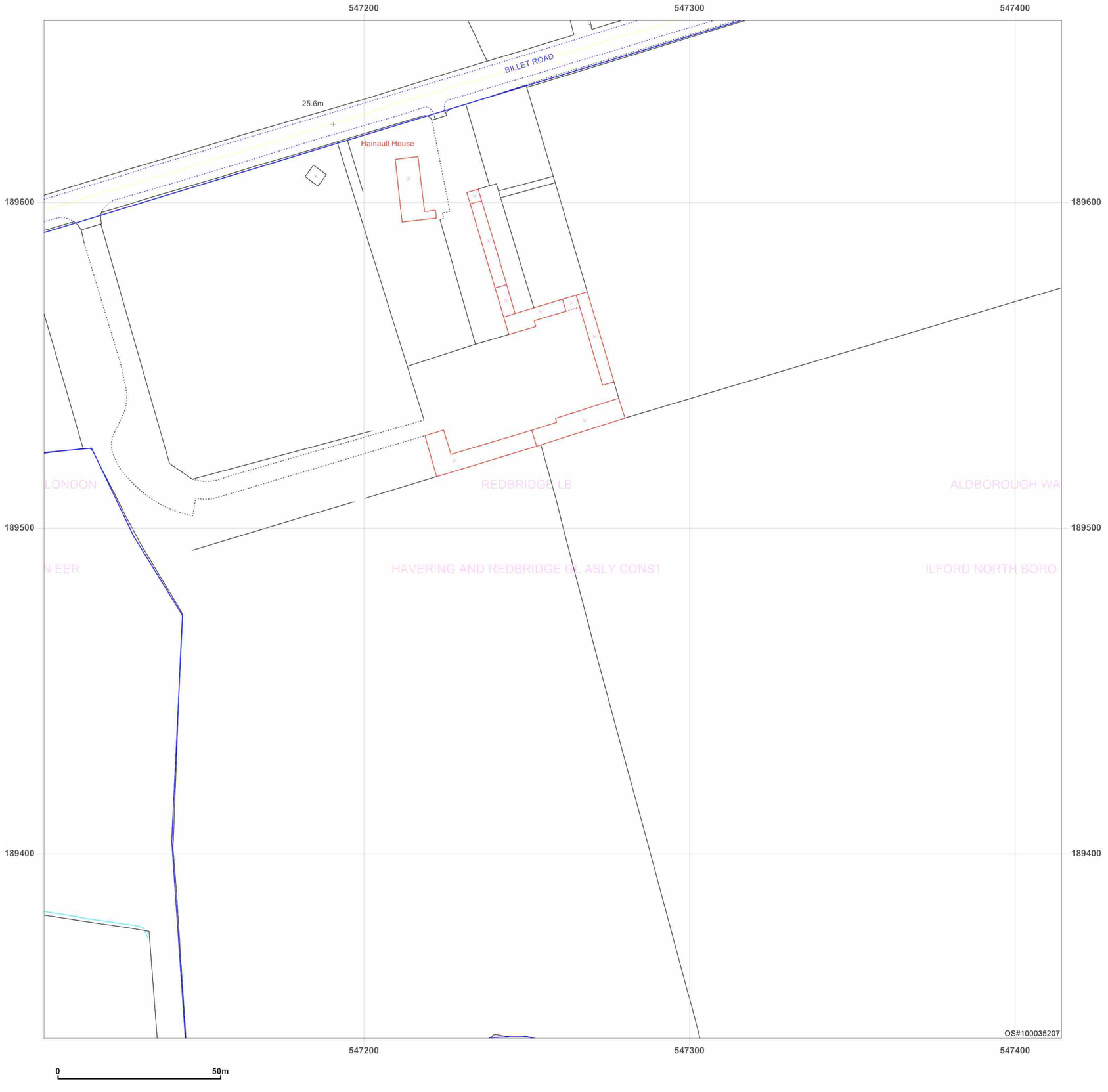

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

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

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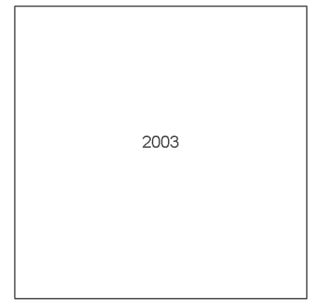

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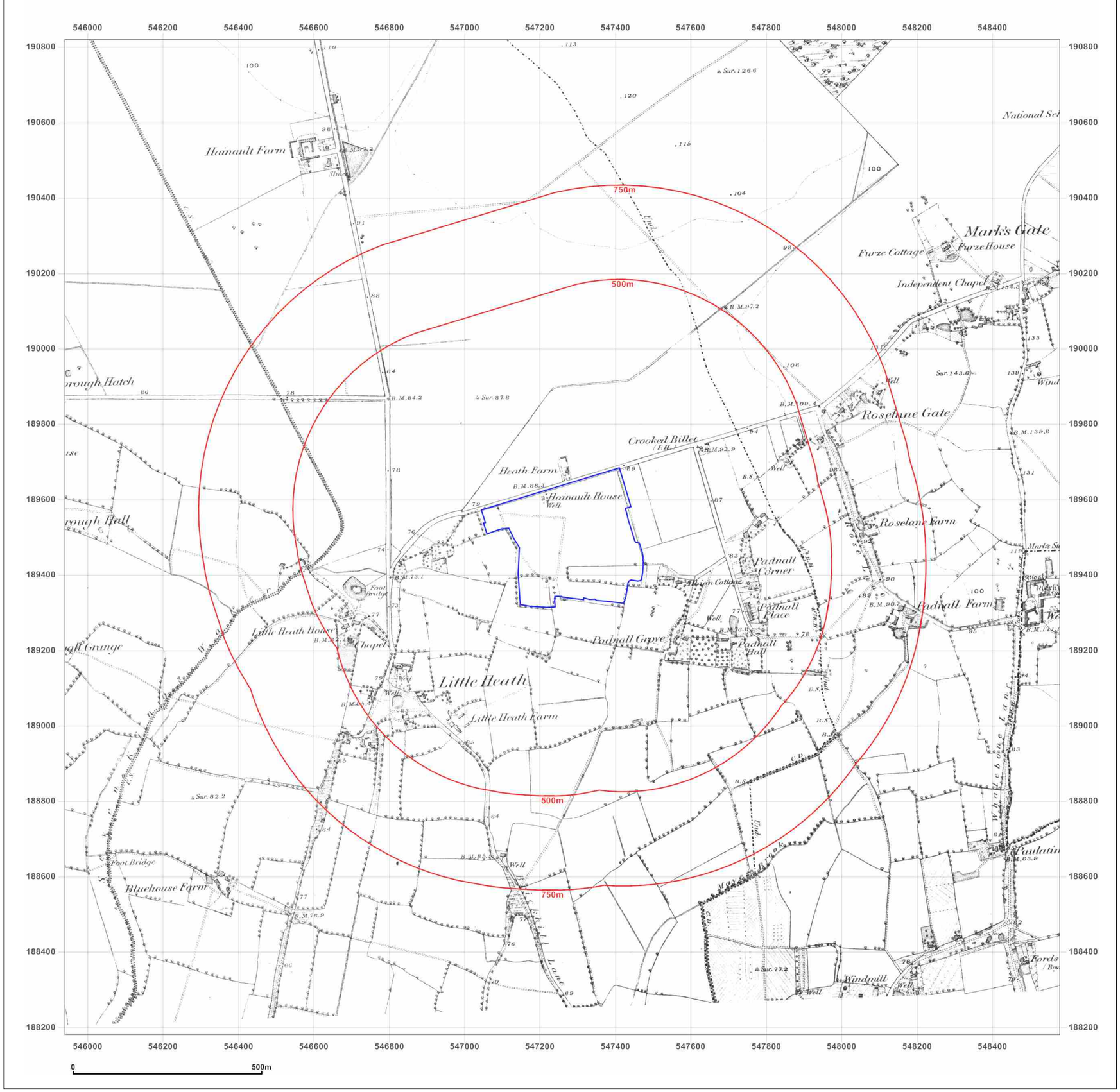

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1871**

Scale: 1:10,560

Printed at: 1:10,560

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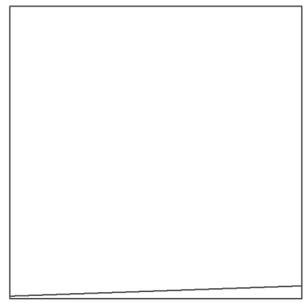
Surveyed 1871
Revised 1871
Edition N/A
Copyright N/A
Levelled N/A



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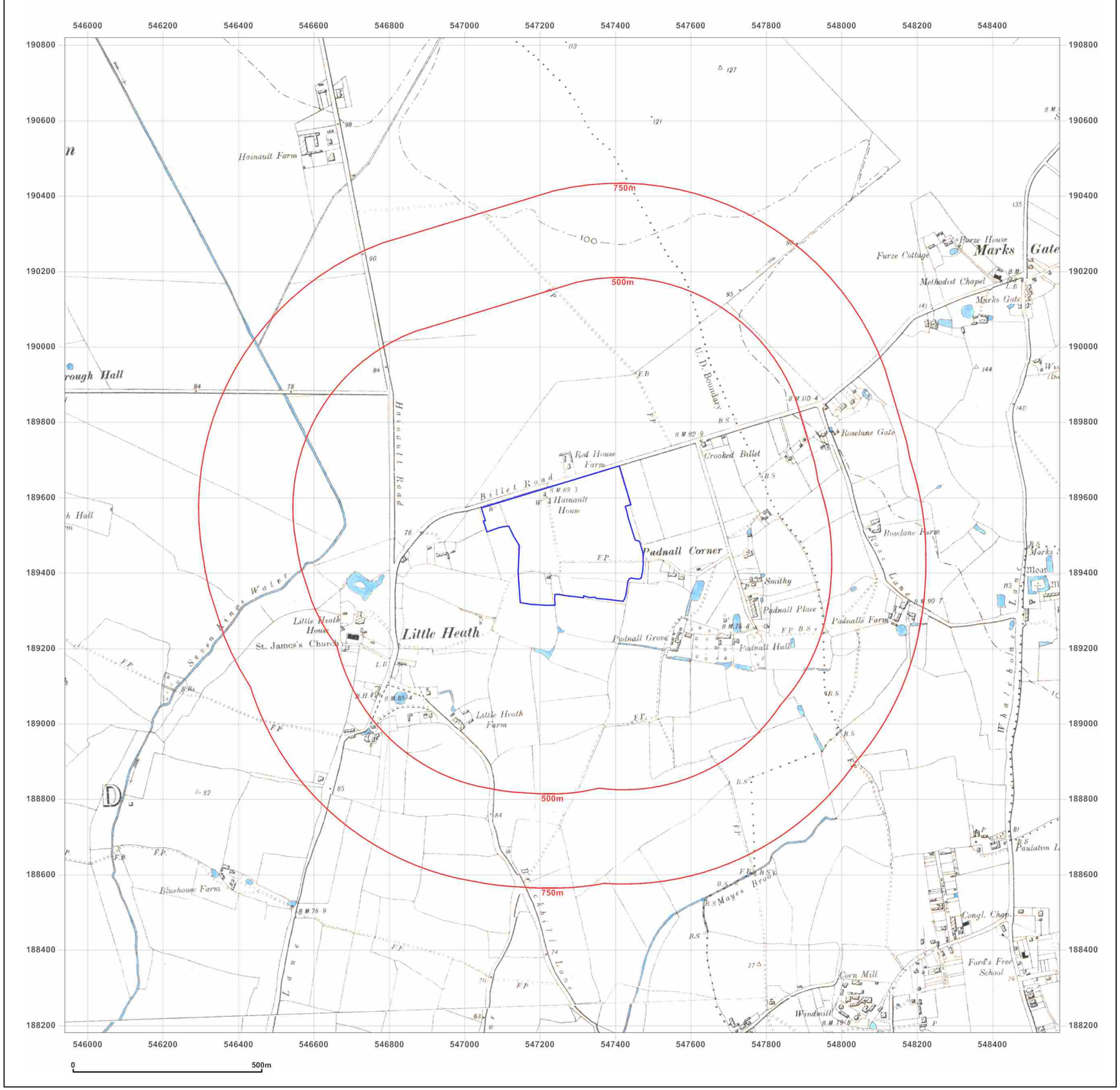

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1894-1895**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1871
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1862
Revised 1894
Edition N/A
Copyright N/A
Levelled N/A

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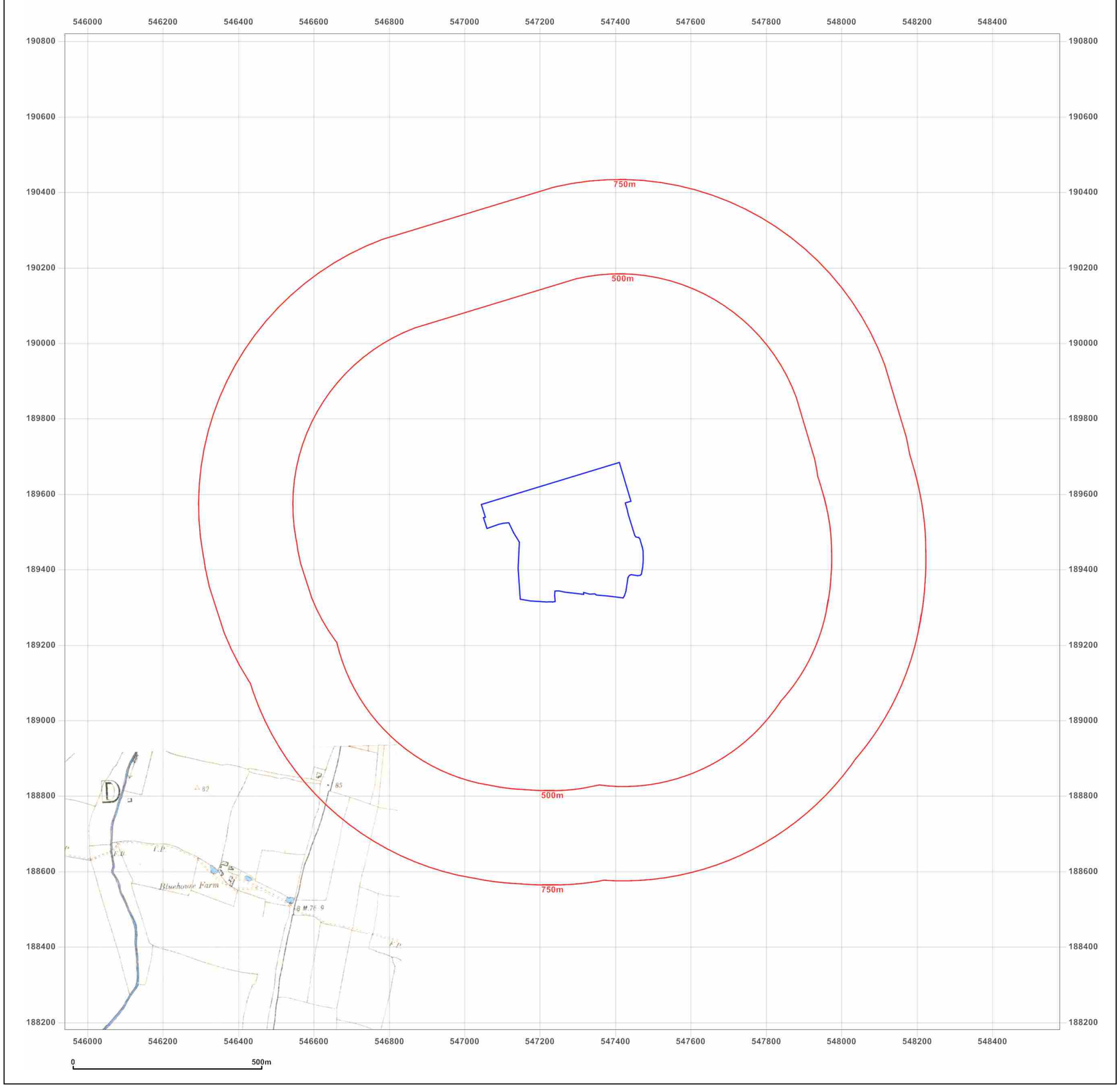

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1895**

Scale: 1:10,560

Printed at: 1:10,560

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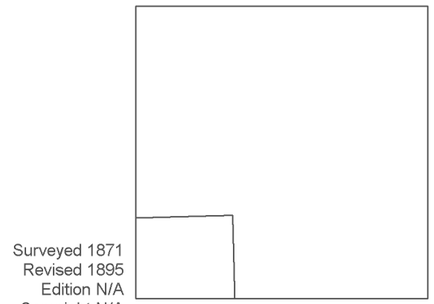

Surveyed 1871
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

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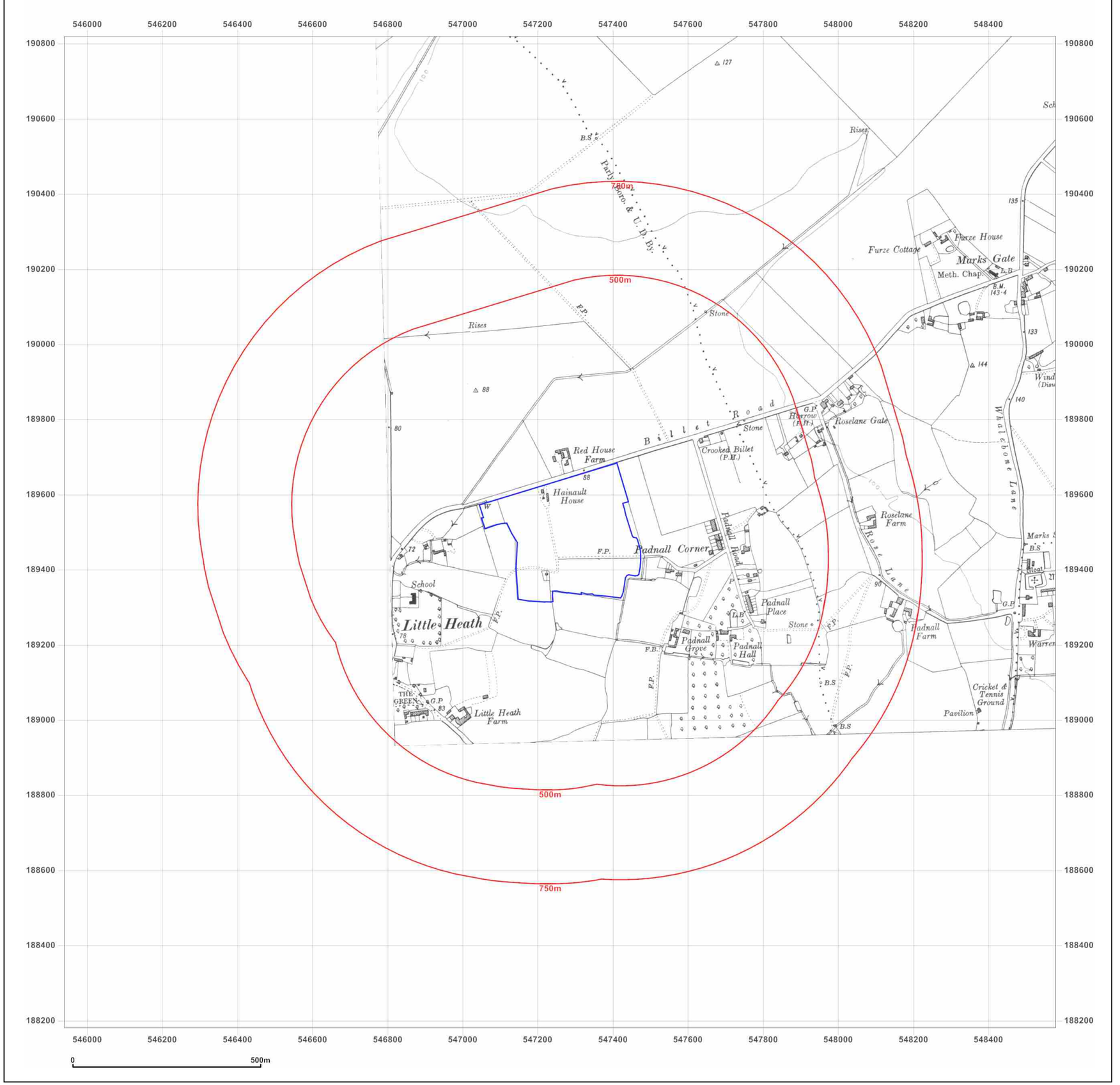

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1914**

Scale: 1:10,560

Printed at: 1:10,560

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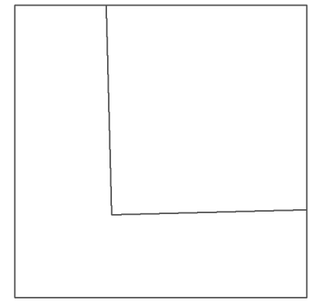

Surveyed 1871
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

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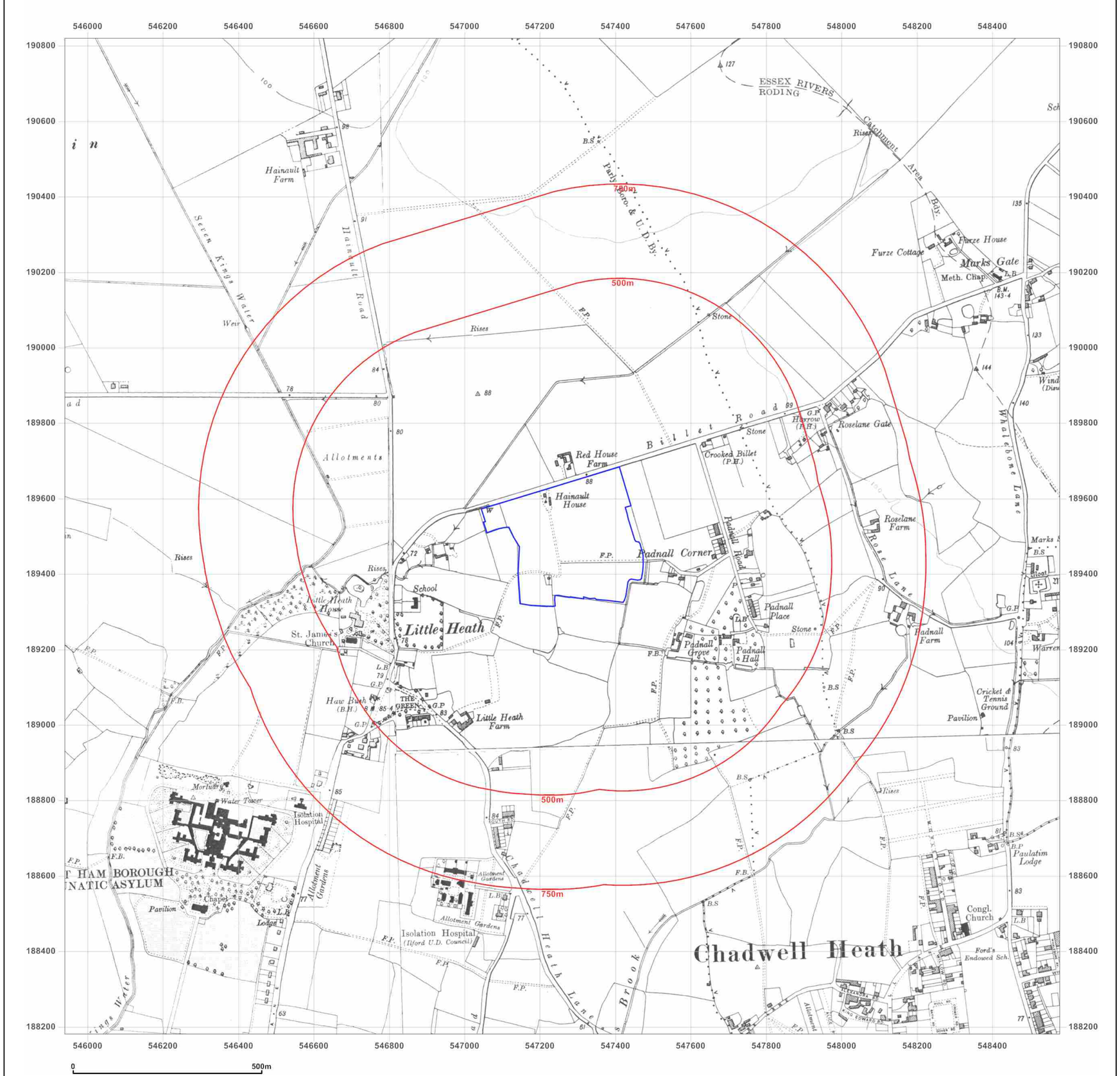

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series
Map date: **1921**
Scale: 1:10,560
Printed at: 1:10,560

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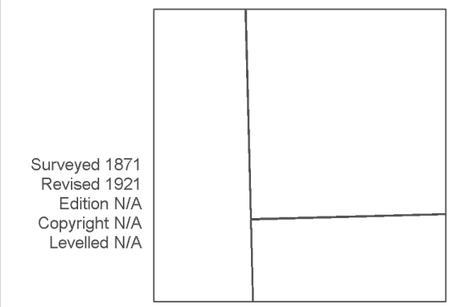

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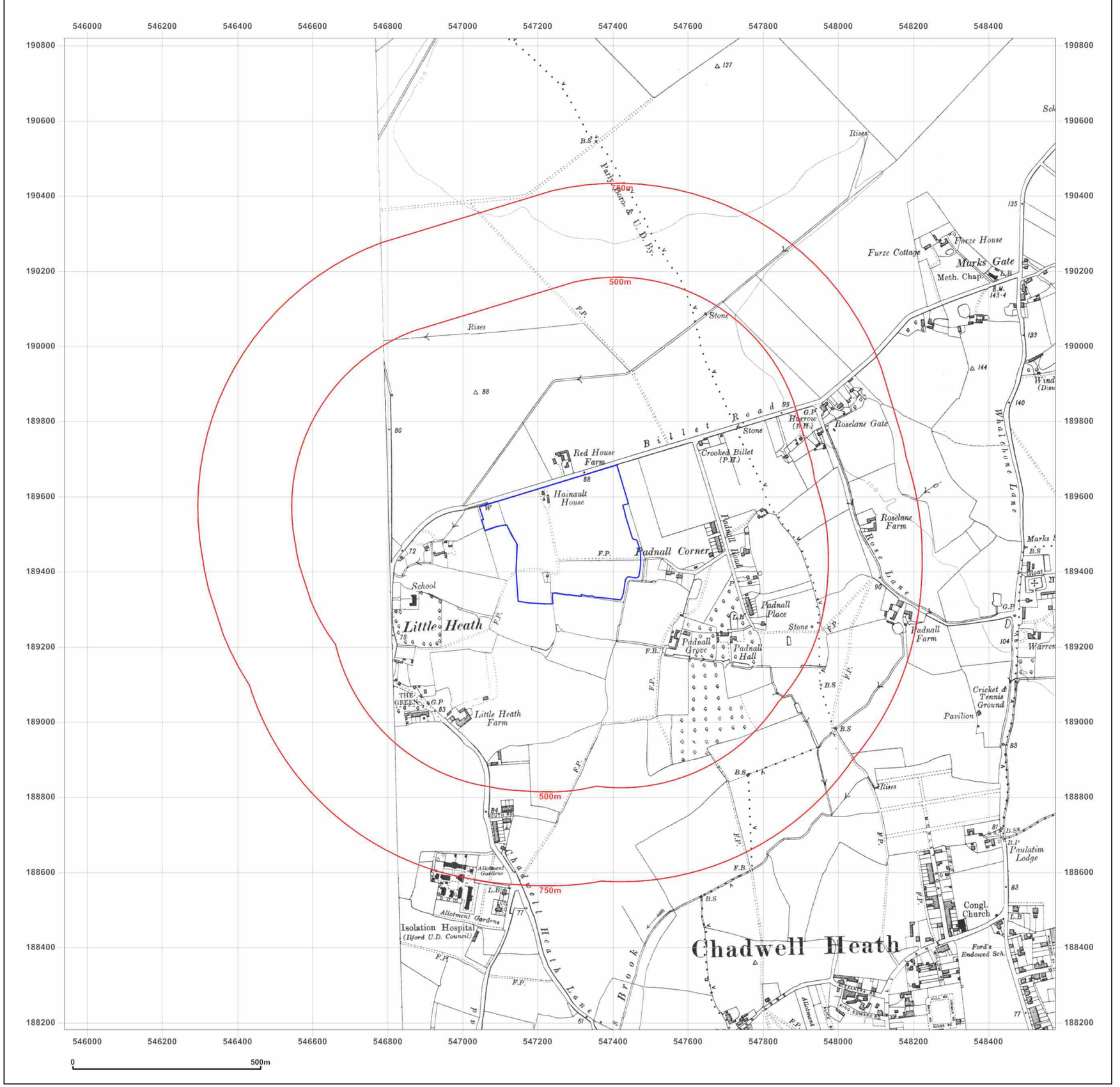

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1921**

Scale: 1:10,560

Printed at: 1:10,560

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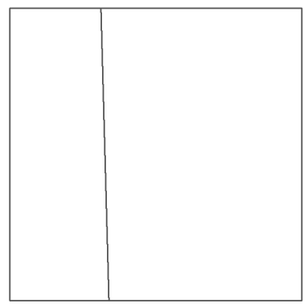

Surveyed 1871
Revised 1921
Edition N/A
Copyright N/A
Levelled N/A

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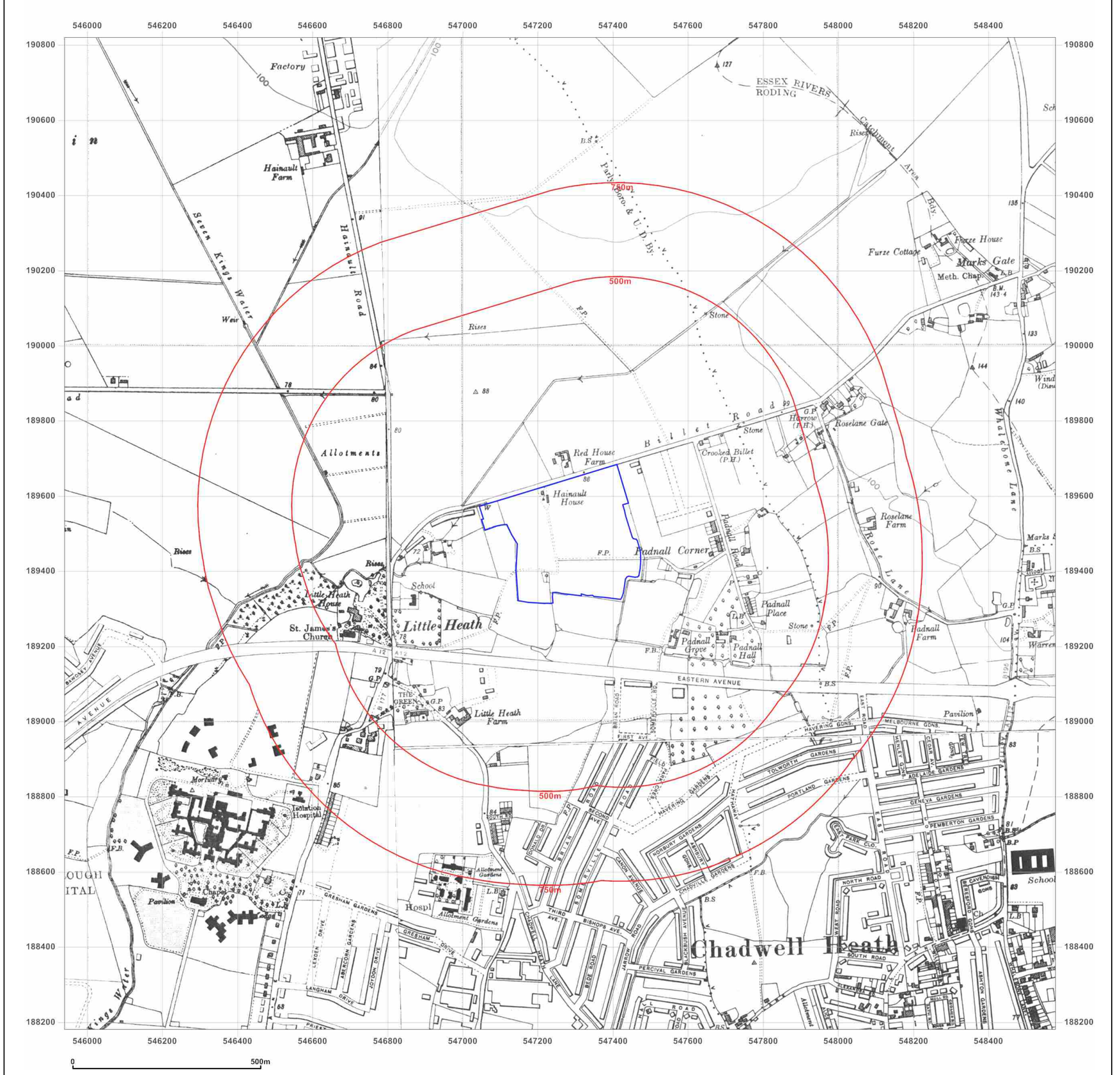

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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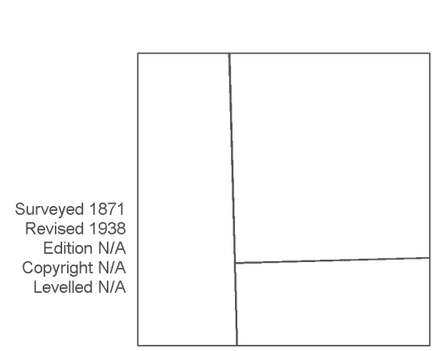

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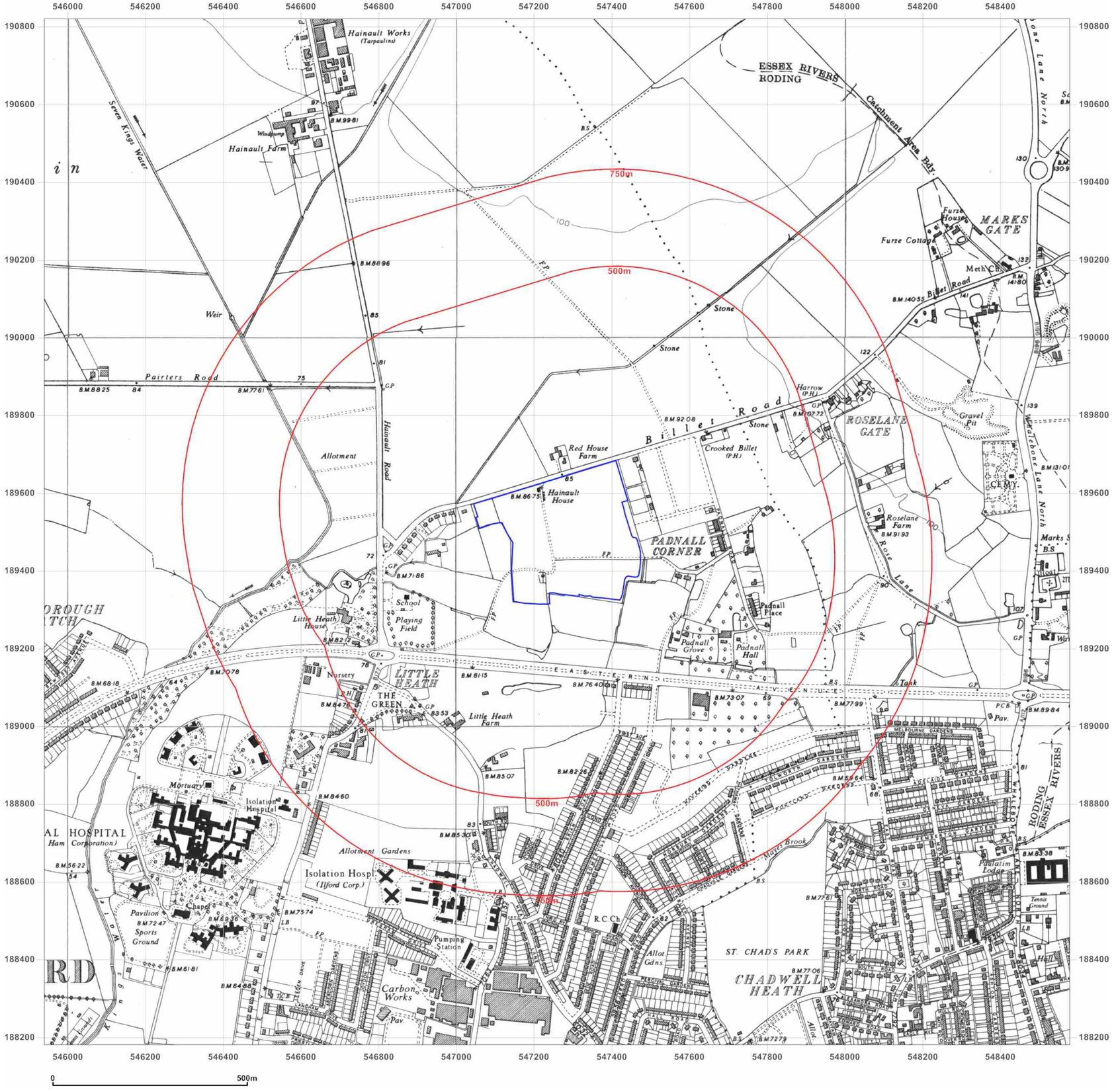

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: Provisional

Map date: **1951**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed N/A
Revised 1950
Edition N/A
Copyright 1951
Levelled N/A

Surveyed N/A
Revised 1950
Edition N/A
Copyright 1951
Levelled N/A

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Production date: 05 June 2020

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Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: Provisional

Map date: **1968-1969**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed N/A
Revised 1969
Edition N/A
Copyright 1951
Levelled N/A

Surveyed N/A
Revised 1968
Edition N/A
Copyright 1968
Levelled N/A

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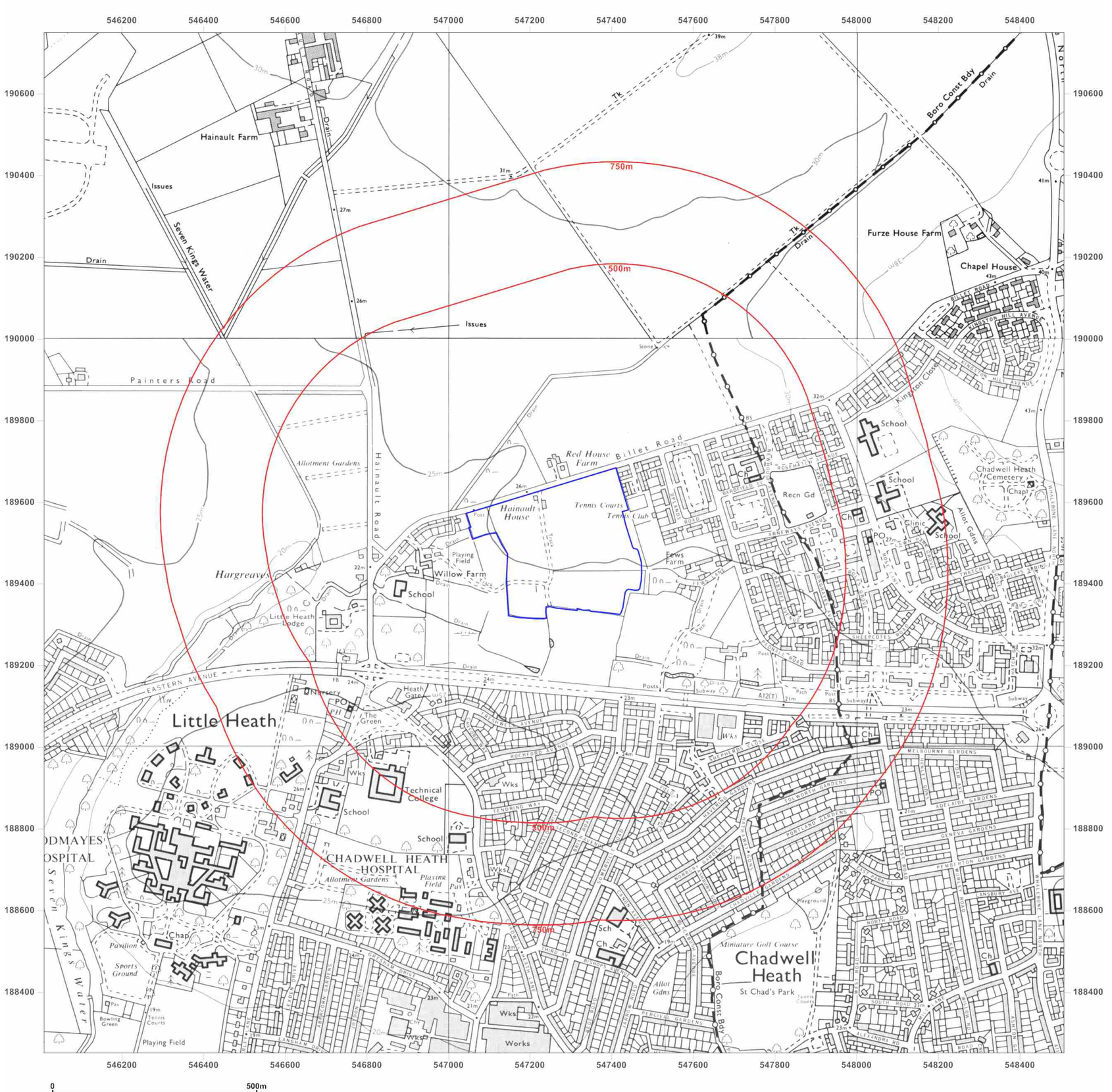

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1972-1975**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1970
Revised 1972
Edition N/A
Copyright 1972
Levelled 1962

Surveyed 1974
Revised 1975
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 05 June 2020

Map legend available at:
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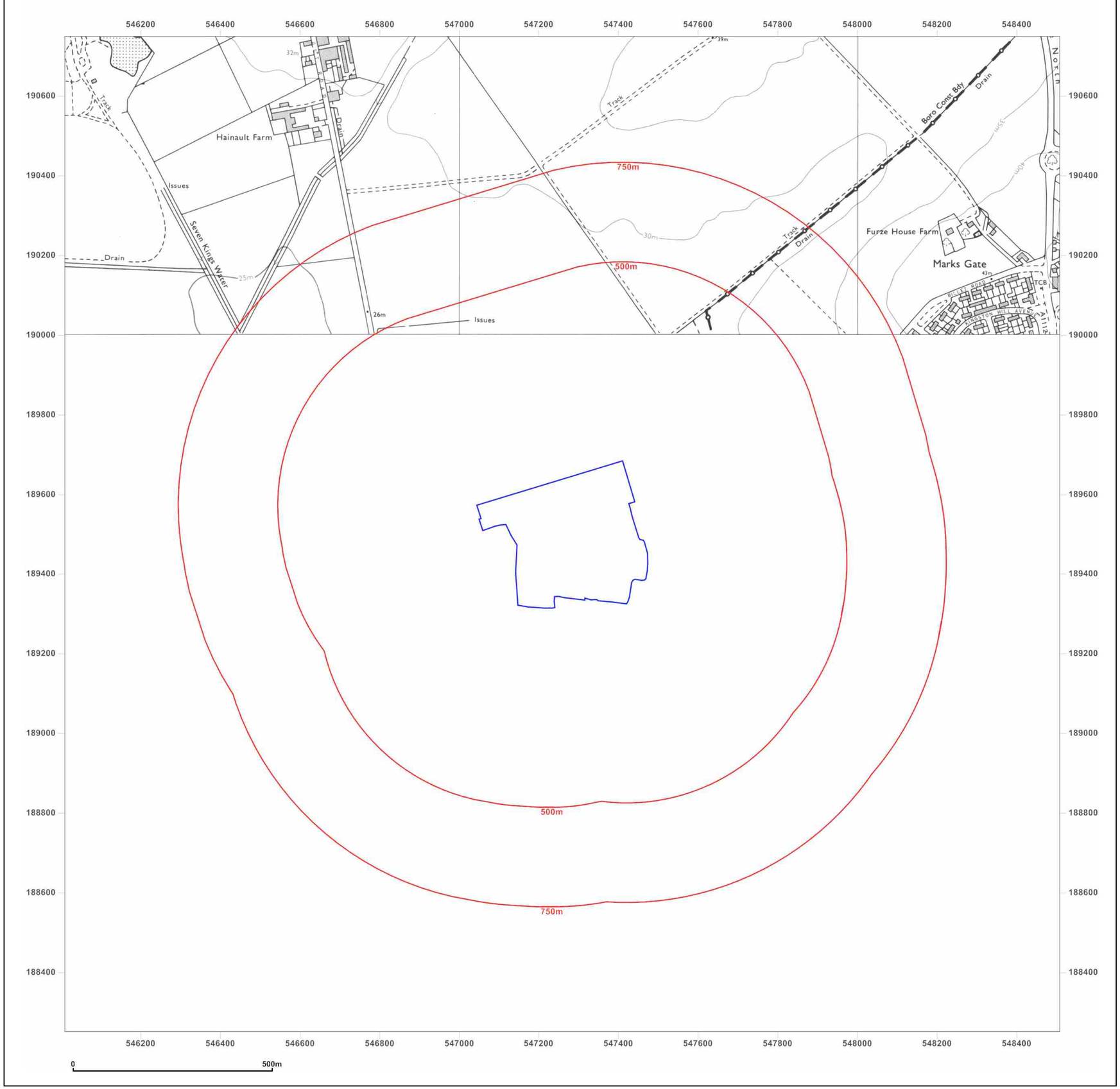

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **1989**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1986
Revised 1989
Edition N/A
Copyright N/A
Levelled N/A

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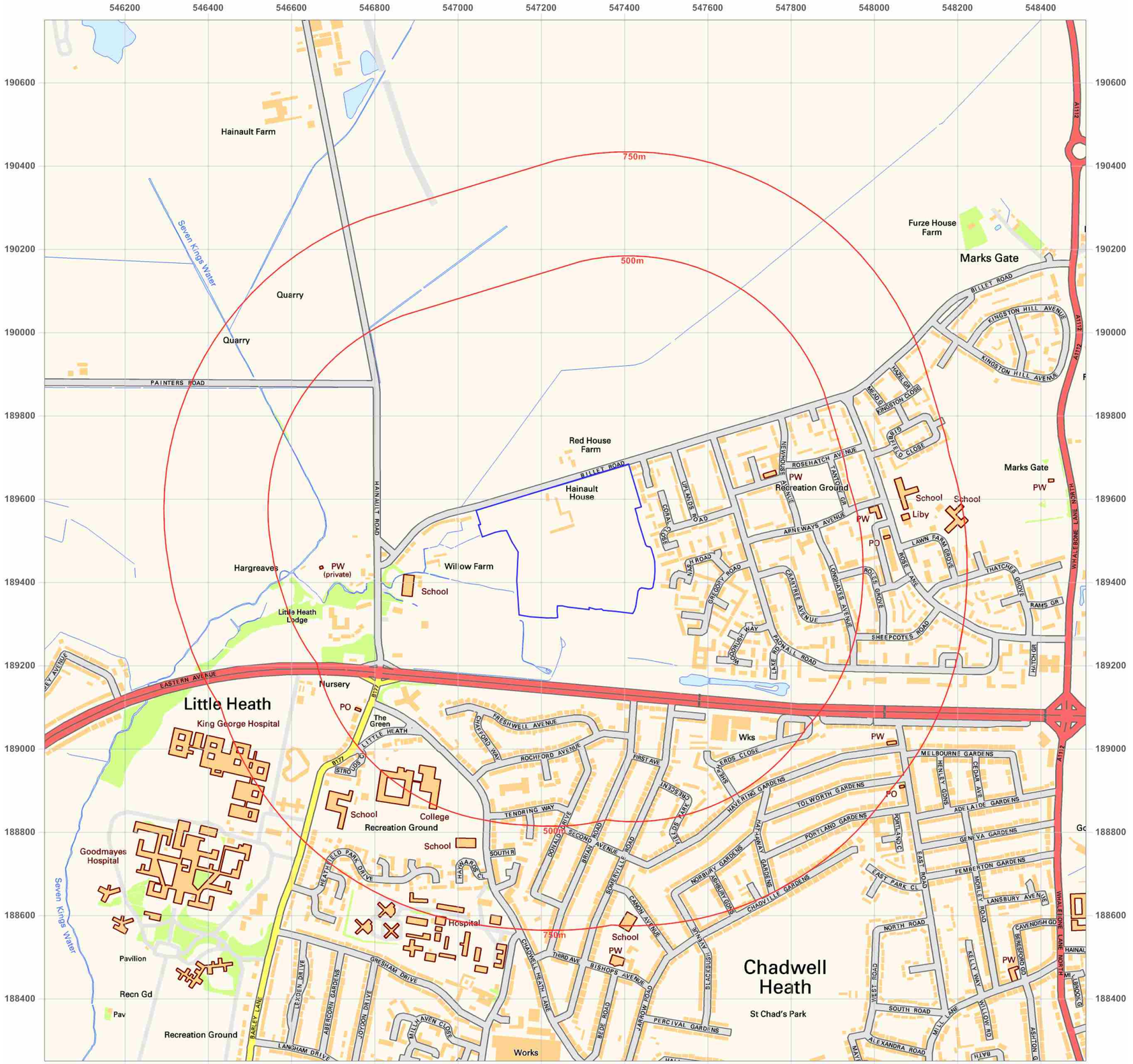
Production date: 05 June 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 05 June 2020

Map legend available at:
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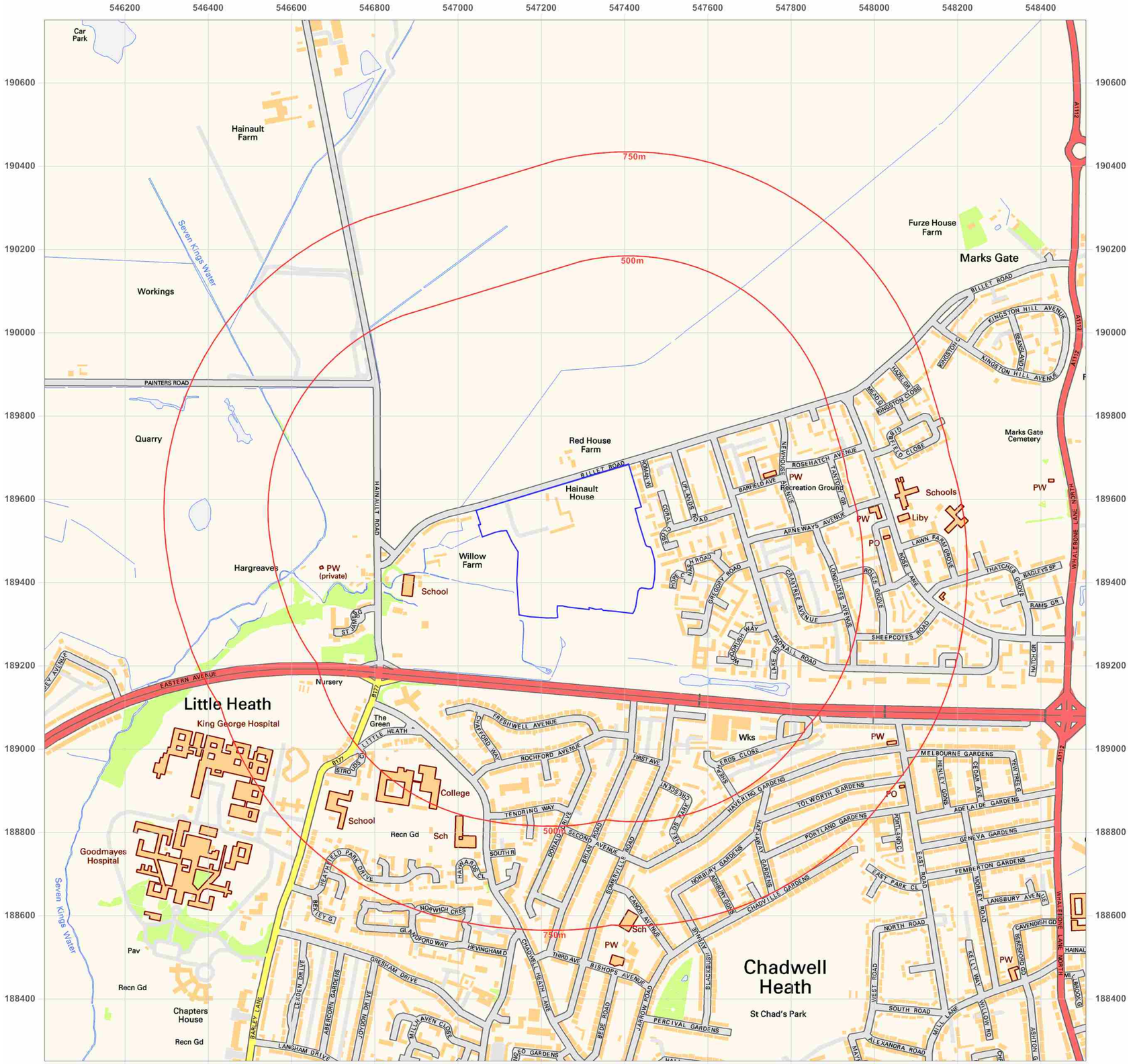

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 05 June 2020

Map legend available at:
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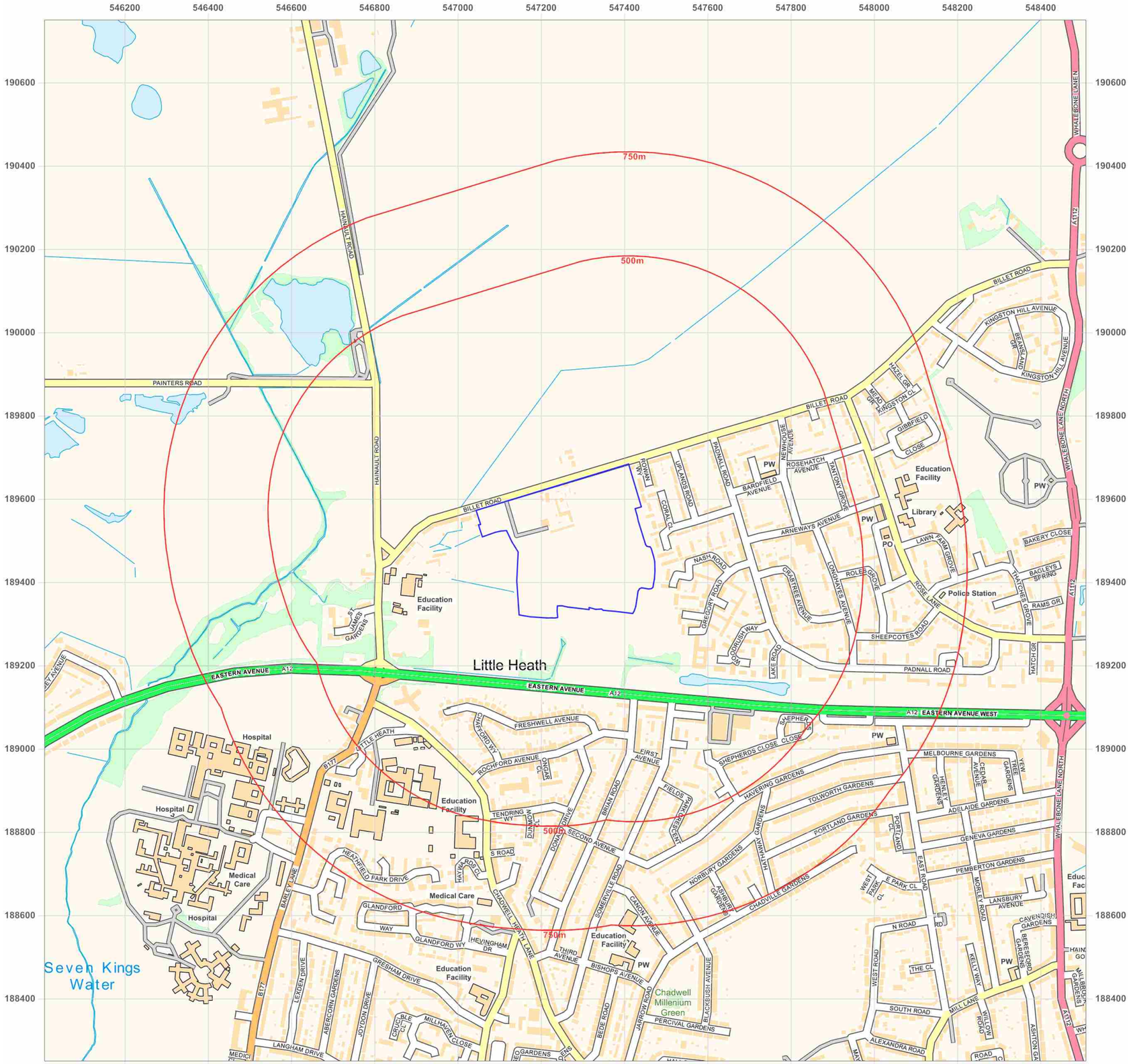

Groundsure INSIGHTS

Site Details:

66, BILLET ROAD, CHADWELL HEATH, RM6 5PP

Client Ref: 20-554-CAH-21912s
Report Ref: HMD-154-6783701
Grid Ref: 547258, 189499

Map Name: National Grid

Map date: **2020**

Scale: 1:10,000

Printed at: 1:10,000

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2020

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Production date: 05 June 2020

Map legend available at:
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APPENDIX 3

- Exploratory Hole Logs
- BGS Borehole Logs

IDOM

Borehole Log

Borehole No.: MBH01

Sheet 1 of 2

Project Name:	Billet Road	Project No.: 21912s	Co-ords: 547153E - 189580N
Location:	Romford		Level (m):
Equipment:	TR2000		Dates: 21/05/2020

Hole Type: CP

Scale: 1:50

Logged By: CAH

Well	Wtr Strk	Sample and In Situ Testing: Depth (m)	Type	Results	Coring: FI	TCR	SCR	RQD	Depth (m)	Level (m)	Legend	Stratum Description
		0.50 - 0.55	D									MADE GROUND comprising firm greenish grey mottled yellowish brown slightly gravelly sandy CLAY. Gravels are fine to medium subangular brick, concrete and flint.
		1.00 - 1.05	D									
		1.20 - 1.25	D						1.20			
		1.20 - 1.70	B									MADE GROUND comprising brownish grey slightly clayey sandy GRAVEL. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded flint and brick.
		1.20	SPT(C)	N=12 (3,3/3,2,3,4)								
		2.00 - 2.05	D						2.00			
		2.00 - 2.50	B									Orangish brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded flint with rare flint cobbles. (Boyn Hill Gravel Member).
		2.00	SPT(C)	N=2 (1,2/1,0,1,0)								
		3.00 - 3.05	D									
		3.00 - 3.50	B									
		3.00	SPT(C)	N=2 (1,0/1,0,1,0)								
		3.60 - 3.65	D						3.60			
		4.00 - 4.05	D									Soft pale grey, blackish green and yellowish brown slightly gravelly sandy CLAY. Gravels are fine angular flint. Sand is fine to coarse. (Boyn Hill Gravel Member).
		4.00 - 4.70	B									
		4.00	SPT(S)	N=9 (1,2/2,2,3,2)								
		5.00 - 5.05	D									
		5.00	SPT(C)	N=8 (1,1/2,2,2,2)								
		5.50 - 5.55	D						5.40			Stiff yellowish orange mottled pale grey slightly silty sandy CLAY. Sand is fine to medium. (Weathered London Clay Formation).
		6.00 - 6.05	D						6.00			
		6.00	SPT(S)	N=12 (1,1/2,3,3,4)								Stiff bluish grey slightly sandy CLAY. Sand is fine. (London Clay Formation).
		7.00 - 7.05	D									
		7.50 - 7.95	U	Ublow=100								
		8.00 - 8.05	D									
		9.00 - 9.05	D									
		9.00	SPT(S)	N=20 (2,3/4,5,5,6)								
		10.00 - 10.05	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.

Services checked and C.A.T. cleared.

IDOM

Borehole Log

Borehole No. **MBH01**

Sheet 2 of 2

Project Name:	Billet Road	Project No. 21912s	Co-ords: 547153E - 189580N
Location:	Romford		Level (m):
Equipment:	TR2000		Dates: 21/05/2020

Hole Type: CP

Scale: 1:50

Logged By: CAH

Well	Wtr Strk	Sample and In Situ Testing			Coring				Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results	FI	TCR	SCR	RQD					
		10.50 - 10.95	U	Ublow=80								Stiff bluish grey slightly sandy CLAY. Sand is fine. (London Clay Formation).	
		11.00 - 11.05	D										11
		12.00 - 12.05 12.00	D SPT(S)	N=22 (1,3/3,6,6,7)									12
		13.00 - 13.05	D										13
		13.50 - 13.95	U	Ublow=95									
		14.00 - 14.05	D										14
		15.00 - 15.05 15.00	D SPT(S)	N=14 (2,2/3,3,4,4)									15
		16.00 - 16.05	D										16
		16.50 - 16.95	U	Ublow=100									
		17.00 - 17.05	D										17
		18.00 - 18.05 18.00	D SPT(S)	N=24 (4,4/5,6,6,7)									18
		19.00 - 19.05	D										19
		19.50 - 19.95	U	Ublow=100									
		20.00 - 20.05	D						20.00			End of Borehole at 20.00m	20

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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS01**

Sheet 1 of 1

Project Name: Billet Road	Project No. 21912s	Co-ords: 547183E - 189589N	Hole Type WS
Location: Romford		Level (m):	Scale 1:25
Equipment: Dando Red Terrier		Dates: 21/05/2020	Logged By CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40 - 0.45	D,J					TOPSOIL comprising stiff greyish brown slightly gravelly sandy clay. Gravels are fine to coarse subrounded flint. Abundant organic material.	
					0.60				
		1.00 - 1.05	D,J					MADE GROUND comprising stiff orangish brown slightly gravelly sandy clay. Gravels are fine to coarse subangular to subrounded flint, brick and concrete. Common organic material.	1
		1.00	SPT(C)	N=11 (2,2/3,3,3,2)					
		1.30 - 1.35	D,J						
					1.50				
	▼	1.80 - 1.85	D,J					MADE GROUND comprising soft becoming very soft greenish black slightly sandy gravelly clay. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded flint, brick and concrete. Strong hydrocarbon odour. Occasional plastic and paper.	
		2.00	SPT(C)	N=9 (1,1/2,4,1,2)					2
		3.00 - 3.05	D,J						
		3.00	SPT(C)	N=0 (1,0/0,0,0,0)					3
		4.00	SPT(C)	N=3 (2,0/0,0,1,2)					4
					4.80			Brownish grey silty fine to coarse SAND. (Boyn Hill Gravel Member).	
		5.00	SPT(C)	N=27 (1,4/5,7,8,7)	5.00			End of Borehole at 5.00m	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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS02**

Sheet 1 of 1

Project Name: Billet Road	Project No. 21912s	Co-ords: 547157E - 189597N	Hole Type WS
Location: Romford		Level (m):	Scale 1:25
Equipment: Dando Red Terrier		Dates: 21/05/2020	Logged By CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.05 - 0.10	D,J					TOPSOIL comprising stiff greyish brown slightly gravelly sandy clay. Gravels are fine to coarse subrounded flint. Abundant organic material.
					0.20			MADE GROUND comprising stiff orangish brown mottled pale grey slightly gravelly sandy clay. Gravels are fine to coarse subangular to subrounded flint and mica. Sand is fine to coarse. Common organic material.
		0.80 - 0.85	D,J					
					0.90			
		1.00	SPT(C)	N=18 (8,9/5,6,3,4)				Orangish brown slightly sandy clayey GRAVEL. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded flint. (Boyn Hill Gravel Member).
		1.50 - 1.55	D,J					
					1.70			Orangish brown silty fine to coarse SAND. (Boyn Hill Gravel Member).
		2.00	SPT(C)	N=7 (4,1/1,1,1,4)				
		3.00	SPT(C)	N=14 (1,1/1,4,5,4)				
		4.00 - 4.05	D,J					
		4.00	SPT(C)	N=26 (5,5/5,7,7,7)				
					4.60			Orangish brown slightly silty gravelly fine to coarse SAND. Gravels are fine to coarse subangular to subrounded flint. (Boyn Hill Gravel Member).
					4.80			Stiff bluish grey slightly sandy CLAY. Sand is fine. (London Clay Formation).
		5.00	SPT(C)	N=20 (4,3/4,5,5,6)	5.00			End of Borehole at 5.00m

1 2 3 4 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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS03**

Sheet 1 of 1

Project Name:	Billet Road	Project No. 21912s	Co-ords: 547136E - 189582N
Location:	Romford		Level (m):
Equipment:	Dando Red Terrier		Dates: 21/05/2020

Hole Type: WS

Scale: 1:25

Logged By: CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.15	D,J					MADE GROUND comprising firm greyish brown slightly gravelly sandy clay. Gravels are fine to coarse subangular to rounded flint and brick. Sand is fine to coarse. Common organic material.	
					0.70				
		0.80 - 0.85	D,J					MADE GROUND comprising soft orangish brown slightly gravelly sandy clay. Gravels are medium to coarse subangular to rounded flint, brick and concrete. Common pockets of greenish grey silty fine to coarse sand.	
		1.00	SPT(C)	N=13 (9,6/3,4,4,2)					1
					1.80				
		1.90 - 1.95	D,J					Brownish orange mottled greenish grey silty medium to coarse SAND. (Boyn Hill Gravel Member).	
		2.00	SPT(C)	N=50 (9,10/12,12,13,13)					2
					2.50				
		3.00	SPT(C)	N=10 (3,2/2,3,3,2)				Brownish orange slightly silty sandy GRAVEL. Sand is fine to coarse. Gravels are fine to medium subangular to subrounded flint. (Boyn Hill Gravel Member).	3
		4.00	SPT(C)	N=25 (5,5/6,8,6,5)					4
		5.00	SPT(C)	N=20 (3,3/4,6,5,5)	5.00			End of Borehole at 5.00m	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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS04**

Sheet 1 of 1

Project Name:	Billet Road	Project No. 21912s	Co-ords: 547105E - 189580N
Location:	Romford		Level (m):
Equipment:	Dando Red Terrier		Dates: 21/05/2020

Hole Type: WS

Scale: 1:25

Logged By: CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.15	D,J					MADE GROUND comprising blackish grey becoming grey slightly clayey sandy gravel. Sand is fine to coarse. Gravels are fine to coarse angular to subrounded flint, brick, concrete and glass.
					0.60			MADE GROUND comprising firm to stiff orangish brown slightly sandy gravelly clay. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded flint and brick.
		1.00 - 1.05 1.00	D,J SPT(C)	N=5 (0,1/2,1,1,1)	0.80			Soft orangish brown mottled pale grey slightly gravelly sandy CLAY with frequent organic material. Gravels are fine to coarse angular to subangular flint. Sand is fine to coarse. (Head Deposits).
					1.40			Orangish brown mottled grey slightly silty sandy GRAVEL. Sand is fine to coarse. Gravels are fine to coarse angular to subrounded flint. (Boyn Hill Gravel Member).
		2.00 - 2.05 2.00	D,J SPT(C)	N=50 (25 for 145mm/50 for 235mm)	1.90 2.00			Reddish brown silty fine to coarse SAND. (Boyn Hill Gravel Member). End of Borehole at 2.00m

1 2 3 4 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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS05**

Sheet 1 of 1

Project Name: Billet Road	Project No. 21912s	Co-ords: 547118E - 189554N	Hole Type WS
Location: Romford		Level (m):	Scale 1:25
Equipment: Dando Red Terrier		Dates: 21/05/2020	Logged By CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.15	D,J					MADE GROUND comprising stiff brownish grey slightly clayey gravelly fine to coarse sand. Gravels are fine to coarse subangular to subrounded flint and basalt.	
		0.50 - 0.55	D,J		0.60			MADE GROUND comprising stiff blackish grey slightly gravelly sandy clay. Gravels are fine to medium subangular brick, flint, basalt and concrete. Sand is fine to coarse. Occasional organic matter.	
		1.00	SPT(C)	N=8 (4,2/2,2,2,2)					1
		1.15 - 1.20	D,J					*Hydrocarbon odour and staining.*	
					1.40			Stiff yellowish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravels are fine to coarse angular to subangular flint. (Boyn Hill Gravel Member).	
		2.00	SPT(C)	N=8 (0,0/2,3,2,1)					2
					2.20			Stiff brownish grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded flint. Occasional wood chips. (Boyn Hill Gravel Member).	
					2.60			Soft yellowish orange mottled bluish green slightly sandy silty CLAY. Sand is fine to medium. (Boyn Hill Gravel Member).	
		2.80 - 2.85	D,J						
		3.00	SPT(C)	N=0 (0,0/0,0,0,0)					3
					3.70			Orangish brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravels are fine to medium angular to subrounded flint. (Boyn Hill Gravel Member).	
		4.00	SPT(C)	N=16 (3,3/4,3,3,6)					4
		5.00	SPT(C)	N=17 (3,3/4,4,4,5)	5.00			End of Borehole at 5.00m	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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS06**

Sheet 1 of 2

Project Name:	Billet Road	Project No. 21912s	Co-ords: 547134E - 189524N
Location:	Romford		Level (m):
Equipment:	Dando Red Terrier		Dates: 21/05/2020

Hole Type: WS

Scale: 1:25

Logged By: CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30 - 0.35	D,J					MADE GROUND comprising blackish grey slightly clayey gravelly fine to coarse sand. Gravels are fine to coarse subangular basalt.
					0.80			
		1.00	SPT(C)	N=12 (2,2/2,3,4,3)				MADE GROUND comprising stiff greenish brown slightly silty sandy clay. Sand is fine to coarse. Rare brick fragments.
		1.50 - 1.55	D,J					
					1.70			
		1.80 - 1.85	D,J					MADE GROUND comprising stiff blackish grey slightly sandy gravelly clay. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded brick, wood, glass, concrete, paper, wood chip and tarmac.
		2.00	SPT(C)	N=4 (2,2/2,1,1,0)				*Strong hydrocarbon odour and staining.*
		2.60 - 2.65	D,J		2.60			MADE GROUND comprising soft greenish grey silty clay with frequent pockets of hydrocarbon staining and odour.
		2.90 - 2.95	D,J					*Wood chips.*
		3.00	SPT(C)	N=0 (0,0/0,0,0,0)				
		4.00	SPT(C)	N=10 (1,1/1,1,4,4)				
					4.90			Orangish brown slightly silty sandy GRAVEL. Sand is
		5.00	SPT(C)	N=31 (7,7/8,8,8,7)	5.00			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)

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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS06**

Sheet 2 of 2

Project Name: Billet Road	Project No. 21912s	Co-ords: 547134E - 189524N	Hole Type WS
Location: Romford		Level (m):	Scale 1:25
Equipment: Dando Red Terrier		Dates: 21/05/2020	Logged By CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Orangish brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravels are fine to coarse subangular to rounded flint. (Boyn Hill Gravel Member).
								End of Borehole at 5.00m

6
7
8
9
10

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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS07**

Sheet 1 of 1

Project Name: Billet Road	Project No. 21912s	Co-ords: 547156E - 189557N	Hole Type WS
Location: Romford		Level (m):	Scale 1:25
Equipment: Dando Red Terrier		Dates: 22/05/2020	Logged By CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND comprising blackish grey sandy gravel. Sand is fine to coarse. Gravels are fine to coarse angular to subangular basalt.
					0.30			
					0.40			MADE GROUND comprising yellowish orange silty coarse SAND.
					0.70			MADE GROUND comprising firm greenish grey mottled yellowish brown slightly gravelly sandy CLAY. Gravels are fine to medium subangular brick, concrete and flint.
								Concrete block.
								Bituminous material.
		1.00	SPT(C)	N=20 (9,3/2,2,9,7)				MADE GROUND comprising blackish grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravels are fine to coarse subangular to rounded brick, flint and concrete.
		1.50 - 1.55	D,J					*Hydrocarbon odour and staining.*
		2.00	SPT(C)	N=0 (1,0/0,0,0,0)	2.00			MADE GROUND comprising very soft greenish grey slightly gravelly sandy CLAY. Gravels are medium to coarse subangular brick and concrete. Sand is fine to coarse. Strong hydrocarbon odour and sheen.
								No recovery.
		2.90 - 2.95	D,J					
		3.00	SPT(C)	N=7 (1,1/2,2,2,1)				*No recovery.*
		4.00	SPT(C)	N=2 (0,0/0,1,1,0)				
					4.60			Yellowish brown silty fine SAND. (Boyn Hill Gravel Member).
					4.70			Yellowish brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravels are fine to medium subangular to subrounded flint. (Boyn Hill Gravel Member).
		5.00	SPT(C)	N=30 (3,3/6,7,8,9)	5.00			End of Borehole at 5.00m

1 2 3 4 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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS08**

Sheet 1 of 1

Project Name: Billet Road	Project No. 21912s	Co-ords: 547159E - 189503N	Hole Type WS
Location: Romford		Level (m):	Scale 1:25
Equipment: Dando Red Terrier		Dates: 22/05/2020	Logged By CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40			MADE GROUND comprising blackish grey sandy gravel. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded flint and basalt. *Concrete block.*
								MADE GROUND comprising soft greenish black slightly gravelly sandy clay. Gravels are medium to rounded flint. Sand is fine to medium. Occasional fine subangular brick. Occasional organic material. *Brick.*
		1.00 1.10 - 1.15	SPT(C) D,J	N=14 (4,6/4,3,3,4)	1.00			MADE GROUND comprising stiff greenish black slightly gravelly sandy clay with occasional black staining. Gravels are fine subangular flint.
					1.50			Yellowish brown mottled greenish blue silty fine to coarse SAND. (Boyn Hill Gravel Member).
					1.70			Pale grey sandy GRAVEL. Sand is fine to coarse. Gravels are fine to coarse angular to subrounded flint. (Boyn Hill Gravel Member).
		2.00	SPT(C)	N=2 (0,0/1,0,1,0)	2.00			End of Borehole at 2.00m

1 2 3 4 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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS09**

Sheet 1 of 1

Project Name:	Billet Road	Project No. 21912s	Co-ords: 547198E - 189525N
Location:	Romford		Level (m):
Equipment:	Dando Red Terrier		Dates: 22/05/2020

Hole Type: WS

Scale: 1:25

Logged By: CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.60			MADE GROUND comprising greyish brown sandy gravel. Sand is fine to coarse. Gravels are fine to coarse subangular to subrounded basalt and concrete.
								End of Borehole at 0.60m
		2.80 - 2.85	D,J					

1
2
3
4
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.

Services checked and C.A.T. cleared.

IDOM

Windowless Sample Log

Borehole No. **MWS09a**

Sheet 1 of 1

Project Name: Billet Road	Project No. 21912s	Co-ords: 547177E - 189537N	Hole Type WS
Location: Romford		Level (m):	Scale 1:25
Equipment: Dando Red Terrier		Dates: 22/05/2020	Logged By CAH

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND comprising brownish grey sandy gravel. Sand is fine to coarse. Gravels are medium to coarse subangular basalt.
								Concrete.
					0.40			MADE GROUND comprising stiff dark greenish grey slightly gravelly sandy clay. Gravels are fine to medium subangular concrete and brick. Sand is fine to coarse.
					1.10			MADE GROUND comprising soft blackish grey mottled greenish grey slightly gravelly sandy clay. Gravels are fine to medium subangular to subrounded brick, flint, concrete and basalt. Rare pockets of brownish yellow fine to coarse sand.
					2.70			Very soft greenish grey slightly gravelly sandy CLAY. Gravels are medium to coarse subangular to subrounded flint. Sand is fine to coarse. (Boyn Hill Gravel Member).
					3.00			End of Borehole at 3.00m

1 2 3 4 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.

Services checked and C.A.T. cleared.

TQ48 NE 16
4800 8975

TQ48/11
30

2. Chadwell Heath. Rose Lane. Mr. Oldaker's. 1878.
About 100 ft. above Ordnance Datum.
Made and communicated by Messrs. Le Grand and Sutcliff.
Bored throughout. Water-level 86 ft. down. Supply 1,900 gallons a day.

		Thickness.		Depth.	
		Ft.	In.	Ft.	In.
[London Clay.]	Blue clay	42	0	42	0
	Brownish clay	27	0	69	0
	Blue clay	42	0	111	0
	Sand and blue sandy clay ...	18	0	129	0
	Blue sandy clay and stone ...	9	6	138	6
[? Woolwich and Reading Beds, 27 ft.]	Grey and green sand	7	2	146	8
	Live grey sand	4	0	149	8
	Blue sandy clay and shells ...	3	4	153	0
	Dead green sand	12	6	165	6
[? Thanet Sand, or Reading Beds, 30½ ft.]	Grey sand	4	6	170	0
	Dead green sand	15	6	185	6
	Dead grey sand	10	6	196	0

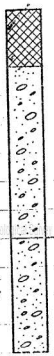
(This may be in Ilford.)

Sited No 4 on 6 inch map Essex N 7 0 NW/W.

Published in
'Water Supply of
of Essex',
page 135

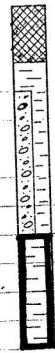
TRIAL HOLE 1.

TQ48NE 31 476-895



TRIAL HOLE 2.

TQ48NE 32 ~~476-895~~ 4756 8946



TRIAL HOLE 3

TQ48NE 83 476-895

TRIAL HOLE 4

TQ48NE 84 476-895

RECORD OF BOREHOLE 19 MAYESBROOK.

BORING: STARTED 16.5.72.
BORING: FINISHED 16.5.72.

GROUND LEVEL 22.39 O.D. TQ48NE 118 4743-8926 HOLE SIZE 0.15 m dia. to 4.0 m depth.

SAMPLE OR TEST DEPTH	TYPE	LEGEND	CHANGE OF STRATA DEPTH	O.D. LEVEL	DESCRIPTION
			0.3	22.09	Topsoil
					Stiff brown and grey mottled silty clay.
1.5	D1				
1.5 - 2.0	U(4)1				
2.9 - 3.2	C(18)		2.9	19.49	
3.0	D2		3.2	19.19	Medium dense gravel with some sand.
3.2 - 3.7	U(4)2				
3.6	D3		4.0	18.39	Firm grey and brown mottled gravelly clay.

10090

19th February 93

REMARKS Water met at 3 m.
Sealed out by lining tubes at 3.2 m.
Standing level on completion 3 m.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

APPENDIX 4

- Soil Chemistry
- Summary Spreadsheet
- Laboratory Analysis Certificates
- Waste Classification Assessment

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Merebrook
1 St Anns Street
Manchester
M2 7LR

e: charris@idom.com

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7 Woodshots Meadow,
Croxley Green
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Herts,
WD18 8YS

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e: reception@i2analytical.com

Analytical Report Number : 20-11647

Project / Site name:	Billet Road	**Samples received on:**	28/05/2020
Your job number:	21912S	**Sample instructed/ Analysis started on:**	28/05/2020
Your order number:		**Analysis completed by:**	05/06/2020
Report Issue Number:	1	**Report issued on:**	05/06/2020
Samples Analysed:	53 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of 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

Excel copies of reports are only valid when accompanied by this PDF certificate.

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: 20-11647

Project / Site name: Billet Road

Lab Sample Number				1520731	1520732	1520733	1520734	1520735
Sample Reference				MWS01	MWS01	MWS01	MWS03	MWS04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.30	1.80	0.10	0.10
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	21/05/2020
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	3.6	11	18	10	4.9
Total mass of sample received	kg	0.001	NONE	0.60	0.60	0.60	0.60	0.60
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	Chrysotile & Amosite	-	-
Asbestos in Soil	Type	N/A	ISO 17025	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	7.6	8.3	7.7	7.3	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	0.023	0.075	0.23	0.026	0.061
Sulphide	mg/kg	1	MCERTS	< 1.0	1.6	25	< 1.0	22
Organic Matter	%	0.1	MCERTS	0.9	1.1	1.5	1.9	5.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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	0.90
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.1
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	< 0.05	1.5
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.58	1.4	< 0.05	13
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.12	0.25	< 0.05	3.5
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.94	1.6	< 0.05	19
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.84	1.4	< 0.05	16
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.68	0.80	< 0.05	7.9
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.50	0.74	< 0.05	4.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.86	0.90	< 0.05	8.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.28	0.62	< 0.05	5.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.60	0.74	< 0.05	7.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.40	0.63	< 0.05	3.3
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.0
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.46	0.72	< 0.05	4.1
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	6.26	10.2	< 0.80	96.8
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	12	17	16	9.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.3	< 0.2	0.3	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	22	29	44	37	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	16	150	55	370	51
Lead (aqua regia extractable)	mg/kg	1	MCERTS	30	240	130	56	75
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.8	0.9	0.8	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	23	48	53	17
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	140	150	380	120

Analytical Report Number: 20-11647

Project / Site name: Billet Road

Lab Sample Number				1520731	1520732	1520733	1520734	1520735
Sample Reference				MWS01	MWS01	MWS01	MWS03	MWS04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.30	1.80	0.10	0.10
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	21/05/2020
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	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	6.0	3.1	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	11	19	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	39	15	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	56	37	< 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	6.9
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	55
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	12	14	< 10	400
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	20	23	< 10	460

Analytical Report Number: 20-11647

Project / Site name: Billet Road

Lab Sample Number				1520736	1520737	1520738	1520739	1520740
Sample Reference				MWS05	MWS05	MWS06	MWS08	MWS09a
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	1.50	1.10	2.80
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	21/05/2020
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	4.1	1.1	6.8	8.6	12
Total mass of sample received	kg	0.001	NONE	0.60	0.60	0.60	0.60	0.60
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	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	9.1	8.5	8.8	10.4
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	0.062	0.033	0.15	0.34	0.29
Sulphide	mg/kg	1	MCERTS	72	3.2	20	52	200
Organic Matter	%	0.1	MCERTS	6.9	0.2	2.7	2.3	2.4
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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	0.40
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.98
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26	< 0.05	0.95
Phenanthrene	mg/kg	0.05	MCERTS	0.62	< 0.05	3.3	0.86	9.4
Anthracene	mg/kg	0.05	MCERTS	0.21	< 0.05	1.2	0.41	3.5
Fluoranthene	mg/kg	0.05	MCERTS	1.4	< 0.05	11	2.5	22
Pyrene	mg/kg	0.05	MCERTS	1.5	< 0.05	11	2.4	20
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.81	< 0.05	6.4	0.93	10
Chrysene	mg/kg	0.05	MCERTS	0.67	< 0.05	4.0	0.76	5.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.97	< 0.05	6.6	1.0	9.0
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.53	< 0.05	3.5	0.46	3.9
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.2	< 0.05	6.2	1.1	8.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.60	< 0.05	2.8	0.49	2.9
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.96	< 0.05	0.86
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.90	< 0.05	3.1	0.69	3.6
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	9.30	< 0.80	60.1	11.6	101
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.8	1.6	10	14	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	0.7	0.4	< 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	22	8.3	24	29	58
Copper (aqua regia extractable)	mg/kg	1	MCERTS	55	23	120	66	37
Lead (aqua regia extractable)	mg/kg	1	MCERTS	35	7.6	200	190	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.8	0.6	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	3.0	22	27	15
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	100	12	160	130	280

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Lab Sample Number				1520736	1520737	1520738	1520739	1520740
Sample Reference				MWS05	MWS05	MWS06	MWS08	MWS09a
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.50	1.50	1.10	2.80
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	21/05/2020
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	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	4.6	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	11	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	77	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	92	< 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	3.2
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	9.5	3.7	60
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	58	< 10	75	21	230
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	690	< 10	370	130	390
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	750	< 10	460	150	690

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Lab Sample Number				1520741	1520742	1520743	1520744	1520745
Sample Reference				MTP01	MTP02	MTP03	MTP03	MTP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.05	0.10	0.05	0.40	0.05
Date Sampled				21/05/2020	21/05/2020	26/05/2020	26/05/2020	26/05/2020
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	5.6	6.9	1.9	6.6	7.5
Total mass of sample received	kg	0.001	NONE	0.60	0.60	0.60	0.60	0.60
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	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	5.7	6.6	6.9	7.5	6.5
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	0.026	0.026	0.030	0.015	0.025
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.9
Organic Matter	%	0.1	MCERTS	4.9	5.8	2.6	0.6	2.7
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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	0.35	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.20	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.47	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.26	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.40	1.4	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.38	1.3	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	1.0	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.75	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.5	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.39	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.74	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.20	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.82	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	10.6	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	12	22	18	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 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	28	52	22	36	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	33	25	22	18	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	260	83	39	17	58
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.8	1.2	< 0.3	< 0.3	0.8
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	18	22	26	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.8	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	78	78	38	46	54

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Lab Sample Number				1520741	1520742	1520743	1520744	1520745
Sample Reference				MTP01	MTP02	MTP03	MTP03	MTP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.05	0.10	0.05	0.40	0.05
Date Sampled				21/05/2020	21/05/2020	26/05/2020	26/05/2020	26/05/2020
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	< 1.0	< 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	12	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	46	21	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	57	23	< 10	< 10	< 10

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Lab Sample Number				1520746	1520747	1520748	1520749	1520750
Sample Reference				MTP04	MTP04	MTP05	MTP05	MTP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.45	2.40	0.10	1.40	2.40
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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
Moisture Content	%	N/A	NONE	5.1	-	4.4	-	10
Total mass of sample received	kg	0.001	NONE	0.60	-	0.60	-	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	-	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	8.2	-	6.3	-	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1	-	2	-	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.35	-	0.040	-	0.040
Sulphide	mg/kg	1	MCERTS	2.4	-	1.4	-	15
Organic Matter	%	0.1	MCERTS	7.1	-	2.9	-	0.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	5.4	-	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	2.7	-	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	4.6	-	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	47	-	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	61	-	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	150	-	< 0.05	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	38	-	< 0.05	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	84	-	< 0.05	-	0.47
Pyrene	mg/kg	0.05	MCERTS	64	-	< 0.05	-	0.42
Benzo(a)anthracene	mg/kg	0.05	MCERTS	34	-	< 0.05	-	0.22
Chrysene	mg/kg	0.05	MCERTS	22	-	< 0.05	-	0.21
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	26	-	< 0.05	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	18	-	< 0.05	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	26	-	< 0.05	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	12	-	< 0.05	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	2.9	-	< 0.05	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	12	-	< 0.05	-	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	604	-	< 0.80	-	1.32
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	-	12	-	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	-	< 0.2	-	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	< 4.0	-	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	-	31	-	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	-	18	-	9.7
Lead (aqua regia extractable)	mg/kg	1	MCERTS	42	-	57	-	20
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	0.5	-	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	-	18	-	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	4.7	-	< 1.0	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	42	-	50	-	38

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Project / Site name: Billet Road

Lab Sample Number				1520746	1520747	1520748	1520749	1520750
Sample Reference				MTP04	MTP04	MTP05	MTP05	MTP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.45	2.40	0.10	1.40	2.40
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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
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	5.5	-	< 2.0	-	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	17	-	< 8.0	-	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	130	-	< 8.0	-	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	150	-	< 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	11	-	< 1.0	-	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	120	-	< 2.0	-	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	310	-	< 10	-	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	310	-	< 10	-	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	760	-	< 10	-	< 10

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Project / Site name: Billet Road

Lab Sample Number				1520751	1520752	1520753	1520754	1520755
Sample Reference				MTP06	MTP06	MTP07	MTP07	MTP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.70	0.10	0.60	1.80
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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	8.9	19	8.4	13	20
Total mass of sample received	kg	0.001	NONE	0.60	0.60	0.60	0.60	0.60
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Amosite
Asbestos in Soil	Type	N/A	ISO 17025	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	7.0	5.9	8.0	8.4	8.5
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	0.021	0.034	0.038	0.16	0.15
Sulphide	mg/kg	1	MCERTS	< 1.0	3.3	< 1.0	44	98
Organic Matter	%	0.1	MCERTS	0.9	0.8	1.8	2.1	1.8
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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	0.50	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.6	1.4
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.8	1.0
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.0	9.2	3.4
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.20	3.4	1.0
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.8	17	4.0
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.6	15	3.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.77	8.1	1.7
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.96	5.4	1.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.76	7.9	2.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.56	5.3	0.92
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.76	7.1	1.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.39	3.0	0.88
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.99	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.54	3.7	0.99
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	9.29	90.1	24.0
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	14	13	15	18
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 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	39	42	31	26	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	19	13	29	38	50
Lead (aqua regia extractable)	mg/kg	1	MCERTS	28	19	110	150	1400
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.5	0.7	1.1
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	20	21	23	18
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	58	63	120	180	310

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Project / Site name: Billet Road

Lab Sample Number				1520751	1520752	1520753	1520754	1520755
Sample Reference				MTP06	MTP06	MTP07	MTP07	MTP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.70	0.10	0.60	1.80
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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	< 1.0	< 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	34	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	35	< 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	3.0	11	12
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	10	76	36
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	18	210	73
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	31	290	120

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Project / Site name: Billet Road

Lab Sample Number				1520756	1520757	1520758	1520759	1520760
Sample Reference				MTP07	MTP08	MTP08	MTP08	MTP09
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.30	0.10	1.20	1.90	0.05
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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
Moisture Content	%	N/A	NONE	-	11	-	18	8.0
Total mass of sample received	kg	0.001	NONE	-	0.60	-	0.60	0.60
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.004	-	-	0.395	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.004	-	-	0.395	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	7.7	-	9.0	7.6
Total Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.051	-	0.32	0.028
Sulphide	mg/kg	1	MCERTS	-	< 1.0	-	80	< 1.0
Organic Matter	%	0.1	MCERTS	-	2.6	-	1.9	1.8
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
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	-	1.0	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	0.36	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	0.67	-	0.66	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	0.15	-	0.45	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	1.4	-	4.3	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	1.1	-	3.9	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.91	-	1.5	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	0.70	-	1.4	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	0.99	-	1.5	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	0.53	-	0.68	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	0.80	-	1.6	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.47	-	0.69	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	0.24	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.53	-	0.91	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	8.29	-	19.3	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	16	-	11	19
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	34	-	31	34
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	44	-	55	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	110	-	150	37
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	0.6	-	1.0	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	25	-	23	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	2.1	-	< 1.0	2.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	140	-	120	53

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Project / Site name: Billet Road

Lab Sample Number				1520756	1520757	1520758	1520759	1520760
Sample Reference				MTP07	MTP08	MTP08	MTP08	MTP09
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.30	0.10	1.20	1.90	0.05
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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
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	-	< 2.0	< 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	-	22	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-	22	< 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	-	5.8	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	< 10	-	20	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	12	-	95	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	19	-	120	< 10

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Project / Site name: Billet Road

Lab Sample Number				1520761	1520762	1520763	1520764	1520765
Sample Reference				MTP09	MTP09	MTP09	MTP10	MTP10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.15	2.00	2.50	0.05	0.40
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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	-	-	-	5.6	6.4
Total mass of sample received	kg	0.001	NONE	-	-	-	0.60	0.60
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	Amosite	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	1.433	-	0.002	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	1.43	-	0.002	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	6.1	6.5
Total Cyanide	mg/kg	1	MCERTS	-	-	-	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	0.024	0.072
Sulphide	mg/kg	1	MCERTS	-	-	-	1.5	< 1.0
Organic Matter	%	0.1	MCERTS	-	-	-	4.0	2.6
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	0.29	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.84	0.36
Pyrene	mg/kg	0.05	MCERTS	-	-	-	0.78	0.35
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	0.36	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	-	-	0.50	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.39	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.24	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.32	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.18	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	0.26	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	-	4.16	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	13	15
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	27	34
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	24	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	90	80
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	0.8	0.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	17	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	73	80

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Project / Site name: Billet Road

Lab Sample Number				1520761	1520762	1520763	1520764	1520765
Sample Reference				MTP09	MTP09	MTP09	MTP10	MTP10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.15	2.00	2.50	0.05	0.40
Date Sampled				26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020
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
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0

Petroleum Hydrocarbons

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

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

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Project / Site name: Billet Road

Lab Sample Number				1520766	1520767	1520768	1520769	1520770
Sample Reference				MTP10	MTP10	MTP11	MTP11	MTP11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	2.50	0.05	0.30	1.30
Date Sampled				26/05/2020	26/05/2020	27/05/2020	27/05/2020	27/05/2020
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	-	-	5.6	-	13
Total mass of sample received	kg	0.001	NONE	-	-	0.60	-	0.60
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-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	-	-	5.8	-	7.3
Total Cyanide	mg/kg	1	MCERTS	-	-	< 1	-	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	0.0089	-	0.043
Sulphide	mg/kg	1	MCERTS	-	-	1.7	-	7.2
Organic Matter	%	0.1	MCERTS	-	-	4.8	-	0.6
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	< 0.80	-	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	9.1	-	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	< 0.2	-	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	< 4.0	-	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	24	-	46
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	18	-	14
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	61	-	30
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	12	-	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	52	-	54

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Project / Site name: Billet Road

Lab Sample Number				1520766	1520767	1520768	1520769	1520770
Sample Reference				MTP10	MTP10	MTP11	MTP11	MTP11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	2.50	0.05	0.30	1.30
Date Sampled				26/05/2020	26/05/2020	27/05/2020	27/05/2020	27/05/2020
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
Toluene	µg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
o-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0

Petroleum Hydrocarbons

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

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

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Project / Site name: Billet Road

Lab Sample Number				1520771	1520772	1520773	1520774	1520775
Sample Reference				MTP11	MTP12	MTP12	MTP12	MTP13
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.40	0.05	0.50	1.55	3.10
Date Sampled				27/05/2020	27/05/2020	27/05/2020	27/05/2020	27/05/2020
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
Moisture Content	%	N/A	NONE	-	5.6	4.8	7.9	10
Total mass of sample received	kg	0.001	NONE	-	0.60	0.60	0.60	0.60
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	-	5.7	6.0	8.1	7.3
Total Cyanide	mg/kg	1	MCERTS	-	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.0085	0.013	0.10	0.015
Sulphide	mg/kg	1	MCERTS	-	2.4	2.1	7.2	19
Organic Matter	%	0.1	MCERTS	-	4.3	2.7	0.5	< 0.1
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	0.45	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	0.55	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	0.26	3.5	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	0.86	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	0.37	0.48	3.3	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	0.34	0.43	2.7	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	0.22	1.1	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	0.32	1.2	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	0.20	0.62	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	0.20	0.42	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	0.18	0.70	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	0.35	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	0.47	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80	2.29	16.2	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	13	13	15	6.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	23	26	39	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	19	18	22	5.6
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	85	77	35	6.8
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	0.8	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	15	17	34	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	67	70	47	21

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Project / Site name: Billet Road

Lab Sample Number				1520771	1520772	1520773	1520774	1520775
Sample Reference				MTP11	MTP12	MTP12	MTP12	MTP13
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.40	0.05	0.50	1.55	3.10
Date Sampled				27/05/2020	27/05/2020	27/05/2020	27/05/2020	27/05/2020
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
Toluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	-	< 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

Petroleum Hydrocarbons

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

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 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
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 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
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	< 2.0	4.6	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	< 10	< 10	21	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	< 10	12	31	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	18	57	< 10

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Project / Site name: Billet Road

Lab Sample Number				1520776	1520777	1520778	1520779	1520780
Sample Reference				MTP14	MTP14	MTP14	MTP14	MTP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.90	1.30	1.90	0.10
Date Sampled				27/05/2020	27/05/2020	27/05/2020	27/05/2020	27/05/2020
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
Moisture Content	%	N/A	NONE	7.7	-	-	25	5.2
Total mass of sample received	kg	0.001	NONE	0.60	-	-	0.60	0.60
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	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.8	-	-	7.7	6.7
Total Cyanide	mg/kg	1	MCERTS	< 1	-	-	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.025	-	-	0.60	0.032
Sulphide	mg/kg	1	MCERTS	< 1.0	-	-	480	< 1.0
Organic Matter	%	0.1	MCERTS	0.3	-	-	2.4	0.7
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
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	-	-	0.24	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	-	1.0	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.32	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	-	2.4	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	2.1	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	1.3	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	-	1.3	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	-	1.6	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.52	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	1.1	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	1.0	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.24	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	-	1.2	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	-	-	14.3	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	-	-	22	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-	4.9	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	27	-	-	260	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	8.4	-	-	78	6.2
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	-	-	860	14
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	0.9	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	-	-	36	13
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	28	-	-	1400	35

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Lab Sample Number				1520776	1520777	1520778	1520779	1520780
Sample Reference				MTP14	MTP14	MTP14	MTP14	MTP15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.90	1.30	1.90	0.10
Date Sampled				27/05/2020	27/05/2020	27/05/2020	27/05/2020	27/05/2020
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
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	-	-	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	-	-	15	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	-	-	100	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	-	-	120	< 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	-	-	8.1	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	-	-	16	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	-	-	53	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	-	-	78	< 10

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Lab Sample Number				1520781	1520782	1520783		
Sample Reference				MTP15	MTP15	MTP17		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.40	2.50	2.90		
Date Sampled				27/05/2020	27/05/2020	27/05/2020		
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	12	14	14		
Total mass of sample received	kg	0.001	NONE	0.60	0.60	0.60		
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-		
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-		
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-		
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	5.2	5.4	7.3		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.048	0.020	0.019		
Sulphide	mg/kg	1	MCERTS	1.9	< 1.0	< 1.0		
Organic Matter	%	0.1	MCERTS	< 0.1	< 0.1	0.5		
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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	< 0.05		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
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		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.4	7.5	16		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	7.6	36		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	12	4.0	9.7		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	12	3.5	22		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	31	16	31		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	42	14	46		

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Lab Sample Number				1520781	1520782	1520783		
Sample Reference				MTP15	MTP15	MTP17		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.40	2.50	2.90		
Date Sampled				27/05/2020	27/05/2020	27/05/2020		
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	< 2.0	< 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	< 2.0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		

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Your Order No:

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
1520733	MWS01	1.80	129	Loose Fibres	**Chrysotile & Amosite**	< 0.001	**< 0.001**
1520749	MTP05	1.40	159	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1520755	MTP07	1.80	134	Loose Fibres	**Amosite**	< 0.001	**< 0.001**
1520756	MTP07	2.30	132	Loose Fibrous Debris	**Chrysotile**	0.004	**0.004**
1520759	MTP08	1.90	134	Hard/Cement Type Material	**Chrysotile**	0.395	**0.395**
1520761	MTP09	1.15	177	Hard/Cement Type Material	**Chrysotile**	1.433	**1.43**
1520763	MTP09	2.50	128	Loose Fibrous Debris	**Amosite**	0.002	**0.002**
1520767	MTP10	2.50	175	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

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

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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 *
1520731	MWS01	None Supplied	0.40	Brown loam with gravel and vegetation.
1520732	MWS01	None Supplied	1.30	Brown clay and loam with gravel and vegetation.
1520733	MWS01	None Supplied	1.80	Brown clay and loam with gravel and vegetation.
1520734	MWS03	None Supplied	0.10	Brown clay and loam with gravel and vegetation.
1520735	MWS04	None Supplied	0.10	Brown gravelly loam.
1520736	MWS05	None Supplied	0.10	Brown gravelly loam with vegetation.
1520737	MWS05	None Supplied	0.50	Light brown gravelly loam.
1520738	MWS06	None Supplied	1.50	Brown gravelly loam.
1520739	MWS08	None Supplied	1.10	Brown clay and loam with gravel.
1520740	MWS09a	None Supplied	2.80	Brown clay and loam with gravel.
1520741	MTP01	None Supplied	0.05	Light brown loam with gravel and vegetation.
1520742	MTP02	None Supplied	0.10	Light brown loam with gravel and vegetation.
1520743	MTP03	None Supplied	0.05	Light brown loam with gravel and vegetation.
1520744	MTP03	None Supplied	0.40	Brown clay and loam with gravel.
1520745	MTP04	None Supplied	0.05	Brown loam with gravel and vegetation.
1520746	MTP04	None Supplied	1.45	Brown clay and loam with gravel and tar.
1520747	MTP04	None Supplied	2.40	-
1520748	MTP05	None Supplied	0.10	Brown loam with gravel and vegetation.
1520749	MTP05	None Supplied	1.40	-
1520750	MTP05	None Supplied	2.40	Brown loam and clay with gravel.
1520751	MTP06	None Supplied	0.40	Brown gravelly loam with vegetation.
1520752	MTP06	None Supplied	1.70	Brown clay and loam.
1520753	MTP07	None Supplied	0.10	Brown loam and clay with gravel and glass.
1520754	MTP07	None Supplied	0.60	Brown loam and clay with gravel and vegetation.
1520755	MTP07	None Supplied	1.80	Brown clay and loam with gravel and vegetation.
1520756	MTP07	None Supplied	2.30	-
1520757	MTP08	None Supplied	0.10	Brown loam with gravel and vegetation.
1520758	MTP08	None Supplied	1.20	-
1520759	MTP08	None Supplied	1.90	Brown clay and loam with gravel.
1520760	MTP09	None Supplied	0.05	Brown loam with gravel and vegetation.
1520761	MTP09	None Supplied	1.15	-
1520762	MTP09	None Supplied	2.00	-
1520763	MTP09	None Supplied	2.50	-
1520764	MTP10	None Supplied	0.05	Brown loam with gravel and vegetation.
1520765	MTP10	None Supplied	0.40	Brown loam with gravel and vegetation.
1520766	MTP10	None Supplied	1.90	-
1520767	MTP10	None Supplied	2.50	-
1520768	MTP11	None Supplied	0.05	Brown loam with gravel and vegetation.
1520769	MTP11	None Supplied	0.30	-
1520770	MTP11	None Supplied	1.30	Brown clay and loam with gravel.
1520771	MTP11	None Supplied	2.40	-
1520772	MTP12	None Supplied	0.05	Brown loam with gravel and vegetation.
1520773	MTP12	None Supplied	0.50	Brown loam with gravel and vegetation.
1520774	MTP12	None Supplied	1.55	Brown clay and loam with gravel.
1520775	MTP13	None Supplied	3.10	Brown sand with gravel.
1520776	MTP14	None Supplied	0.60	Brown loam and clay with gravel.
1520777	MTP14	None Supplied	0.90	-
1520778	MTP14	None Supplied	1.30	-
1520779	MTP14	None Supplied	1.90	Brown clay and loam with gravel.
1520780	MTP15	None Supplied	0.10	Brown gravelly loam.
1520781	MTP15	None Supplied	1.40	Brown clay and sand.
1520782	MTP15	None Supplied	2.50	Brown sand.
1520783	MTP17	None Supplied	2.90	Brown clay and sand with gravel.

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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 diphenylcarbazide 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.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
MTP01		S	20-11647	1520741	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP01		S	20-11647	1520741	bc	Sulphide in soil	L010-PL	c
MTP01		S	20-11647	1520741	bc	TPHCWG (Soil)	L088/76-PL	b
MTP01		S	20-11647	1520741	bc	Total cyanide in soil	L080-PL	c
MTP02		S	20-11647	1520742	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP02		S	20-11647	1520742	bc	Sulphide in soil	L010-PL	c
MTP02		S	20-11647	1520742	bc	TPHCWG (Soil)	L088/76-PL	b
MTP02		S	20-11647	1520742	bc	Total cyanide in soil	L080-PL	c
MTP03		S	20-11647	1520743	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP03		S	20-11647	1520743	b	TPHCWG (Soil)	L088/76-PL	b
MTP03		S	20-11647	1520744	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP03		S	20-11647	1520744	b	TPHCWG (Soil)	L088/76-PL	b
MTP04		S	20-11647	1520745	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP04		S	20-11647	1520745	b	TPHCWG (Soil)	L088/76-PL	b
MTP04		S	20-11647	1520746	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP04		S	20-11647	1520746	b	TPHCWG (Soil)	L088/76-PL	b
MTP05		S	20-11647	1520748	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP05		S	20-11647	1520748	b	TPHCWG (Soil)	L088/76-PL	b
MTP05		S	20-11647	1520750	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP05		S	20-11647	1520750	b	TPHCWG (Soil)	L088/76-PL	b
MTP06		S	20-11647	1520751	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP06		S	20-11647	1520751	b	TPHCWG (Soil)	L088/76-PL	b
MTP06		S	20-11647	1520752	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP06		S	20-11647	1520752	b	TPHCWG (Soil)	L088/76-PL	b
MTP07		S	20-11647	1520753	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP07		S	20-11647	1520753	b	TPHCWG (Soil)	L088/76-PL	b
MTP07		S	20-11647	1520754	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP07		S	20-11647	1520754	b	TPHCWG (Soil)	L088/76-PL	b
MTP07		S	20-11647	1520755	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP07		S	20-11647	1520755	b	TPHCWG (Soil)	L088/76-PL	b
MTP08		S	20-11647	1520757	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP08		S	20-11647	1520757	b	TPHCWG (Soil)	L088/76-PL	b
MTP08		S	20-11647	1520759	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP08		S	20-11647	1520759	b	TPHCWG (Soil)	L088/76-PL	b
MTP09		S	20-11647	1520760	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP09		S	20-11647	1520760	b	TPHCWG (Soil)	L088/76-PL	b
MTP10		S	20-11647	1520764	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP10		S	20-11647	1520764	b	TPHCWG (Soil)	L088/76-PL	b
MTP10		S	20-11647	1520765	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP10		S	20-11647	1520765	b	TPHCWG (Soil)	L088/76-PL	b
MTP11		S	20-11647	1520768	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP11		S	20-11647	1520768	b	TPHCWG (Soil)	L088/76-PL	b
MTP11		S	20-11647	1520770	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP11		S	20-11647	1520770	b	TPHCWG (Soil)	L088/76-PL	b
MTP12		S	20-11647	1520772	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP12		S	20-11647	1520772	b	TPHCWG (Soil)	L088/76-PL	b
MTP12		S	20-11647	1520773	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP12		S	20-11647	1520773	b	TPHCWG (Soil)	L088/76-PL	b
MTP12		S	20-11647	1520774	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP12		S	20-11647	1520774	b	TPHCWG (Soil)	L088/76-PL	b
MTP13		S	20-11647	1520775	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b

MTP13		S	20-11647	1520775	b	TPHCWG (Soil)	L088/76-PL	b
MTP14		S	20-11647	1520776	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP14		S	20-11647	1520776	b	TPHCWG (Soil)	L088/76-PL	b
MTP14		S	20-11647	1520779	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP14		S	20-11647	1520779	b	TPHCWG (Soil)	L088/76-PL	b
MTP15		S	20-11647	1520780	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP15		S	20-11647	1520780	b	TPHCWG (Soil)	L088/76-PL	b
MTP15		S	20-11647	1520781	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP15		S	20-11647	1520781	b	TPHCWG (Soil)	L088/76-PL	b
MTP15		S	20-11647	1520782	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP15		S	20-11647	1520782	b	TPHCWG (Soil)	L088/76-PL	b
MTP17		S	20-11647	1520783	b	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MTP17		S	20-11647	1520783	b	TPHCWG (Soil)	L088/76-PL	b
MWS01		S	20-11647	1520731	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS01		S	20-11647	1520731	bc	Sulphide in soil	L010-PL	c
MWS01		S	20-11647	1520731	bc	TPHCWG (Soil)	L088/76-PL	b
MWS01		S	20-11647	1520731	bc	Total cyanide in soil	L080-PL	c
MWS01		S	20-11647	1520732	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS01		S	20-11647	1520732	bc	Sulphide in soil	L010-PL	c
MWS01		S	20-11647	1520732	bc	TPHCWG (Soil)	L088/76-PL	b
MWS01		S	20-11647	1520732	bc	Total cyanide in soil	L080-PL	c
MWS01		S	20-11647	1520733	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS01		S	20-11647	1520733	bc	Sulphide in soil	L010-PL	c
MWS01		S	20-11647	1520733	bc	TPHCWG (Soil)	L088/76-PL	b
MWS01		S	20-11647	1520733	bc	Total cyanide in soil	L080-PL	c
MWS03		S	20-11647	1520734	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS03		S	20-11647	1520734	bc	Sulphide in soil	L010-PL	c
MWS03		S	20-11647	1520734	bc	TPHCWG (Soil)	L088/76-PL	b
MWS03		S	20-11647	1520734	bc	Total cyanide in soil	L080-PL	c
MWS04		S	20-11647	1520735	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS04		S	20-11647	1520735	bc	Sulphide in soil	L010-PL	c
MWS04		S	20-11647	1520735	bc	TPHCWG (Soil)	L088/76-PL	b
MWS04		S	20-11647	1520735	bc	Total cyanide in soil	L080-PL	c
MWS05		S	20-11647	1520736	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS05		S	20-11647	1520736	bc	Sulphide in soil	L010-PL	c
MWS05		S	20-11647	1520736	bc	TPHCWG (Soil)	L088/76-PL	b
MWS05		S	20-11647	1520736	bc	Total cyanide in soil	L080-PL	c
MWS05		S	20-11647	1520737	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS05		S	20-11647	1520737	bc	Sulphide in soil	L010-PL	c
MWS05		S	20-11647	1520737	bc	TPHCWG (Soil)	L088/76-PL	b
MWS05		S	20-11647	1520737	bc	Total cyanide in soil	L080-PL	c
MWS06		S	20-11647	1520738	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS06		S	20-11647	1520738	bc	Sulphide in soil	L010-PL	c
MWS06		S	20-11647	1520738	bc	TPHCWG (Soil)	L088/76-PL	b
MWS06		S	20-11647	1520738	bc	Total cyanide in soil	L080-PL	c
MWS08		S	20-11647	1520739	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS08		S	20-11647	1520739	bc	Sulphide in soil	L010-PL	c
MWS08		S	20-11647	1520739	bc	TPHCWG (Soil)	L088/76-PL	b
MWS08		S	20-11647	1520739	bc	Total cyanide in soil	L080-PL	c
MWS09a		S	20-11647	1520740	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
MWS09a		S	20-11647	1520740	bc	Sulphide in soil	L010-PL	c
MWS09a		S	20-11647	1520740	bc	TPHCWG (Soil)	L088/76-PL	b
MWS09a		S	20-11647	1520740	bc	Total cyanide in soil	L080-PL	c

BASIC STATISTICAL RESULTS SUMMARY

choose screening level from dropdown ->	Residential with homegrown produce

Site Name	Billet Road	Romford			Made Ground										
Project Number	21912s				Natural Ground										
Sample Location	MWS01	MWS01	MWS01	MWS03	MWS04	MWS05	MWS05	MWS06	MWS08	MWS09a					
Depth	0.40	1.30	1.80	0.10	0.10	0.10	0.50	1.50	1.10	2.80					
Determinand											Number of Tests	Maximum (mg.kg^{-1})	Mean (mg.kg^{-1})	Screening Level (mg.kg^{-1})	No. > SL
Arsenic	12	12	17	16	9.2	4.8	1.6	10	14	14	10	17	11.060	37	0
Cadmium	0.2	0.3	0.2	0.3	0.2	0.2	0.4	0.7	0.4	0.2	10	0.7	0.310	11	0
Hexavalent Chromium	4	4	4	4	4	4	4	4	4	4	10	4	4.000	6	0
Chromium	22	29	44	37	24	22	8.3	24	29	58	10	58	29.730	910	0
Copper	16	150	55	370	51	55	23	120	66	37	10	370	94.300	2400	0
Lead	30	240	130	56	75	35	7.6	200	190	100	10	240	106.360	200	1
Mercury	0.3	0.8	0.9	0.8	0.5	0.3	0.3	0.8	0.6	0.3	10	0.9	0.560	40	0
Nickel	18	23	48	53	17	17	3	22	27	15	10	53	24.300	130	0
Selenium	1	1	1	1	1	1	1	1	1	1	10	1	1.000	250	0
Zinc	48	140	150	380	120	100	12	160	130	280	10	380	152.000	3700	0
pH	7.6	8.3	7.7	7.3	8.6	8.5	9.1	8.5	8.8	10.4	10	10.4	8.480	10	1
Cyanide total	1	1	1	1	1	1	1	1	1	1	10	1	1.000	-	-
Water Soluble SO4 (BRE SD 2:1 Leach Equivalent) g.l^{-1}	0.023	0.075	0.23	0.026	0.061	0.062	0.033	0.15	0.34	0.29	10	0.34	0.129	-	-
Sulphide	1	1.6	25	1	22	72	3.2	20	52	200	10	200	39.780	-	-
Organic matter	0.9	1.1	1.5	1.9	5.5	6.9	0.2	2.7	2.3	2.4	10	6.9	2.540	-	-
Aliphatic C5-C6	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	78	0
Aliphatic C6-C8	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	230	0
Aliphatic C8-C10	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	65	0
Aliphatic C10-C12	1	1	1	1	1	1	1	1	1	1	10	1	1.000	330	0
Aliphatic C12-C16	2	2	6	3.1	2	2	2	2	4.6	2	10	6	2.770	2400	0
Aliphatic C16-C21	8	8	11	19	8	8	8	8	11	8	10	19	9.700	92000	0
Aliphatic C21-C35	8	8	39	15	8	8	8	8	77	8	10	77	18.700	92000	0
Aliphatic C5-C35	10	10	56	37	10	10	10	10	92	10	10	92	25.500	-	-
Aromatic C5-C7	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	140	0
Aromatic C7-C8	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	290	0
Aromatic C8-C10	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	83	0
Aromatic C10-C12	1	1	1	1	1	1	1	1	1	3.2	10	3.2	1.220	180	0
Aromatic C12-C16	2	2	2	2	6.9	2	2	9.5	3.7	60	10	60	9.210	330	0
Aromatic C16-C21	10	10	10	10	55	58	10	75	21	230	10	230	48.900	540	0
Aromatic C21-C35	10	12	14	10	400	690	10	370	130	390	10	690	203.600	1500	0
Aromatic C5-C35	10	20	23	10	460	750	10	460	150	690	10	750	258.300	-	-
Benzene	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	0.17	0
Toluene	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	290	0
Ethylbenzene	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	110	0
total xylene	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	10	0.002	0.002	130	0
MTBE	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	10	0.001	0.001	-	-
Naphthalene	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	10	0.05	0.050	5.6	0
Acenaphthylene	0.05	0.05	0.05	0.05	0.9	0.05	0.05	0.05	0.05	0.4	10	0.9	0.170	420	0
Acenaphthene	0.05	0.05	0.05	0.05	1.1	0.05	0.05	0.05	0.05	0.98	10	1.1	0.248	510	0
Fluorene	0.05	0.05	0.42	0.05	1.5	0.05	0.05	0.26	0.05	0.95	10	1.5	0.343	400	0
Phenanthrene	0.05	0.58	1.4	0.05	13	0.62	0.05	3.3	0.86	9.4	10	13	2.931	220	0
Anthracene	0.05	0.12	0.25	0.05	3.5	0.21	0.05	1.2	0.41	3.5	10	3.5	0.934	5400	0
Fluoranthene	0.05	0.94	1.6	0.05	19	1.4	0.05	11	2.5	22	10	22	5.859	560	0
Pyrene	0.05	0.84	1.4	0.05	16	1.5	0.05	11	2.4	20	10	20	5.329	1200	0
Benzo(a)anthracene	0.05	0.68	0.8	0.05	7.9	0.81	0.05	6.4	0.93	10	10	10	2.767	11	0
Chrysene	0.05	0.5	0.74	0.05	4.7	0.67	0.05	4	0.76	5.8	10	5.8	1.732	22	0
Benzo(b)fluoranthene	0.05	0.86	0.9	0.05	8.1	0.97	0.05	6.6	1	9	10	9	2.758	3.3	3
Benzo(k)fluoranthene	0.05	0.28	0.62	0.05	5.2	0.53	0.05	3.5	0.46	3.9	10	5.2	1.464	93	0
Benzo(a)pyrene	0.05	0.6	0.74	0.05	7.2	1.2	0.05	6.2	1.1	8	10	8	2.519	2.7	3
Indeno(1,2,3-c,d)pyrene	0.05	0.4	0.63	0.05	3.3	0.6	0.05	2.8	0.49	2.9	10	3.3	1.127	36	0
Dibenzo(a,h)anthracene	0.05	0.05	0.05	0.05	1	0.05	0.05	0.96	0.05	0.86	10	1	0.317	0.28	3
Benzo(g,h,i)perylene	0.05	0.46	0.72	0.05	4.1	0.9	0.05	3.1	0.69	3.6	10	4.1	1.372	340	0
Total PAH - USEPA 16	0.8	6.26	10.2	0.8	96.8	9.3	0.8	60.1	11.6	101	10	101	29.766	-	-
Phenol - Monohydric	1	1	1	1	1	1	1	1	1	1	10	1	1.000	200	0

APPENDIX 5 ▪ Geotechnical Laboratory Certificates

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

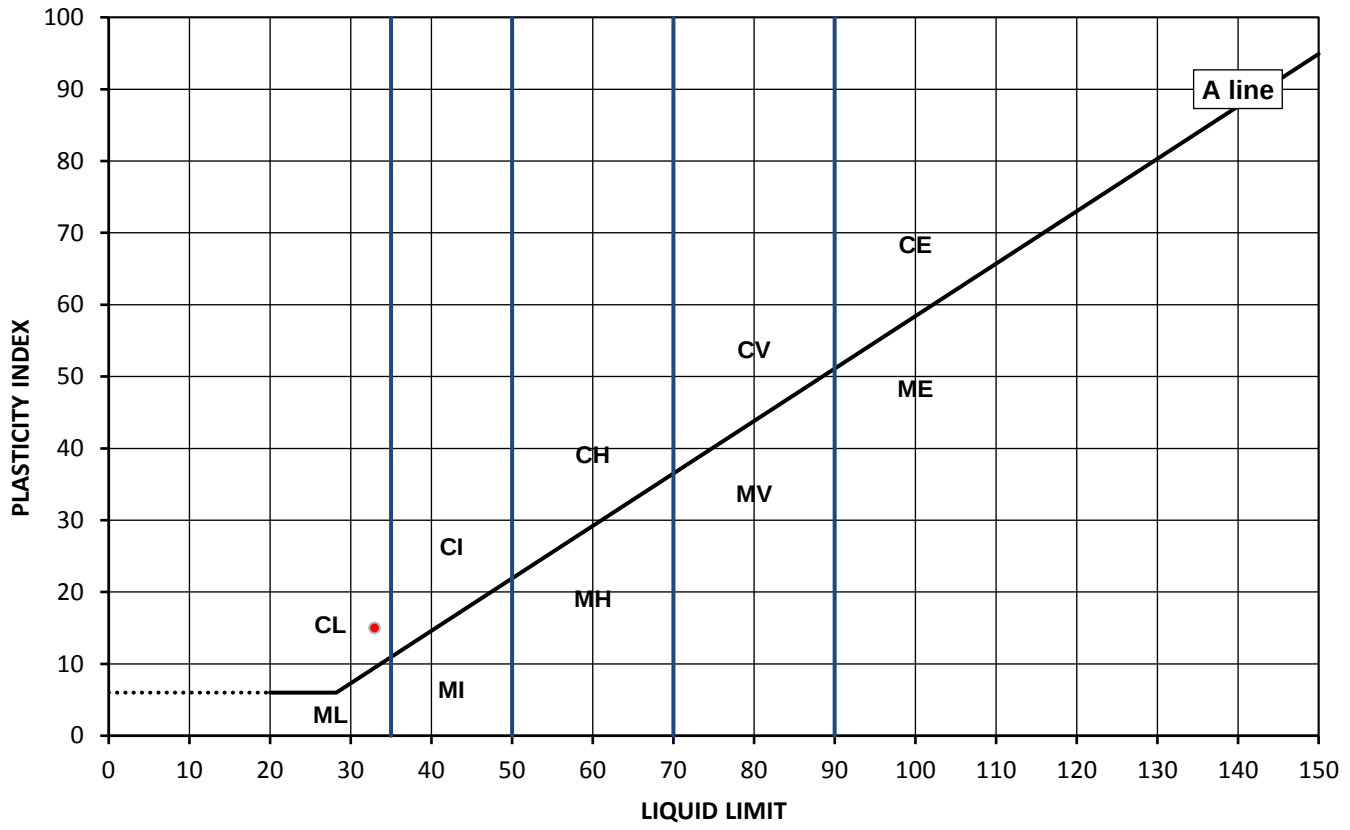
Client:	Merebrook	Client Reference:	21912S
Client Address:	Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ	Job Number:	20-14165
		Date Sampled:	21/05/2020
		Date Received:	04/06/2020
Contact:	Darren Ettritch	Date Tested:	23/06/2020
Site Address:	Billet Road, Romford - Parcel A & B	Sampled By:	CAH

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1533827	Depth Top [m]:	3.60
Hole No.:	MBH01	Depth Base [m]:	3.65
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Mottled brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
18	33	18	15	72



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Merebrook	Client Reference:	21912S
Client Address:	Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ	Job Number:	20-14165
		Date Sampled:	21/05/2020
		Date Received:	04/06/2020
Contact:	Darren Ettritch	Date Tested:	23/06/2020
Site Address:	Billet Road, Romford - Parcel A & B	Sampled By:	CAH

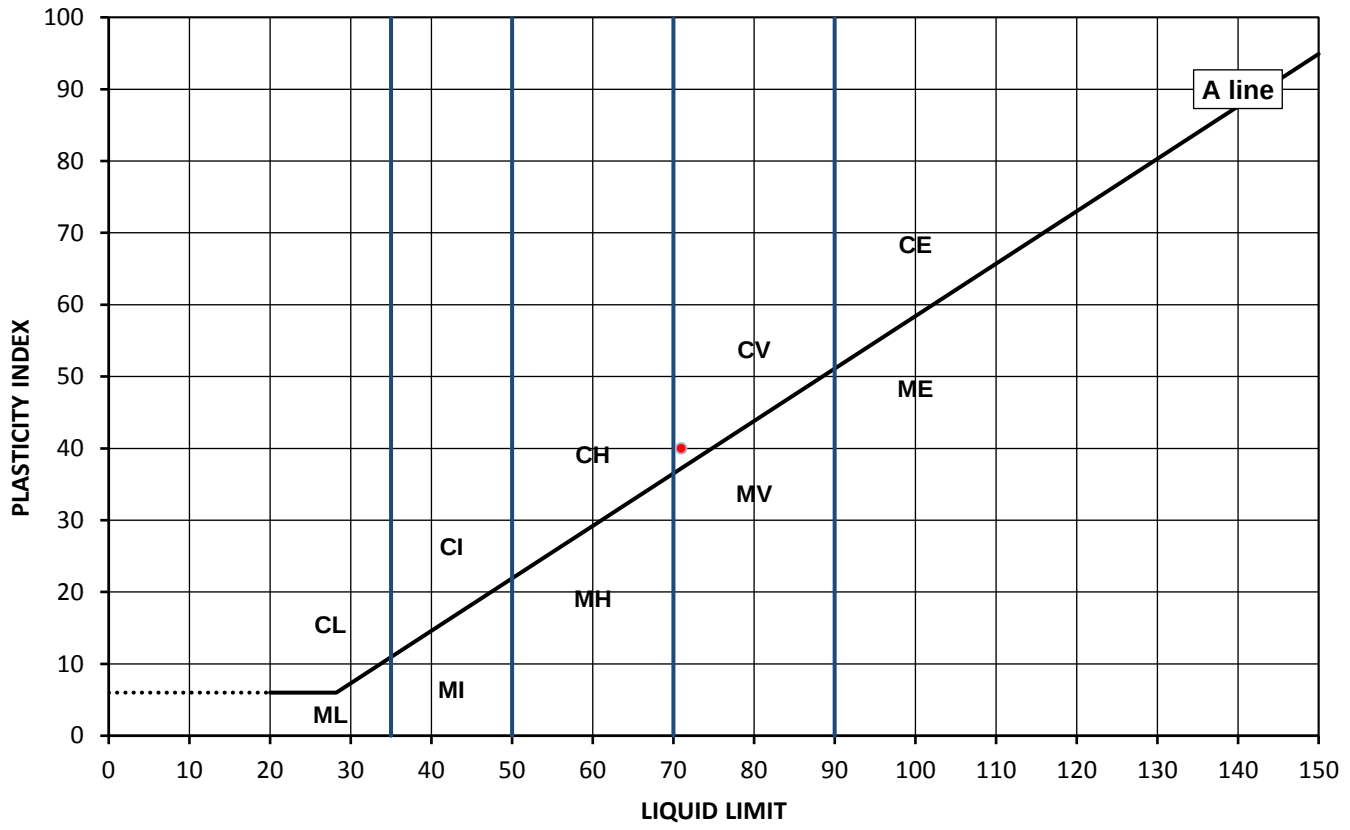
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1533828	Depth Top [m]:	5.50
Hole No.:	MBH01	Depth Base [m]:	5.55
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
29	71	31	40	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

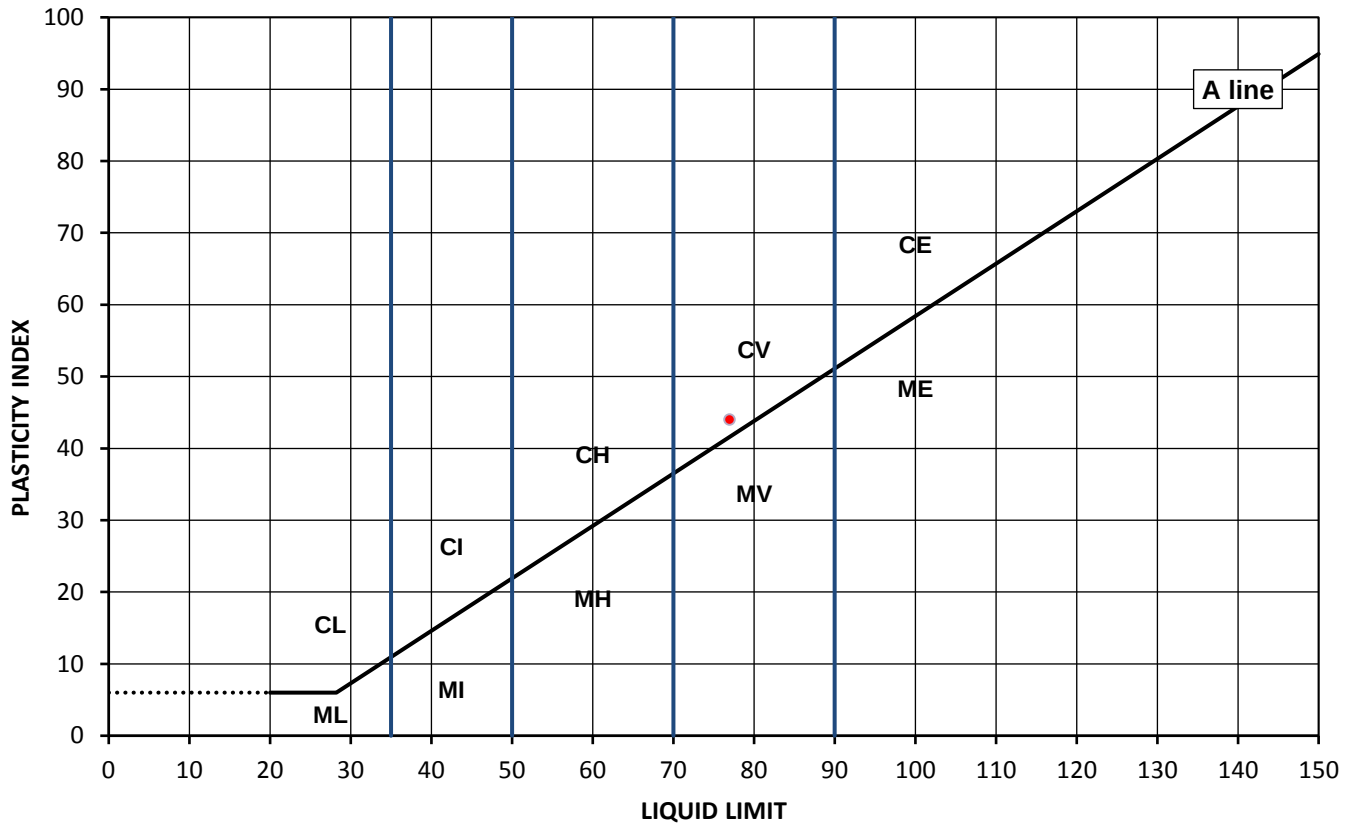
Client:	Merebrook	Client Reference:	21912S
Client Address:	Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ	Job Number:	20-14165
		Date Sampled:	21/05/2020
		Date Received:	04/06/2020
Contact:	Darren Ettritch	Date Tested:	23/06/2020
Site Address:	Billet Road, Romford - Parcel A & B	Sampled By:	CAH

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1533829	Depth Top [m]:	7.00
Hole No.:	MBH01	Depth Base [m]:	7.05
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Greyish brown CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
31	77	33	44	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 232.9

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Merebrook

Client Address: Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ

Contact: Darren Ettritch

Site Address: Billet Road, Romford - Parcel A & B

Client Reference: 21912S
Job Number: 20-14165
Date Sampled: 21/05/2020
Date Received: 04/06/2020
Date Tested: 20/06/2020
Sampled By: CAH

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	LL	PL	PI	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1533825	MBH01	Not Given	1.00	1.05	D	Greyish brown MADE GROUND		15											
1533827	MBH01	Not Given	3.60	3.65	D	Mottled brown slightly gravelly very sandy CLAY	Atterberg 1 Point	18		72	33	18	15						
1533828	MBH01	Not Given	5.50	5.55	D	Brown CLAY	Atterberg 1 Point	29		100	71	31	40						
1533829	MBH01	Not Given	7.00	7.05	D	Greyish brown CLAY	Atterberg 1 Point	31		100	77	33	44						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 234.11

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

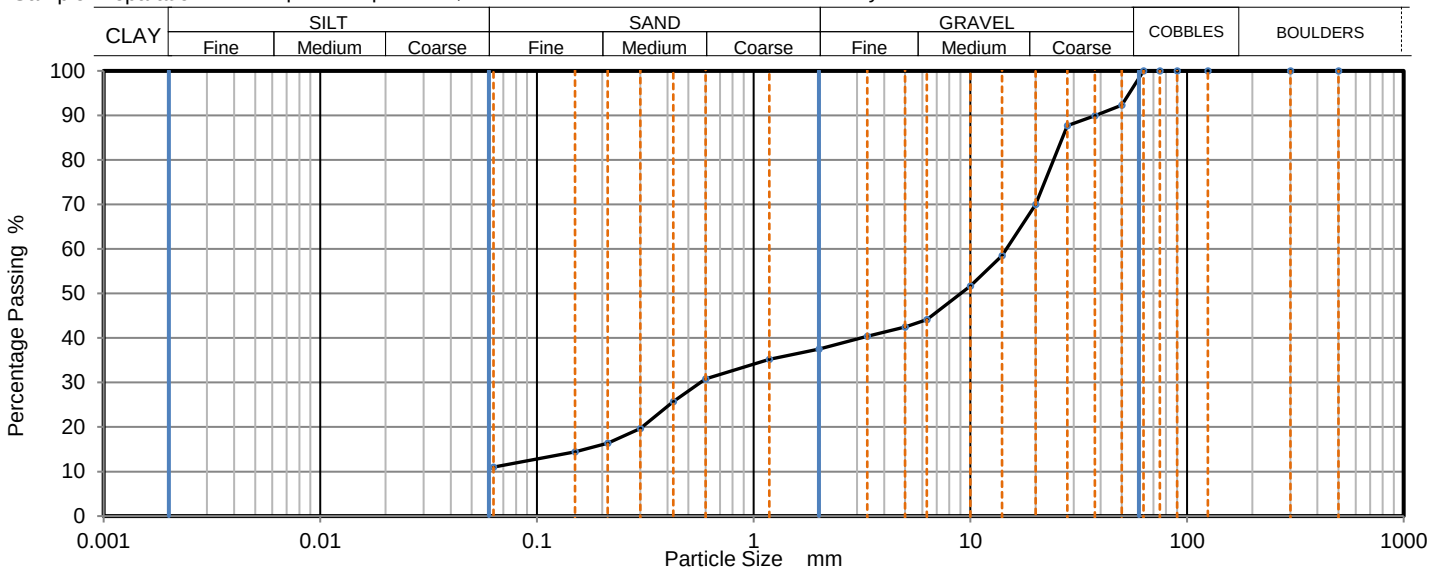
4041

Client:	Merebrook	Client Reference:	21912S
Client Address:	Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ	Job Number:	20-14165
		Date Sampled:	21/05/2020
		Date Received:	04/06/2020
Contact:	Darren Ettritch	Date Tested:	20/06/2020
Site Address:	Billet Road, Romford - Parcel A & B	Sampled By:	CAH

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1533826	Depth Top [m]:	2.00
Hole No.:	MBH01	Depth Base [m]:	2.50
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Black to grey clayey sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	92		
37.5	90		
28	88		
20	70		
14	59		
10	52		
6.3	44		
5	43		
3.35	40		
2	38		
1.18	35		
0.6	31		
0.425	26		
0.3	20		
0.212	16		
0.15	14		
0.063	12		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	62.50
Sand	25.60
Fines <0.063mm	11.80

Grading Analysis		
D100	mm	63
D60	mm	14.7
D30	mm	0.57
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 100.18

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	Merebrook	Client Reference:	21912S
Client Address:	Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ	Job Number:	20-14165
		Date Sampled:	21/05/2020
		Date Received:	04/06/2020
Contact:	Darren Ettritch	Date Tested:	23/06/2020
Site Address:	Billet Road, Romford - Parcel A & B	Sampled By:	CAH

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

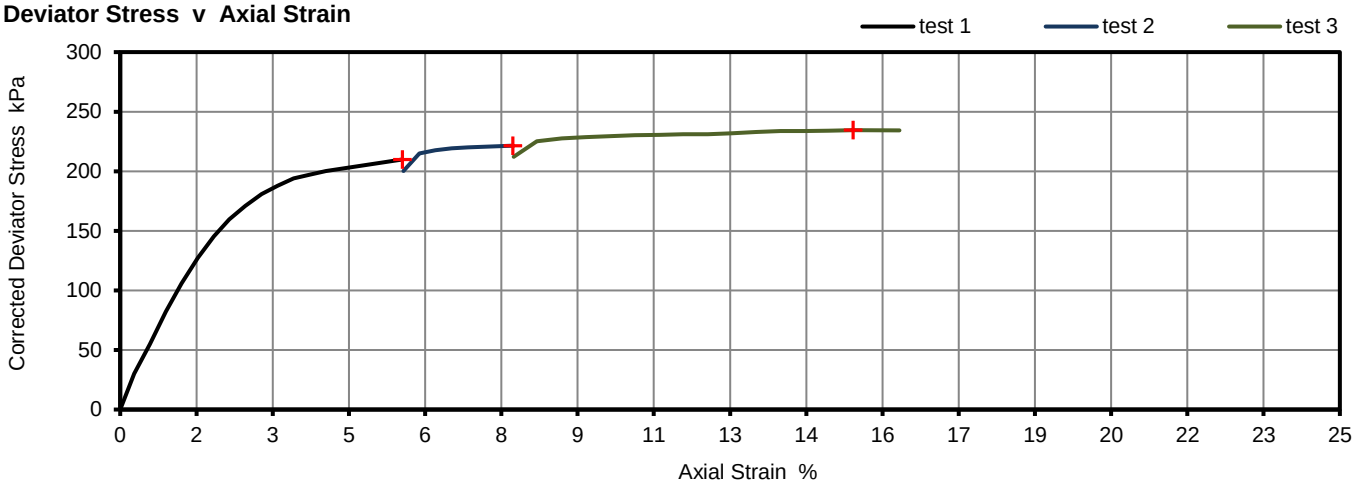
Test Results:

Laboratory Reference:	1533830	Depth Top [m]:	7.50
Hole No.:	MBH01	Depth Base [m]:	7.95
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Greyish brown CLAY		

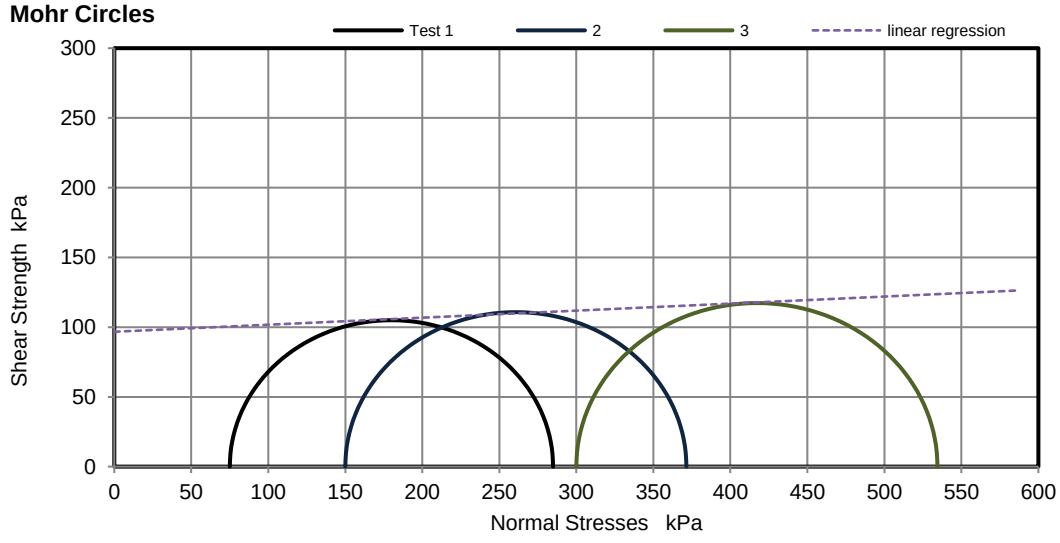
Length	201.35	mm
Diameter	102.90	mm
Bulk Density	1.98	Mg/m3
Moisture Content	28	%
Dry Density	1.54	Mg/m3
Membrane thickness	0.26	mm

Rate of Strain	1.99			%/min
Stage Number	1	2	3	
Cell Pressure	75	150	300	kPa
Axial Strain at failure	5.8	8.0	15.0	%
Deviator Stress, (σ1 - σ3)f	210	221	234	kPa
Shear strength, cu	105	111	117	kPa
Mode of failure	Compound			
Membrane Correction	0.39	0.48	0.77	kPa

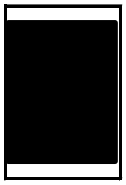
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	2.9	°
cu	97	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 75kPa=39N, 150kPa=55N, 300kPa=123N.

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	Merebrook	Client Reference:	21912S
Client Address:	Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ	Job Number:	20-14165
		Date Sampled:	21/05/2020
		Date Received:	04/06/2020
Contact:	Darren Ettritch	Date Tested:	23/06/2020
Site Address:	Billet Road, Romford - Parcel A & B	Sampled By:	CAH

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

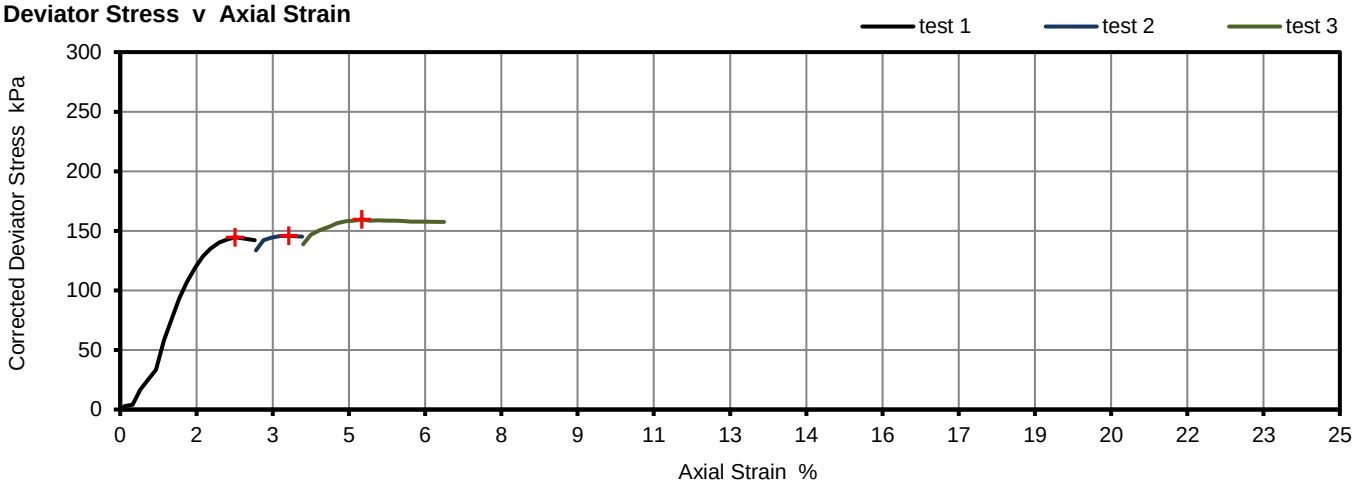
Test Results:

Laboratory Reference:	1533831	Depth Top [m]:	10.50
Hole No.:	MBH01	Depth Base [m]:	10.95
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Greyish brown CLAY		

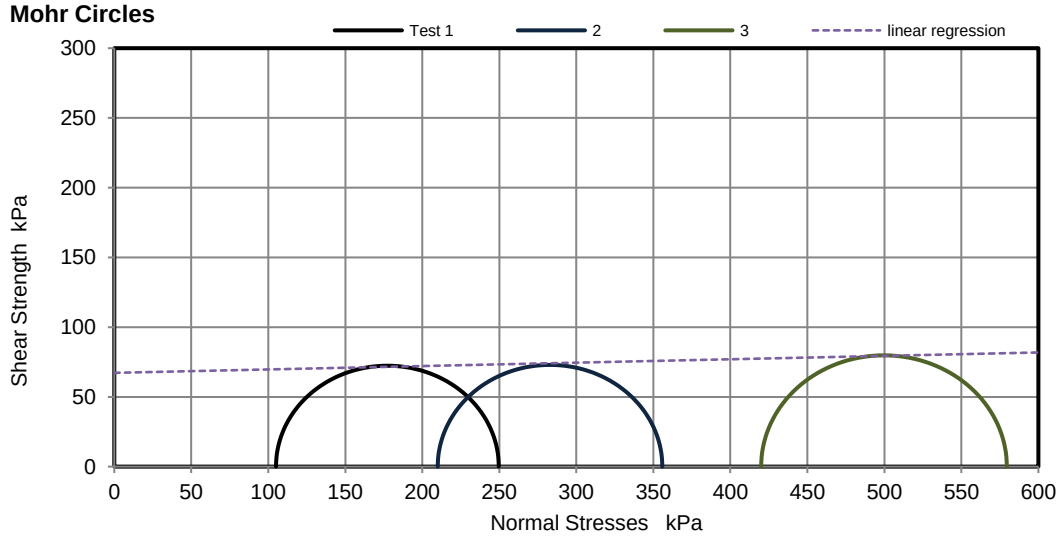
Length	198.73	mm
Diameter	103.05	mm
Bulk Density	1.95	Mg/m3
Moisture Content	29	%
Dry Density	1.51	Mg/m3
Membrane thickness	0.28	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	105	210	420	kPa
Axial Strain at failure	2.4	3.5	5.0	%
Deviator Stress, (σ1 - σ3)f	145	146	160	kPa
Shear strength, cu	72	73	80	kPa
Mode of failure	Brittle			
Membrane Correction	0.18	0.26	0.37	kPa

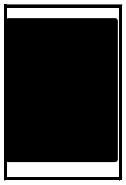
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	1.4	°
cu	67	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 105kPa=77N, 210kPa=129N, 420kPa=238N.

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	Merebrook	Client Reference:	21912S
Client Address:	Cromford Mills, Mill Lane, Cromford, Derbyshire, DE4 3RQ	Job Number:	20-14165
		Date Sampled:	21/05/2020
		Date Received:	04/06/2020
Contact:	Darren Ettritch	Date Tested:	23/06/2020
Site Address:	Billet Road, Romford - Parcel A & B	Sampled By:	CAH

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

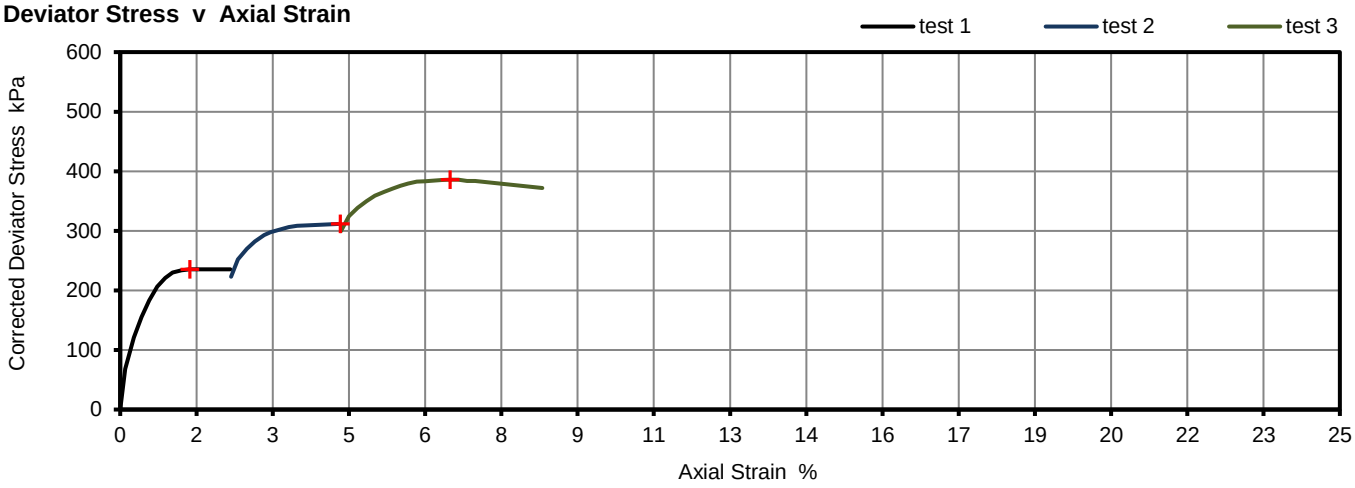
Test Results:

Laboratory Reference:	1533832	Depth Top [m]:	13.50
Hole No.:	MBH01	Depth Base [m]:	13.95
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Greyish brown CLAY		

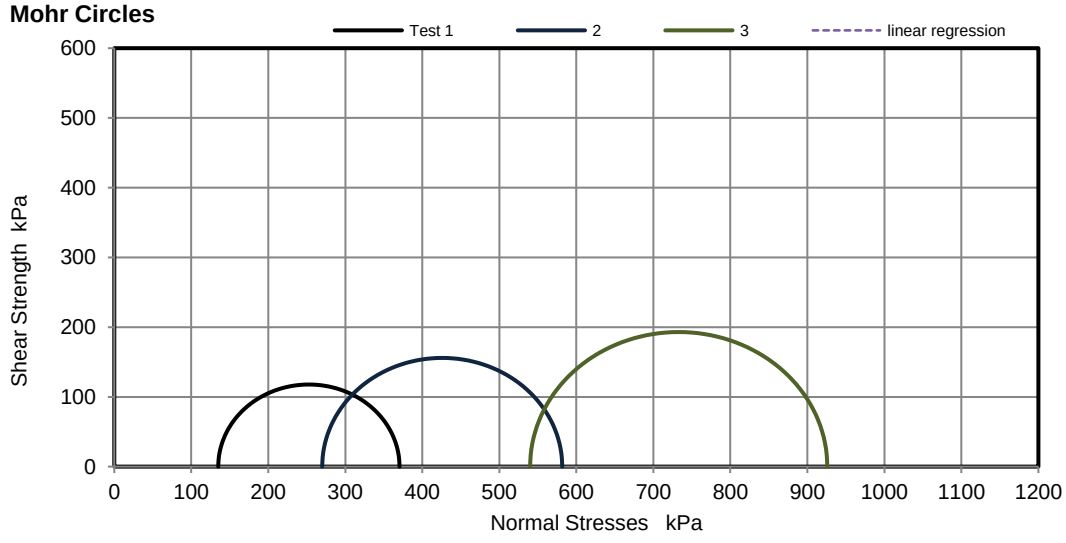
Length	136.84	mm
Diameter	69.44	mm
Bulk Density	1.99	Mg/m3
Moisture Content	28	%
Dry Density	1.55	Mg/m3
Membrane thickness	0.26	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	135	270	540	kPa
Axial Strain at failure	1.4	4.5	6.8	%
Deviator Stress, (σ1 - σ3)f	235	312	386	kPa
Shear strength, cu	118	156	193	kPa
Mode of failure	Brittle			
Membrane Correction	0.15	0.46	0.64	kPa

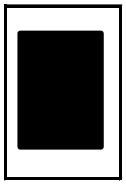
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression
ϕu °
cu kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 135kPa=93N, 270kPa=165N, 540kPa=305N.

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/06/2020

GF 186.11

Darren Ettritch
Merebrook
Cromford Mills
Mill Lane
Cromford
Derbyshire
DE4 3RQ

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Watford,
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e: reception@i2analytical.com

Analytical Report Number : 20-14169

Project / Site name:	Billet Road, Romford - Parcel A & B	**Samples received on:**	04/06/2020
Your job number:	21912S	**Sample instructed/ Analysis started on:**	12/06/2020
Your order number:	20-2-FDO-LABS	**Analysis completed by:**	30/06/2020
Report Issue Number:	1	**Report issued on:**	01/07/2020
Samples Analysed:	4 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of 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

Excel copies of reports are only valid when accompanied by this PDF certificate.

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: 20-14169

Project / Site name: Billet Road, Romford - Parcel A & B
Your Order No: 20-2-FDO-LABS

Lab Sample Number				1533848	1533849	1533850	1533851	
Sample Reference				MBH01	MBH01	MBH01	MBH01	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				1.20-1.25	5.00-5.05	9.00-9.05	13.00-13.05	
Date Sampled				21/05/2020	21/05/2020	21/05/2020	21/05/2020	
Time Taken				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	
Moisture Content	%	N/A	NONE	13	18	18	18	
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.1	1.5	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	7.8	7.8	6.7	
Total Sulphate as SO_4	%	0.005	MCERTS	0.368	0.019	0.081	0.182*	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.7	0.072	0.35	1.0*	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	1710	72.0	353	1010*	
Total Sulphur	%	0.005	MCERTS	0.232	0.011	0.351	0.912	

* Despite repeating Total Sulphate and Water Soluble Sulphate analysis, the results remain contradictory.

Analytical Report Number : 20-14169

Project / Site name: Billet Road, Romford - Parcel A & B

* 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 *
1533848	MBH01	None Supplied	1.20-1.25	Brown clay and sand with vegetation.
1533849	MBH01	None Supplied	5.00-5.05	Light brown clay.
1533850	MBH01	None Supplied	9.00-9.05	Grey clay.
1533851	MBH01	None Supplied	13.00-13.05	Grey clay.

Analytical Report Number : 20-14169

Project / Site name: Billet Road, Romford - Parcel A & B

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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
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
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
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	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.

APPENDIX 6 ▪ Groundwater Laboratory Certificates

Sam Mitchell
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First Floor
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Westerham Road
Keston
BR2 6HQ

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Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-11568

Project / Site name:	Billet Road, Romford	**Samples received on:**	29/05/2020
Your job number:	21912S	**Sample instructed/ Analysis started on:**	29/05/2020
Your order number:	20-2-FDO-LABS	**Analysis completed by:**	08/06/2020
Report Issue Number:	1	**Report issued on:**	08/06/2020
Samples Analysed:	4 water samples		

Signed: Karolina Marek

Karolina Marek
PL Head of 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

Excel copies of reports are only valid when accompanied by this PDF certificate.

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: 20-11568

Project / Site name: Billet Road, Romford

Your Order No: 20-2-FDO-LABS

Lab Sample Number				1520274	1520275	1520276	1520277	
Sample Reference				MWS03	MWS06	MWS07	MBH01	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				28/05/2020	28/05/2020	28/05/2020	28/05/2020	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	6.9	6.8	7.0	7.1	
Total Cyanide	µg/l	10	ISO 17025	< 10	12	< 10	< 10	
Sulphate as SO_4	µg/l	45	ISO 17025	243000	7490	6390	83100	
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	43.6	51.1	17.8	16.2	
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	11	< 10	< 10	
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	7.51	0.38	2.21	
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.30	< 0.01	
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	7.37	13.9	3.77	
Fluorene	µg/l	0.01	ISO 17025	< 0.01	2.79	6.43	2.36	
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	0.95	6.25	2.96	
Anthracene	µg/l	0.01	ISO 17025	< 0.01	0.26	1.94	0.72	
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	0.13	3.10	1.10	
Pyrene	µg/l	0.01	ISO 17025	< 0.01	0.14	2.16	0.83	
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.15	< 0.01	
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.12	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Total PAH								
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	19.2	34.7	14.0	
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.98	2.42	< 0.15	< 0.15	
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02	< 0.02	
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.4	< 0.2	< 0.2	
Copper (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	
Lead (dissolved)	µg/l	0.2	ISO 17025	0.2	0.3	0.5	0.7	
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel (dissolved)	µg/l	0.5	ISO 17025	1.7	0.6	0.5	2.1	
Selenium (dissolved)	µg/l	0.6	ISO 17025	2.6	2.0	1.6	1.7	
Zinc (dissolved)	µg/l	0.5	ISO 17025	< 0.5	0.6	2.8	< 0.5	

Analytical Report Number: 20-11568

Project / Site name: Billet Road, Romford

Your Order No: 20-2-FDO-LABS

Lab Sample Number				1520274	1520275	1520276	1520277	
Sample Reference				MWS03	MWS06	MWS07	MBH01	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				28/05/2020	28/05/2020	28/05/2020	28/05/2020	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	83.2	< 1.0	< 1.0	
p & m-xylene	µg/l	1	ISO 17025	< 1.0	1160	< 1.0	< 1.0	
o-xylene	µg/l	1	ISO 17025	< 1.0	10.7	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	1600	< 1.0	< 1.0	
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	960	50	160	
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	790	280	260	
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	100	< 10	
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	3300	430	420	

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

Analytical Report Number : 20-11568

Project / Site name: Billet Road, Romford

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
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

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
MBH01		W	20-11568	1520277	c	pH at 20oC in water (automated)	L099-PL	c
MWS03		W	20-11568	1520274	c	pH at 20oC in water (automated)	L099-PL	c
MWS06		W	20-11568	1520275	c	pH at 20oC in water (automated)	L099-PL	c
MWS07		W	20-11568	1520276	c	pH at 20oC in water (automated)	L099-PL	c

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

Site: Billet Road, Romford
Project Number: 21912s

Sample Location	Results (µg.l^{-1} unless specified) MWS03	MWS06	MWS07	MBH01	Number of Tests	Maximum	Mean	PROTECTION OF DRINKIN: The Water Supply (Water Quality) Regulations 2016: Schedule 1 or Schedule 2 or The Water Supply (Water Quality) Regulations 1989: Schedule 2 in blue — Drinking Water Standard µg.l^{-1}	Number of Exceedances	Guidelines
Arsenic	< .98	< 2.42	< .15	< .15	4	2.42	0.925	10	0	
Cadmium	< .02	< .02	< .02	< .02	4	0.02	0.02	5	0	
Chromium (III)	< 5.	< 5.	< 5.	< 5.	4	5	5	50	0	
Chromium (VI)	0.2	0.4	0.2	0.2	4	0.4	0.25	50	0	
Copper	< .5	< .5	< .5	0.5	4	0.5	0.5	2000	0	
Lead	0.2	< .3	< .5	0.7	4	0.7	0.425	10	0	
Mercury	0.05	0.05	0.05	0.05	4	0.05	0.05	1	0	
Nickel	1.7	0.6	0.5	2.1	4	2.1	1.225	20	0	
Selenium	2.6	2	1.6	1.7	4	2.6	1.975	10	0	
Zinc	0.5	0.6	2.8	0.5	4	2.8	1.1	5000	0	
pH	6.9	6.8	7	7.1	4	7.1	6.95	6.5-9.5	-	
Cyanide as HCN	10	12	10	10	4	12	10.5	50	0	
Sulphate	243000	7490	6390	83100	4	243000	84995	250000	0	
Sulphide	< 5.	< 5.	< 5.	< 5.	4	5	5	50	0	
DOC	43.6	51.1	17.8	16.2	4	51.1	32.175	no prescribed value	-	

Site: Billet Road, Romford
Project Number: 21912s

Sample Location	Results (µg.l^{-1} unless specified) MWS03	MWS06	MWS07	MBH01	Number of Tests	Maximum	Mean	PROTECTION OF DRINKIN: The Water Supply (Water Quality) Regulations 2016: Schedule 1 or Schedule 2 or The Water Supply (Water Quality) Regulations 1989: Schedule 2 in blue — Drinking Water Standard µg.l^{-1}	Number of Exceedances	Guidelines
TPH (total)	< 106.	6725	926	916	4	6725	2168.25	10	4	
Phenol	< 10.	11	< 10.	< 10.	4	11	10.25	0.5	4	
Benzene	< 1.	< 1.	< 1.	< 1.	4	1	1	1	0	
Toluene	< 1.	< 1.	< 1.	< 1.	4	1	1	no prescribed value	-	
Ethylbenzene	< 1.	83.2	< 1.	< 1.	4	83.2	21.55	no prescribed value	-	
Xylene	< 1.	1170.7	< 1.	< 1.	4	1170.7	293.425	no prescribed value	-	
Anthracene	0.01	0.26	1.94	0.72	4	1.94	0.7325	no prescribed value	-	
Benzo(a)pyrene	0.01	0.01	0.01	0.01	4	0.01	0.01	0.01	0	
Benzo(b)fluoranthene	0.01	0.01	0.01	0.01	4	0.01	0.01	no prescribed value	-	
Benzo(k)fluoranthene	0.01	0.01	0.01	0.01	4	0.01	0.01	no prescribed value	-	
Benzo(g,h,i)perylene	0.01	0.01	0.01	0.01	4	0.01	0.01	no prescribed value	-	
Fluoranthene	0.01	0.13	3.1	1.1	4	3.1	1.085	no prescribed value	-	
Indeno(1,2,3-c,d)pyrene	0.01	0.01	0.01	0.01	4	0.01	0.01	no prescribed value	-	
Naphthalene	0.01	7.51	0.38	2.21	4	7.51	2.5275	no prescribed value	-	
benzo(b)fluoranthene + benzo(k)fluoranthene + benzo(ghi)perylene + indeno(1,2,3-cd)pyrene	0.04	0.04	0.04	0.04	4	0.04	0.04	0.1	0	

G WATER

for drinking water quality - 4th ed. Incorporating first addendum WHO 2017

Site: Billet Road, Romford
Project Number: 21912s

Sample Location	Drinking Water Standard µg.l^{-1}	Number of Exceedances
Arsenic	10	0
Cadmium	3	0
Chromium (III)	50	0
Chromium (VI)	50	0
Copper	2000	0
Lead	10	0
Mercury	6	0
Nickel	70	0
Selenium	40	0
Zinc	no prescribed value	-
pH	no prescribed value	-
Cyanide as HCN	no prescribed value	-
Sulphate	no prescribed value	-
Sulphide	no prescribed value	-
DOC	no prescribed value	-

	G WATER	
Site: Billet Road, Romford Project Number: 21912s	for drinking water quality - 4th ed. Incorporating first addendum WHO 2017	
Sample Location	Drinking Water Standard µg.l^{-1}	Number of Exceedances
TPH (total)	no prescribed value	-
Phenol	no prescribed value	-
Benzene	10	0
Toluene	700	0
Ethylbenzene	300	0
Xylene	500	1
Anthracene	no prescribed value	-
Benzo(a)pyrene	0.7	0
Benzo(b)fluoranthene	no prescribed value	-
Benzo(k)fluoranthene	no prescribed value	-
Benzo(g,h,i)perylene	no prescribed value	-
Fluoranthene	no prescribed value	-
Indeno(1,2,3-c,d)pyrene	no prescribed value	-
Naphthalene	no prescribed value	-
benzo(b)fluoranthene + benzo(k)fluoranthene + benzo(ghi)perylene + indeno(1,2,3-cd)pyrene	no prescribed value	-

APPENDIX 7

- Field Monitoring Records
- Groundwater Level Data
- Hazardous Soil Gas Data

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GAS MONITORING RECORD ROUND 1

Location Reference	Time	Flow and Pressure Measurements				Gas Measurements						VOC Measurements		Dip Measurements		Comments
		Flow		Atmospheric Pressure	Differential Pressure	Methane	Methane LEL	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulphide	Hexane	PID	Depth to Water	Depth to Base	
		max	steady													
		$l\ hr^{-1}$		mb	Pa	%	%	%	%	ppm	ppm	%	ppm	m	m	
MWS03	09:30	0	0	1036	0	0	0	0	20.2	0	0	0.010	nr	1.50	2.50	Ground water - Brown opague, no sheen on surface.
MWS06	11:20	0	0	1034	0	0	0	0	20.6	0	0	0.010	nr	2.20	5.20	Ground water - Brown opague, no sheen on surface.
MWS07	10:45	0	0	1034	0	0	0	0	20.5	0	0	0.006	nr	2.00	3.85	Ground water - greenish grey translucent, black particles (up to 3 mm), no sheen on surface.
MBH01	09:53	0	0	1034	0	0	0	0	20.3	0	0	0.021	nr	1.60	2.90	Ground water - greenish grey translucent, black particles (up to 3 mm), no sheen on surface.
MBH02	-	-	-	-	-	-	-	-	-	-	nr	-	nr	-	-	Not installed.
MBH03	-	-	-	-	-	-	-	-	-	-	nr	-	nr	-	-	Not installed.
MBH05	-	-	-	-	-	-	-	-	-	-	nr	-	nr	-	-	Not installed.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Weather:	Clear and sunny. Pressures over the past 24 hours have been unchanged.	nr = not recorded	Gas Analyser	PID	Site:	Billet Road, Romford
		Model:	GFM 436	-	Project Number:	21912s
		Serial Number:	12228	-	Monitored By:	Sam Mitchell
		Date of Last Calibration:	20/05/2019	-	Date:	28/05/2020

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GAS MONITORING RECORD ROUND 2

Location Reference	Time	Flow and Pressure Measurements				Gas Measurements						VOC Measurements		Dip Measurements		Comments
		Flow		Atmospheric Pressure	Differential Pressure	Methane	Methane LEL	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulphide	Hexane	PID	Depth to Water	Depth to Base	
		max	steady													
		$l\ hr^{-1}$		mb	Pa	%	%	%	%	ppm	ppm	%	ppm	m	m	
MWS03	10:45	0	0	1007	0	0	0	3.6	13.1	0	0	0.000	0	1.10	1.60	-
MWS06	11:00	0	0	1007	0	15.7	>>>	3.9	14.7	10	0	0.988	nr	2.25	3.05	-
MWS07	11:15	0	0	1007	0	41.8	>>>	3.5	0.2	10	0	2.186	nr	2.05	2.90	-
MBH01	10:30	0	0	1007	0	0	0	0.6	20.6	0	0	0.000	0	1.70	4.85	-
MBH02	09:00	0	0	1006	0	0	0	5.3	12.7	0	0	0.000	0	2.15	5.20	Fully purged and sampled. Water odourless murky brown.
MBH03	09:20	0	0	1008	0	0	0	0.1	20.9	0	0	0.000	0	1.20	3.30	Fully purged and sampled. Water odourless murky brown.
MBH05	-	-	-	-	-	-	-	-	-	-	nr	-	nr	-	-	Not installed yet.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Weather:	18 C, Cloudy, Breezy	nr = not recorded	Gas Analyser	PID	Site:	Billet Road, Romford
		Model:	GFM 436	Mini RAE 2000 (1)	Project Number:	21912s
		Serial Number:	12228	-	Monitored By:	Callum Harris
		Date of Last Calibration:	20/05/2019	-	Date:	03/06/2020

APPENDIX 8 ▪ Gas Risk Assessment

NHBC TRAFFIC LIGHT GAS CHARACTERISTIC SITUATION

SITE: Billet Road, Romford JOB NUMBER: 21912s 12/06/2020

Carbon Dioxide				Methane			
Maximum Gas Concentration	5.30	%	carbon dioxide concentration greater than 5% consider Amber 1	Maximum Gas Concentration	41.80	%	methane concentration greater than 20% consider Red
Maximum Measured Steady Flow	0.10	L hr^{-1}		Maximum Measured Peak Flow	0.10	L hr^{-1}	
Gas Screening Value	0.01	L hr^{-1}		Gas Screening Value	0.04	L hr^{-1}	
Characteristic Situation	Green			Characteristic Situation	Green		

if measured values are zero then resolution limit of instrument is used for calculation of GSV
worst case carbon dioxide or methane characteristic situation value defines overall characterstic situation for the site

NHBC Classification **Protection Measures**

Characteristic Situation	Carbon Dioxide		Methane		Identified Gas Regime		Protection Measures Required
	Typical Maximum Concentration (%v/v)	Gas Screening Value (L hr^{-1})	Typical Maximum Concentration (%v/v)	Gas Screening Value (L hr^{-1})			
Green						negligible	Ground gas protection measures are not required
Amber 1	5	0.78	1	0.16		low to intermediate	Low-level ground gas protection measures are required, using a membrane and ventilated sub-floor void that creates a permeability contrast to limit the ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. Ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours
Amber 2	10	1.56	5	0.63		intermediate to high	High-level ground gas protection measures are required, creating a permeability contrast to prevent ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. Membranes used should always be fitted by a specialist contractor and should be fully certified (see Appendix E). As with Amber 1, ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours.
Red	30	3.10	20	1.56		high	Standard residential housing is not normally acceptable without further Ground Gas Risk Assessment and/or possible remedial mitigation measures to reduce/remove the source of the ground gases. In certain circumstances, active protection methods could be applied, but only when there is a legal agreement assuring the management and maintenance of the system for the life of the property.

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