



Environmental Visage

**SITE CONDITION REPORT
CONDITION AT PERMIT APPLICATION**

**OIL SALVAGE LIMITED
BISHOP'S STORTFORD OIL STORAGE DEPOT
BISHOP'S STORTFORD, CM23 1JB**

**Report Issue No: 1
Report Date: February 2023
Report Author: A. Owen**

Executive Summary

This Site Condition Report details the status of the land and groundwater at the Oil Salvage Limited Bishop's Stortford Oil Storage Depot situated off Farnham Road, Bishop's Stortford, Hertfordshire.

The Baseline Site Condition Report confirms levels of soil and groundwater contamination beneath the site from historical fuel storage operations. No specific remediation of this contamination has taken place, and the existing underground storage tanks have not yet been removed. However, these will be appropriately decommissioned and / or excavated prior to the operation of the site as a waste oil storage depot.

Additionally, the remaining site infrastructure will be assessed and certified as suitable for use in accordance with 'CIRIA 736 Containment systems for the prevention of pollution, secondary, tertiary and other measures for industrial and commercial premises'.

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Issue and Revision Record

Issue	Date	Author	Review / Authorise	Description
DRAFT	14/02/2022	A. Owen		Draft for Client Comment
1	21/02/2023	A. Owen	ENVISAGE	Issue 1 – Condition at Permit Application

1. Introduction

This Site Condition Report details the status of the land and groundwater at the Oil Salvage Limited Bishop's Stortford Oil Storage Depot situated off Farnham Road, Bishop's Stortford, Hertfordshire. The report effectively summarises work already prepared by BWB Consulting, and essentially presents the BWB data in the required Environment Agency Site Condition Report style.

2. Site Details

Name of the applicant: Oil Salvage Limited
Activity address: Farnham Road, Bishop's Stortford, CM23 1JB
National grid reference: 548581, 223459

Document reference and dates for Site Condition Report at Permit application:

This report, informed by:

Oil Salvage Ltd; Butler Fuels, Farnham Road, Bishop Stortford - Baseline Site Condition Report.
BWB Consulting; September 2021.

Document references for site plans (including location and boundaries):

Environmental Permit Application Supporting Documentation; Copied here in Figures section as:

Figures 1 and 2: Location of the Bishop's Stortford Oil Storage Depot, and Bishop's Stortford Oil Storage Depot Installation Boundary and Operational Areas.

3. Condition of the Land at Permit Issue

The site is currently occupied by a disused oil storage depot located on Farnham Road, on the outskirts of Bishop Stortford. A small one storey office building is present in the north of the site, with fuel pumps and a gantry in the centre of the site and an above ground tank farm in the south of the site. Two 45,000 litre underground storage tanks (USTs) are also present in the south of the site. Bourne Brook is an ephemeral water course which flows along the northern and western site boundary following heavy rainfall events.

The site is underlain by superficial Head Deposits (clay, silt, sand and gravel). The underlying bedrock geology is indicated to comprise undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations (Section 3; page 5 of BWB's Baseline Site Condition Report (BWB report)). The Head deposits are categorised by the Environment Agency as undifferentiated Secondary Aquifers. The underlying Chalk is classified as a Principal Aquifer. The site lies within a Zone 1 Source Protection Zone centred around a potable groundwater abstraction located 890 m to the south east of the site (Section 3; page 5 of BWB report).

Ground investigation has identified limited Made Ground (typically less than 0.5 m) over cohesive Head Deposits proven to between 3.9 m and 5.5 m below ground level (bgl), overlying chalk. Deeper Made Ground with abundant waste was identified in one location in the west of the site, possibly reflective of imported waste materials used to raise site levels. Groundwater levels within the Principal Aquifer were recorded between 4.63 m and 5.9 m bgl, with flow tentatively indicated to flow in a northerly or easterly direction (Section 5; pages 10 and 11 of BWB report).

This summary should be read in conjunction with BWB's full report attached at Appendix A (ref. BFFR-BWB-ZZ-XX-RP-YE-0003-BSCR), specifically at the sections signposted above.

An intrusive investigation at the site, undertaken in advance of any waste oil storage activities, revealed evidence of historical contamination from the previous fuel oil storage depot operations.

Observations during site investigation works identified hydrocarbon contamination roughly at the interface between the Head Deposits and underlying Chalk, with increased contamination odours and PID readings noted below 6 m, associated with impact in the groundwater (Section 5; page 12 of BWB report). Light non-aqueous phase liquids (LNAPL) were reported in most of the monitoring wells (Section 5; page 13 of the BWB report).

The distribution of soil contamination is detailed in the BWB report (Section 5; pages 14 – 16), but can be summarised as follows:

Preliminary gas monitoring recorded elevated Carbon Dioxide, Methane and Volatile Organic Compound (VOC) vapours emanating from the contaminated soils and groundwater at concentrations which could represent a risk to future site users. However, contaminant levels within the soils were not indicated to represent a risk to future site users in the context of a commercial end use, although asbestos was recorded in all Made Ground samples.

Relatively low leachate concentrations were recorded in the Made Ground.

High concentrations of hydrocarbons and LNAPL were recorded in the groundwater,

This summary should be read in conjunction with BWB's full report attached at Appendix A (ref. BFFR-BWB-ZZ-XX-RP-YE-0003-BSCR), specifically at the sections signposted above.

4. Permitted Activities

Permitted activities:

The proposed future use of the site is as a waste oil transfer station, and therefore, the temporary storage of hazardous waste and associated activities. The operation will involve the bulk storage of mixed waste oils for transfer to other sites for treatment and recovery, recycling or disposal. No treatment of the waste will be facilitated at the Bishop's Stortford site.

Environmental Permitting Reference:

Schedule 1; Part 2; Section 5.6 A(1) (a) Temporary storage of hazardous waste with total capacity exceeding 50 tonnes.

Of the seven above-ground storage tanks currently located at the site, six will store mixed waste oils while the seventh will store potentially contaminated water from the bund. The existing underground storage tanks will not be used and will be removed prior to the operation of the site as a waste oil storage depot.

Non-permitted activities undertaken:

The waste storage and transfer activities at the site will all be permitted. There will be no non-permitted activities undertaken at the site.

Document references for:

Plan showing activity layout – See Bishop's Stortford Oil Storage Depot Installation Boundary and Operational Areas diagram (Figure 2 in the Figures section of this report); and

Environmental Risk Assessment – See Oil Salvage Limited EA04: Environmental Risk Assessment Bishops Stortford: Version 1; 19th October 2021 (Appendix C of this report).

The above documents are as per the submissions made in the Environmental Permit Application Supporting Documentation.

5. Assessment of Relevant Hazardous Substances

Identifying the hazardous substances that are currently used, produced or released at the installation:

The proposed activities at the site involve the transfer and storage of substances (waste oil) that are classified as **hazardous for the environment** and could pollute the soil or groundwater if there were an accident, or if the measures in place to protect land, fail.

The wastes to be received at the site comprise waste engine, gear and lubricating oils as follows:

Waste Code	Description
12 01 wastes from shaping and physical and mechanical treatment of metals and plastics	
12 01 06*	mineral-based machining oils containing halogens (except emulsions and solutions)
12 01 07*	mineral-based machining oils free of halogens (except emulsions and solutions)
12 01 09*	machining emulsions and solutions free of halogens
12 01 10*	synthetic machining oils
12 01 19*	readily biodegradable machining oil
13 01 waste hydraulic oils	
13 01 01*	hydraulic oils, containing PCBs
13 01 05*	non-chlorinated emulsions
13 01 09*	mineral-based chlorinated hydraulic oils
13 01 10*	mineral based non-chlorinated hydraulic oils
13 01 11*	synthetic hydraulic oils
13 01 12*	readily biodegradable hydraulic oils
13 01 13*	other hydraulic oils
13 02 waste engine, gear and lubricating oils	
13 02 04*	mineral-based chlorinated engine, gear and lubricating oils
13 02 05*	mineral-based non-chlorinated engine, gear and lubricating oils
13 02 06*	synthetic engine, gear and lubricating oils
13 02 07*	readily biodegradable engine, gear and lubricating oils
13 02 08*	other engine, gear and lubricating oils
13 03 waste insulating and heat transmission oils	
13 03 01*	insulating or heat transmission oils containing PCBs
13 03 06*	mineral-based chlorinated insulating and heat transmission oils other than those mentioned in 13 03 01
13 03 07*	mineral-based non-chlorinated insulating and heat transmission oils
13 03 08*	synthetic insulating and heat transmission oils
13 03 09*	readily biodegradable insulating and heat transmission oils
13 03 10*	other insulating and heat transmission oils
13 05 oil / water separator contents	
13 05 02*	sludges from oil/water separators
13 05 03*	interceptor sludges
13 05 06*	oil from oil/water separators
13 05 07*	oily water from oil/water separators
13 07 waste liquid fuels	
13 07 01*	fuel oil and diesel
13 07 03*	other fuels (including mixtures)
13 08 oil waste not otherwise specified	
13 08 02*	other emulsions

Identifying the relevant hazardous substances:

Waste oil is a liquid hydrocarbon. It is combustible, but with a flash point of > 200 °C, is not flammable.

Waste oil is incompatible with strong oxidising agents. No oxidising agents will be stored at the site.

Spillages should be contained and collected using non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth. Used absorbents should be placed in a suitable container for disposal as oil contaminated waste.

Waste oil must not be allowed to enter drains or watercourses. If the product enters drains or sewers, the local water company or, in the case of contamination of streams, rivers or lakes, the Environment Agency should be contacted immediately.

Waste oil is insoluble in water.

As waste oil is classified as hazardous for the environment, it is a relevant hazardous substance.

Assessment of the site-specific pollution possibility:

Section 7 below considers the possibility of pollution to occur and details the measures taken at the site to protect the land, groundwater and water courses.

6. Changes to the Activity

Although historically used as a fuel depot storing liquid hydrocarbons, the site has not previously been required to hold an Environmental Permit. As such, the application being made is for a new installation and there are no changes to any previously permitted activities.

7. Measures Taken to Protect Land

The proposed installation will involve the bulk storage of mixed waste oils for transfer to other sites for treatment and recovery, recycling or disposal. No treatment of the waste will be facilitated at the Bishop's Stortford site.

The site comprises a yard area which includes an off-load gantry and seven bunded storage tanks, with an office and rest-room facilities also located at the site. The site is generally un-manned and, aside from waste storage, is only operational when a driver or drivers attend site to load waste oil into or draw waste oil out of the storage tanks. The site has a secure perimeter fence, the gates to which are locked at all times when the site is not manned.

Prior to the commissioning and use of the site for waste oil storage, the existing underground storage tanks will be removed and the remaining site infrastructure will be assessed and certified as suitable for use in accordance with 'CIRIA 736 Containment systems for the prevention of pollution, secondary, tertiary and other measures for industrial and commercial premises', or will be replaced with new infrastructure that meets the requirements of CIRIA 736.

Each above-ground storage tank has a breather vent and an over-flow at the top, the latter of which is directed down-wards into the bund.

The level meters to be employed on the tanks will be appropriate for the measurement of mixed waste oils and waste-water, with appropriate temperature and pressure ranges and employing a guided microwave and comprehensive diagnostic possibilities to enable maintenance-free operation and hence a high plant availability. The level meters will have an on-site read-out and can also be viewed remotely from the Company Head Office in order to manage bulk collections.

All site tanks and pipework are labelled with a unique numbering system to identify which load / off-load point serves which tank. The site monitoring and labelling systems therefore enable the drivers to have full control over any transfer made, ensuring that the correct delivery goes to the correct tank and no tank is over-loaded.

Drivers carry spill kits on their vehicles and are trained in their use, and additional kits are located at the site. All spillages of hazardous wastes will be logged and, where any spillage is of more than 200 litres, this will be reported to the Environment Agency.

The operational area of the site comprises the off-load area and has an impervious surface with self-contained drainage to prevent any spillage escaping off-site. Drainage in this area passes to surface water via an interceptor which includes a penstock valve that will be shut-off from release during site operations, resulting in a sealed drainage system.

The site will not include any discharge to sewer. Surface water run-off from around the operational areas of the site passes through a full retention, three-stage interceptor to ensure that any oil that the run-off might have collected from site surfacing is removed before the clean surface water is released into the Bourne Brook. The release point includes a penstock valve which can be operated either on site or remotely by OSL management to ensure that no release can occur during waste oil transfers or in the event of an identified emergency. Additionally, water collected within the storage bund, which may contain higher levels of oil or emulsified oils, will be pumped into a dedicated storage tank for transfer from site before treatment and disposal at an alternative facility.

Surface water from other hardstanding areas of the site, namely the concrete apron which runs alongside the office block and provides access to the main operational area, is also discharged to the Bourne Brook via a separate full retention, three-stage interceptor to ensure that any oil that the run-off might have collected from site surfacing is removed before the clean surface water is released into the water course. Interceptors will be cleaned and maintained at least once every six months, more frequently as required and, in the case of W1, prior to the re-opening of the penstock valve in the event of any significant spillage that might have impacted on the interceptor. When cleaning the interceptors, wastes will be added to the driver's waste oil tank for subsequent removal from site with other collected oils.

In addition to regular checks made by each delivery and collection driver when attending site, a documented management visit and inspection will be performed monthly and will comprise a visual inspection of tanks, pavements and the site bund, as well as all other associated infrastructure. Inspections will pay particular attention to signs of damage, deterioration and leakage and thorough records will be maintained detailing any action taken, either during the visit or subsequently, to repair or replace faulty or damaged equipment. As the site is not yet operational, no inspection records are available for inclusion here.

Further detailed information on the proposed operations at the site are provided in the supporting documentation for the Permit application.

8. Pollution Incidents that may have had an Impact on Land, and their Remediation

The Baseline Site Condition Report prepared by BWB Consulting has confirmed levels of soil and groundwater contamination beneath the site from historical fuel storage operations.

No specific remediation of this contamination has taken place, and the existing underground storage tanks have not yet been removed, although these will be appropriately decommissioned and / or excavated prior to the operation of the site as a waste oil storage depot.

An environmental assessment has however been prepared by BWB Consulting (Appendix B) and the findings and recommendations are summarised here.

Preliminary gas monitoring recorded elevated Carbon Dioxide, Methane and Volatile Organic Compound (VOC) vapours at the site, emanating from the contaminated soils and groundwater at concentrations which represent a risk to future site users.

Ground gas protection measures commensurate with a Characteristic Situation 2 site would be required for new buildings based on preliminary gas monitoring information.

Contaminant levels within the soils were not indicated to represent a risk to future site users in the context of a commercial end use. However, asbestos was recorded in all Made Ground samples. A clean capping layer would therefore be required in areas of soft landscaping if the site were to be redeveloped.

The relatively low leachate concentrations in the Made Ground were not considered to represent a risk to Bourne Brook given the lack of surface water infiltration at the site, and the ephemeral nature of the water course making it a relatively low sensitivity receptor. Proposed upgrade works to the site drainage system would further reduce the risk to Bourne Brook.

High concentrations of hydrocarbons and LNAPL were recorded in the groundwater, and given the presence of an ongoing source in the form of the underground tanks and LNAPL within groundwater, the site is considered to represent a high risk to the underlying Principal Aquifer / SPZ1.

The site is deemed to meet the definition of Category 1 or 2 Contaminated Land due to the presence of significant contamination within a Principal Aquifer and Zone 1 Source Protection Zone.

Groundwater remediation could comprise removal of the underground tanks, associated infrastructure, and any grossly impacted soils, as well as removal of any LNAPL product from groundwater to ensure that there is no source remaining at the site.

Document reference for supporting information:

Oil Salvage Ltd; Butler Fuels, Farnham Road, Bishop Stortford – Environmental Assessment Report. BWB Consulting; October 2022. BFFR-BWB-ZZ-XX-RP-YE-0003_EAR (see Appendix B).

9. Soil, Gas and Water Quality Monitoring

Details of all soil, gas and water quality monitoring currently undertaken are presented in Sections 5 – 8 of BWB report BFFR-BWB-ZZ-XX-RP-YE-0003_EAR, presented in Appendix B. The resultant risk assessments are presented in Sections 9 – 11 and a conceptual site model is presented in Table 11.1 of the same report.

10. Decommissioning and Removal of Pollution Risk

Prior to the operation of the installation for any waste oil storage activities, Oil Salvage Limited propose the removal of the underground tanks, their associated infrastructure, and any grossly impacted soils from the area surrounding the redundant tanks, as well as removing any LNAPL product from groundwater to ensure that there is no source remaining at the site.

Oil Salvage Limited will also assess the site infrastructure and make any necessary improvements or replacements in order that it can be certified as suitable for use in accordance with 'CIRIA 736 Containment systems for the prevention of pollution, secondary, tertiary and other measures for industrial and commercial premises'.

Although the historic and redundant underground tanks will be decommissioned, the plan is for the continued operation of the site, employing suitable and sufficient infrastructure and operational procedures to remove the existing and minimise any potential future pollution risk. Therefore, no further decommissioning is proposed at this stage, although where required, due consideration will be given to the potential for pollution to exist and the possibility of improvements to be made during the decommissioning of any old infrastructure.

11. Reference Data and Remediation

No further information or reference data is currently available. However, detailed records of works to remove the redundant underground tanks, remedial works to remove gross contamination, and improvements to the existing site infrastructure as required will be documented in full as they are undertaken.

12. Statement of Site Condition

The Baseline Site Condition Report and Environmental Assessment Report prepared by BWB Consulting have confirmed levels of soil and groundwater contamination beneath the site from historical fuel storage operations.

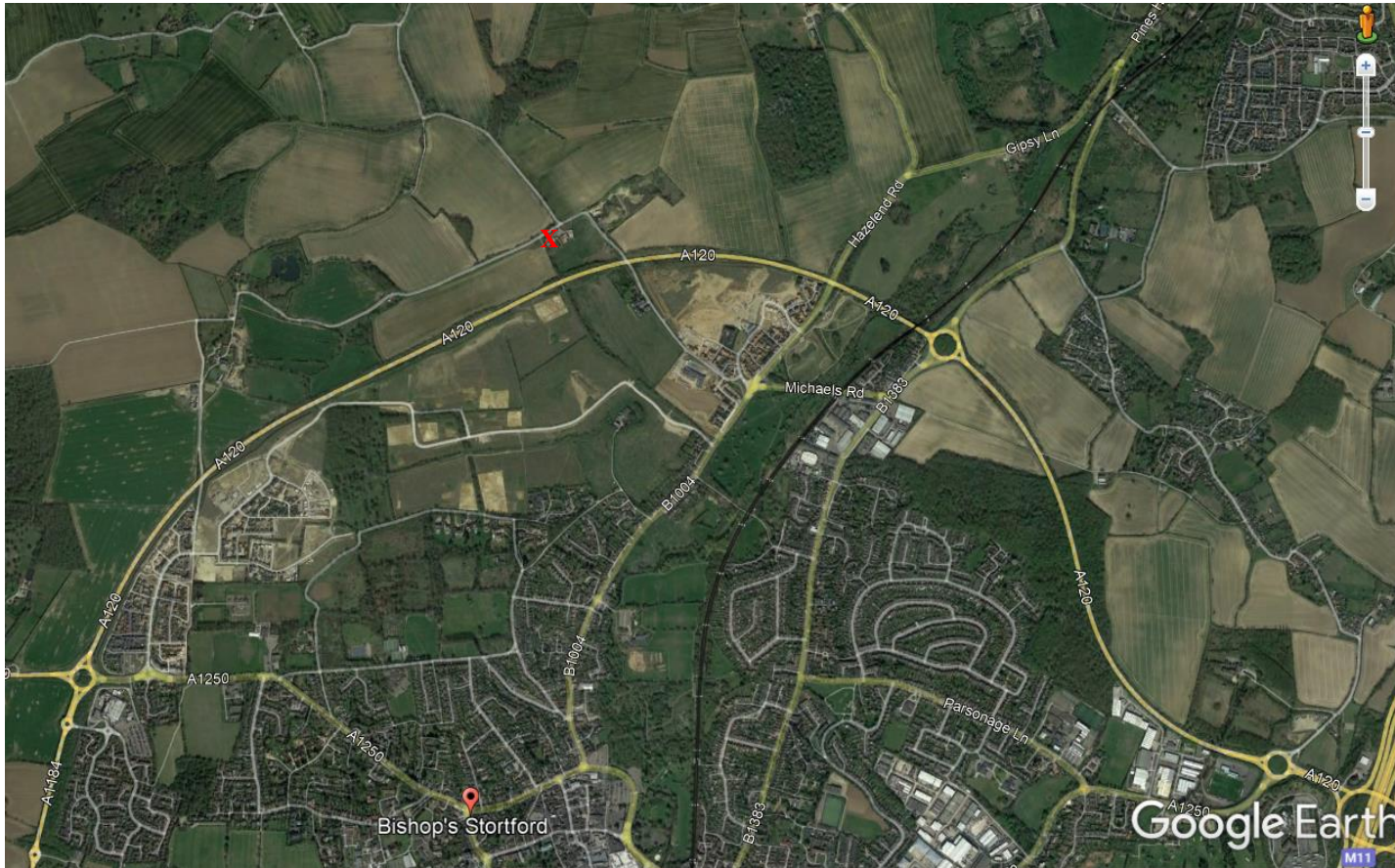
Improvements through the removal of historic underground tanks and the remediation of gross contamination are proposed, along with the upgrading of the existing site infrastructure where required, in advance of the operation of the installation as a waste oil storage depot.

The results of testing subsequent to the removal of the historic underground tanks will form the basis of the site condition going forward.

FIGURES

The general site location and the installation boundary are shown in Figures 1 and 2.

Figure 1 Location of the Bishop's Stortford Oil Storage Depot



Imagery in Figure 1 courtesy of Google Earth 2021
Red 'X' denotes site location

APPENDIX A
BWB Consulting
Baseline Site Condition Report

ENVIRONMENT

Oil Salvage Ltd
Butler Fuels, Farnham Road
Bishop Stortford

Baseline Site Condition Report

ENVIRONMENT

Oil Salvage Ltd
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Baseline Site Condition Report

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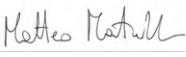


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September 2021

DOCUMENT ISSUE RECORD

Document Number:	BFFR-BWB-ZZ-XX-RP-YE-0003-BSCR
BWB Reference:	NTG2113

Revision	Date of Issue	Status	Author:	Checked:	Approved:
P1	September 2021	Final	Matteo Marteddu BSc MSc FGS	Chris Rhodes BSc MSc FGS	Tim Hull BSc MSc CGeol FGS SiLC SQP
					

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY	
Site Address	Former Butler Fuels Site, Farnham Road, Bishop's Stortford, CM23 1JB
Site Setting	The site is currently occupied by a disused oil storage depot located on Farnham Road, on the outskirts of Bishop Stortford. A small one storey office building is present in the north of the site, with fuel pumps and a gantry in the centre of the site and an above ground tank farm in the south of the site. Two 45,000 litre underground storage tanks (USTs) were indicated to be present in the south of the site. Bourne Brook is an ephemeral water course which flows along the northern and western site boundary following heavy rainfall events.
Site History	Historically, the site has remained undeveloped until the 1960s when a small building is mapped in the north of the site. From 1974 the site appears in its current layout with the office building in the north and tanks towards the south. A former quarry located 125m northeast has subsequently been used as a landfill site.
Published Ground Conditions	The site is underlain by superficial Head Deposits (clay, silt, sand and gravel). The underlying bedrock geology is indicated to comprise undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations. The Head deposits are categorised by the Environment Agency as undifferentiated Secondary Aquifers. The underlying Chalk is classified as a Principal Aquifer. The site lies within a Zone 1 Source Protection Zone centred around a potable groundwater abstraction 890m southeast.
Site Investigation	Ground investigation has identified limited Made Ground (typically less than 0.5m) over cohesive Head Deposits proven to between 3.9m and 5.5m bgl, overlying chalk. Deeper Made Ground with abundant waste was identified in one location in the west of the site, possibly reflective of imported waste materials used to raise site levels. Groundwater levels were recorded between 4.63m and 5.9m bgl or 58.03m to 59.12m above ordnance datum (AOD), with flow tentatively indicated to flow in a northerly or easterly direction.
Ground Conditions Encountered	Ground investigation has identified limited Made Ground (typically less than 0.5m) over cohesive Head Deposits proven to between 3.9m and 5.5m bgl, overlying chalk. Deeper Made Ground with abundant waste was identified in one location in the west of the site, possibly reflective of imported waste materials used to raise site levels. Groundwater levels within the Principal Aquifer were recorded between 4.63m and 5.9m bgl or 58.03m to 59.12m above ordnance datum (AOD), with flow tentatively indicated to flow in a northerly or easterly direction.
This summary should be read in conjunction with BWB's full report (ref. BFFR-BWB-ZZ-XX-RP-YE-0003-BSCR) and reflects an assessment of the Site based on information received by BWB at the time of production.	

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Drawing 1: Exploratory Hole Locations Plan

APPENDICES

Appendix 1: Exploratory Hole Logs

Appendix 2: Ground Gas and Groundwater Monitoring Results

Appendix 3: Soil Chemical Analysis Results

Appendix 4: Groundwater Chemical Analysis Results

Appendix 5: Water Quality Parameter Sheets

1. INTRODUCTION

Instruction

- 1.1 BWB Consulting (BWB) was instructed by Oil Salvage Ltd (the Client) to carry out a Baseline Site Condition Report. to produce a Baseline Site Condition Report for the site known as Butler Fuels, Farnham Road, Bishop's Stortford. Details of the project brief are included in BWB proposal reference 20200603/R3/0001/NTG2113/RTR/KES dated June 2020.
- 1.2 It is understood that the Client is considering purchasing the site with the intent of utilising it as a waste oil transfer station. Should the purchase proceed, a Baseline Site Condition Report is required to be submitted to the Environment Agency in order for the Client to gain an environmental permit for site in accordance with the Environmental Permitting (England and Wales) Regulations 2016 (EPR).

Previous Reports

- 1.3 The following geo-environmental reports for the site have previously been completed by BWB for the client:
- 'Risk Register' by BWB for Oil Salvage Ltd, reference BFFR-BWB-ZZ-XX-RP-YE-0001-RR, July 2020; and
 - 'Environmental Assessment Report' by BWB for Oil Salvage Ltd, reference BFFR-BWB-ZZ-XX-RP-YE-0002_EAR, dated July 2020.
- 1.4 It is understood that the Client has reliance on the above reports and therefore pertinent information has been used within this report.

Objectives

- 1.5 The objectives of the Baseline Site Condition Report include the following:
- Confirm the environmental setting at the site, including the geology, hydrogeology and hydrology;
 - To review existing site investigation and remediation information available for the site; and

Scope of Works

- 1.6 The ground investigation scope of works had been completed between 18th and 19th June 2020 and comprised the following:
- Non-intrusive survey of excavation locations for underground utilities;
 - Five dynamic sampler borehole to depths of between 7m and 8m below ground level (bgl);
 - One hand pit to a depth of 0.8m;
 - Five subsequent gas and groundwater monitoring visits; and

- Chemical analysis of soils and groundwater.

2. THE SITE

Site Location

- 2.1 The site is located at Farnham Road, Bishops Stortford located at National Grid reference 548581 223459. The location of the site is shown in **Figure 2:1**.

Figure 2:1: Site Location Plan



- 2.2 A site walkover was completed on 10 June 2020 by BWB. The site comprised a disused oil storage depot located on the outskirts of Bishop Stortford. The site forms a roughly rectangular shaped plot of land and is relatively flat at an elevation of c. 64m above ordnance datum (AOD).
- 2.3 The entrance to the site is along the northern boundary off Farnham Road. A small one storey office building is present in the north of the site, with fuel pumps and a gantry in the centre of the site and an above ground tank farm in the south.
- 2.4 Two 45,000 litre underground storage tanks (USTs) were indicated to be present in the south of the site as indicated on a site drawing and presence of manhole covers. The above ground storage tank (AST) farm comprised seven 55,000 litre tanks utilised for kerosene, gas oil and diesel oil. A small brick bund was present around the base of the ASTs. A 2,500 litre kerosene heating oil tank was located along the northwestern boundary.
- 2.5 A two-stage interceptor drain was present along the western site boundary receiving drainage from both the AST bund and the refilling point under the gantry. The interceptor subsequently drained into the stream along the western boundary. At the

time of the ground investigation, shortly after a heavy rainfall event, the interceptor was noted to be inundated, with both chambers full and surface water pooling in the refilling point. It is not clear whether the interceptor drainage is damaged or simply inadequate to handle the volumes of surface water run off.

- 2.6 A septic tank was noted to be actively pumping treated sewage into Bourne Brook to the west.
- 2.7 The majority of the site was covered in hardstanding with small areas of soft landscaping present along the southern and eastern boundaries. Trees were present around the majority of the site boundary.
- 2.8 Water sampling pipework, oxygen release compounds and slow release socks were observed on site, indicating groundwater remedial works have been undertaken in the past. Several boreholes were noted during the walkover with a number present in clusters and of variable diameter suggesting varying uses. It was hypothesised that they had been used for initial ground investigation (50mm diameter well) and subsequent treatment (125mm wells). Groundwater levels were recorded at a number of locations during the walkover indicating resting groundwater levels to be between circa 5 and 6m below ground level (bgl).
- 2.9 Surrounding land use is largely agricultural, with Bourne Brook present along the western and northern boundary (c. 1-2m below the level of the site), and a storage facility/warehouse located to the east.

3. PUBLISHED GROUND CONDITIONS

Published Geology

- 3.1 BGS mapping indicates that the site is underlain by superficial Head Deposits (clay, silt, sand and gravel). The underlying bedrock geology is indicated to comprise undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations.
- 3.2 BGS borehole logs mapped 100m south of the site recorded ground conditions to comprise head deposits to between 3.75m and 4.75m bgl overlying chalk. The Head deposits were recorded as soft to stiff silty sandy clay with increased gravels at depth. The thickness of Head deposits was reduced/ absent with increased distance from Bourne Brook.
- 3.3 Five pollution incidents are listed between 165m and 290m north east relating to tyres, metal waste, household waste and commercial waste indicated to have a minor impact on land quality. These are likely related to the landfill site.

Hydrogeology

- 3.4 The Head deposits are categorised by the Environment Agency as undifferentiated Secondary Aquifer. The underlying Chalk is classified as a Principal Aquifer.
- 3.5 The site lies within a Zone 1 Source Protection Zone (SPZ) – Inner Catchment. The inner catchment covers a large area of land extending to over 1.5km to the north east.
- 3.6 The nearest groundwater abstraction is listed 890m south east of the site and is for potable purposes. It is likely that this abstraction forms the centre of the SPZ.
- 3.7 A discharge consent is listed 360m south east issuing to groundwater relating to treated sewage effluent.
- 3.8 Groundwater strikes recorded in the historical off site BGS boreholes were recorded as seepages at between 8m and 8.3m.

Hydrology

- 3.9 The closest mapped surface water feature to the site is Bourne Brook which is present along the northern and western site boundaries. It is understood that Bourne Brook is an ephemeral water course which only flows following heavy rainfall (c. 10% of the year). Based on the anticipated depth to groundwater (c. 6m bgl), and the elevation of Bourne Brook (c. 2m below site level), it is considered that Bourne Brook is not in continuity with the groundwater in the Chalk Aquifer.
- 3.10 The site holds an active discharge consent issuing treated effluent into Bourne Brook. No further active discharge consents are listed as issuing into Bourne Brook within 500m of the site.
- 3.11 There are no other surface water receptors within 1km of the site.

Site History

On site

- 3.12 The site has remained undeveloped from the earliest mapping (1876) until 1950. From 1960, a small building is present in the north of the site. 1974 mapping shows the site in its current layout with the office building in the north and tanks towards the south.

Off site

- 3.13 The surrounding land use is largely agricultural from the earliest mapping with Bourne Brook immediately north and west of site, with Farnham Road 40m north and an old chalk pit 125m north east. 1921 plans indicate a building mapped immediately north east of the site, with the chalk pit to the north east no longer referred to as 'old'. Between 1950 and 1981, the chalk pit is expanding and is referred to as a Lime Quarry from the 1970s. The site immediately north east is described as a depot from 1974 plans, and the A120 is mapped 100m south from 1978.
- 3.14 Only from 2020 is the quarry to the north east described as The Old Lime Works.

Mining

- 3.15 The Groundsure Report confirmed that two former mines are present in close proximity to the site, Foxdells Chalk Pit, also known as The Old Lime Works and Stortford Lime Works, located between 160m and 270m north east of site adjacent to each other. These entries correlate with the quarrying observed in the historical mapping review.
- 3.16 There is no indication that mining has occurred at the site.

Landfill

- 3.17 The aforementioned opencast quarry sites have subsequently been utilised as a single landfill site covering both quarries, with the Groundsure Report indicating that the landfill was operational between 1950 and 1994, and handled inert waste.
- 3.18 According to a due diligence report provided by the Client, a separate landfill license listed in the same location handled waste streams including cement & similar bonded asbestos, inert/non-hazardous/non-toxic construction/demolition materials, hardcore and rubble, and non-hazardous waste.
- 3.19 Given the location, the landfill sites may represent a source of leachate and elevated ground gasses which could migrate towards the site.

Ground Gas

- 3.20 The site is not located in an area where naturally elevated Radon is indicated to occur, as less than 1% of properties are above the Action Level.

- 3.21 The nearby landfill site could possibly represent a source of ground gas, as could any contamination within the underlying soils and groundwater.

4. ENVIRONMENTAL GROUND INVESTIGATION

- 4.1 Intrusive ground investigation works were undertaken between 18th and 19th June 2020. Following clearance of the investigation locations from buried services, the investigation comprised the advancement of five dynamic sampler boreholes (DS01 – DS05) to depths of 7-8m with installations of gas and groundwater monitoring wells in the Principal Aquifer, the advancement of one hand excavated pit (DS06) to a depth of 0.8m bgl, collection of environmental soil and groundwater water samples for chemical analysis at a UKAS and MCERTS accredited laboratory. Collection of coordinates and elevations of exploratory hole locations (including historic boreholes) was also undertaken during the sitework.
- 4.2 An exploratory hole location plan is presented as **Drawing 1**. BWB exploratory hole records are presented as **Appendix 1** and the post investigation gas and groundwater monitoring data is presented as **Appendix 2**.
- 4.3 The site investigation works were carried out in general accordance with BS5930:2015 'Code of Practice for Site Investigations' and BS10175:2011 'Investigation of Potentially Contaminated Sites'. Investigation locations were situated around the USTs and ASTs as the primary source of contamination at the site, whilst also maintaining good coverage across the site.

Soil Chemical Analytical Strategy

- 4.4 Selected soil samples collected from exploratory hole locations were sent to i2 Analytical (UKAS and MCERTS accredited) for chemical analysis. The following chemical analytical testing was undertaken:
- Ten soil samples tested for a soil suite (BWB Standard Suite) comprising arsenic, barium, beryllium, water soluble boron, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate (2:1 extract), total phenols, total cyanide, free cyanide, complex cyanide, fraction of organic carbon, pH, Polycyclic Aromatic Hydrocarbons (PAHs) (United States Environment Protection Agency priority 16 compounds) and Total Petroleum Hydrocarbons (TPH) C6-C40;
 - Ten soil samples tested for TPH speciated to the UK Criteria Working Group (TPHCWG) aliphatic and aromatic compounds;
 - Six soil samples for asbestos screening;
 - Six soil samples for asbestos quantification; and
 - Two soil samples tested for a suite of common leachable contaminants, namely arsenic, barium, beryllium, water soluble boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate (2:1 extract), sulphate, total cyanide and pH.
- 4.5 The results of the soil chemical testing are presented as **Appendix 3**.

Monitoring of ground gas and groundwater conditions

- 4.6 BWB have undertaken five ground gas and groundwater monitoring visits, the initial two separated by one week during the 26th July and 3rd July 2020, within subsequent visits undertaken on 23/24 December 2020, 9/10 December 2020, and 28/29 June 2021.
- 4.7 Five of the historic boreholes were also utilised for groundwater sampling across the site. With the absence of any borehole logs for these locations, they have been labelled HBH1 – HBH5 as shown on **Drawing 1**.
- 4.8 Groundwater samples were obtained during all monitoring visits from within the Principal Aquifer. Samples were obtained using a bailer following the removal of 3 times the well volume of water during the first two visits. During the latter three visits, groundwater samples were obtained using low flow sampling techniques to obtain a more representative sample of the groundwater. The groundwater samples were sent to i2 Analytical (UKAS and MCERTS accredited) for the following suite of groundwater chemical testing:
- Ten water samples tested for arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, conductivity, soluble sulphate, ammoniacal nitrogen, total phenols, total cyanide, pH, total organic carbon; and
 - Twenty water samples tested for PAHs (US EPA priority 16 compounds) and TPHCWG.
- 4.9 The latter three sampling visits were all scheduled for PAHs (US EPA priority 16 compounds) and TPHCWG.
- 4.10 The results of the water chemical testing are presented as **Appendix 4**. Water Quality Monitoring Parameter data sheets are presented in **Appendix 5**.

Limitations and Uncertainty

- 4.11 Accurate coordinates and ground level data could not be obtained for selected boreholes (DS02, DS04, HBH3 and HBH4) due to the presence of high trees interfering with GPS signal. Where this has occurred, coordinates have been estimated from online mapping websites, and ground levels estimated from topographical drawings.
- 4.12 DS06 encountered asbestos containing materials (ACMs) within the hand pit and was terminated for health and safety reasons. The arisings were dampened and reintroduced into the hole.

5. GROUND CONDITIONS ENCOUNTERED

Geological Summary

- 5.1 The ground conditions recorded confirmed the published geology comprising superficial Head Deposits and the underlying undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations, with the addition of superficial Made Ground deposits.
- 5.2 The recorded ground conditions are summarised in **Table 5:1** below. Uncorrected SPT results collected from the borehole locations are presented on the exploratory hole records presented in **Appendix 1**.

Table 5:1 : Summary of Ground Conditions

Stratum	Top Depth (m)		Base Depth (m)		Thickness (m)	
	Min	Max	Min	Max	Min	Max
Made Ground	Ground Level		0.30	>0.80	0.30	>0.80
Head Deposits	0.30	0.45	3.90	5.50	3.60	5.10
Lewes Nodular Chalk Formation and Seaford Chalk Formation	3.90	5.50	>7.00	>8.00	>1.70	>4.10

Geological Descriptions

Made Ground

- 5.3 Made Ground was encountered within all exploratory holes with thicknesses ranging between 0.3m and >0.8m.
- 5.4 In the south of the site, Made Ground was relatively thin, predominantly comprising occasionally clayey gravelly sand. Concrete was encountered in DS01 (0.1m - 0.2m), DS02 (0 – 0.3m), DS04 (0 – 0.3m), DS05 (0 – 0.2m) and DS06 (0 – 0.08m).
- 5.5 Made Ground was only encountered in excess of 0.45m in one location; DS06, where it was recorded in excess of 0.8m. Under the concrete in this location there was sandy gravel over a layer of large concrete and brick boulders to a depth of 0.4m. Below this, the Made Ground was recorded as soft gravelly clay with inclusions (becoming abundant below 0.7m) of glass, wood, metal, fabric, rubber and possible ACMs.

Head Deposits

- 5.6 Head Deposits were recorded across the site, under the Made Ground (excluding DS06) to depths of between 3.9m and 5.5m bgl. The depth of the Head deposits was slightly increased in the southeast (DS02 and DS04), however, this is likely representative of the typically undulating topography of the surface of the underlying chalk.
- 5.7 The Head Deposits were commonly encountered as firm to stiff light brown clay typically with minor gravel, silt and sand fractions, over a very soft to firm greenish grey gravelly clay at between 3m and 3.5m bgl. At DS05, the initial light brown horizon was not

encountered, with greenish grey slightly gravelly clay present from 0.3m to 4.1m bgl. At DS04, the soft greenish grey clay was only present to 1.8m bgl, with varying bands of very soft to soft light brown, orangish brown and greyish brown gravelly clay recorded to 5.3m bgl.

- 5.8 At the boundary with the underlying chalk, the Head Deposits were occasionally recorded as soft pale brown gravelly clay (DS02), or a light brown clayey sandy gravel (DS04).

Lewes Nodular Chalk Formation and Seaford Chalk Formation

- 5.9 The chalk was encountered underlying the Head Deposits in all borehole locations and was described as white gravelly putty chalk with occasional grey staining. Gravels were recorded as subangular chalk and rounded to angular flint.
- 5.10 The chalk was proven to depths in excess of 8m bgl.

Hydrogeology

- 5.11 During the ground investigation, groundwater strikes were not readily observable due to the drilling techniques. During the initial two post investigation monitoring visits, groundwater levels were recorded between 4.63m and 5.9m bgl or 58.03m to 59.12m AOD within the Principal Aquifer.
- 5.12 Groundwater recharge rates were noted to be relatively poor during the groundwater sampling, with the majority of monitoring wells bailed dry and allowed to recharge prior to sampling.
- 5.13 Due to the difficulties encountered with obtaining accurate coordinates and ground levels across much of the site, only a limited number of data points were able to be used. Groundwater levels from DS03, DS05, HBH1 and HBH2 were used to infer the groundwater flow direction, with the indicative flow indicated to be to the north and east over the two monitoring visits. Considering the limited data points the flow direction is considered to be an estimate at this stage.

Hydrology

- 5.14 The levels of Bourne Brook were not measured; however, they were noted to be between 1m and 2m below the levels of the site. The brook was noted to be dry during the site walkover but flowing following heavy rainfall during the ground investigation. Based on the groundwater levels recorded the groundwater is not considered to be in continuity with water flow within Bourne Brook.
- 5.15 As discussed in the site walkover section, the outflow from the interceptor drain and the septic tank feed directly into Bourne Brook. Based on the drainage plans, it is likely that all surface water drainage feeds into the Brook, whether it is via standard drainage, the interceptor, or infiltrating through soft landscaping and migrating laterally across the top of the Head Deposits.

Contamination Observations During Intrusive Investigations

- 5.16 A summary of the contamination observations and volatile vapour concentrations recorded using a photo ionisation detector (PID) (calibrated against isobutylene) noted during the intrusive investigation works are summarised in **Table 5:2** below.

Table 5:2: Summary of Contamination Observations

Location	Depth (m bgl)	Observations	PID Concentration (ppm)
DS01	3.5 – 4.3	Hydrocarbon odour	183
	4.3 – 5.0	Mild hydrocarbon odour and grey staining	20
	5.0 – 6.0	Mild hydrocarbon odour with less grey staining	-
	6.0 -8.0	Strong hydrocarbon odour	289
DS02	3.5 – 3.9	Hydrocarbon odour	132
	4.9 – 5.1	Grey staining and hydrocarbon odour	-
	5.3 – 6.0	Grey staining and hydrocarbon odour	16.1
	6.0 - 7.0	Faint hydrocarbon odour	345
DS03	3.0 – 3.9	Hydrocarbon odour	125
	3.9 – 8.0	Grey staining and mild hydrocarbon odour	17.7 at 4.5m 236 at 7.5m
DS04	3.3 – 4.0	Hydrocarbon odour and black staining at 3.9 – 4.0m	0
	4.3 – 4.4	Black staining	1
	5.5 – 8.0	Grey staining and hydrocarbon odour. Strong hydrocarbon odour below 6.0m	363
DS05	2.0 – 2.5	Faint hydrocarbon odour	253 at 2.5m
	2.5 – 4.1	Hydrocarbon odour	411 at 4.2m
	4.6 – 8.0	Hydrocarbon odour and occasional grey staining	114
DS06	0.5	Made Ground with inclusion of waste	8.6
	0.8	Made Ground with abundant inclusion of waste	14.2

- 5.17 The observations identified hydrocarbon contamination roughly at the interface between the Head Deposits and underlying Chalk, with increased contamination odours and PID readings noted below 6m, associated with impact in the groundwater.

Observations during monitoring visits

- 5.18 During the initial two monitoring visits, the oil/water interface metre was inconsistent at recording light non-aqueous phase liquids (LNAPL), also referred to as free phase product, within each monitoring well. This can be caused following the introduction of an oxygen releasing compound into the groundwater which can emulsify the free

phase contamination and affect the readings. Due to the issues with the interface meter, the product thicknesses were also measured by the observed thicknesses within the bailer. A summary of the LNAPL thicknesses is presented in **Table 5:3**.

Table 5:3: Summary of LNAPL Observations

Location	LNAPL - Interphase meter readings (mm)					LNAPL – Bailer Observations (mm)				
	GW1	GW2	GW3	GW4	GW5	GW1	GW2	GW3	GW4	GW5
DS01	NR	<10	NR	30	10	700	400*	NR	30	10
DS02	NR	70	NR	110	NR	100	100*	NR	110*	10*
DS03	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
DS04	310	10	NR	160	NR	NR	160	NR	160*	30
DS05	NR	60	NR	110	70	NR	50	NR	120*	70*
HBH1	10	NR	NR	NR	NR	NR	NR	NR	NR	NR
HBH2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
HBH3	NR	<10	NR	10	10	30	50	NR	10	10
HBH4	<10	NR	NR	NR	NR	NR	NR	NR	NR	NR
HBH5	10	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR = None recorded. * Does not include foamy emulsion between LNAPL and groundwater.

6. GROUNDWATER AND GAS MONITORING VISITS

Ground Gas Monitoring Results

- 6.1 Ground gas monitoring has been undertaken during the first two visits to assess the risks associated with ground gases and volatile vapours to new buildings and their occupants. As the monitoring programme targeted mainly groundwater, gas concentrations associated with shallow deposits (principally Made ground) have not been assessed, although no significant organic matter has been identified at shallow depth that would suggest shallow soils would give rise to a significant gas generation concern.
- 6.2 The concentrations recorded for borehole flow, oxygen, carbon dioxide and methane are summarised below in **Table 6:1**. The full ground gas monitoring results are presented in **Appendix 2**.

Table 6:1: Summary of Recorded Ground Gas Results

Borehole ID	Targeted Geology	Steady Flow (l/hr)		Carbon Dioxide (%v/v)		Methane (%v/v)	
		min.	max.	min.	max.	min.	max.
DS01	Chalk	<0.1	<0.1	13.9	14.3	4.3	5.3
DS02		<0.1	<0.1	6.3	9.9	8.9	18.4
DS03		<0.1	<0.1	7.3	14.4	<0.1	<0.1
DS04		<0.1	<0.1	2.0	5.3	27.7	42.0
DS05		<0.1	<0.1	4.0	13.9	13.7	41.8

- 6.3 The atmospheric pressures were recorded at 1004mB and 1007mB, with regional trends over the previous 12 hours indicated to have been falling.
- 6.4 Hydrogen sulphide concentrations were not recorded above the limit of detection of the equipment during the monitoring visits. Carbon monoxide concentrations were recorded at a maximum of 33ppm during the first visit, and 10ppm during the second visits.
- 6.5 PID concentrations were recorded between <0.4ppm and a maximum of 125ppm in DS01 during the second monitoring visit.

Soil Contaminant Distribution

- 6.6 The soil chemical laboratory results are presented as **Appendix 3**.

Made Ground

- 6.7 Generally low levels of heavy metals were recorded in the Made Ground, with concentrations all appearing in a similar order of magnitude. Slightly elevated lead was recorded at DS02 (890mg/kg at 0.4m), DS05 (410mg/kg at 0.25m), and DS06 (420mg/kg – 0.8m), with marginally elevated copper (870mg/kg) and zinc (1,900mg/kg) at DS06 (0.8m).

6.8 Slightly elevated Total TPH was recorded at DS03 (580mg/kg at 0.2m) and DS06 (1,200mg/kg at 0.8m). Elevated Total PAH was recorded in most Made Ground samples with a maximum of 105mg/kg recorded at DS02 (0.4m).

6.9 Asbestos has been recorded in all six samples of Made Ground tested, the results are summarised in **Table 6:2**. Across much of the site, the quantity of asbestos is either below, or around, the limit of detection (<0.001%), however, two types of asbestos have been recorded in the Made Ground at DS06 constituting nearly 10% of the material analysed.

Table 6:2: Asbestos Testing Results

Location	Depth	Asbestos Type	Asbestos Quantification (%)
DS02	0.40	Chrysotile - Hard/Cement Type Material & Loose Fibres	0.002
DS03	0.20	Amosite - Loose Fibres	< 0.001
DS01	0.30	Chrysotile - Loose Fibrous Debris	0.006
DS06	0.50	Chrysotile & Amosite - Loose Fibres	< 0.001
DS06	0.80	Chrysotile & Crocidolite - Hard/Cement Type Material & Insulation Board/Tile	9.85
DS05	0.25	Chrysotile - Loose Fibres	< 0.001

6.10 Leachate analysis was undertaken on the Made Ground samples obtained from DS06. Results are presented in Appendix 3, with a summary of the recorded concentrations is presented in **Table 6:3**.

Table 6:3: Summary of Leachate Exceedances

Contaminant	Range of Concentrations
Copper	5.9 – 6.8
Lead	2.9 – 6.0
Nickel	1.5 – 5.0
Zinc	19.0 – 56.0

Natural Soils

6.11 Eight samples from the Head Deposits and three from the chalk were scheduled for analysis. Low concentrations of heavy metals were recorded in both strata, at a similar order of magnitude.

6.12 Slightly elevated total TPH was recorded in several locations, with only one sample where total TPH was recorded above 500mg/kg (790mg/kg at 4.2m in DS05). Relatively low concentrations of speciated TPH were recorded in the natural soils, with a maximum Aliphatic C5-35 of 600mg/kg (4.2m in DS05) and Aromatic C5-35 of 460mg/kg (DS01 at 3.9m), both within the Head Deposits. The TPH fractions were both short and long chain, with Aliphatic in the C6-35 range and Aromatic in the C8-35 range. TPH concentrations in the chalk were noted to be either below the limits of detection, or marginally above them.

- 6.13 Concentrations of ethylbenzene (16µg/kg) and xylene (75µg/kg) were recorded at 5.9m in DS02, located immediately adjacent to the USTs.
- 6.14 PAH concentrations within the natural soils were all below the limits of detection

Groundwater

- 6.15 Five rounds of groundwater sampling have been undertaken at the site. Some tests could not be conducted due to the presence of trace concentrations of LNAPL within the samples interfering with the analysis process. These test results are labelled US on the lab report (**Appendix 4**).
- 6.16 Low concentrations of heavy metals were recorded during the first round of groundwater sampling. Marginally elevated localised arsenic (max 43.1µg/l at HBH1), nickel (max 120µg/l at HBH3) and zinc (max 15µg/l at DS05) concentrations were recorded. Heavy metal analysis was not conducted after the first monitoring visit.
- 6.17 Elevated Total PAH has been recorded in the groundwater samples also, with the most significant impact recorded in recently installed BWB wells (DS01 to DS05) (**Table 6:4**). Speciated analysis indicates that naphthalene, fluorene and phenanthrene are more elevated than the other PAH compounds.

Table 6:4: Summary of Groundwater Chemical Testing Results – Total PAH

Location	Total PAH (µg/l)				
	Rd 1	Rd 2	Rd 3	Rd 4	Rd 5
DS01	6,370	1,080	22.1	5.63	48.3
DS02	5,430	250	84	158	114
DS03	233	2320	1,970	4.97	26.9
DS04	112	215,000	68.1	23.9	133
DS05	2,120	6,810	2,060	185	137
HBH1	286	44.3	33.6	18.3	16.8
HBH2	16.1	10.2	< 0.16	2.41	1.16
HBH3	96.4	3210	68.6	20.9	28.1
HBH4	201	36.0	22.2	210	483
HBH5	22.4	456	22.6	8.47	7.87

- 6.18 Significantly elevated hydrocarbons and BTEX have been recorded in the groundwater with a summary of TPH concentrations presented in **Table 6:5** and BTEX presented in **Table 6:6**.

Table 6:5: Summary of Groundwater Chemical Testing Results - TPH

Location	Round 1 (mg/l)		Round 2 (mg/l)		Round 3 (mg/l)		Round 4 (mg/l)		Round 5 (mg/l)	
	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35
DS01	15,000	3,400	200	78	12	5.1	<0.01	2.7	100	16
DS02	180,000	49,000	260	100	11	6.6	160	150	68	9.4
DS03	25	7.3	190	100	4,200	1,200	<0.01	5	32	7.8
DS04	1,000	110	99,000	34,000	61	21	3	3.9	100	38
DS05	390	170	860	420	1,400	660	110	120	85	21
HBH1	22	5	17	8.4	7.4	5.7	53	54	50	10
HBH2	19	6	23	12	0.55	0.75	0.85	1.2	1.5	0.45
HBH3	38	11	190	99	2	2.3	1.9	5.4	8.2	4
HBH4	130	56	51	12	2.6	2.4	650	190	430	50
HBH5	11	2.9	88	38	5.1	4.1	14	9.2	3.2	2.4

Table 6:6: Summary of Groundwater Chemical Testing Results - BTEX

Loca tion	Benzene (µg/l)					Toluene (µg/l)					Ethylbenzene (µg/l)					Xylene (µg/l)				
	Rd 1	Rd 2	Rd 3	Rd 4	Rd 5	Rd 1	Rd 2	Rd 3	Rd 4	Rd 5	Rd 1	Rd 2	Rd 3	Rd 4	Rd 5	Rd 1	Rd 2	Rd 3	Rd 4	Rd 5
DS01	< 1.0	< 1.0	4.4	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	387	< 1.0	<1.0	2.1	1,240	1540	44.6	<1.0	6.3
DS02	578	< 1.0	42.6	<1.0	< 1.0	< 1.0	< 1.0	9.9	<1.0	< 1.0	22,000	2,600	16.4	<1.0	< 1.0	37,700	5,640	739	66.5	71.2
DS03	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0
DS04	< 1.0	927	5.3	<1.0	< 1.0	< 1.0	2,220	< 1.0	<1.0	< 1.0	4,350	24,000	78.9	<1.0	< 1.0	19,340	50,400	760.9	<1.0	300.8
DS05	48.2	< 1.0	130	67.6	90.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	99.8	228	<1.0	< 1.0	< 1.0	260	71.6	18.1	32.2
HBH1	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	7.4	<1.0	5.0	< 1.0	< 1.0	12.5	<1.0	8.1
HBH2	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0
HBH3	55.1	70.7	112	27.8	54.3	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	14	187	8.8	<1.0	< 1.0	96.5	820	98.4	9.2	14.2
HBH4	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0
HBH5	< 1.0	< 1.0	11.2	1.5	< 1.0	< 1.0	< 1.0	< 1.0	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	< 1.0

6.19 The most significant hydrocarbon impact has been observed within the newly installed boreholes, with lower concentrations recorded in the historic boreholes.

7. CONCLUSIONS

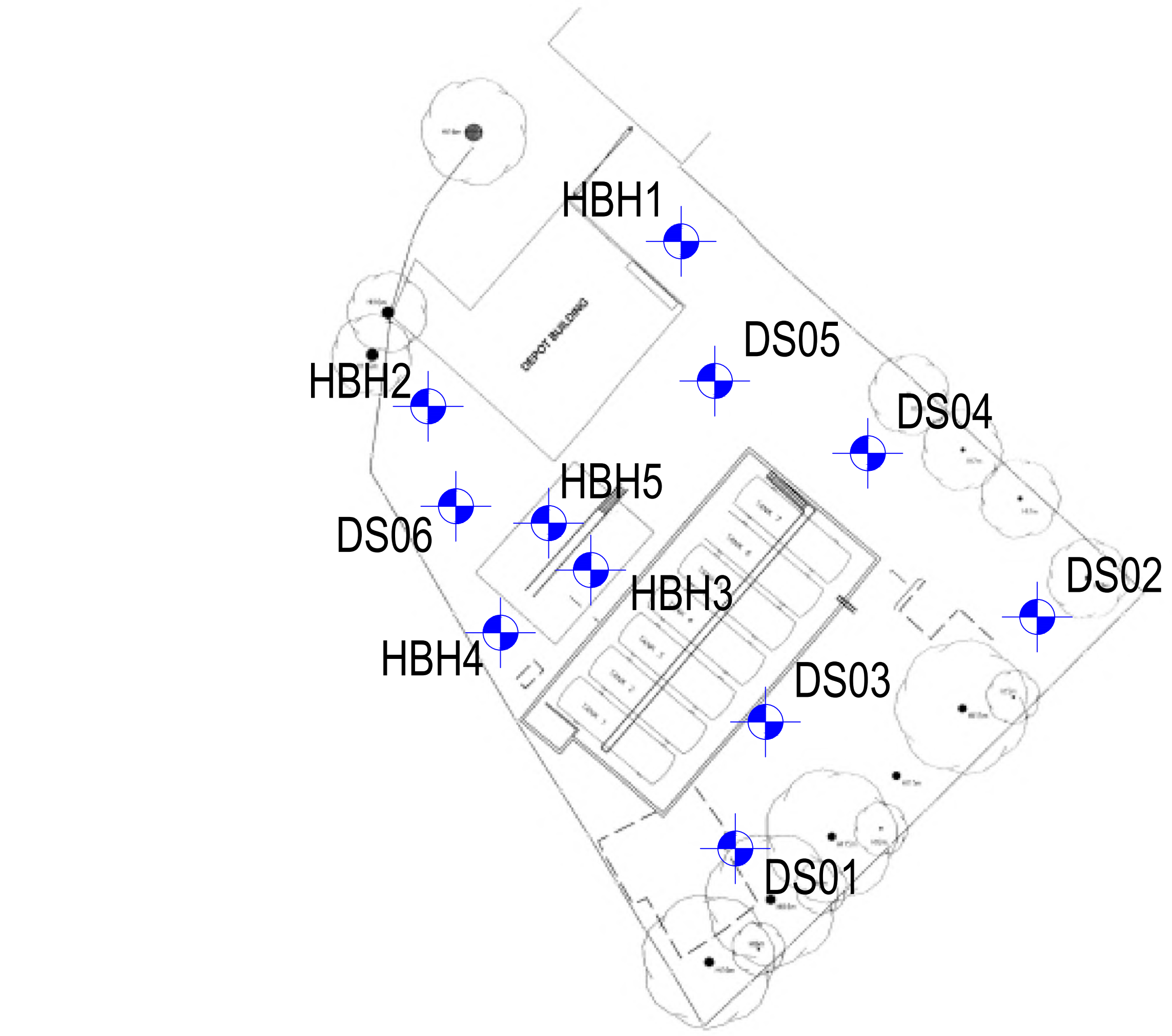
- 7.1 The site is currently occupied by a disused oil storage depot located on Farnham Road, on the outskirts of Bishop Stortford. A small one storey office building is present in the north of the site, with fuel pumps and a gantry in the centre of the site and a tank farm in the south of the site. Two 45,000 litre underground storage tanks (USTs) were indicated to be present in the south of the site. Bourne Brook is an ephemeral water course which flows along the northern and western site boundary following heavy rainfall events.
- 7.2 The site is underlain by superficial Head Deposits (clay, silt, sand and gravel). The underlying bedrock geology is indicated to comprise undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations. The Head deposits are categorised by the Environment Agency as undifferentiated Secondary Aquifers. The underlying Chalk is classified as a Principal Aquifer. The site lies within a Zone 1 Source Protection Zone centred around a potable groundwater abstraction 890m southeast.
- 7.3 Historically, the site has remained undeveloped until the 1960s when a small building is mapped in the north of the site. From 1974 site appears in its current layout with the office building in the north and tanks towards the south. A former quarry located 125m northeast has subsequently been used as a landfill site.
- 7.4 Ground investigation has identified limited Made Ground (typically less than 0.5m) over cohesive Head Deposits proven to between 3.9m and 5.5m bgl, overlying chalk. Deeper Made Ground with abundant waste was identified in one location in the west of the site, possibly reflective of imported waste materials used to raise site levels. Groundwater levels were recorded between 4.63m and 5.9m bgl or 58.03m to 59.12m AOD.
- 7.5 Preliminary gas monitoring has recorded elevated carbon dioxide, methane and VOC vapours at the site, emanating from the contaminated soils and groundwater at concentrations which represent a risk to future site users.
- 7.6 Contaminant levels within the soils are not indicated to represent a risk to future site users in the context of a commercial end use. However, asbestos has been recorded in all Made Ground samples.
- 7.7 Relatively low leachate concentrations in the Made Ground have been recorded.
- 7.8 High concentrations of hydrocarbons and LNAPL have been recorded in the groundwater,

8. REFERENCES

1. British Standards Institution, (BSI), BS 8485:2015, Code of Practice for the characterization and remediation from ground gas in affected developments
2. British Standards Institution, (BSI), BS 8576:2013, Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)
3. British Standards Institution, (BSI), BS 10175:2011+A2:2017, Investigation of Contaminated Sites – Code of Practice
4. British Standards Institution, (BSI), BS5930:2015) Code of practice for ground investigations
5. British Standards Institution, (BSI), BS EN 1997-2:2007 Incorporating corrigendum June 2010, Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and testing.
6. Building Research Establishment Special Digest 1 *Third Edition*. Concrete in Aggressive Ground (2005)
7. Construction Industry Research and Information Association (CIRIA). 2007, Report C665, Assessing Risk Posed by on Hazardous Ground Gases to Buildings
8. Department for Communities and Local Government (DCLG), 2012, National Planning Policy Framework.
9. Department for Environment Food and Rural Affairs (DEFRA), 2012, Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.
10. Environment Agency report Land Contamination Risk Management, 2020.
11. Environment Agency 2008, Human health toxicological assessment of contaminants in soil Science Report – SC050021/SR2
12. Environment Agency, 2006, Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination
13. Health and Safety Executive (HSE) 'Protection of workers and the general public during the Development of Contaminated Land (1991).

DRAWINGS

Drawing 1: Exploratory Hole Location Plan



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

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Client
 Oil Salvage Ltd

Project Title
 Farnham Road, Bishop's Stortford

Drawing Title
 Indicative Exploratory Hole Location Plan

Drawn:	CR	Reviewed:	
BWB Ref:	NTG2113	Date:	July 2020
Scale:	A3	NTS	
Drawing Status			
Final			
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev	
BFFR-BWB-ZZ-XX-DR-YE-0001	S1	P1	

APPENDICES

Appendix 1: Exploratory Hole Logs

BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS01	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.90		
	Project Number: NTG2113	Eastings: 548584.70		
	Client: Oil Salvage Ltd	Northings: 223425.61		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 18/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		63.90 (0.10)	Brown gravelly SAND with frequent rootlets. (Made Ground)	[Symbol]	0.10							
		63.70 (0.10)	Weak concrete. (Made Ground)	[Symbol]	0.20	ES7	0.30	0.30	PID	0.30	0ppm	
		63.50 (0.20)	Brown gravelly SAND. Gravel is fine to coarse angular to rounded quartzite flint, and brick. (Made Ground)	[Symbol]	0.40							
		63.30 (3.10)	Stiff light brown slightly gravelly slightly silty CLAY with low cobble content. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits)	[Symbol]								
			<i>Slightly sandy at 2.8 - 3.0m.</i>									
		60.40 (0.80)	Soft to firm greenish grey gravelly CLAY. Gravel is fine to coarse angular to rounded flint and quartzite. Hydrocarbon odour. (Head Deposits)	[Symbol]	3.50	ES8	3.90	3.90	PID	3.90	183ppm	
		59.60 (3.70)	White gravelly putty chalk with grey staining and mild hydrocarbon odour. Gravel is fine to coarse subangular to rounded chalk and flint. (Lewes Nodular Chalk Formation And Seaford Chalk Formation) <i>Less staining below 5.0m.</i>	[Symbol]	4.30	ES9	4.90	4.90	PID	4.90	20ppm	
			<i>Strong hydrocarbon odour below 6m.</i>									
						D3	7.60	7.60	PID	7.60	289ppm	
		55.90	Hole Terminated at 8.00m bgl.		8.00							

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated at target depth.
Water Added			Groundwater Remarks: No groundwater encountered.
From (m bgl)	To (m bgl)	Volume (l)	Other Remarks: 1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits. 3. Coordinates and ground level could not be obtained and estimated from plans.



BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS02	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.80		
	Project Number: NTG2113	Eastings: 548614.00		
	Client: Oil Salvage Ltd	Northings: 223441.00		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 18/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		[0.20]	Concrete. (Made Ground)	[Pattern]	0.20							
		63.60 [0.10]	Weak concrete. (Made Ground)	[Pattern]	0.30							
		63.50 [0.15]	Light brown slightly clayey gravelly SAND. Gravel is fine to coarse angular to rounded brick, concrete, quartzite, flint and chalk. Occasional inclusion of metal and possible ACM. (Made Ground)	[Pattern]	0.45	ES1	0.40	0.40	PID	0.40	0.3ppm	
		63.35 [3.05]	Stiff friable light brown slightly gravelly slightly sandy CLAY. Gravel is fine angular chalk. Occasional carbonaceous flecks. (Head Deposits)	[Pattern]								
			<i>Slightly gravelly from 2.0m. Gravel is fine to coarse angular to rounded flint.</i>									
		60.30 [0.40]	Soft to firm greenish grey gravelly CLAY. Gravel is fine to coarse angular to rounded flint and quartzite. Hydrocarbon odour. (Head Deposits)	[Pattern]	3.50	ES2	3.70	3.70	PID	3.70	132ppm	
		59.90 [1.40]	Soft to firm pale brown gravelly CLAY. Gravel is fine to coarse subangular to angular chalk and occasional flint. (Head Deposits)	[Pattern]	3.90							
			<i>Grey staining and hydrocarbon odour at 4.9 - 5.1m.</i>									
		58.50 [1.70]	White putty chalk with grey staining and hydrocarbon odour. (Lewes Nodular Chalk Formation And Seaford Chalk Formation)	[Pattern]	5.30	ES3	5.90	5.90	PID	5.90	16.1ppm	
			<i>Faint hydrocarbon odour below 6.0m.</i>									
		56.80	Hole Terminated at 7.00m bgl.		7.00	D1	6.90	6.90	PID	6.90	345ppm	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated at target depth.
Water Added			Groundwater Remarks: No groundwater encountered.
From (m bgl)	To (m bgl)	Volume (l)	Other Remarks: 1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits. 3. Coordinates and ground level could not be obtained and estimated from plans.

BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS04	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.75		
	Project Number: NTG2113	Eastings: 548601.00		
	Client: Oil Salvage Ltd	Northings: 223454.00		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 19/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		63.35 (1.40)	Reinforced concrete. (Made Ground)	[Cross-hatch pattern]	0.30							
		63.45 (0.10)	Light brown and dark grey sandy GRAVEL. Gravel is fine to coarse angular to rounded flint, brick and quartzite. (Made Ground)	[X pattern]	0.40							
			Soft greenish greyish brown silty CLAY. (Head Deposits)	[Dotted pattern]								
		61.95 (0.90)	Soft light brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. (Head Deposits)	[X pattern]	1.80	ES10	1.50	1.50	PID	1.50	1ppm	
		61.05 (0.60)	Very soft orangish brown and white gravelly CLAY with low cobble content. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits)	[Dotted pattern]	2.70							
		60.45 (0.70)	Very soft greyish brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. Hydrocarbon odour. (Head Deposits)	[X pattern]	3.30	ES11	3.50	3.50	PID	3.50	0ppm	
		59.75 (1.30)	Very gravelly and black stained at 3.9 - 4.0m Soft light brown slightly sandy very gravelly CLAY. Gravel is fine to coarse angular flint and chalk. (Head Deposits) <i>Black staining in sandy clayey gravel band at 4.3 - 4.4m.</i>	[X pattern]	4.00	ES12	4.30	4.40	PID	4.30	1ppm	
		58.45 (0.20)	Light brown clayey sandy GRAVEL. Gravel is fine to coarse angular to rounded chalk and flint. (Head Deposits)	[X pattern]	5.30							
		58.25 (2.50)	White gravelly putty chalk with grey staining and hydrocarbon odour. Gravel is fine to coarse subangular to rounded chalk and flint. (Lewes Nodular Chalk Formation And Seaford Chalk Formation) <i>Strong hydrocarbon odour below 6m.</i>	[Horizontal lines]	5.50							
		55.75	Hole Terminated at 8.00m bgl.		8.00	D4	7.50	7.50	PID	7.50	363ppm	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated at target depth.
Water Added			Groundwater Remarks: No groundwater encountered.
From (m bgl)	To (m bgl)	Volume (l)	Other Remarks: 1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits. 3. Coordinates and ground level could not be obtained and estimated from plans.



BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS05	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.83		
	Project Number: NTG2113	Eastings: 548583.70		
	Client: Oil Salvage Ltd	Northings: 223458.10		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 19/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (Blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		0.20	Concrete. (Made Ground)		0.20							
		63.63 (0.10) 63.53 (2.20)	Black clayey GRAVEL. Gravel is fine to coarse angular to rounded brick and flint. (Made Ground) Soft greenish grey slightly gravelly CLAY. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits) <i>Grey speckled to 0.5m.</i>		0.30	ES15	0.25	0.25	PID	0.25	5.6ppm	
			<i>Faint hydrocarbon odour from 2.0m.</i>									
		61.33 (1.60)	Soft to firm greenish grey very gravelly CLAY with hydrocarbon odour. (Head Deposits) <i>Gravelly below 3.5m.</i>		2.50	ES16	2.50	2.50	PID	2.50	253ppm	
		59.73 (0.50)	Very soft greyish brown, grey and white very gravelly CLAY. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits)		4.10	ES17	4.20	4.20	PID	4.20	411ppm	
		50.33 (3.40)	White gravelly putty chalk with occasional grey staining and hydrocarbon odour throughout. Gravel is fine to coarse subangular to rounded chalk and flint. (Lewes Nodular Chalk Formation And Seaford Chalk Formation) <i>Very gravelly from 4.8 - 4.9m.</i> <i>White below 5.5m.</i>		4.60							
			<i>White mottled pale brown from 7.0m.</i>									
		55.83	Hole Terminated at 8.00m bgl.		8.00	DS	7.80	7.80	PID	7.80	114ppm	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
Reason for Termination:			
Terminated at target depth.			
Groundwater Remarks:			
No groundwater encountered.			
Water Added			
From (m bgl)	To (m bgl)	Volume (l)	
Other Remarks:			
1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits.			

BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS06	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.68		
	Project Number: NTG2113	Eastings: 548566.69		
	Client: Oil Salvage Ltd	Northings: 223451.13		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 19/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		0.08 63.60 [0.22] 63.38 [0.10] 63.28 [0.30] 62.98 [0.10] 62.88	Concrete. (Made Ground) Light brown and greyish brown sandy GRAVEL, Gravel is fine to coarse angular to rounded flint, quartzite and chalk. (Made Ground) Boulders of concrete and brick. (Made Ground) Soft greyish brown gravelly CLAY. Gravel is fine to coarse angular to subangular brick, concrete and flint, Inclusions of glass and wood. (Made Ground) Soft greyish brown gravelly CLAY. Gravel is fine to coarse angular to subangular brick, concrete and flint. Abundant inclusions of glass, metal, material, rubber and possible ACMs. (Made Ground)		0.08 0.30 0.40 0.70 0.80							
						ES13	0.50	0.50	PID	0.50	8.6ppm	
						ES14	0.80	0.80	PID	0.80	14.2ppm	
Hole Terminated at 0.80m bgl.												

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated due to possible ACMs.
			Groundwater Remarks: No groundwater encountered.
Water Added			Other Remarks: 1. Borehole backfilled with arisings. 2. Possible ACM encountered in hand pit.
From (m bgl)	To (m bgl)	Volume (l)	



Appendix 2: Ground Gas and Groundwater Monitoring Results

Appendix 3: Soil Chemical Analysis Results



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Analytical Report Number : 20-15385

Project / Site name:	Farnham Rd	Samples received on:	19/06/2020
Your job number:	NTG2113	Sample instructed/ Analysis started on:	22/06/2020
Your order number:	POR031686	Analysis completed by:	26/06/2020
Report Issue Number:	1	Report issued on:	26/06/2020
Samples Analysed:	2 leachate samples - 14 soil samples		

Signed:

Will Fardon

Technical Reviewer (CS 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.

Iss No 20-15385-1 Farnham Rd NTG2113.XLS

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

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

Page 1 of 12



4041



Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540346	1540347	1540348	1540349	1540350			
Sample Reference	DS02	DS02	DS02	DS03	DS03			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	0.40	3.70	5.90	0.20	3.50			
Date Sampled	18/06/2020	18/06/2020	18/06/2020	18/06/2020	18/06/2020			
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	8.5	14	22	8.6	15
Total mass of sample received	kg	0.001	NONE	1.2	0.60	0.60	1.2	0.60

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	Amosite	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	Detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.002	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.002	-	-	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	-	-	8.4	-
Total Cyanide	mg/kg	1	MCERTS	3	-	-	< 1	-
Complex Cyanide	mg/kg	1	MCERTS	3	-	-	< 1	-
Free Cyanide	mg/kg	1	MCERTS	< 1	-	-	< 1	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.6	-	-	0.021	-
Total Sulphur	mg/kg	50	MCERTS	3200	-	-	330	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.012	-	-	0.016	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
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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	4.6	-	-	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	3.5	-	-	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	20	-	-	< 0.05	-
Pyrene	mg/kg	0.05	MCERTS	19	-	-	< 0.05	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	13	-	-	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	7.5	-	-	< 0.05	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	12	-	-	< 0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	4.9	-	-	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	9.9	-	-	< 0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	5.5	-	-	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	5.8	-	-	< 0.05	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	105	-	-	< 0.80	-
-----------------------------	-------	-----	--------	-----	---	---	--------	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	-	-	15	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	450	-	-	43	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.62	-	-	0.58	-
Boron (water soluble)	mg/kg	0.2	MCERTS	3.5	-	-	1.6	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	-	-	1.3	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	-	< 4.0	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	-	-	19	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	96	-	-	30	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	890	-	-	34	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.7	-	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	-	-	20	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	-	-	29	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	620	-	-	190	-

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540346	1540347	1540348	1540349	1540350
Sample Reference	DS02	DS02	DS02	DS03	DS03
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.40	3.70	5.90	0.20	3.50
Date Sampled	18/06/2020	18/06/2020	18/06/2020	18/06/2020	18/06/2020
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
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	16	-	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	46	-	< 1.0
o-xylene	µg/kg	1	MCERTS	-	< 1.0	29	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
TPH C10 - C40	mg/kg	10	MCERTS	190	-	-	580	-

Parameter	Units	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-

Parameter	Units	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
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	-	1.2	< 0.001	-	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	15	0.36	-	15
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	39	< 1.0	-	100
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	170	< 2.0	-	230
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	86	< 8.0	-	100
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	8.7	< 8.0	-	9.5
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	320	< 10	-	460

Parameter	Units	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
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	-	7.7	0.18	-	4.2
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	18	< 1.0	-	78
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	86	< 2.0	-	200
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	56	< 10	-	130
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	< 10	< 10	-	34
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	170	< 10	-	440



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Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540351		1540352		1540353		1540354		1540355	
Sample Reference	DS03		DS01		DS01		DS01		DS06	
Sample Number	None Supplied		None Supplied		None Supplied		None Supplied		None Supplied	
Depth (m)	4.50		0.30		3.90		4.90		0.50	
Date Sampled	18/06/2020		18/06/2020		18/06/2020		18/06/2020		18/06/2020	
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	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	25	9.1	16	23	18	18	18
Total mass of sample received	kg	0.001	NONE	0.60	1.2	0.60	0.60	0.60	0.60	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	Chrysotile & Amosite
Asbestos in Soil	Type	N/A	ISO 17025	-	Detected	-	-	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	0.006	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	0.006	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	8.2	-	8.7	9.7
Total Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Complex Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.050	-	0.015	0.52
Total Sulphur	mg/kg	50	MCERTS	-	370	-	230	1600
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	0.016	-	0.0013	0.018

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	1.2	-	< 0.05	1.8
Anthracene	mg/kg	0.05	MCERTS	-	0.37	-	< 0.05	0.37
Fluoranthene	mg/kg	0.05	MCERTS	-	3.5	-	< 0.05	3.8
Pyrene	mg/kg	0.05	MCERTS	-	3.7	-	< 0.05	3.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	2.0	-	< 0.05	1.2
Chrysene	mg/kg	0.05	MCERTS	-	1.6	-	< 0.05	1.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	3.2	-	< 0.05	1.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	1.1	-	< 0.05	0.98
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	2.6	-	< 0.05	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	1.9	-	< 0.05	0.83
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	0.63	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	2.4	-	< 0.05	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	24.1	-	< 0.80	18.9
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	16	-	< 1.0	16
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	180	-	9.9	190
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	0.93	-	< 0.06	0.75
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.6	-	< 0.2	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	0.5	-	0.2	2.9
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	27	-	1.8	36
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	52	-	3.1	94
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	120	-	1.0	190
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	25	-	2.1	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	39	-	3.1	34
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	270	-	9.4	260



Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540351			1540352			1540353			1540354			1540355		
Sample Reference	DS03			DS01			DS01			DS01			DS06		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	4.50			0.30			3.90			4.90			0.50		
Date Sampled	18/06/2020			18/06/2020			18/06/2020			18/06/2020			18/06/2020		
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 C10 - C40	mg/kg	10	MCERTS	-	110	-	< 10	490
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	-	< 0.1	-	3.6	< 0.1
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	11	-	0.78	2.5	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	2.3	-	54	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	14	-	230	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	-	110	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	-	38	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	35	-	430	< 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	0.72	-	0.19	0.81	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	3.4	-	50	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	27	-	220	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	30	-	130	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	22	-	53	< 10	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	83	-	460	< 10	-

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540356			1540357			1540358			1540359		
Sample Reference	DS06			DS04			DS04			DS04		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.80			1.50			3.50			4.30-4.40		
Date Sampled	18/06/2020			18/06/2020			18/06/2020			18/06/2020		
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	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	24	14	16	8.9					
Total mass of sample received	kg	0.001	NONE	1.2	0.60	0.60	0.60	0.60	0.60	0.60	0.60	

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile & Crocidolite	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	-	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	9.852	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	9.85	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	7.7	-	-	-
Total Cyanide	mg/kg	1	MCERTS	2	< 1	-	-	-
Complex Cyanide	mg/kg	1	MCERTS	2	< 1	-	-	-
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.34	0.018	-	-	-
Total Sulphur	mg/kg	50	MCERTS	2200	200	-	-	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.042	0.0077	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
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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	2.1	< 0.05	-	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	5.5	< 0.05	-	-	-
Pyrene	mg/kg	0.05	MCERTS	6.2	< 0.05	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.0	< 0.05	-	-	-
Chrysene	mg/kg	0.05	MCERTS	2.3	< 0.05	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.7	< 0.05	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	< 0.05	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.9	< 0.05	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.6	< 0.05	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.9	< 0.05	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	27.3	< 0.80	-	-	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25	11	-	-	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	340	72	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.54	1.1	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	2.6	1.4	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	22	0.2	-	-	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	89	29	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	870	13	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	420	15	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	< 0.3	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	59	25	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29	46	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	1900	61	-	-	-

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540356			1540357			1540358			1540359		
Sample Reference	DS06			DS04			DS04			DS04		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.80			1.50			3.50			4.30-4.40		
Date Sampled	18/06/2020			18/06/2020			18/06/2020			18/06/2020		
Time Taken	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 C10 - C40	mg/kg	10	MCERTS	1200	< 10	-	-		
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-		
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	3.1		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	45		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	< 8.0	40		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	28	50		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	28	140		
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	1.8		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	33		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	< 10	36		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	< 10	12		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	< 10	83		



Analytical Report Number: 20-15385
Project / Site name: Farnham Rd
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
1540346	DS02	0.40	127	Hard/Cement Type Material & Loose Fibres	Chrysotile	0.002	0.002
1540349	DS03	0.20	157	Loose Fibres	Amosite	< 0.001	< 0.001
1540352	DS01	0.30	138	Loose Fibrous Debris	Chrysotile	0.006	0.006
1540355	DS06	0.50	159	Loose Fibres	Chrysotile & Amosite	< 0.001	< 0.001
1540356	DS06	0.80	119	Hard/Cement Type Material & Insulation Board/Tile	Chrysotile & Crocidolite	9.852	9.85

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



Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number				1540360	1540361			
Sample Reference				DS06	DS06			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.50	0.80			
Date Sampled				18/06/2020	18/06/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.8	7.6			
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10			
Sulphate as SO ₄	mg/l	0.1	ISO 17025	102	93.4			

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	4.8			
Barium (dissolved)	µg/l	0.05	ISO 17025	83	120			
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Boron (dissolved)	µg/l	10	ISO 17025	83	220			
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08			
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4	< 0.4			
Copper (dissolved)	µg/l	0.7	ISO 17025	5.9	6.8			
Lead (dissolved)	µg/l	1	ISO 17025	6.0	2.9			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.5	5.0			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0			
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7			
Zinc (dissolved)	µg/l	0.4	ISO 17025	19	56			



Analytical Report Number : 20-15385

Project / Site name: Farnham Rd

* 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 *
1540346	DS02	None Supplied	0.40	Brown loam and sand with gravel and brick.
1540347	DS02	None Supplied	3.70	Brown loam and clay with gravel and chalk.
1540348	DS02	None Supplied	5.90	Grey clay with chalk and gravel
1540349	DS03	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1540350	DS03	None Supplied	3.50	Brown loam and clay with gravel.
1540351	DS03	None Supplied	4.50	White clay with chalk and gravel
1540352	DS01	None Supplied	0.30	Brown loam and clay with gravel and vegetation.
1540353	DS01	None Supplied	3.90	Brown clay with gravel and vegetation.
1540354	DS01	None Supplied	4.90	White clay with chalk and gravel
1540355	DS06	None Supplied	0.50	Brown clay and loam with rubble and vegetation.
1540356	DS06	None Supplied	0.80	Brown clay and loam with rubble and fibres.
1540357	DS04	None Supplied	1.50	Brown clay.
1540358	DS04	None Supplied	3.50	Brown clay.
1540359	DS04	None Supplied	4.30-4.40	Brown clay with gravel.

Analytical Report Number : 20-15385

Project / Site name: Farnham Rd

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
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
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
Complex Cyanide in soil	Determination of complex cyanide by calculation.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-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
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Free cyanide in soil	Determination of free 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
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
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
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
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

Analytical Report Number : 20-15385

Project / Site name: Farnham Rd

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
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 in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025
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 cyanide in leachate	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	ISO 17025
Total Sulphur in soil	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
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPH2 (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	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.



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Analytical Report Number : 20-15427

Project / Site name:	Farnham Road	Samples received on:	22/06/2020
Your job number:	BTG2113	Sample instructed/ Analysis started on:	22/06/2020
Your order number:	POR031686	Analysis completed by:	29/06/2020
Report Issue Number:	1	Report issued on:	29/06/2020
Samples Analysed:	3 soil samples		

Signed:

Will Fardon

Technical Reviewer (CS 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: 20-15427

Project / Site name: Farnham Road

Lab Sample Number	1540516	1540517	1540518			
Sample Reference	DS05	DS05	DS05			
Sample Number	None Supplied	None Supplied	None Supplied			
Depth (m)	0.25	2.50	4.20			
Date Sampled	19/06/2020	19/06/2020	19/06/2020			
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	15	8.3	7.7
Total mass of sample received	kg	0.001	NONE	1.0	0.50	0.50

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	
Asbestos in Soil	Type	N/A	ISO 17025	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	8.0	8.4	
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	
Complex Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.80	0.018	0.033	
Total Sulphur	mg/kg	50	MCERTS	4100	110	130	
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.014	0.0031	0.0041	

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	3.0	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	1.7	< 0.05	< 0.05	
Anthracene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05	
Fluoranthene	mg/kg	0.05	MCERTS	6.7	< 0.05	< 0.05	
Pyrene	mg/kg	0.05	MCERTS	5.4	< 0.05	< 0.05	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.3	< 0.05	< 0.05	
Chrysene	mg/kg	0.05	MCERTS	2.0	< 0.05	< 0.05	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.5	< 0.05	< 0.05	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.57	< 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	0.77	< 0.05	< 0.05	

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	27.5	< 0.80	< 0.80	
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Analytical Report Number: 20-15427

Project / Site name: Farnham Road

Lab Sample Number	1540516			1540517			1540518		
Sample Reference	DS05			DS05			DS05		
Sample Number	None Supplied			None Supplied			None Supplied		
Depth (m)	0.25			2.50			4.20		
Date Sampled	19/06/2020			19/06/2020			19/06/2020		
Time Taken	None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status						

Heavy Metals / Metalloids

Element	Units	Limit of detection	Accreditation Status	1540516	1540517	1540518
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	6.5	16
Barium (aqua regia extractable)	mg/kg	1	MCERTS	230	38	36
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.89	0.63	0.92
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.3	0.3
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	21	22	31
Copper (aqua regia extractable)	mg/kg	1	MCERTS	85	8.1	12
Lead (aqua regia extractable)	mg/kg	1	MCERTS	410	9.6	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	18	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	33	29	50
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	180	45	83

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1540516	1540517	1540518
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

Parameter	Units	Limit of detection	Accreditation Status	1540516	1540517	1540518
TPH C10 - C40	mg/kg	10	MCERTS	410	460	790
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	11	20
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	-	11	18
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	20	44
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	130	390
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	52	110
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	100	45
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	320	600
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	2.0
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	9.0	12
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	85	120
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	27	58
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	18	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	140	200



Analytical Report Number: 20-15427
Project / Site name: Farnham Road
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
1540516	DS05	0.25	126	Loose Fibres	Chrysotile	< 0.001	< 0.001

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



Analytical Report Number : 20-15427

Project / Site name: Farnham Road

* 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 *
1540516	DS05	None Supplied	0.25	Brown loam and clay with gravel.
1540517	DS05	None Supplied	2.50	Brown loam and clay with gravel.
1540518	DS05	None Supplied	4.20	Brown loam and clay with gravel.

Analytical Report Number : 20-15427

Project / Site name: Farnham Road

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
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Complex Cyanide in soil	Determination of complex cyanide by calculation.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-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
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Free cyanide in soil	Determination of free 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
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
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
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



Analytical Report Number : 20-15427

Project / Site name: Farnham Road

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
Total Sulphur in soil	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
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPH2 (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	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.

Appendix 4: Groundwater Chemical Analysis Results



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Analytical Report Number : 20-16515

Project / Site name:	Bishops Stortford	Samples received on:	29/06/2020
Your job number:	NTG2113	Sample instructed/ Analysis started on:	29/06/2020
Your order number:	POR031689	Analysis completed by:	17/07/2020
Report Issue Number:	1	Report issued on:	17/07/2020
Samples Analysed:	10 water samples		

Signed:

Will Fardon

Technical Reviewer (CS 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 :

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

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

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

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Analytical Report Number: 20-16515
Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number	1546496			1546497			1546498			1546499			1546500		
Sample Reference	DS01			DS02			DS03			DS04			DS05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	26/06/2020			26/06/2020			26/06/2020			26/06/2020			26/06/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

General Inorganics

Parameter	Units	N/A	ISO 17025	1546496	1546497	1546498	1546499	1546500
pH	pH Units			6.5	6.8	6.7	6.8	6.5
Electrical Conductivity at 20 °C	µS/cm	10	ISO 17025	690000	250000	630000	590000	1100000
Total Cyanide	µg/l	10	ISO 17025	< 10	U/S	< 10	U/S	< 10
Sulphate as SO ₄	µg/l	45	ISO 17025	U/S	U/S	5820	U/S	24300
Sulphate as SO ₄	mg/l	0.045	ISO 17025	U/S	U/S	5.82	U/S	24.3
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	U/S	U/S	5800	U/S	U/S
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	54.5	87.5	119	62.9	15.9

Total Phenols

Parameter	Units	N/A	ISO 17025	1546496	1546497	1546498	1546499	1546500
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	U/S	< 10	U/S	11

Speciated PAHs

Parameter	Units	N/A	ISO 17025	1546496	1546497	1546498	1546499	1546500
Naphthalene	µg/l	0.01	ISO 17025	1020	U/S	18.5	102	374
Acenaphthylene	µg/l	0.01	ISO 17025	297	< 0.01	14.2	< 0.01	114
Acenaphthene	µg/l	0.01	ISO 17025	369	< 0.01	16.3	< 0.01	131
Fluorene	µg/l	0.01	ISO 17025	889	1510	17.6	6.55	156
Phenanthrene	µg/l	0.01	ISO 17025	907	1080	18.9	2.80	142
Anthracene	µg/l	0.01	ISO 17025	269	321	12.6	0.16	118
Fluoranthene	µg/l	0.01	ISO 17025	274	263	15.5	0.12	124
Pyrene	µg/l	0.01	ISO 17025	335	302	15.8	0.31	129
Benzo(a)anthracene	µg/l	0.01	ISO 17025	276	265	14.7	< 0.01	112
Chrysene	µg/l	0.01	ISO 17025	282	275	15.1	< 0.01	126
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	271	263	14.1	< 0.01	116
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	272	263	14.3	< 0.01	119
Benzo(a)pyrene	µg/l	0.01	ISO 17025	255	241	13.0	< 0.01	113
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	210	219	10.1	< 0.01	83.0
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	228	220	11.4	< 0.01	81.8
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	214	203	11.0	< 0.01	78.1

Total PAH

Parameter	Units	N/A	ISO 17025	1546496	1546497	1546498	1546499	1546500
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	6370	5430	233	112	2120

Heavy Metals / Metalloids

Parameter	Units	N/A	ISO 17025	1546496	1546497	1546498	1546499	1546500
Arsenic (dissolved)	µg/l	0.15	ISO 17025	U/S	U/S	3.23	U/S	40.3
Barium (dissolved)	µg/l	0.06	ISO 17025	U/S	U/S	97	U/S	250
Beryllium (dissolved)	µg/l	0.1	ISO 17025	U/S	U/S	< 0.1	U/S	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	U/S	U/S	72	U/S	85
Cadmium (dissolved)	µg/l	0.02	ISO 17025	U/S	U/S	< 0.02	U/S	0.03
Calcium (dissolved)	mg/l	0.012	ISO 17025	U/S	U/S	190	U/S	200
Chromium (hexavalent)	µg/l	5	ISO 17025	U/S	U/S	U/S	U/S	U/S
Chromium (dissolved)	µg/l	0.2	ISO 17025	U/S	U/S	< 0.2	U/S	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	U/S	U/S	8.7	U/S	7.0
Lead (dissolved)	µg/l	0.2	ISO 17025	U/S	U/S	< 0.2	U/S	2.6
Mercury (dissolved)	µg/l	0.05	ISO 17025	U/S	U/S	< 0.05	U/S	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	U/S	U/S	20	U/S	110
Selenium (dissolved)	µg/l	0.6	ISO 17025	U/S	U/S	< 0.6	U/S	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	U/S	U/S	< 0.2	U/S	0.7
Zinc (dissolved)	µg/l	0.5	ISO 17025	U/S	U/S	5.8	U/S	15



Analytical Report Number: 20-16515
Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number	1546496			1546497			1546498			1546499			1546500		
Sample Reference	DS01			DS02			DS03			DS04			DS05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	26/06/2020			26/06/2020			26/06/2020			26/06/2020			26/06/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Monoaromatics & Oxygenates

Parameter	Units	Limit of detection	Accreditation Status	1546496	1546497	1546498	1546499	1546500
Benzene	µg/l	1	ISO 17025	< 1.0	578	< 1.0	< 1.0	48.2
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	22000	< 1.0	4350	< 1.0
p & m-xylene	µg/l	1	ISO 17025	1240	37700	< 1.0	17200	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2140	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1546496	1546497	1546498	1546499	1546500
TPH1 (C10 - C40)	µg/l	10	NONE	17000000	230000000	27000	130000	550000
TPH2 (C6 - C10)	µg/l	10	ISO 17025	930000	2200000	5200	990000	8400
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	3800	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	150000	420000	< 1.0	75000	1600
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	720000	1600000	5200	840000	6500
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	3800000	68000000	5000	38000	140000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	7100000	97000000	7800	49000	200000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	2500000	11000000	3500	2800	26000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	620000	1700000	3300	200	13000
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	15000000	180000000	25000	1000000	390000
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	580	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	45000	180000	< 1.0	74000	370
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	1300000	14000000	2700	16000	81000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	1600000	31000000	2900	18000	80000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	500000	3100000	1200	1000	10000
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	35000	760000	500	< 10	3000
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	3400000	49000000	7300	110000	170000

Please note the sample matrix (oily/water) interfered with several of the analytical methods and viable results could not be produced
U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number: 20-16515
Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number	1546501				1546502				1546503				1546504				1546505			
Sample Reference	HBH1				HBH2				HBH3				HBH4				HBH5			
Sample Number	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Depth (m)	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Date Sampled	26/06/2020				26/06/2020				26/06/2020				26/06/2020				26/06/2020			
Time Taken	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status																	

General Inorganics

Parameter	Units	Limit of detection	ISO 17025	1546501	1546502	1546503	1546504	1546505
pH	pH Units	N/A	ISO 17025	6.5	7.0	6.8	7.1	7.0
Electrical Conductivity at 20 °C	µS/cm	10	ISO 17025	1000000	460000	960000	480000	720000
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Sulphate as SO ₄	µg/l	45	ISO 17025	1390	3570	2220	3960	1840
Sulphate as SO ₄	mg/l	0.045	ISO 17025	1.39	3.57	2.22	3.96	1.84
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	140	1100	8500	U/S	4800
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	11.2	5.42	24.9	28.2	15.9

Total Phenols

Parameter	Units	Limit of detection	ISO 17025	1546501	1546502	1546503	1546504	1546505
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10

Speciated PAHs

Parameter	Units	Limit of detection	ISO 17025	1546501	1546502	1546503	1546504	1546505
Naphthalene	µg/l	0.01	ISO 17025	37.4	10.3	78.2	97.5	15.5
Acenaphthylene	µg/l	0.01	ISO 17025	16.7	0.72	1.70	8.02	0.79
Acenaphthene	µg/l	0.01	ISO 17025	18.5	0.65	2.35	11.6	1.10
Fluorene	µg/l	0.01	ISO 17025	19.1	1.67	6.08	33.4	2.22
Phenanthrene	µg/l	0.01	ISO 17025	18.8	1.68	5.87	37.1	2.21
Anthracene	µg/l	0.01	ISO 17025	15.4	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	18.6	0.49	0.77	4.08	0.17
Pyrene	µg/l	0.01	ISO 17025	18.6	0.55	1.37	9.72	0.43
Benzo(a)anthracene	µg/l	0.01	ISO 17025	16.5	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	17.8	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	17.0	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	17.1	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	17.0	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	13.2	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	12.5	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	12.1	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Parameter	Units	Limit of detection	ISO 17025	1546501	1546502	1546503	1546504	1546505
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	286	16.1	96.4	201	22.4

Heavy Metals / Metalloids

Parameter	Units	Limit of detection	ISO 17025	1546501	1546502	1546503	1546504	1546505
Arsenic (dissolved)	µg/l	0.15	ISO 17025	43.1	21.4	10.6	4.09	4.30
Barium (dissolved)	µg/l	0.06	ISO 17025	320	190	160	71	420
Beryllium (dissolved)	µg/l	0.1	ISO 17025	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	70	33	170	74	89
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Calcium (dissolved)	mg/l	0.012	ISO 17025	190	140	180	130	140
Chromium (hexavalent)	µg/l	5	ISO 17025	U/S	< 5.0	U/S	U/S	U/S
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	3.2	30	47	17	12
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.2	0.4	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	14	12	120	7.3	16
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	1.2	< 0.6	2.0	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	3.8	3.6	5.4	3.7	9.2



Analytical Report Number: 20-16515
Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number				1546501	1546502	1546503	1546504	1546505
Sample Reference				HBH1	HBH2	HBH3	HBH4	HBH5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				26/06/2020	26/06/2020	26/06/2020	26/06/2020	26/06/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

	µg/l	1	ISO 17025	< 1.0	< 1.0	55.1	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	14.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	96.5	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	15000	20000	35000	180000	6600
TPH2 (C6 - C10)	µg/l	10	ISO 17025	12000	4700	15000	3400	7700
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	12000	4700	15000	3400	7700
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	2100	4300	6900	30000	1300
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	3600	8000	12000	54000	2000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	2500	1900	3300	30000	400
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	2000	< 10	1000	10000	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	22000	19000	38000	130000	11000
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	250	< 1.0	97	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	1400	2300	4900	18000	1400
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	1500	3000	5000	22000	1400
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	1000	700	1000	15000	150
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	800	< 10	400	1000	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	5000	6000	11000	56000	2900

Please note the sample matrix (oily/water) interfered with several of the analytical method
U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 20-16515

Project / Site name: Bishops Stortford

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
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
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
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Electrical conductivity at 20oC of water	Determination of electrical conductivity in water by electrometric measurement. Accredited Matrices SW, GW, PW	In-house method	L031-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
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-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	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L005-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
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
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
TPH2 (Waters)	Determination of hydrocarbons C6-C10 by headspace GC-MS. Accredited Matrices SW, PW. GW.	In-house method based on USEPA8260	L088-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.

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

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Sample Deviation Report



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
DS01		W	20-16515	1546496	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS01		W	20-16515	1546496	c	Electrical conductivity at 20oC of water	L031-PL	c
DS01		W	20-16515	1546496	c	pH at 20oC in water	L005-PL	c
DS02		W	20-16515	1546497	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS02		W	20-16515	1546497	c	Electrical conductivity at 20oC of water	L031-PL	c
DS02		W	20-16515	1546497	c	pH at 20oC in water	L005-PL	c
DS03		W	20-16515	1546498	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS03		W	20-16515	1546498	c	Electrical conductivity at 20oC of water	L031-PL	c
DS03		W	20-16515	1546498	c	pH at 20oC in water	L005-PL	c
DS04		W	20-16515	1546499	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS04		W	20-16515	1546499	c	Electrical conductivity at 20oC of water	L031-PL	c
DS04		W	20-16515	1546499	c	pH at 20oC in water	L005-PL	c
DS05		W	20-16515	1546500	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS05		W	20-16515	1546500	c	Electrical conductivity at 20oC of water	L031-PL	c
DS05		W	20-16515	1546500	c	pH at 20oC in water	L005-PL	c
HBH1		W	20-16515	1546501	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH1		W	20-16515	1546501	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH1		W	20-16515	1546501	c	pH at 20oC in water	L005-PL	c
HBH2		W	20-16515	1546502	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH2		W	20-16515	1546502	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH2		W	20-16515	1546502	c	pH at 20oC in water	L005-PL	c
HBH3		W	20-16515	1546503	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH3		W	20-16515	1546503	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH3		W	20-16515	1546503	c	pH at 20oC in water	L005-PL	c
HBH4		W	20-16515	1546504	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH4		W	20-16515	1546504	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH4		W	20-16515	1546504	c	pH at 20oC in water	L005-PL	c
HBH5		W	20-16515	1546505	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH5		W	20-16515	1546505	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH5		W	20-16515	1546505	c	pH at 20oC in water	L005-PL	c



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Analytical Report Number : 20-17830

Replaces Analytical Report Number : 20-17830, issue no. 1

Additional analysis undertaken.

Project / Site name:	Bishops Storford	Samples received on:	06/07/2020
Your job number:	NTG2113	Sample instructed/ Analysis started on:	06/07/2020
Your order number:		Analysis completed by:	23/07/2020
Report Issue Number:	2	Report issued on:	24/07/2020
Samples Analysed:	10 water samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska

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

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

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

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

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

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

Iss No 20-17830-2 Bishops Storford NTG2113.XLS

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

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Analytical Report Number: 20-17830

Project / Site name: Bishops Storford

Lab Sample Number	1553446			1553447			1553448			1553449			1553450		
Sample Reference	HBH1			HBH2			HBH3			HBH4			HBH5		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	03/07/2020			03/07/2020			03/07/2020			03/07/2020			03/07/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	35.3	< 0.01	2520	27.0	< 0.01
Naphthalene	µg/l	0.01	ISO 17025	35.3	< 0.01	2520	27.0	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	1.50	< 0.01	72.5	0.86	19.0
Acenaphthene	µg/l	0.01	ISO 17025	1.21	< 0.01	80.2	1.18	< 0.01
Fluorene	µg/l	0.01	ISO 17025	4.38	< 0.01	242	3.10	131
Phenanthrene	µg/l	0.01	ISO 17025	1.93	8.45	231	3.84	212
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	21.5
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	0.38	15.3	< 0.01	15.0
Pyrene	µg/l	0.01	ISO 17025	< 0.01	1.39	53.3	< 0.01	40.4
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	5.33
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	5.52
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	2.46
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	0.84
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	1.57
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	0.56
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	0.70

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	44.3	10.2	3210	36.0	456
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Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	< 1.0	< 1.0	70.7	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	70.7	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	187	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	820	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	2700	< 1.0	50000*	26000*	2700*
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	2200	3000	25000	3900	28000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	9200	17000	83000	6600	39000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	2700	2700	25000	4000	14000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	160	420	5900	11000	4800
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	17000	23000	190000	51000	88000

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	71	< 1.0	< 1.0
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	71	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	9700	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	3100	2100	45000	4700	8700
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	4700	8700	36000	3400	18000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	560	1400	8900	3600	6200
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	5100
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	8400	12000	99000	12000	38000

*Over range data, sample was diluted and results are estimated from an extrapolated calibration. Results should be interpreted with care.

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



Analytical Report Number: 20-17830

Project / Site name: Bishops Storford

Lab Sample Number	1553451			1553452			1553453			1553454			1553455		
Sample Reference	DS01			DS02			DS03			DS04			DS05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	03/07/2020			03/07/2020			03/07/2020			03/07/2020			03/07/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	708	212	< 0.01	177000*	5330*
Naphthalene	µg/l	0.01	ISO 17025	708	212	< 0.01	177000*	5330*
Acenaphthylene	µg/l	0.01	ISO 17025	48.1	6.32	191	6570*	187*
Acenaphthene	µg/l	0.01	ISO 17025	43.2	4.43	< 0.01	10100*	159*
Fluorene	µg/l	0.01	ISO 17025	109	15.5	743	14100*	621*
Phenanthrene	µg/l	0.01	ISO 17025	133	10.3	1190	6650*	434*
Anthracene	µg/l	0.01	ISO 17025	14.7	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	9.12	0.20	47.5	174*	19.1*
Pyrene	µg/l	0.01	ISO 17025	16.6	0.73	147	599*	61.0*
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	3.94	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.61	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	2.16	17.3*	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	1080	250	2320	215000	6810
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Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	927	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	927	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2220	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	387	2600	< 1.0	24000*	99.8
p & m-xylene	µg/l	1	ISO 17025	1540	5640	< 1.0	40100*	260
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	10300*	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	95000	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	140000*	180000*	1500	300000*	31000*
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	17000	26000	58000	38000000*	220000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	33000	51000	78000	56000000*	480000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	11000	8400	43000	4300000*	100000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	3000	830	9800	450000*	21000
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	200000	260000	190000	99000000	860000

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	930	< 1.0
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	930	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2200	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	35000	52000	170	160000*	4200
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	19000	23000	17000	9400000*	160000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	19000	22000	56000	23000000*	200000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	4900	5400	23000	1800000*	56000
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	7300	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	78000	100000	100000	34000000	420000

*Over range data, sample was diluted and results are estimated from an extrapolated calibration. Results should be interpreted with care.

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



Analytical Report Number : 20-17830

Project / Site name: Bishops Storford

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
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
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.



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Analytical Report Number : 20-32218

Project / Site name:	NTG2113	Samples received on:	25/09/2020
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	28/09/2020
Your order number:	POR032373	Analysis completed by:	05/10/2020
Report Issue Number:	1	Report issued on:	05/10/2020
Samples Analysed:	10 water samples		

Signed: _____

Rachel Bradley
 Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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



Analytical Report Number: 20-32218
Project / Site name: NTG2113

Your Order No: POR032373

Lab Sample Number	1631627	1631628	1631629	1631630
Sample Reference	DS01	DS02	DS03	DS04
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	23/09/2020	23/09/2020	23/09/2020	23/09/2020
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
Naphthalene	µg/l	0.01	ISO 17025	13.2	81.9	< 0.01	59.7
Acenaphthylene	µg/l	0.01	ISO 17025	0.84	0.53	196	1.52
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.77
Fluorene	µg/l	0.01	ISO 17025	3.57	1.6	776	3.73
Phenanthrene	µg/l	0.01	ISO 17025	3.59	< 0.01	848	1.35
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.3	< 0.01	34.9	< 0.01
Pyrene	µg/l	0.01	ISO 17025	0.61	< 0.01	112	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 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	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	22.1	84	1970	68.1

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
Benzene	µg/l	1	ISO 17025	4.4	42.6	< 1.0	5.3
Toluene	µg/l	1	ISO 17025	< 1.0	9.9	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	16.4	< 1.0	78.9
p & m-xylene	µg/l	1	ISO 17025	44.6	739	< 1.0	695
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	65.9
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	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
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	1100	3400	1200000	24000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	6000	7000	2200000	34000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3200	1000	700000	3000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	2000	< 10	160000	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	12000	11000	4200000	61000

TPH-CWG - Aromatic >C5 - C7	µg/l	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	4.4	43	< 1.0	5.3
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	9.9	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	660	2200	18	1800
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	2000	2500	400000	10000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	1800	1900	530000	8000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	600	< 10	150000	700
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	120000	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	5100	6600	1200000	21000

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



Analytical Report Number: 20-32218
Project / Site name: NTG2113



Your Order No: POR032373

Lab Sample Number	1631631	1631632	1631633	1631634
Sample Reference	DS05	HBH1	HBH2	HBH3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	23/09/2020	24/09/2020	24/09/2020	24/09/2020
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
Naphthalene	µg/l	0.01	ISO 17025	1610	23.6	< 0.01	65
Acenaphthylene	µg/l	0.01	ISO 17025	76.2	1.86	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	2.05	< 0.01	0.46
Fluorene	µg/l	0.01	ISO 17025	208	4.35	< 0.01	1.19
Phenanthrene	µg/l	0.01	ISO 17025	135	1.75	< 0.01	1.45
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	8.36	< 0.01	< 0.01	0.15
Pyrene	µg/l	0.01	ISO 17025	21.4	< 0.01	< 0.01	0.33
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 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	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	2060	33.6	< 0.16	68.6

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
Benzene	µg/l	1	ISO 17025	130	< 1.0	< 1.0	112
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	228	7.4	< 1.0	8.8
p & m-xylene	µg/l	1	ISO 17025	71.6	12.5	< 1.0	98.4
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	127	47.2	< 1.0	49.2

Petroleum Hydrocarbons

Compound	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
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	7900	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	50000	2500	< 10	990
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	1200000	4500	470	800
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	150000	400	80	180
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	1400000	7400	550	2000

Compound	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	130	< 1.0	< 1.0	110
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	3400	120	< 1.0	420
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	300000	2200	400	1000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	330000	3000	300	700
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	30000	350	48	100
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	660000	5700	750	2300

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



Analytical Report Number: 20-32218
Project / Site name: NTG2113



Your Order No: POR032373

Lab Sample Number	1631635	1631636			
Sample Reference	HBH4	HBH5			
Sample Number	None Supplied	None Supplied			
Depth (m)	None Supplied	None Supplied			
Date Sampled	24/06/2020	24/09/2020			
Time Taken	None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accredi- tation Status		

Speciated PAHs

Compound	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
Naphthalene	µg/l	0.01	ISO 17025	15.8	8.58
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	1	1.86
Fluorene	µg/l	0.01	ISO 17025	2.74	6.08
Phenanthrene	µg/l	0.01	ISO 17025	2.16	4.54
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.15	0.33
Pyrene	µg/l	0.01	ISO 17025	0.43	1.18
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	22.2	22.6
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Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
Benzene	µg/l	1	ISO 17025	< 1.0	11.2
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	15.3

Petroleum Hydrocarbons

Compound	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	1200	1800
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	1100	2500
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	240	800
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	2600	5100

Compound	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	11
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	14	7.3
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	1300	1600
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	930	2000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	150	500
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	2400	4100

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



Analytical Report Number : 20-32218
Project / Site name: NTG2113

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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

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

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

Sample Deviation Report



Analytical Report Number : 20-32218
Project / Site name: NTG2113

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
HBH4	None Supplied	W	1631635	c	BTEX and MTBE in water (Monoaromatics)	L073B-PL	c
HBH4	None Supplied	W	1631635	c	Speciated EPA-16 PAHs in water	L102B-PL	c
HBH4	None Supplied	W	1631635	c	TPHCWG (Waters)	L070-PL	c



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Analytical Report Number : 20-46963

Project / Site name:	Bishops Stortford	Samples received on:	14/12/2020
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	14/12/2020
Your order number:	POR033147	Analysis completed by:	21/12/2020
Report Issue Number:	1	Report issued on:	21/12/2020
Samples Analysed:	10 water samples		

Signed: *A. Czerwińska*

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

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

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

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

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

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



Analytical Report Number: 20-46963
Project / Site name: Bishops Stortford

Your Order No: POR033147

Lab Sample Number	1715217				1715218	1715219	1715220	1715221
Sample Reference	HBH2				HBH4	HBH5	HBH3	DS05
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	09/12/2020				09/12/2020	09/12/2020	09/12/2020	09/12/2020
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	1715217	1715218	1715219	1715220	1715221
Naphthalene	µg/l	0.01	ISO 17025	0.78	< 0.01	< 0.01	17.8	160
Acenaphthylene	µg/l	0.01	ISO 17025	0.22	< 0.01	0.58	0.28	3.36
Acenaphthene	µg/l	0.01	ISO 17025	0.34	< 0.01	1.34	0.67	4.05
Fluorene	µg/l	0.01	ISO 17025	0.72	69.5	2.99	1.48	9.31
Phenanthrene	µg/l	0.01	ISO 17025	0.35	105	2.38	0.7	6.81
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	10.6	0.34	< 0.01	0.49
Pyrene	µg/l	0.01	ISO 17025	< 0.01	24.9	0.84	< 0.01	0.92
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	1715217	1715218	1715219	1715220	1715221
				2.41	210	8.47	20.9	185

Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	1715217	1715218	1715219	1715220	1715221
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	27.8	67.6
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	9.2	18.1
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	1715217	1715218	1715219	1715220	1715221
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	170000	2000	670	34000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	700	300000	9000	1300	56000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	150	140000	3000	< 10	12000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	44000	< 10	< 10	4400
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	850	650000	14000	1900	110000

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	1715217	1715218	1715219	1715220	1715221
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	28	68
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	6.8	< 1.0	11	110	350
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	600	47000	3800	2400	53000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	500	93000	4700	2900	47000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	99	41000	700	< 10	11000
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	11000	< 10	< 10	4000
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1200	190000	9200	5400	120000

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



Analytical Report Number: 20-46963
Project / Site name: Bishops Stortford

Your Order No: POR033147

Lab Sample Number	1715222				1715223	1715224	1715225	1715226
Sample Reference	HBH1				DS04	DS02	DS01	DS03
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	09/12/2020				09/12/2020	10/12/2020	10/12/2020	10/12/2020
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	9.28	22.1	133	3.09	1.07
Naphthalene	µg/l	0.01	ISO 17025	9.28	22.1	133	3.09	1.07
Acenaphthylene	µg/l	0.01	ISO 17025	1.42	0.17	3.87	0.2	0.27
Acenaphthene	µg/l	0.01	ISO 17025	1.74	0.51	4.62	0.41	0.74
Fluorene	µg/l	0.01	ISO 17025	4.22	0.97	9.46	1.28	1.81
Phenanthrene	µg/l	0.01	ISO 17025	1.68	0.23	6.15	0.65	1.08
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.3	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.58	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	18.3	23.9	158	5.63	4.97
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Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	59	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	7.5	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	55	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	21000	850	38000	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	26000	1400	110000	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3100	280	13000	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	2800	380	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	53000	3000	160000	< 10	< 10

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	2.2	4.6	220	19	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	30000	1200	30000	720	2000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	21000	2200	100000	1700	3000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	3400	520	19000	220	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	4100	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	54000	3900	150000	2700	5000

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



Analytical Report Number : 20-46963
Project / Site name: Bishops Stortford

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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.



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Analytical Report Number : 21-84167

Replaces Analytical Report Number: 21-84167, issue no. 1
Additional analysis undertaken.

Project / Site name:	Bishops Stortford	Samples received on:	29/06/2021
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	30/06/2021
Your order number:	POR034918	Analysis completed by:	19/07/2021
Report Issue Number:	2	Report issued on:	19/07/2021
Samples Analysed:	10 water samples		

Signed: _____

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

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

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

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

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

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: 21-84167
Project / Site name: Bishops Stortford

Your Order No: POR034918

Lab Sample Number	1922064			1922065			1922066			1922067			1922068		
Sample Reference	DS01			DS02			DS03			DS04			DS05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	29/06/2021			29/06/2021			28/06/2021			28/06/2021			28/06/2021		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	94.4	< 0.01	111	107
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	5.77	4.40	3.78	4.90	5.96
Fluorene	µg/l	0.01	ISO 17025	21.2	9.67	11.0	12.2	14.2
Phenanthrene	µg/l	0.01	ISO 17025	18.5	4.86	10.6	4.40	8.81
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.78	0.21	0.43	0.18	0.56
Pyrene	µg/l	0.01	ISO 17025	2.06	0.41	1.16	0.46	1.25
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Parameter	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	48.3	114	26.9	133	137

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	90.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	2.1	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	6.3	60.7	< 1.0	262	32.2
o-xylene	µg/l	1	ISO 17025	< 1.0	10.5	< 1.0	38.8	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	95.9

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	31000	24000	6500	53000	31000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	51000	41000	19000	48000	48000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	19000	3100	6300	2400	6100
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	100000	68000	32000	100000	85000

Parameter	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	92
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	110	180	< 1.0	770	580
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	2600	6400	2700	16000	12000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	11000	2800	4300	21000	7700
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	2200	< 10	830	< 10	910
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	16000	9400	7800	38000	21000

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



Analytical Report Number: 21-84167
Project / Site name: Bishops Stortford

Your Order No: POR034918

Lab Sample Number	1922069			1922070			1922071			1922072			1922073		
Sample Reference	HBH1			HBH2			HBH3			HBH4			HBH5		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	28/06/2021			28/06/2021			28/06/2021			28/06/2021			28/06/2021		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	19.8	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	3.82	0.29	1.44	59.5	2.14
Fluorene	µg/l	0.01	ISO 17025	8.98	0.67	3.71	157	3.99
Phenanthrene	µg/l	0.01	ISO 17025	3.25	0.20	2.44	187	0.80
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.24	< 0.01	0.21	23.5	0.34
Pyrene	µg/l	0.01	ISO 17025	0.51	< 0.01	0.49	55.9	0.60
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Parameter	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	16.8	1.16	28.1	483	7.87

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	54.3	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	5.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	8.1	< 1.0	14.2	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	38.7	< 1.0	23.1	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	740	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	16000	380	2300	91000	600
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	32000	940	4800	230000	1700
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3100	130	1100	100000	920
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	50000	1500	8200	430000	3200

Parameter	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	53	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	110	< 1.0	170	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	5600	150	1100	7200	1400
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	4000	270	2400	32000	820
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	340	29	290	10000	140
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	10000	450	4000	50000	2400

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



Analytical Report Number : 21-84167
Project / Site name: Bishops Stortford

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Appendix 5: Water Quality Parameter Sheets

Low-Flow Test Report:

Test Date / Time: 12/9/2020 9:51:37 AM

Project: NTG2113

Operator Name: Megan and luke

Location Name: HBH2 Well Diameter: 100 cm Total Depth: 7.78 m Initial Depth to Water: 4.91 m	Pump Type: Peristaltic Tubing Type: MF Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/9/2020 9:51 AM	00:00	7.00 pH	8.21 °C	8.25 µS/cm	8.25 mg/L		327.6 mV	491.00 cm
12/9/2020 9:56 AM	05:00	7.00 pH	9.79 °C	942.89 µS/cm	0.84 mg/L		175.1 mV	491.00 cm
12/9/2020 10:01 AM	10:00	7.00 pH	10.96 °C	897.98 µS/cm	0.62 mg/L		162.8 mV	491.00 cm
12/9/2020 10:06 AM	15:00	7.00 pH	11.43 °C	885.85 µS/cm	0.51 mg/L		156.3 mV	491.00 cm
12/9/2020 10:11 AM	20:00	7.00 pH	11.61 °C	873.64 µS/cm	0.56 mg/L		151.7 mV	491.00 cm
12/9/2020 10:16 AM	25:00	7.00 pH	11.70 °C	863.29 µS/cm	0.58 mg/L		147.5 mV	491.00 cm
12/9/2020 10:21 AM	30:00	7.00 pH	11.75 °C	855.91 µS/cm	0.43 mg/L		144.1 mV	491.00 cm
12/9/2020 10:26 AM	35:00	7.00 pH	11.66 °C	858.44 µS/cm	0.43 mg/L		140.6 mV	491.00 cm

Samples

Sample ID:	Description:
HBH2	Stabilised

Low-Flow Test Report:

Test Date / Time: 12/9/2020 10:53:48 AM

Project: NTG2113

Operator Name: Megan and luke

Location Name: HBH4 Total Depth: 6.7 m Initial Depth to Water: 3.73 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
--------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------	----------------------------------------------------------------------

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/9/2020 10:53 AM	00:00	7.00 pH	10.74 °C	695.67 µS/cm	0.50 mg/L		136.7 mV	373.00 cm
12/9/2020 10:54 AM	01:00	7.00 pH	10.96 °C	692.46 µS/cm	0.51 mg/L		143.0 mV	373.00 cm
12/9/2020 10:55 AM	02:00	7.00 pH	11.14 °C	690.11 µS/cm	0.47 mg/L		144.1 mV	373.00 cm
12/9/2020 10:56 AM	03:00	7.00 pH	11.24 °C	689.06 µS/cm	0.47 mg/L		143.9 mV	373.00 cm
12/9/2020 10:57 AM	04:00	7.00 pH	11.42 °C	684.95 µS/cm	0.45 mg/L		143.2 mV	373.00 cm
12/9/2020 10:58 AM	05:00	7.00 pH	11.50 °C	684.09 µS/cm	0.44 mg/L		142.4 mV	373.00 cm
12/9/2020 10:59 AM	06:00	7.00 pH	11.55 °C	682.91 µS/cm	0.43 mg/L		141.5 mV	373.00 cm
12/9/2020 11:00 AM	07:00	7.00 pH	11.56 °C	682.95 µS/cm	0.42 mg/L		140.5 mV	373.00 cm
12/9/2020 11:01 AM	08:00	7.00 pH	11.59 °C	683.43 µS/cm	0.42 mg/L		139.5 mV	373.00 cm
12/9/2020 11:02 AM	09:00	7.00 pH	11.62 °C	683.97 µS/cm	0.44 mg/L		138.5 mV	373.00 cm
12/9/2020 11:03 AM	10:00	7.00 pH	11.65 °C	684.71 µS/cm	0.41 mg/L		137.5 mV	373.00 cm
12/9/2020 11:04 AM	11:00	7.00 pH	11.66 °C	685.21 µS/cm	0.41 mg/L		136.4 mV	373.00 cm
12/9/2020 11:05 AM	12:00	7.00 pH	11.68 °C	684.78 µS/cm	0.42 mg/L		135.5 mV	373.00 cm
12/9/2020 11:06 AM	13:00	7.00 pH	11.71 °C	674.69 µS/cm	0.65 mg/L		135.0 mV	373.00 cm
12/9/2020 11:07 AM	14:00	7.00 pH	11.71 °C	271.71 µS/cm	1.68 mg/L		135.6 mV	373.00 cm
12/9/2020 11:08 AM	15:00	7.00 pH	11.66 °C	254.59 µS/cm	2.21 mg/L		136.2 mV	373.00 cm
12/9/2020 11:09 AM	16:00	7.00 pH	11.58 °C	244.35 µS/cm	2.31 mg/L		136.8 mV	373.00 cm
12/9/2020 11:10 AM	17:00	7.00 pH	11.56 °C	272.71 µS/cm	2.36 mg/L		137.4 mV	373.00 cm

12/9/2020 11:11 AM	18:00	7.00 pH	11.52 °C	227.43 µS/cm	2.53 mg/L		138.0 mV	373.00 cm
12/9/2020 11:12 AM	19:00	7.00 pH	11.50 °C	203.39 µS/cm	2.48 mg/L		138.7 mV	373.00 cm
12/9/2020 11:13 AM	20:00	7.00 pH	11.47 °C	233.35 µS/cm	2.84 mg/L		139.3 mV	373.00 cm
12/9/2020 11:14 AM	21:00	7.00 pH	11.43 °C	230.16 µS/cm	3.04 mg/L		140.1 mV	373.00 cm
12/9/2020 11:15 AM	22:00	7.00 pH	11.42 °C	226.22 µS/cm	3.09 mg/L		141.0 mV	373.00 cm
12/9/2020 11:16 AM	23:00	7.00 pH	11.41 °C	249.54 µS/cm	3.11 mg/L		141.7 mV	373.00 cm
12/9/2020 11:17 AM	24:00	7.00 pH	11.38 °C	245.77 µS/cm	3.37 mg/L		142.5 mV	373.00 cm
12/9/2020 11:18 AM	25:00	7.00 pH	11.37 °C	306.79 µS/cm	2.58 mg/L		143.2 mV	373.00 cm
12/9/2020 11:19 AM	26:00	7.00 pH	11.38 °C	204.98 µS/cm	2.59 mg/L		143.8 mV	373.00 cm
12/9/2020 11:20 AM	27:00	7.00 pH	11.35 °C	251.21 µS/cm	2.09 mg/L		144.4 mV	373.00 cm
12/9/2020 11:21 AM	28:00	7.00 pH	11.33 °C	295.26 µS/cm	2.77 mg/L		144.9 mV	373.00 cm
12/9/2020 11:22 AM	29:00	7.00 pH	11.33 °C	534.73 µS/cm	3.67 mg/L		146.3 mV	373.00 cm
12/9/2020 11:23 AM	30:00	7.00 pH	11.33 °C	702.17 µS/cm	2.49 mg/L		144.2 mV	373.00 cm

Samples

Sample ID:	Description:
HBH4	Did not stabilise at 30 mins Drawn up air

Low-Flow Test Report:

Test Date / Time: 12/9/2020 11:37:36 AM

Project: NTG2113

Operator Name: Megan and luke

Location Name: HBH5 Total Depth: 9.95 m Initial Depth to Water: 4.07 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/9/2020 11:37 AM	00:00	7.00 pH	10.45 °C	934.10 µS/cm	5.08 mg/L		142.9 mV	407.00 cm
12/9/2020 11:38 AM	01:00	7.00 pH	10.76 °C	960.85 µS/cm	2.29 mg/L		143.9 mV	407.00 cm
12/9/2020 11:39 AM	02:00	7.00 pH	11.20 °C	957.91 µS/cm	1.53 mg/L		143.6 mV	407.00 cm
12/9/2020 11:40 AM	03:00	7.00 pH	11.47 °C	957.27 µS/cm	1.15 mg/L		142.9 mV	407.00 cm
12/9/2020 11:41 AM	04:00	7.00 pH	11.61 °C	953.36 µS/cm	0.91 mg/L		141.9 mV	407.00 cm
12/9/2020 11:42 AM	05:00	7.00 pH	11.74 °C	952.02 µS/cm	0.83 mg/L		140.9 mV	407.00 cm
12/9/2020 11:43 AM	06:00	7.00 pH	11.84 °C	949.75 µS/cm	0.72 mg/L		139.8 mV	407.00 cm
12/9/2020 11:44 AM	07:00	7.00 pH	11.87 °C	950.19 µS/cm	0.65 mg/L		138.7 mV	407.00 cm
12/9/2020 11:45 AM	08:00	7.00 pH	11.93 °C	948.17 µS/cm	0.60 mg/L		137.7 mV	407.00 cm
12/9/2020 11:46 AM	09:00	6.99 pH	11.94 °C	948.36 µS/cm	0.54 mg/L		136.6 mV	407.00 cm
12/9/2020 11:47 AM	10:00	6.99 pH	11.96 °C	947.20 µS/cm	0.52 mg/L		135.7 mV	407.00 cm
12/9/2020 11:48 AM	11:00	6.99 pH	11.98 °C	945.85 µS/cm	0.50 mg/L		134.8 mV	407.00 cm
12/9/2020 11:49 AM	12:00	6.99 pH	12.02 °C	943.74 µS/cm	0.49 mg/L		133.9 mV	407.00 cm
12/9/2020 11:50 AM	13:00	6.99 pH	12.02 °C	942.31 µS/cm	0.48 mg/L		133.1 mV	407.00 cm
12/9/2020 11:51 AM	14:00	6.99 pH	12.02 °C	941.54 µS/cm	0.47 mg/L		132.3 mV	407.00 cm
12/9/2020 11:52 AM	15:00	6.99 pH	12.04 °C	939.99 µS/cm	0.46 mg/L		131.5 mV	407.00 cm
12/9/2020 11:53 AM	16:00	6.99 pH	12.02 °C	939.69 µS/cm	0.46 mg/L		130.9 mV	407.00 cm
12/9/2020 11:54 AM	17:00	6.99 pH	12.02 °C	939.20 µS/cm	0.45 mg/L		129.5 mV	407.00 cm

12/9/2020 11:55 AM	18:00	6.99 pH	12.02 °C	940.18 µS/cm	0.44 mg/L		129.2 mV	407.00 cm
12/9/2020 11:56 AM	19:00	6.99 pH	12.02 °C	941.85 µS/cm	0.44 mg/L		128.7 mV	407.00 cm
12/9/2020 11:57 AM	20:00	6.99 pH	12.03 °C	942.40 µS/cm	0.42 mg/L		128.1 mV	407.00 cm

Samples

Sample ID:	Description:
HBH5	Stabilised at 20 mins

Low-Flow Test Report:

Test Date / Time: 12/9/2020 12:08:22 PM

Project: NTG2113

Operator Name: Megan and luke

Location Name: HBH3 Total Depth: 11.24 m Initial Depth to Water: 4.775 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/9/2020 12:08 PM	00:00	6.99 pH	11.19 °C	1,299.4 µS/cm	2.14 mg/L		114.1 mV	477.50 cm
12/9/2020 12:09 PM	01:00	6.99 pH	11.19 °C	1,306.2 µS/cm	1.60 mg/L		123.8 mV	477.50 cm
12/9/2020 12:10 PM	02:00	6.99 pH	11.23 °C	1,310.7 µS/cm	1.24 mg/L		126.6 mV	477.50 cm
12/9/2020 12:11 PM	03:00	6.99 pH	11.28 °C	1,309.4 µS/cm	1.22 mg/L		127.7 mV	477.50 cm
12/9/2020 12:12 PM	04:00	6.99 pH	11.30 °C	1,311.6 µS/cm	1.08 mg/L		127.8 mV	477.50 cm
12/9/2020 12:13 PM	05:00	6.99 pH	11.33 °C	1,309.4 µS/cm	1.00 mg/L		127.6 mV	477.50 cm
12/9/2020 12:14 PM	06:00	6.99 pH	11.37 °C	1,308.6 µS/cm	0.97 mg/L		127.0 mV	477.50 cm
12/9/2020 12:15 PM	07:00	6.99 pH	11.42 °C	1,305.3 µS/cm	0.96 mg/L		126.3 mV	477.50 cm
12/9/2020 12:16 PM	08:00	6.99 pH	11.42 °C	1,303.6 µS/cm	0.94 mg/L		125.7 mV	477.50 cm
12/9/2020 12:17 PM	09:00	6.99 pH	11.46 °C	1,303.2 µS/cm	0.86 mg/L		124.7 mV	477.50 cm
12/9/2020 12:18 PM	10:00	6.99 pH	11.48 °C	1,303.8 µS/cm	0.78 mg/L		123.8 mV	477.50 cm
12/9/2020 12:19 PM	11:00	6.99 pH	11.52 °C	1,302.1 µS/cm	0.75 mg/L		122.9 mV	477.50 cm
12/9/2020 12:20 PM	12:00	6.99 pH	11.56 °C	1,299.5 µS/cm	0.73 mg/L		121.9 mV	477.50 cm
12/9/2020 12:21 PM	13:00	6.99 pH	11.59 °C	1,296.9 µS/cm	0.72 mg/L		121.0 mV	477.50 cm
12/9/2020 12:22 PM	14:00	6.99 pH	11.61 °C	1,290.0 µS/cm	0.70 mg/L		120.2 mV	477.50 cm
12/9/2020 12:23 PM	15:00	6.99 pH	11.58 °C	1,292.6 µS/cm	0.46 mg/L		119.5 mV	477.50 cm
12/9/2020 12:24 PM	16:00	6.99 pH	11.59 °C	1,291.3 µS/cm	0.40 mg/L		118.6 mV	477.50 cm
12/9/2020 12:25 PM	17:00	6.99 pH	11.61 °C	1,290.4 µS/cm	0.39 mg/L		117.7 mV	477.50 cm

12/9/2020 12:26 PM	18:00	6.99 pH	11.64 °C	1,287.1 µS/cm	0.38 mg/L		116.8 mV	477.50 cm
12/9/2020 12:27 PM	19:00	6.99 pH	11.65 °C	1,286.2 µS/cm	0.37 mg/L		116.0 mV	477.50 cm
12/9/2020 12:28 PM	20:00	6.99 pH	11.66 °C	1,283.2 µS/cm	0.37 mg/L		115.1 mV	477.50 cm
12/9/2020 12:29 PM	21:00	6.99 pH	11.67 °C	1,279.6 µS/cm	0.37 mg/L		114.4 mV	477.50 cm
12/9/2020 12:30 PM	22:00	6.99 pH	11.68 °C	1,277.4 µS/cm	0.36 mg/L		113.7 mV	477.50 cm
12/9/2020 12:31 PM	23:00	6.99 pH	11.66 °C	1,273.8 µS/cm	0.35 mg/L		112.9 mV	477.50 cm
12/9/2020 12:32 PM	24:00	6.99 pH	11.65 °C	1,272.5 µS/cm	0.37 mg/L		112.2 mV	477.50 cm
12/9/2020 12:33 PM	25:00	6.99 pH	11.61 °C	1,273.8 µS/cm	0.41 mg/L		111.5 mV	477.50 cm
12/9/2020 12:34 PM	26:00	6.99 pH	11.58 °C	1,272.2 µS/cm	0.44 mg/L		110.8 mV	477.50 cm

Samples

Sample ID:	Description:
HBH3	Stabilised at 26 mins

Low-Flow Test Report:

Test Date / Time: 12/9/2020 12:55:58 PM

Project: NTG2113

Operator Name: Megan and Luke

Location Name: DS05 Total Depth: 7.66 m Initial Depth to Water: 4.33 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/9/2020 12:55 PM	00:00	6.99 pH	10.77 °C	1,321.4 µS/cm	0.86 mg/L		67.9 mV	433.00 cm
12/9/2020 12:56 PM	01:00	6.99 pH	11.42 °C	1,289.8 µS/cm	0.55 mg/L		80.5 mV	433.00 cm
12/9/2020 12:57 PM	02:00	6.99 pH	11.93 °C	1,279.2 µS/cm	0.48 mg/L		86.2 mV	433.00 cm
12/9/2020 12:58 PM	03:00	6.99 pH	12.27 °C	1,293.4 µS/cm	0.46 mg/L		90.0 mV	433.00 cm
12/9/2020 12:59 PM	04:00	6.99 pH	12.44 °C	1,329.5 µS/cm	0.40 mg/L		92.8 mV	433.00 cm
12/9/2020 1:00 PM	05:00	6.99 pH	12.61 °C	1,327.5 µS/cm	0.39 mg/L		94.9 mV	433.00 cm
12/9/2020 1:01 PM	06:00	6.99 pH	12.67 °C	1,321.3 µS/cm	0.39 mg/L		96.5 mV	433.00 cm
12/9/2020 1:02 PM	07:00	6.99 pH	12.71 °C	1,320.3 µS/cm	0.41 mg/L		97.8 mV	433.00 cm
12/9/2020 1:03 PM	08:00	6.99 pH	12.73 °C	1,326.4 µS/cm	0.39 mg/L		98.8 mV	433.00 cm
12/9/2020 1:04 PM	09:00	6.99 pH	12.74 °C	1,334.0 µS/cm	0.39 mg/L		99.7 mV	433.00 cm
12/9/2020 1:05 PM	10:00	6.99 pH	12.76 °C	1,332.5 µS/cm	0.40 mg/L		100.4 mV	433.00 cm
12/9/2020 1:06 PM	11:00	6.99 pH	12.79 °C	1,324.1 µS/cm	0.40 mg/L		101.0 mV	433.00 cm
12/9/2020 1:07 PM	12:00	6.99 pH	12.80 °C	1,345.6 µS/cm	0.39 mg/L		101.4 mV	433.00 cm
12/9/2020 1:08 PM	13:00	6.99 pH	12.78 °C	1,354.1 µS/cm	0.39 mg/L		101.7 mV	433.00 cm
12/9/2020 1:09 PM	14:00	6.99 pH	12.77 °C	1,359.0 µS/cm	0.38 mg/L		102.0 mV	433.00 cm
12/9/2020 1:10 PM	15:00	6.99 pH	12.75 °C	1,306.9 µS/cm	0.37 mg/L		102.2 mV	433.00 cm
12/9/2020 1:11 PM	16:00	6.99 pH	12.74 °C	1,367.5 µS/cm	0.32 mg/L		102.4 mV	433.00 cm
12/9/2020 1:12 PM	17:00	6.99 pH	12.76 °C	1,371.6 µS/cm	0.31 mg/L		102.5 mV	433.00 cm

12/9/2020 1:13 PM	18:00	6.99 pH	12.76 °C	1,373.9 µS/cm	0.31 mg/L		102.5 mV	433.00 cm
12/9/2020 1:14 PM	19:00	6.99 pH	12.76 °C	1,371.0 µS/cm	0.31 mg/L		102.5 mV	433.00 cm
12/9/2020 1:15 PM	20:00	6.99 pH	12.75 °C	1,376.7 µS/cm	0.30 mg/L		102.5 mV	433.00 cm
12/9/2020 1:16 PM	21:00	6.99 pH	12.76 °C	1,372.6 µS/cm	0.32 mg/L		102.4 mV	433.00 cm
12/9/2020 1:17 PM	22:00	6.99 pH	12.76 °C	1,378.8 µS/cm	0.32 mg/L		102.2 mV	433.00 cm
12/9/2020 1:18 PM	23:00	6.99 pH	12.77 °C	1,381.8 µS/cm	0.31 mg/L		102.0 mV	433.00 cm
12/9/2020 1:19 PM	24:00	6.99 pH	12.76 °C	1,381.0 µS/cm	0.33 mg/L		101.8 mV	433.00 cm
12/9/2020 1:20 PM	25:00	6.99 pH	12.76 °C	1,381.8 µS/cm	0.33 mg/L		101.7 mV	433.00 cm
12/9/2020 1:21 PM	26:00	6.99 pH	12.80 °C	1,380.8 µS/cm	0.33 mg/L		101.5 mV	433.00 cm
12/9/2020 1:22 PM	27:00	6.99 pH	12.84 °C	1,380.5 µS/cm	0.32 mg/L		101.2 mV	433.00 cm
12/9/2020 1:23 PM	28:00	6.99 pH	12.76 °C	1,383.8 µS/cm	0.33 mg/L		101.0 mV	433.00 cm
12/9/2020 1:24 PM	29:00	6.99 pH	12.78 °C	1,382.7 µS/cm	0.32 mg/L		100.7 mV	433.00 cm
12/9/2020 1:25 PM	30:00	6.99 pH	12.80 °C	1,379.5 µS/cm	0.33 mg/L		100.4 mV	433.00 cm
12/9/2020 1:26 PM	31:00	6.99 pH	12.81 °C	1,386.7 µS/cm	0.33 mg/L		100.1 mV	433.00 cm
12/9/2020 1:27 PM	32:00	6.99 pH	12.75 °C	1,386.0 µS/cm	0.33 mg/L		99.8 mV	433.00 cm
12/9/2020 1:28 PM	33:00	6.99 pH	12.77 °C	1,385.5 µS/cm	0.31 mg/L		99.5 mV	433.00 cm
12/9/2020 1:29 PM	34:00	6.99 pH	12.78 °C	1,388.0 µS/cm	0.32 mg/L		99.2 mV	433.00 cm
12/9/2020 1:30 PM	35:00	6.99 pH	12.79 °C	1,386.3 µS/cm	0.33 mg/L		98.8 mV	433.00 cm
12/9/2020 1:31 PM	36:00	6.99 pH	12.80 °C	1,384.5 µS/cm	0.33 mg/L		98.5 mV	433.00 cm
12/9/2020 1:32 PM	37:00	6.99 pH	12.80 °C	1,385.6 µS/cm	0.32 mg/L		98.0 mV	433.00 cm

Samples

Sample ID:	Description:
DS05	Stabilised at 37 mins

Low-Flow Test Report:

Test Date / Time: 12/9/2020 1:47:27 PM

Project: NTG2113

Operator Name: Megan abdluke

Location Name: HBH1 Total Depth: 8.12 m Initial Depth to Water: 4.44 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/9/2020 1:47 PM	00:00	6.99 pH	11.69 °C	1,646.3 µS/cm	4.62 mg/L		65.5 mV	444.00 cm
12/9/2020 1:48 PM	01:00	6.99 pH	11.79 °C	1,711.3 µS/cm	1.04 mg/L		76.4 mV	444.00 cm
12/9/2020 1:49 PM	02:00	6.99 pH	12.07 °C	1,707.5 µS/cm	1.02 mg/L		82.0 mV	444.00 cm
12/9/2020 1:50 PM	03:00	6.99 pH	12.34 °C	1,701.0 µS/cm	1.24 mg/L		85.4 mV	444.00 cm
12/9/2020 1:51 PM	04:00	6.99 pH	12.44 °C	1,699.7 µS/cm	1.22 mg/L		87.8 mV	444.00 cm
12/9/2020 1:52 PM	05:00	6.99 pH	12.53 °C	1,696.9 µS/cm	0.63 mg/L		89.5 mV	444.00 cm
12/9/2020 1:53 PM	06:00	6.99 pH	12.63 °C	1,685.8 µS/cm	0.65 mg/L		90.8 mV	444.00 cm
12/9/2020 1:54 PM	07:00	6.99 pH	12.67 °C	1,681.2 µS/cm	0.71 mg/L		91.9 mV	444.00 cm
12/9/2020 1:55 PM	08:00	6.99 pH	12.69 °C	1,679.4 µS/cm	0.74 mg/L		92.8 mV	444.00 cm
12/9/2020 1:56 PM	09:00	6.99 pH	12.69 °C	1,678.6 µS/cm	0.72 mg/L		93.4 mV	444.00 cm
12/9/2020 1:57 PM	10:00	6.99 pH	12.71 °C	1,678.9 µS/cm	0.68 mg/L		93.9 mV	444.00 cm
12/9/2020 1:58 PM	11:00	6.99 pH	12.68 °C	1,678.6 µS/cm	0.57 mg/L		94.2 mV	444.00 cm
12/9/2020 1:59 PM	12:00	6.99 pH	12.75 °C	1,678.3 µS/cm	0.62 mg/L		93.4 mV	444.00 cm
12/9/2020 2:00 PM	13:00	6.99 pH	12.76 °C	1,676.6 µS/cm	0.63 mg/L		94.3 mV	444.00 cm
12/9/2020 2:01 PM	14:00	6.99 pH	12.76 °C	1,673.8 µS/cm	0.68 mg/L		94.7 mV	444.00 cm
12/9/2020 2:02 PM	15:00	6.99 pH	12.75 °C	1,673.5 µS/cm	0.68 mg/L		94.8 mV	444.00 cm
12/9/2020 2:03 PM	16:00	6.99 pH	12.76 °C	1,673.5 µS/cm	0.69 mg/L		94.9 mV	444.00 cm
12/9/2020 2:04 PM	17:00	6.99 pH	12.76 °C	1,672.9 µS/cm	0.68 mg/L		94.9 mV	444.00 cm

12/9/2020 2:05 PM	18:00	6.99 pH	12.76 °C	1,671.4 µS/cm	0.67 mg/L		94.8 mV	444.00 cm
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Samples

Sample ID:	Description:
HBH1	Stabilised after 18 mins

Low-Flow Test Report:

Test Date / Time: 12/9/2020 2:30:03 PM

Project: NTG2113

Operator Name: Megan okelly

Location Name: DS04 Total Depth: 7.69 m Initial Depth to Water: 3.74 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/9/2020 2:30 PM	00:00	6.99 pH	11.36 °C	983.89 µS/cm	0.60 mg/L		73.9 mV	374.00 cm
12/9/2020 2:31 PM	01:00	6.99 pH	11.77 °C	978.60 µS/cm	0.50 mg/L		88.7 mV	374.00 cm
12/9/2020 2:32 PM	02:00	6.99 pH	11.99 °C	975.55 µS/cm	0.46 mg/L		96.1 mV	374.00 cm
12/9/2020 2:33 PM	03:00	6.99 pH	12.13 °C	975.49 µS/cm	0.50 mg/L		101.1 mV	374.00 cm
12/9/2020 2:34 PM	04:00	6.99 pH	12.26 °C	975.65 µS/cm	0.49 mg/L		104.6 mV	374.00 cm
12/9/2020 2:35 PM	05:00	6.99 pH	12.33 °C	975.09 µS/cm	0.58 mg/L		107.6 mV	374.00 cm
12/9/2020 2:36 PM	06:00	6.99 pH	12.32 °C	976.43 µS/cm	0.57 mg/L		110.2 mV	374.00 cm
12/9/2020 2:37 PM	07:00	6.99 pH	12.39 °C	976.50 µS/cm	0.58 mg/L		112.0 mV	374.00 cm
12/9/2020 2:38 PM	08:00	6.99 pH	12.40 °C	977.69 µS/cm	0.56 mg/L		113.5 mV	374.00 cm
12/9/2020 2:39 PM	09:00	6.99 pH	12.41 °C	979.12 µS/cm	0.63 mg/L		112.1 mV	374.00 cm
12/9/2020 2:40 PM	10:00	6.99 pH	12.38 °C	981.07 µS/cm	0.62 mg/L		111.6 mV	374.00 cm
12/9/2020 2:41 PM	11:00	6.99 pH	12.37 °C	982.04 µS/cm	0.61 mg/L		115.8 mV	374.00 cm
12/9/2020 2:42 PM	12:00	6.99 pH	12.34 °C	983.19 µS/cm	0.60 mg/L		117.2 mV	374.00 cm
12/9/2020 2:43 PM	13:00	6.99 pH	12.34 °C	983.91 µS/cm	0.57 mg/L		118.3 mV	374.00 cm
12/9/2020 2:44 PM	14:00	6.99 pH	12.35 °C	986.01 µS/cm	0.59 mg/L		117.7 mV	374.00 cm
12/9/2020 2:45 PM	15:00	6.99 pH	12.39 °C	986.80 µS/cm	0.57 mg/L		119.0 mV	374.00 cm
12/9/2020 2:46 PM	16:00	6.99 pH	12.44 °C	986.96 µS/cm	0.55 mg/L		118.1 mV	374.00 cm
12/9/2020 2:47 PM	17:00	6.99 pH	12.48 °C	986.81 µS/cm	0.54 mg/L		119.0 mV	374.00 cm

12/9/2020 2:48 PM	18:00	6.99 pH	12.48 °C	986.93 µS/cm	0.57 mg/L		117.5 mV	374.00 cm
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Samples

Sample ID:	Description:
DS04	Stabilised after 18 mins

Low-Flow Test Report:

Test Date / Time: 12/10/2020 9:05:31 AM

Project: NTG2113

Operator Name: Megan O'Kelly

Location Name: DS02 Total Depth: 6.84 m Initial Depth to Water: 4.02 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/10/2020 9:05 AM	00:00	7.01 pH	7.99 °C	1,440.8 µS/cm	0.88 mg/L		271.8 mV	402.00 cm
12/10/2020 9:06 AM	01:00	7.00 pH	9.41 °C	1,404.2 µS/cm	0.85 mg/L		201.3 mV	402.00 cm
12/10/2020 9:07 AM	02:00	7.00 pH	10.26 °C	1,371.4 µS/cm	0.88 mg/L		181.1 mV	402.00 cm
12/10/2020 9:08 AM	03:00	7.00 pH	10.73 °C	1,342.6 µS/cm	1.12 mg/L		173.2 mV	402.00 cm
12/10/2020 9:09 AM	04:00	7.00 pH	11.10 °C	1,306.1 µS/cm	1.16 mg/L		169.1 mV	402.00 cm
12/10/2020 9:10 AM	05:00	7.00 pH	11.29 °C	1,281.2 µS/cm	1.28 mg/L		166.4 mV	402.00 cm
12/10/2020 9:11 AM	06:00	7.00 pH	11.44 °C	1,262.1 µS/cm	1.29 mg/L		164.3 mV	402.00 cm
12/10/2020 9:12 AM	07:00	7.00 pH	11.56 °C	1,249.5 µS/cm	1.30 mg/L		162.6 mV	402.00 cm
12/10/2020 9:13 AM	08:00	7.00 pH	11.61 °C	1,240.4 µS/cm	1.23 mg/L		161.3 mV	402.00 cm
12/10/2020 9:14 AM	09:00	7.00 pH	11.65 °C	1,238.3 µS/cm	1.24 mg/L		160.1 mV	402.00 cm
12/10/2020 9:15 AM	10:00	7.00 pH	11.75 °C	1,235.3 µS/cm	1.20 mg/L		159.1 mV	402.00 cm
12/10/2020 9:16 AM	11:00	7.00 pH	11.75 °C	1,241.5 µS/cm	1.19 mg/L		158.1 mV	402.00 cm
12/10/2020 9:17 AM	12:00	7.00 pH	11.79 °C	1,243.9 µS/cm	1.11 mg/L		157.3 mV	402.00 cm
12/10/2020 9:18 AM	13:00	7.00 pH	11.79 °C	1,247.7 µS/cm	1.03 mg/L		156.6 mV	402.00 cm
12/10/2020 9:19 AM	14:00	7.00 pH	11.84 °C	1,252.1 µS/cm	0.96 mg/L		155.9 mV	402.00 cm
12/10/2020 9:20 AM	15:00	7.00 pH	11.84 °C	1,256.1 µS/cm	0.97 mg/L		155.2 mV	402.00 cm
12/10/2020 9:21 AM	16:00	7.00 pH	11.86 °C	1,258.2 µS/cm	0.95 mg/L		154.6 mV	402.00 cm
12/10/2020 9:22 AM	17:00	7.00 pH	11.87 °C	1,261.6 µS/cm	0.94 mg/L		154.0 mV	402.00 cm

12/10/2020 9:23 AM	18:00	7.00 pH	11.88 °C	1,270.2 µS/cm	0.88 mg/L		153.4 mV	402.00 cm
12/10/2020 9:24 AM	19:00	7.00 pH	11.93 °C	1,180.8 µS/cm	0.86 mg/L		152.9 mV	402.00 cm
12/10/2020 9:25 AM	20:00	7.00 pH	11.92 °C	1,279.2 µS/cm	0.81 mg/L		152.3 mV	402.00 cm
12/10/2020 9:26 AM	21:00	7.00 pH	11.93 °C	1,281.0 µS/cm	0.70 mg/L		151.9 mV	402.00 cm
12/10/2020 9:27 AM	22:00	7.00 pH	11.93 °C	1,286.1 µS/cm	0.67 mg/L		151.4 mV	402.00 cm
12/10/2020 9:28 AM	23:00	7.00 pH	11.96 °C	1,288.4 µS/cm	0.62 mg/L		150.9 mV	402.00 cm
12/10/2020 9:29 AM	24:00	7.00 pH	11.96 °C	1,290.7 µS/cm	0.58 mg/L		150.4 mV	402.00 cm
12/10/2020 9:30 AM	25:00	7.00 pH	11.96 °C	1,293.3 µS/cm	0.57 mg/L		149.9 mV	402.00 cm

Samples

Sample ID:	Description:
DS02	Stabilised after 25 mins

Low-Flow Test Report:

Test Date / Time: 12/10/2020 9:44:23 AM

Project: NTG2113

Operator Name: Megan O'Kelly

Location Name: DS03 Total Depth: 7.68 m Initial Depth to Water: 4.16 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/10/2020 9:44 AM	00:00	7.00 pH	10.56 °C	1,105.1 µS/cm	2.63 mg/L		151.8 mV	416.00 cm
12/10/2020 9:45 AM	01:00	7.00 pH	10.77 °C	1,108.8 µS/cm	1.04 mg/L		151.8 mV	416.00 cm
12/10/2020 9:46 AM	02:00	7.00 pH	11.00 °C	1,104.5 µS/cm	0.69 mg/L		151.1 mV	416.00 cm
12/10/2020 9:47 AM	03:00	7.00 pH	11.12 °C	1,102.9 µS/cm	0.56 mg/L		150.2 mV	416.00 cm
12/10/2020 9:48 AM	04:00	7.00 pH	11.21 °C	1,100.5 µS/cm	0.52 mg/L		149.1 mV	416.00 cm
12/10/2020 9:49 AM	05:00	7.00 pH	11.28 °C	1,096.8 µS/cm	0.49 mg/L		147.9 mV	416.00 cm
12/10/2020 9:50 AM	06:00	7.00 pH	11.31 °C	1,095.6 µS/cm	0.46 mg/L		146.9 mV	416.00 cm
12/10/2020 9:51 AM	07:00	7.00 pH	11.33 °C	1,093.2 µS/cm	0.50 mg/L		145.1 mV	416.00 cm
12/10/2020 9:52 AM	08:00	7.00 pH	11.32 °C	1,091.2 µS/cm	0.55 mg/L		144.8 mV	416.00 cm
12/10/2020 9:53 AM	09:00	7.00 pH	11.29 °C	1,093.7 µS/cm	0.56 mg/L		144.0 mV	416.00 cm
12/10/2020 9:54 AM	10:00	7.00 pH	11.24 °C	1,095.8 µS/cm	0.56 mg/L		143.2 mV	416.00 cm
12/10/2020 9:55 AM	11:00	7.00 pH	11.22 °C	1,097.2 µS/cm	0.56 mg/L		142.5 mV	416.00 cm
12/10/2020 9:56 AM	12:00	7.00 pH	11.19 °C	1,101.6 µS/cm	0.51 mg/L		141.6 mV	416.00 cm
12/10/2020 9:57 AM	13:00	7.00 pH	11.23 °C	1,102.1 µS/cm	0.47 mg/L		140.7 mV	416.00 cm
12/10/2020 9:58 AM	14:00	7.00 pH	11.28 °C	1,101.4 µS/cm	0.44 mg/L		140.0 mV	416.00 cm
12/10/2020 9:59 AM	15:00	7.00 pH	11.30 °C	1,100.5 µS/cm	0.42 mg/L		139.2 mV	416.00 cm
12/10/2020 10:00 AM	16:00	7.00 pH	11.33 °C	1,099.4 µS/cm	0.42 mg/L		138.6 mV	416.00 cm
12/10/2020 10:01 AM	17:00	7.00 pH	11.33 °C	1,098.5 µS/cm	0.41 mg/L		138.0 mV	416.00 cm

Samples

Sample ID:	Description:
DS03	Stabilised after 17 mins

Low-Flow Test Report:

Test Date / Time: 12/10/2020 10:14:50 AM

Project: NTG2113

Operator Name: Megan O'Kelly

Location Name: DS01 Total Depth: 7.79 m Initial Depth to Water: 4.2 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
12/10/2020 10:14 AM	00:00	7.00 pH	10.45 °C	1,113.2 µS/cm	1.77 mg/L		118.7 mV	420.00 cm
12/10/2020 10:15 AM	01:00	7.00 pH	10.71 °C	1,114.1 µS/cm	1.84 mg/L		133.1 mV	420.00 cm
12/10/2020 10:16 AM	02:00	7.00 pH	10.91 °C	1,112.1 µS/cm	1.78 mg/L		137.0 mV	420.00 cm
12/10/2020 10:17 AM	03:00	7.00 pH	11.06 °C	1,100.8 µS/cm	1.61 mg/L		138.5 mV	420.00 cm
12/10/2020 10:18 AM	04:00	7.00 pH	11.19 °C	1,106.3 µS/cm	1.90 mg/L		139.2 mV	420.00 cm
12/10/2020 10:19 AM	05:00	7.00 pH	11.24 °C	1,105.0 µS/cm	2.39 mg/L		139.4 mV	420.00 cm
12/10/2020 10:20 AM	06:00	7.00 pH	11.30 °C	1,105.3 µS/cm	2.60 mg/L		139.3 mV	420.00 cm
12/10/2020 10:21 AM	07:00	7.00 pH	11.35 °C	1,087.6 µS/cm	3.16 mg/L		139.1 mV	420.00 cm
12/10/2020 10:22 AM	08:00	7.00 pH	11.37 °C	1,104.4 µS/cm	2.07 mg/L		138.9 mV	420.00 cm
12/10/2020 10:23 AM	09:00	7.00 pH	11.42 °C	1,094.0 µS/cm	2.24 mg/L		138.6 mV	420.00 cm
12/10/2020 10:24 AM	10:00	7.00 pH	11.44 °C	1,097.2 µS/cm	3.41 mg/L		138.2 mV	420.00 cm
12/10/2020 10:25 AM	11:00	7.00 pH	11.45 °C	1,104.3 µS/cm	2.70 mg/L		137.8 mV	420.00 cm
12/10/2020 10:26 AM	12:00	7.00 pH	11.47 °C	1,112.8 µS/cm	3.31 mg/L		137.4 mV	420.00 cm
12/10/2020 10:27 AM	13:00	7.00 pH	11.49 °C	1,110.9 µS/cm	2.10 mg/L		137.0 mV	420.00 cm
12/10/2020 10:28 AM	14:00	7.00 pH	11.51 °C	1,107.7 µS/cm	3.06 mg/L		136.4 mV	420.00 cm
12/10/2020 10:29 AM	15:00	7.00 pH	11.51 °C	1,102.1 µS/cm	3.27 mg/L		136.0 mV	420.00 cm
12/10/2020 10:30 AM	16:00	7.00 pH	11.56 °C	1,085.3 µS/cm	3.38 mg/L		135.4 mV	420.00 cm
12/10/2020 10:31 AM	17:00	7.00 pH	11.56 °C	1,109.4 µS/cm	3.09 mg/L		135.0 mV	420.00 cm

12/10/2020 10:32 AM	18:00	7.00 pH	11.58 °C	1,096.0 µS/cm	3.06 mg/L		134.5 mV	420.00 cm
12/10/2020 10:33 AM	19:00	7.00 pH	11.60 °C	1,102.7 µS/cm	3.60 mg/L		134.0 mV	420.00 cm
12/10/2020 10:34 AM	20:00	7.00 pH	11.61 °C	1,109.2 µS/cm	2.54 mg/L		133.6 mV	420.00 cm
12/10/2020 10:35 AM	21:00	7.00 pH	11.61 °C	1,111.6 µS/cm	3.29 mg/L		133.1 mV	420.00 cm
12/10/2020 10:36 AM	22:00	7.00 pH	11.62 °C	1,106.0 µS/cm	3.30 mg/L		132.8 mV	420.00 cm
12/10/2020 10:37 AM	23:00	7.00 pH	11.64 °C	1,103.2 µS/cm	3.56 mg/L		132.2 mV	420.00 cm
12/10/2020 10:38 AM	24:00	7.00 pH	11.63 °C	1,099.4 µS/cm	3.58 mg/L		131.8 mV	420.00 cm
12/10/2020 10:39 AM	25:00	7.00 pH	11.65 °C	1,087.4 µS/cm	1.67 mg/L		131.3 mV	420.00 cm
12/10/2020 10:40 AM	26:00	7.00 pH	11.65 °C	1,098.9 µS/cm	2.57 mg/L		130.9 mV	420.00 cm

Samples

Sample ID:	Description:
DS01	Did not stabilise after 26 mins

Low-Flow Test Report:

Test Date / Time: 28/06/2021 10:00:06

Project: NTG2113

Operator Name: Mok

Location Name: HBH2 Total Depth: 7.72 m Initial Depth to Water: 4.11 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 10:00	00:00	7.10 pH	15.74 °C	661.21 µS/cm	5.36 mg/L		338.7 mV	411.00 cm
28/06/2021 10:01	01:00	7.10 pH	14.52 °C	687.71 µS/cm	0.72 mg/L		303.1 mV	411.00 cm
28/06/2021 10:02	02:00	7.10 pH	13.87 °C	692.00 µS/cm	0.38 mg/L		281.9 mV	411.00 cm
28/06/2021 10:03	03:00	7.10 pH	13.31 °C	698.43 µS/cm	0.29 mg/L		269.1 mV	411.00 cm
28/06/2021 10:04	04:00	7.10 pH	12.98 °C	701.20 µS/cm	0.25 mg/L		260.1 mV	411.00 cm
28/06/2021 10:05	05:00	7.10 pH	12.75 °C	702.07 µS/cm	0.23 mg/L		253.6 mV	411.00 cm
28/06/2021 10:06	06:00	7.10 pH	12.59 °C	703.24 µS/cm	0.21 mg/L		248.5 mV	411.00 cm
28/06/2021 10:07	07:00	7.10 pH	12.48 °C	703.92 µS/cm	0.19 mg/L		244.4 mV	411.00 cm
28/06/2021 10:08	08:00	7.10 pH	12.41 °C	702.57 µS/cm	0.18 mg/L		241.4 mV	411.00 cm
28/06/2021 10:09	09:00	7.10 pH	12.35 °C	702.59 µS/cm	0.18 mg/L		238.6 mV	411.00 cm
28/06/2021 10:10	10:00	7.10 pH	12.31 °C	703.56 µS/cm	0.17 mg/L		235.8 mV	411.00 cm
28/06/2021 10:11	11:00	7.09 pH	12.30 °C	703.68 µS/cm	0.17 mg/L		233.5 mV	411.00 cm
28/06/2021 10:12	12:00	7.09 pH	12.32 °C	708.16 µS/cm	0.17 mg/L		232.6 mV	411.00 cm
28/06/2021 10:13	13:00	7.09 pH	12.43 °C	699.15 µS/cm	0.18 mg/L		230.6 mV	411.00 cm
28/06/2021 10:14	14:00	7.09 pH	12.33 °C	695.82 µS/cm	0.15 mg/L		228.6 mV	411.00 cm
28/06/2021 10:15	15:00	7.09 pH	12.21 °C	697.18 µS/cm	0.14 mg/L		227.2 mV	411.00 cm
28/06/2021 10:16	16:00	7.09 pH	12.11 °C	696.11 µS/cm	0.13 mg/L		225.7 mV	411.00 cm
28/06/2021 10:17	17:00	7.09 pH	12.05 °C	694.59 µS/cm	0.12 mg/L		224.3 mV	411.00 cm

28/06/2021 10:18	18:00	7.09 pH	11.98 °C	695.89 µS/cm	0.11 mg/L		223.4 mV	411.00 cm
28/06/2021 10:19	19:00	7.09 pH	11.92 °C	695.52 µS/cm	0.11 mg/L		222.4 mV	411.00 cm
28/06/2021 10:20	20:00	7.09 pH	11.88 °C	696.81 µS/cm	0.10 mg/L		221.6 mV	411.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 28/06/2021 10:30:36

Project: NTG2113

Operator Name: Mok

Location Name: HBH4 Total Depth: 6.58 m Initial Depth to Water: 3.95 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 10:30	00:00	7.10 pH	13.30 °C	634.30 µS/cm	5.23 mg/L		372.7 mV	395.00 cm
28/06/2021 10:31	01:00	7.10 pH	12.57 °C	646.72 µS/cm	0.80 mg/L		315.8 mV	395.00 cm
28/06/2021 10:32	02:00	7.10 pH	11.93 °C	649.78 µS/cm	0.38 mg/L		284.3 mV	395.00 cm
28/06/2021 10:33	03:00	7.10 pH	11.47 °C	654.44 µS/cm	0.29 mg/L		265.7 mV	395.00 cm
28/06/2021 10:34	04:00	7.09 pH	11.24 °C	652.57 µS/cm	0.24 mg/L		254.0 mV	395.00 cm
28/06/2021 10:35	05:00	7.09 pH	11.12 °C	652.27 µS/cm	0.22 mg/L		246.4 mV	395.00 cm
28/06/2021 10:36	06:00	7.09 pH	11.05 °C	649.38 µS/cm	0.20 mg/L		241.0 mV	395.00 cm
28/06/2021 10:37	07:00	7.09 pH	10.99 °C	645.86 µS/cm	0.18 mg/L		236.8 mV	395.00 cm
28/06/2021 10:38	08:00	7.09 pH	10.93 °C	644.82 µS/cm	0.17 mg/L		233.5 mV	395.00 cm
28/06/2021 10:39	09:00	7.09 pH	10.92 °C	644.01 µS/cm	0.16 mg/L		230.9 mV	395.00 cm
28/06/2021 10:40	10:00	7.09 pH	10.90 °C	643.47 µS/cm	0.15 mg/L		228.8 mV	395.00 cm
28/06/2021 10:41	11:00	7.09 pH	10.87 °C	644.64 µS/cm	0.15 mg/L		227.1 mV	395.00 cm
28/06/2021 10:42	12:00	7.09 pH	10.85 °C	646.06 µS/cm	0.14 mg/L		225.5 mV	395.00 cm
28/06/2021 10:43	13:00	7.09 pH	10.84 °C	647.87 µS/cm	0.14 mg/L		224.4 mV	395.00 cm
28/06/2021 10:44	14:00	7.09 pH	10.84 °C	649.61 µS/cm	0.13 mg/L		223.2 mV	395.00 cm
28/06/2021 10:45	15:00	7.09 pH	10.83 °C	651.59 µS/cm	0.13 mg/L		222.3 mV	395.00 cm
28/06/2021 10:46	16:00	7.09 pH	10.82 °C	652.56 µS/cm	0.12 mg/L		221.5 mV	395.00 cm
28/06/2021 10:47	17:00	7.10 pH	10.78 °C	653.59 µS/cm	0.12 mg/L		220.7 mV	395.00 cm

28/06/2021 10:48	18:00	7.10 pH	10.75 °C	654.82 µS/cm	0.11 mg/L		220.0 mV	395.00 cm
28/06/2021 10:49	19:00	7.09 pH	10.74 °C	655.55 µS/cm	0.10 mg/L		219.3 mV	395.00 cm
28/06/2021 10:50	20:00	7.10 pH	10.74 °C	654.29 µS/cm	0.09 mg/L		219.5 mV	395.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 28/06/2021 11:03:20

Project: NtG2113

Operator Name: Mok

Location Name: HBH5 Total Depth: 9.89 m Initial Depth to Water: 4.2 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 11:03	00:00	7.10 pH	12.58 °C	689.01 µS/cm	6.05 mg/L		384.7 mV	420.00 cm
28/06/2021 11:04	01:00	7.10 pH	12.28 °C	635.80 µS/cm	1.20 mg/L		328.6 mV	420.00 cm
28/06/2021 11:05	02:00	7.10 pH	12.16 °C	629.67 µS/cm	0.77 mg/L		300.0 mV	420.00 cm
28/06/2021 11:06	03:00	7.10 pH	12.13 °C	626.63 µS/cm	0.69 mg/L		283.0 mV	420.00 cm
28/06/2021 11:07	04:00	7.10 pH	12.11 °C	635.33 µS/cm	0.62 mg/L		272.2 mV	420.00 cm
28/06/2021 11:08	05:00	7.10 pH	12.12 °C	636.37 µS/cm	0.59 mg/L		265.1 mV	420.00 cm
28/06/2021 11:09	06:00	7.10 pH	12.11 °C	640.49 µS/cm	0.56 mg/L		260.2 mV	420.00 cm
28/06/2021 11:10	07:00	7.10 pH	12.11 °C	641.90 µS/cm	0.54 mg/L		256.7 mV	420.00 cm
28/06/2021 11:11	08:00	7.10 pH	12.07 °C	647.09 µS/cm	0.52 mg/L		254.2 mV	420.00 cm
28/06/2021 11:12	09:00	7.10 pH	12.07 °C	646.73 µS/cm	0.49 mg/L		252.3 mV	420.00 cm
28/06/2021 11:13	10:00	7.10 pH	12.05 °C	645.87 µS/cm	0.45 mg/L		250.9 mV	420.00 cm
28/06/2021 11:14	11:00	7.10 pH	12.04 °C	652.13 µS/cm	0.42 mg/L		249.8 mV	420.00 cm
28/06/2021 11:15	12:00	7.10 pH	12.04 °C	654.55 µS/cm	0.40 mg/L		248.8 mV	420.00 cm
28/06/2021 11:16	13:00	7.10 pH	12.05 °C	652.51 µS/cm	0.38 mg/L		247.9 mV	420.00 cm
28/06/2021 11:17	14:00	7.10 pH	12.02 °C	650.85 µS/cm	0.37 mg/L		247.3 mV	420.00 cm
28/06/2021 11:18	15:00	7.10 pH	12.02 °C	647.09 µS/cm	0.36 mg/L		246.7 mV	420.00 cm
28/06/2021 11:19	16:00	7.10 pH	12.01 °C	647.86 µS/cm	0.35 mg/L		246.4 mV	420.00 cm
28/06/2021 11:20	17:00	7.10 pH	11.98 °C	643.31 µS/cm	0.37 mg/L		246.2 mV	420.00 cm

28/06/2021 11:21	18:00	7.10 pH	12.02 °C	651.99 µS/cm	0.34 mg/L		246.0 mV	420.00 cm
28/06/2021 11:22	19:00	7.10 pH	12.02 °C	652.52 µS/cm	0.33 mg/L		245.6 mV	420.00 cm
28/06/2021 11:23	20:00	7.10 pH	11.98 °C	654.87 µS/cm	0.31 mg/L		245.2 mV	420.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 28/06/2021 11:35:37

Project: NTG2113

Operator Name: Mok

Location Name: HBH3 Total Depth: 11.11 m Initial Depth to Water: 4.48 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 11:35	00:00	7.09 pH	13.26 °C	1,326.6 µS/cm	5.16 mg/L		405.3 mV	448.00 cm
28/06/2021 11:36	01:00	7.10 pH	12.71 °C	1,337.7 µS/cm	0.64 mg/L		320.0 mV	448.00 cm
28/06/2021 11:37	02:00	7.09 pH	12.35 °C	1,344.2 µS/cm	0.37 mg/L		278.7 mV	448.00 cm
28/06/2021 11:38	03:00	7.09 pH	12.11 °C	1,351.9 µS/cm	0.29 mg/L		256.1 mV	448.00 cm
28/06/2021 11:39	04:00	7.09 pH	11.98 °C	1,356.8 µS/cm	0.25 mg/L		243.9 mV	448.00 cm
28/06/2021 11:40	05:00	7.09 pH	11.93 °C	1,354.5 µS/cm	0.22 mg/L		235.5 mV	448.00 cm
28/06/2021 11:41	06:00	7.09 pH	11.84 °C	1,355.6 µS/cm	0.20 mg/L		230.1 mV	448.00 cm
28/06/2021 11:42	07:00	7.09 pH	11.79 °C	1,357.4 µS/cm	0.19 mg/L		226.5 mV	448.00 cm
28/06/2021 11:43	08:00	7.09 pH	11.79 °C	1,358.7 µS/cm	0.18 mg/L		223.8 mV	448.00 cm
28/06/2021 11:44	09:00	7.09 pH	11.79 °C	1,358.1 µS/cm	0.17 mg/L		221.5 mV	448.00 cm
28/06/2021 11:45	10:00	7.09 pH	11.77 °C	1,357.6 µS/cm	0.16 mg/L		219.6 mV	448.00 cm
28/06/2021 11:46	11:00	7.09 pH	11.77 °C	1,358.6 µS/cm	0.16 mg/L		217.9 mV	448.00 cm
28/06/2021 11:47	12:00	7.09 pH	11.75 °C	1,358.6 µS/cm	0.15 mg/L		216.4 mV	448.00 cm
28/06/2021 11:48	13:00	7.09 pH	11.74 °C	1,359.7 µS/cm	0.15 mg/L		214.9 mV	448.00 cm
28/06/2021 11:49	14:00	7.09 pH	11.74 °C	1,359.6 µS/cm	0.14 mg/L		213.6 mV	448.00 cm
28/06/2021 11:50	15:00	7.09 pH	11.71 °C	1,358.8 µS/cm	0.13 mg/L		212.4 mV	448.00 cm
28/06/2021 11:51	16:00	7.09 pH	11.70 °C	1,357.3 µS/cm	0.13 mg/L		211.3 mV	448.00 cm
28/06/2021 11:52	17:00	7.09 pH	11.70 °C	1,356.4 µS/cm	0.13 mg/L		210.3 mV	448.00 cm

28/06/2021 11:53	18:00	7.09 pH	11.70 °C	1,354.8 µS/cm	0.12 mg/L		209.5 mV	448.00 cm
28/06/2021 11:54	19:00	7.09 pH	11.70 °C	1,359.0 µS/cm	0.12 mg/L		208.5 mV	448.00 cm
28/06/2021 11:55	20:00	7.09 pH	11.70 °C	1,357.7 µS/cm	0.12 mg/L		207.7 mV	448.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 28/06/2021 12:23:40

Project: NTG2113

Operator Name: Mok

Location Name: DS05 Total Depth: 7.58 m Initial Depth to Water: 4.39 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 12:23	00:00	7.09 pH	15.43 °C	1,170.0 µS/cm	2.32 mg/L		402.5 mV	439.00 cm
28/06/2021 12:24	01:00	7.09 pH	14.39 °C	1,222.3 µS/cm	0.53 mg/L		328.7 mV	439.00 cm
28/06/2021 12:25	02:00	7.09 pH	13.76 °C	1,240.9 µS/cm	0.39 mg/L		292.1 mV	439.00 cm
28/06/2021 12:26	03:00	7.09 pH	13.49 °C	1,247.2 µS/cm	0.36 mg/L		271.3 mV	439.00 cm
28/06/2021 12:27	04:00	7.09 pH	13.26 °C	1,252.6 µS/cm	0.32 mg/L		258.1 mV	439.00 cm
28/06/2021 12:28	05:00	7.09 pH	13.19 °C	1,256.0 µS/cm	0.29 mg/L		249.5 mV	439.00 cm
28/06/2021 12:29	06:00	7.09 pH	13.13 °C	1,258.2 µS/cm	0.27 mg/L		243.3 mV	439.00 cm
28/06/2021 12:30	07:00	7.09 pH	13.12 °C	1,259.6 µS/cm	0.26 mg/L		238.8 mV	439.00 cm
28/06/2021 12:31	08:00	7.09 pH	13.14 °C	1,262.1 µS/cm	0.25 mg/L		235.3 mV	439.00 cm
28/06/2021 12:32	09:00	7.09 pH	13.38 °C	1,264.3 µS/cm	0.48 mg/L		232.5 mV	439.00 cm
28/06/2021 12:33	10:00	7.09 pH	13.35 °C	1,251.5 µS/cm	0.47 mg/L		229.9 mV	439.00 cm
28/06/2021 12:34	11:00	7.09 pH	13.27 °C	1,246.0 µS/cm	0.45 mg/L		228.1 mV	439.00 cm
28/06/2021 12:35	12:00	7.09 pH	13.24 °C	1,250.4 µS/cm	0.44 mg/L		226.7 mV	439.00 cm
28/06/2021 12:36	13:00	7.09 pH	13.35 °C	1,240.6 µS/cm	0.47 mg/L		225.1 mV	439.00 cm
28/06/2021 12:37	14:00	7.09 pH	13.07 °C	1,230.2 µS/cm	0.44 mg/L		223.5 mV	439.00 cm
28/06/2021 12:38	15:00	7.09 pH	12.87 °C	1,232.3 µS/cm	0.40 mg/L		221.9 mV	439.00 cm
28/06/2021 12:39	16:00	7.09 pH	12.76 °C	1,235.7 µS/cm	0.37 mg/L		220.7 mV	439.00 cm
28/06/2021 12:40	17:00	7.09 pH	12.69 °C	1,227.3 µS/cm	0.34 mg/L		219.6 mV	439.00 cm

28/06/2021 12:41	18:00	7.09 pH	12.68 °C	1,218.8 µS/cm	0.29 mg/L		218.9 mV	439.00 cm
28/06/2021 12:42	19:00	7.09 pH	12.67 °C	1,216.6 µS/cm	0.28 mg/L		218.4 mV	439.00 cm
28/06/2021 12:43	20:00	7.09 pH	12.67 °C	1,214.8 µS/cm	0.26 mg/L		217.9 mV	439.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 28/06/2021 12:57:19

Project: NTG2113

Operator Name: Mok

Location Name: HBH1 Total Depth: 8.07 m Initial Depth to Water: 4.54 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 12:57	00:00	7.09 pH	13.98 °C	1,604.3 µS/cm	3.88 mg/L		372.3 mV	454.00 cm
28/06/2021 12:58	01:00	7.09 pH	13.58 °C	1,620.7 µS/cm	2.72 mg/L		294.8 mV	454.00 cm
28/06/2021 12:59	02:00	7.09 pH	13.35 °C	1,628.4 µS/cm	2.47 mg/L		260.8 mV	454.00 cm
28/06/2021 13:00	03:00	7.09 pH	13.17 °C	1,632.0 µS/cm	2.20 mg/L		242.3 mV	454.00 cm
28/06/2021 13:01	04:00	7.09 pH	13.08 °C	1,634.7 µS/cm	1.99 mg/L		231.1 mV	454.00 cm
28/06/2021 13:02	05:00	7.09 pH	13.03 °C	1,634.4 µS/cm	1.86 mg/L		224.0 mV	454.00 cm
28/06/2021 13:03	06:00	7.09 pH	12.96 °C	1,633.8 µS/cm	1.79 mg/L		219.0 mV	454.00 cm
28/06/2021 13:04	07:00	7.09 pH	12.92 °C	1,633.1 µS/cm	0.87 mg/L		215.2 mV	454.00 cm
28/06/2021 13:05	08:00	7.09 pH	12.85 °C	1,630.9 µS/cm	0.48 mg/L		212.0 mV	454.00 cm
28/06/2021 13:06	09:00	7.09 pH	12.80 °C	1,630.7 µS/cm	0.42 mg/L		209.5 mV	454.00 cm
28/06/2021 13:07	10:00	7.09 pH	12.76 °C	1,629.4 µS/cm	0.40 mg/L		207.3 mV	454.00 cm
28/06/2021 13:08	11:00	7.09 pH	12.75 °C	1,625.4 µS/cm	0.38 mg/L		205.5 mV	454.00 cm
28/06/2021 13:09	12:00	7.09 pH	12.70 °C	1,623.9 µS/cm	0.35 mg/L		203.9 mV	454.00 cm
28/06/2021 13:10	13:00	7.09 pH	12.69 °C	1,622.7 µS/cm	0.33 mg/L		202.6 mV	454.00 cm
28/06/2021 13:11	14:00	7.09 pH	12.68 °C	1,619.7 µS/cm	0.32 mg/L		201.4 mV	454.00 cm
28/06/2021 13:12	15:00	7.09 pH	12.70 °C	1,614.0 µS/cm	0.31 mg/L		200.3 mV	454.00 cm
28/06/2021 13:13	16:00	7.09 pH	12.67 °C	1,612.2 µS/cm	0.30 mg/L		199.1 mV	454.00 cm
28/06/2021 13:14	17:00	7.09 pH	12.66 °C	1,617.4 µS/cm	0.27 mg/L		198.0 mV	454.00 cm

28/06/2021 13:15	18:00	7.09 pH	12.67 °C	1,615.8 µS/cm	0.26 mg/L		197.0 mV	454.00 cm
28/06/2021 13:16	19:00	7.09 pH	12.68 °C	1,613.6 µS/cm	0.26 mg/L		196.2 mV	454.00 cm
28/06/2021 13:17	20:00	7.09 pH	12.70 °C	1,611.9 µS/cm	0.25 mg/L		195.5 mV	454.00 cm
28/06/2021 13:17	20:14	7.09 pH	12.71 °C	1,611.7 µS/cm	0.25 mg/L		195.2 mV	454.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 28/06/2021 13:29:58

Project: NTG2113

Operator Name: Mok

Location Name: DS04 Total Depth: 7.69 m Initial Depth to Water: 4.16 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 13:29	00:00	7.09 pH	14.21 °C	633.67 µS/cm	1.76 mg/L		315.6 mV	416.00 cm
28/06/2021 13:30	01:00	7.09 pH	13.90 °C	641.88 µS/cm	0.16 mg/L		264.2 mV	416.00 cm
28/06/2021 13:31	02:00	7.09 pH	13.69 °C	645.26 µS/cm	0.13 mg/L		223.0 mV	416.00 cm
28/06/2021 13:32	03:00	7.09 pH	13.30 °C	743.38 µS/cm	0.09 mg/L		203.5 mV	416.00 cm
28/06/2021 13:33	04:00	7.09 pH	12.81 °C	785.64 µS/cm	0.09 mg/L		193.3 mV	416.00 cm
28/06/2021 13:34	05:00	7.09 pH	12.67 °C	795.83 µS/cm	0.08 mg/L		187.0 mV	416.00 cm
28/06/2021 13:35	06:00	7.09 pH	12.64 °C	818.56 µS/cm	0.07 mg/L		182.0 mV	416.00 cm
28/06/2021 13:36	07:00	7.09 pH	12.68 °C	813.30 µS/cm	0.08 mg/L		179.0 mV	416.00 cm
28/06/2021 13:37	08:00	7.09 pH	12.55 °C	816.51 µS/cm	0.07 mg/L		176.3 mV	416.00 cm
28/06/2021 13:38	09:00	7.09 pH	12.46 °C	829.88 µS/cm	0.07 mg/L		174.2 mV	416.00 cm
28/06/2021 13:39	10:00	7.09 pH	12.44 °C	834.23 µS/cm	0.07 mg/L		173.4 mV	416.00 cm
28/06/2021 13:40	11:00	7.09 pH	12.42 °C	838.21 µS/cm	0.08 mg/L		172.2 mV	416.00 cm
28/06/2021 13:41	12:00	7.09 pH	12.39 °C	843.36 µS/cm	0.09 mg/L		171.7 mV	416.00 cm
28/06/2021 13:42	13:00	7.09 pH	12.39 °C	846.99 µS/cm	0.09 mg/L		171.2 mV	416.00 cm
28/06/2021 13:43	14:00	7.09 pH	12.35 °C	847.51 µS/cm	0.09 mg/L		170.4 mV	416.00 cm
28/06/2021 13:44	15:00	7.09 pH	12.34 °C	847.67 µS/cm	0.08 mg/L		169.7 mV	416.00 cm
28/06/2021 13:45	16:00	7.09 pH	12.33 °C	852.76 µS/cm	0.08 mg/L		169.0 mV	416.00 cm
28/06/2021 13:46	17:00	7.09 pH	12.31 °C	854.63 µS/cm	0.08 mg/L		168.9 mV	416.00 cm

28/06/2021 13:47	18:00	7.09 pH	12.30 °C	855.45 µS/cm	0.08 mg/L		168.6 mV	416.00 cm
28/06/2021 13:48	19:00	7.09 pH	12.28 °C	857.46 µS/cm	0.08 mg/L		168.3 mV	416.00 cm
28/06/2021 13:49	20:00	7.09 pH	12.23 °C	860.31 µS/cm	0.10 mg/L		168.1 mV	416.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 28/06/2021 14:20:00

Project: NTG2113

Operator Name: Mok

Location Name: DS02 Total Depth: 6.8 m Initial Depth to Water: 4.13 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
28/06/2021 14:20	00:00	7.09 pH	14.40 °C	1,234.5 µS/cm	4.51 mg/L		309.5 mV	413.00 cm
28/06/2021 14:21	01:00	7.09 pH	13.40 °C	1,255.3 µS/cm	1.70 mg/L		232.0 mV	413.00 cm
28/06/2021 14:22	02:00	7.09 pH	12.82 °C	1,261.9 µS/cm	1.44 mg/L		201.1 mV	413.00 cm
28/06/2021 14:23	03:00	7.09 pH	12.39 °C	1,269.0 µS/cm	1.25 mg/L		185.1 mV	413.00 cm
28/06/2021 14:24	04:00	7.09 pH	12.21 °C	1,279.5 µS/cm	0.95 mg/L		176.3 mV	413.00 cm
28/06/2021 14:25	05:00	7.09 pH	12.25 °C	1,282.5 µS/cm	0.83 mg/L		170.0 mV	413.00 cm
28/06/2021 14:26	06:00	7.09 pH	12.25 °C	1,285.7 µS/cm	0.74 mg/L		166.0 mV	413.00 cm
28/06/2021 14:27	07:00	7.09 pH	12.29 °C	1,282.1 µS/cm	0.67 mg/L		162.3 mV	413.00 cm
28/06/2021 14:28	08:00	7.09 pH	12.30 °C	1,280.4 µS/cm	0.62 mg/L		159.9 mV	413.00 cm
28/06/2021 14:29	09:00	7.09 pH	12.30 °C	1,276.5 µS/cm	0.58 mg/L		157.8 mV	413.00 cm
28/06/2021 14:30	10:00	7.09 pH	12.30 °C	1,275.6 µS/cm	0.55 mg/L		156.5 mV	413.00 cm
28/06/2021 14:31	11:00	7.09 pH	12.34 °C	1,268.5 µS/cm	0.52 mg/L		155.2 mV	413.00 cm
28/06/2021 14:32	12:00	7.09 pH	12.25 °C	1,261.8 µS/cm	0.47 mg/L		153.9 mV	413.00 cm
28/06/2021 14:33	13:00	7.09 pH	12.23 °C	1,263.1 µS/cm	0.46 mg/L		153.1 mV	413.00 cm
28/06/2021 14:34	14:00	7.09 pH	12.21 °C	1,259.8 µS/cm	0.44 mg/L		152.5 mV	413.00 cm
28/06/2021 14:35	15:00	7.09 pH	12.17 °C	1,256.7 µS/cm	0.43 mg/L		151.8 mV	413.00 cm
28/06/2021 14:36	16:00	7.09 pH	12.17 °C	1,257.7 µS/cm	0.41 mg/L		151.0 mV	413.00 cm
28/06/2021 14:37	17:00	7.09 pH	12.19 °C	1,252.4 µS/cm	0.35 mg/L		150.3 mV	413.00 cm

28/06/2021 14:38	18:00	7.09 pH	12.10 °C	1,254.9 µS/cm	0.38 mg/L		149.5 mV	413.00 cm
28/06/2021 14:39	19:00	7.09 pH	12.10 °C	1,259.1 µS/cm	0.38 mg/L		149.2 mV	413.00 cm
28/06/2021 14:40	20:00	7.09 pH	12.12 °C	1,255.0 µS/cm	0.37 mg/L		149.0 mV	413.00 cm

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 29/06/2021 08:36:43

Project: NTG2113

Operator Name: Mok

Location Name: DS01 Total Depth: 7.71 m Initial Depth to Water: 4.37 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
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Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
29/06/2021 08:36	00:00	7.09 pH	14.40 °C	951.06 µS/cm	4.38 mg/L		423.7 mV	437.00 cm
29/06/2021 08:37	01:00	7.08 pH	13.10 °C	994.28 µS/cm	1.50 mg/L		314.0 mV	437.00 cm
29/06/2021 08:38	02:00	7.08 pH	11.93 °C	1,015.6 µS/cm	0.93 mg/L		267.9 mV	437.00 cm
29/06/2021 08:39	03:00	7.08 pH	11.46 °C	1,025.0 µS/cm	0.63 mg/L		245.5 mV	437.00 cm
29/06/2021 08:40	04:00	7.08 pH	11.10 °C	1,033.0 µS/cm	0.49 mg/L		233.3 mV	437.00 cm
29/06/2021 08:41	05:00	7.08 pH	11.00 °C	1,033.0 µS/cm	0.39 mg/L		226.2 mV	437.00 cm
29/06/2021 08:42	06:00	7.08 pH	10.91 °C	1,034.9 µS/cm	0.33 mg/L		219.7 mV	437.00 cm
29/06/2021 08:43	07:00	7.08 pH	10.86 °C	1,035.9 µS/cm	0.31 mg/L		214.8 mV	437.00 cm
29/06/2021 08:44	08:00	7.08 pH	10.82 °C	1,037.5 µS/cm	0.30 mg/L		210.8 mV	437.00 cm
29/06/2021 08:45	09:00	7.08 pH	10.80 °C	1,035.7 µS/cm	0.30 mg/L		207.7 mV	437.00 cm
29/06/2021 08:46	10:00	7.08 pH	10.77 °C	1,037.1 µS/cm	0.32 mg/L		205.2 mV	437.00 cm
29/06/2021 08:47	11:00	7.09 pH	10.75 °C	1,036.8 µS/cm	0.37 mg/L		203.1 mV	437.00 cm
29/06/2021 08:48	12:00	7.09 pH	10.73 °C	1,038.3 µS/cm	0.37 mg/L		201.2 mV	437.00 cm
29/06/2021 08:49	13:00	7.09 pH	10.73 °C	1,039.0 µS/cm	0.32 mg/L		199.5 mV	437.00 cm
29/06/2021 08:50	14:00	7.09 pH	10.72 °C	1,038.7 µS/cm	0.31 mg/L		197.9 mV	437.00 cm
29/06/2021 08:51	15:00	7.09 pH	10.70 °C	1,038.7 µS/cm	0.32 mg/L		196.3 mV	437.00 cm
29/06/2021 08:52	16:00	7.09 pH	10.68 °C	1,039.2 µS/cm	0.34 mg/L		194.8 mV	437.00 cm
29/06/2021 08:53	17:00	7.09 pH	10.68 °C	1,040.1 µS/cm	0.33 mg/L		193.6 mV	437.00 cm

29/06/2021 08:54	18:00	7.09 pH	10.68 °C	1,037.2 µS/cm	0.33 mg/L		192.3 mV	437.00 cm
29/06/2021 08:55	19:00	7.09 pH	10.65 °C	1,039.0 µS/cm	0.35 mg/L		191.2 mV	437.00 cm
29/06/2021 08:56	20:00	7.09 pH	10.64 °C	1,037.3 µS/cm	0.37 mg/L		190.2 mV	437.00 cm

Samples

Sample ID:	Description:
-------------------	---------------------

Low-Flow Test Report:

Test Date / Time: 29/06/2021 09:12:31

Project: NTG2113

Operator Name: Mok

Location Name: DS03 Total Depth: 7.65 m Initial Depth to Water: 4.27 m	Pump Type: Peristaltic Flow Cell Volume: 90 ml Final Draw Down: 0 m	Instrument Used: SmarTROLL MP Serial Number: 528157
---------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------	----------------------------------------------------------------------

Test Notes:

Stabilised at 20 mins

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5
29/06/2021 09:12	00:00	7.09 pH	12.66 °C	948.73 µS/cm	7.14 mg/L		350.5 mV	427.00 cm
29/06/2021 09:13	01:00	7.09 pH	11.97 °C	946.32 µS/cm	3.89 mg/L		276.7 mV	427.00 cm
29/06/2021 09:14	02:00	7.09 pH	11.65 °C	952.53 µS/cm	2.63 mg/L		243.8 mV	427.00 cm
29/06/2021 09:15	03:00	7.09 pH	11.47 °C	956.39 µS/cm	1.72 mg/L		226.0 mV	427.00 cm
29/06/2021 09:16	04:00	7.09 pH	11.38 °C	955.98 µS/cm	1.14 mg/L		215.2 mV	427.00 cm
29/06/2021 09:17	05:00	7.09 pH	11.28 °C	957.93 µS/cm	0.80 mg/L		207.9 mV	427.00 cm
29/06/2021 09:18	06:00	7.09 pH	11.23 °C	959.16 µS/cm	0.61 mg/L		202.9 mV	427.00 cm
29/06/2021 09:19	07:00	7.09 pH	11.19 °C	960.47 µS/cm	0.48 mg/L		199.1 mV	427.00 cm
29/06/2021 09:20	08:00	7.09 pH	11.14 °C	960.10 µS/cm	0.38 mg/L		196.3 mV	427.00 cm
29/06/2021 09:21	09:00	7.08 pH	11.12 °C	960.91 µS/cm	0.34 mg/L		194.0 mV	427.00 cm
29/06/2021 09:22	10:00	7.08 pH	11.12 °C	962.02 µS/cm	0.31 mg/L		192.0 mV	427.00 cm
29/06/2021 09:23	11:00	7.09 pH	11.12 °C	960.68 µS/cm	0.28 mg/L		190.4 mV	427.00 cm
29/06/2021 09:24	12:00	7.08 pH	11.10 °C	961.68 µS/cm	0.25 mg/L		189.1 mV	427.00 cm
29/06/2021 09:25	13:00	7.09 pH	11.10 °C	961.48 µS/cm	0.23 mg/L		188.2 mV	427.00 cm
29/06/2021 09:26	14:00	7.08 pH	11.10 °C	961.88 µS/cm	0.22 mg/L		187.4 mV	427.00 cm
29/06/2021 09:27	15:00	7.09 pH	11.09 °C	961.70 µS/cm	0.20 mg/L		186.7 mV	427.00 cm
29/06/2021 09:28	16:00	7.09 pH	11.05 °C	961.78 µS/cm	0.20 mg/L		185.9 mV	427.00 cm
29/06/2021 09:29	17:00	7.09 pH	11.05 °C	962.04 µS/cm	0.19 mg/L		185.3 mV	427.00 cm

29/06/2021 09:30	18:00	7.09 pH	11.02 °C	962.67 µS/cm	0.18 mg/L		184.6 mV	427.00 cm
29/06/2021 09:31	19:00	7.09 pH	11.03 °C	963.35 µS/cm	0.17 mg/L		184.0 mV	427.00 cm
29/06/2021 09:32	20:00	7.09 pH	11.02 °C	963.24 µS/cm	0.16 mg/L		183.4 mV	427.00 cm

Samples

Sample ID:	Description:
------------	--------------



APPENDIX B
BWB Consulting
Environmental Assessment Report



BETTER SOLUTIONS, INTELLIGENTLY ENGINEERED

ENVIRONMENT

Oil Salvage Ltd
Butler Fuels, Farnham Road
Bishops Stortford

Environmental Assessment Report

ENVIRONMENT

Oil Salvage Ltd
Butler Fuels, Farnham Road
Bishops Stortford
Environmental Assessment Report

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October 2022

DOCUMENT ISSUE RECORD

Document Number:	BFFR-BWB-ZZ-XX-RP-YE-0003_EAR
BWB Reference:	NTG2113

Revision	Date of Issue	Status	Author:	Checked:	Approved:
P1	October 2022	S1	Rebecca Connorton BSc (Hons)	Chris Rhodes BSc MSc (Hons)	Richard Robinson BSc (Hons) MCIWEM
					

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY	
Site Address	Butler Fuels, Farnham Road, Bishop's Stortford, CM23 1JB
Site Setting	The site is currently occupied by a disused oil storage depot located on Farnham Road, on the outskirts of Bishop Stortford. A small one storey office building is present in the north of the site, with fuel pumps and a gantry in the centre of the site and a tank farm in the south of the site. Two 45,000 litre underground storage tanks (USTs) were indicated to be present in the south of the site. Bourne Brook is an ephemeral water course which flows along the northern and western site boundary following heavy rainfall events.
Published Ground Conditions	The site is underlain by superficial Head Deposits (clay, silt, sand and gravel). The underlying bedrock geology is indicated to comprise undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations. The Head deposits are categorised by the Environment Agency as undifferentiated Secondary Aquifers. The underlying Chalk is classified as a Principal Aquifer. The site lies within a Zone 1 Source Protection Zone (SPZ) centred around a potable groundwater abstraction 890m south east.
Site History	Historically, the site has remained undeveloped until the 1960s when a small building is mapped in the north of the site. From 1974 the site appears in its current layout with the office building in the north and tanks towards the south. A former quarry located 125m north east has subsequently been used as a landfill site.
Site Investigation	Ground investigation has been undertaken comprising the advancement of five dynamic sampler boreholes to depths of 7-8m below ground level, one hand excavated pit, eight groundwater and ground gas monitoring visits, and chemical analysis of soils and groundwater.
Ground Conditions Encountered	Ground investigation has identified limited Made Ground (typically less than 0.5m) over cohesive Head Deposits proven to between 3.9m and 5.5m bgl, overlying chalk. Deeper Made Ground with abundant waste was identified in one location in the west of the site, possibly reflective of imported waste materials used to raise site levels. Groundwater levels were recorded between 4.63m and 5.9m bgl or 58.03m to 59.12m above ordnance datum (AOD), with flow tentatively indicated to flow in a northerly or easterly direction.
Environmental Appraisal	<p>Preliminary gas monitoring has recorded elevated carbon dioxide, methane and volatile organic compound (VOC) vapours at the site, emanating from the contaminated soils and groundwater at concentrations which represent a risk to future site users. Ground gas protection measures commensurate with a Characteristic Situation 2 site would be required for new buildings based on preliminary gas monitoring information.</p> <p>Contaminant levels within the soils are not indicated to represent a risk to future site users in the context of a commercial end use. However, asbestos has been recorded in all Made Ground samples. A clean capping layer would be required in areas of soft landscaping if the site were to be redeveloped.</p> <p>Relatively low leachate concentrations in the Made Ground are not considered to represent a risk to Bourne Brook given the lack of surface water infiltration at the site, and the ephemeral nature of the water course making it a relatively low sensitivity receptor. The proposed upgrade works to the site drainage system would further reduce the risk to Bourne Brook.</p> <p>High concentrations of hydrocarbons and LNAPL have been recorded in the groundwater, and given the presence of an ongoing source in the form of the underground tanks and LNAPL within groundwater, the site is considered to represent a high risk to the underlying Principal Aquifer/SPZ1.</p>

	<p>It is considered that the site would meet the definition of Category 1 or 2 Contaminated Land due to the presence of significant contamination within a Principal Aquifer and Zone 1 Source Protection Zone. It is likely that the Environment Agency would require some form of groundwater remediation prior to providing a permit to use the site as a waste oil transfer station. It is considered that this would, as a minimum, comprise removal of the underground tank, associated infrastructure, and any grossly impacted soils, as well as removal of any LNAPL product from groundwater to ensure that there is no source remaining at the site.</p>
<p>Recommendations</p>	<p>It is likely that remedial works would be required by the EA prior to them granting a permit for the site. A detailed quantitative risk assessment may be required to inform the extents of the remediation and would be required to support any planning applications. Further gas and vapour assessment would also be required.</p> <p>Should redevelopment be considered, it would be prudent to assess the vertical and lateral extents of the Made Ground containing abundant waste materials to assess the implications to future site users with respect to possibly elevated ground gasses.</p> <p>If the buildings are to be retained on site it is recommended that details are requested as to the levels of gas and vapour protection installed within them. Should this not be made available, or none exist, it may be prudent to undertake some internal monitoring to provide greater confidence in the risk to future site users.</p>
<p>This summary should be read in conjunction with BWB's full report (ref. BFFR-BWB-ZZ-XX-RP-YE-0003_EAR) and reflects an assessment of the Site based on information received by BWB at the time of production.</p>	

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Appendix 1: Site Photographs

Appendix 2: Groundsure Report

Appendix 3: Historical Mapping

Appendix 4: Express UXO Assessment

Appendix 5: Risk Classification Scheme

Appendix 6: Exploratory Hole Logs

Appendix 7: Ground Gas and Groundwater Monitoring Results
Appendix 8: Soil Chemical Analysis Results
Appendix 9: Groundwater Chemical Laboratory Testing Results
Appendix 10: Leachate Screening Sheets
Appendix 11: Groundwater Screening Sheets
Appendix 12: CLEA Screening Sheets

1. INTRODUCTION

Instruction

- 1.1 BWB Consulting (BWB) was instructed by Oil Salvage Ltd (the Client) to carry out a Environmental Assessment Report for the site known as Butler Fuels, Farnham Road, Bishopd Stortford. Details of the project brief are included in BWB proposal reference 20200603/R3/0001/NTG2113/RTR/KES dated June 2020.
- 1.2 It is understood that the Client is considering purchasing the site with the intent of utilising it as a waste oil transfer station. An Environmental Assessment is required to assess the contamination status of the site and identify potential liabilities associated with the proposed end use.

Objectives

- 1.3 The desk study element of this report has been completed to present pertinent information into the environmental risks and liabilities associated with the site. It has been completed to fulfil the requirements of a preliminary risk assessment in accordance with BS10175: 2011+A2:2017 'Investigation of Potentially Contaminated Sites Code of Practice' and CLR11 'Model Procedures for the Management of Contaminated Land'. The objectives of the report are:
- To assess historical activities at the site with respect to their potential impact on the site environment;
 - To characterise the environmental setting of the site, identify migration pathways and vulnerable receptors for contamination originating at the site, focusing on potential soil and groundwater liabilities;
 - To assess historical and current surrounding land use in relation to known or potential off-site contamination issues that may impact the subject property;
 - To review existing site investigation and remediation information available for the site; and
 - To develop a preliminary Conceptual Site Model (CSM).
- 1.4 The objectives of the investigation element of the report are to assess:
- The prevailing ground and groundwater conditions across the site;
 - The potential presence and extent of contamination in shallow soil and groundwater beneath the site;
 - The significance and magnitude of the observed contamination through comparison of analytical data to appropriate published environmental screening criteria;
 - The ground gas regime beneath the site; and
 - To assess potential environmental liabilities associated with the site.

Scope of Works

- 1.5 The desk study scope of work included:

- Site visit to inspect the current condition of the site, photographs in **Appendix 1**;
- Review of the following information
- Groundsure Report No. HMD 214-68538008 (see **Appendix 2**);
- Historical Ordnance Survey Mapping (**Appendix 3**);
- British Geological Survey (BGS) exploratory hole records (www.bgs.co.uk);
- British Geological Survey (1990) 1:50 000 Scale Great Dunmow Sheet 222 Solid and Drift;
- First Line Defence Preliminary Unexploded Ordinance Report (**Appendix 4**); and
- Environment Agency website (www.environment-agency.gov.uk).
- Provide a summary of key risks that require further investigation in order to control the identified risks; and
- Produce a geo-environmental desk study (this report) providing qualitative contamination risk assessment and ground-related constraints to the proposed development.

1.6 The ground investigation scope of works were completed between 18th and 19th June 2020 and comprised the following:

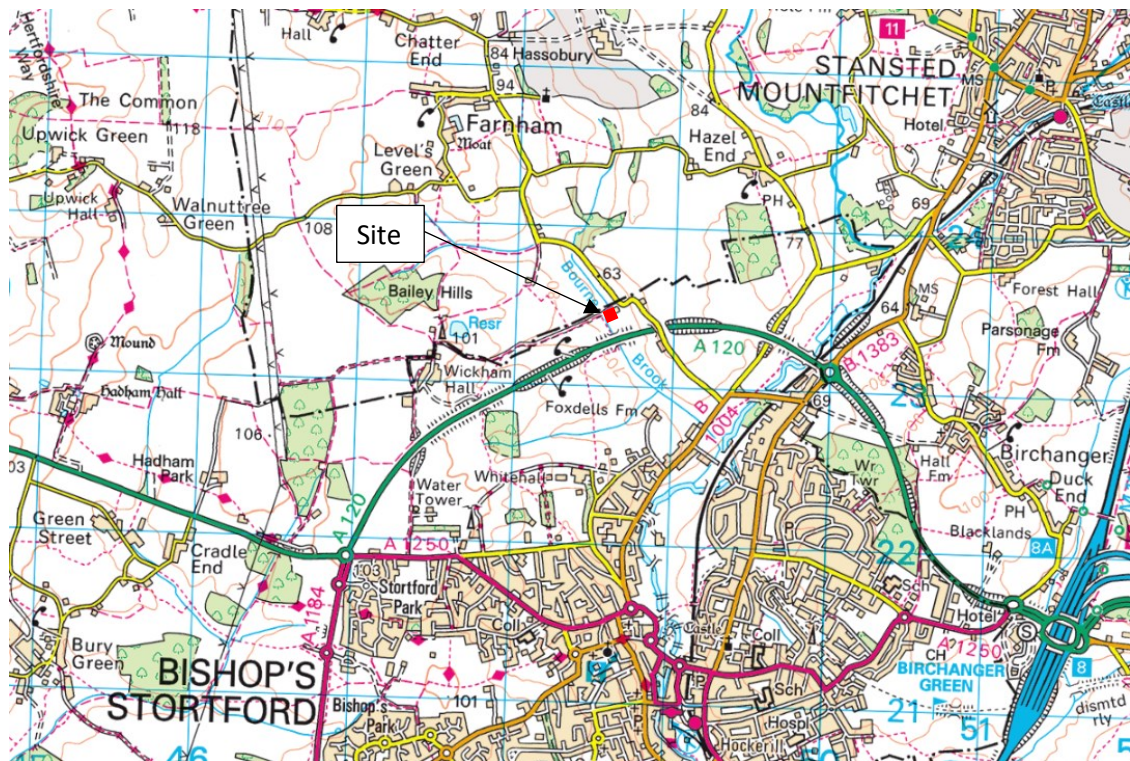
- Non-intrusive survey of excavation locations for underground utilities;
- Five dynamic sampler borehole to depths of between 7m and 8m below ground level (bgl);
- One hand pit to a depth of 0.8m;
- Eight subsequent gas and groundwater monitoring visits (between June 2020 and June 2022) and
- Chemical analysis of soils and groundwater.

2. THE SITE

Site Location

- 2.1 The site is located at Farnham Road, Bishops Stortford located at National Grid reference 548581 223459. The location of the site is shown in **Figure 2.1**.

Figure 2.1: Site Location Plan



Site Description

- 2.2 A site walkover was undertaken by BWB in July 2020. At the time of the walkover, the site comprised a disused oil storage depot located on the outskirts of Bishop Stortford. The site formed a roughly rectangular shaped plot of land and was relatively flat at an elevation of c. 64m above ordinance datum (AOD). Photographs of the site from July 2020 are presented in **Appendix 1**, and recent groundwater monitoring visits have not identified significant variation to these site conditions.
- 2.3 The entrance to the site was along the northern boundary off Farnham Road. A small one storey office building was present in the north of the site, with fuel pumps and a gantry in the centre of the site and a tank farm in the south.
- 2.4 Two 45,000 litre underground storage tanks (USTs) were indicated to be present in the south of the site as indicated on a site drawing and presence of manhole covers. The above ground storage tank (AST) farm comprised seven 55,000 litre tanks utilised for kerosene, gas oil and diesel oil. A small brick bund was present around the base of the

- ASTs. A 2,500 litre kerosene heating oil tank was located along the north western boundary.
- 2.5 A two-stage interceptor drain was present along the western site boundary receiving drainage from both the AST bund and the refilling point under the gantry. The interceptor subsequently drained into the stream along the western boundary. At the time of the ground investigation, shortly after a heavy rainfall event, the interceptor was noted to be inundated, with both chambers full and surface water pooling in the refilling point. It was not clear whether the interceptor drainage was damaged or simply inadequate to handle the volumes of surface water run off, however, it is understood that the surface water drainage system is to be surveyed and repaired (if necessary) to ensure efficiency.
 - 2.6 A septic tank was noted to be actively pumping treated sewage into Bourne Brook to the west.
 - 2.7 The majority of the site was covered in hardstanding with small areas of soft landscaping present along the southern and eastern boundaries. Trees were present around the majority of the site boundary.
 - 2.8 Water sampling pipework, oxygen release compounds and slow release socks were observed on site, indicating groundwater remedial works had been undertaken in the past. Several boreholes were noted during the walkover with a number present in clusters and of variable diameter suggesting varying uses. It was hypothesised that they had been used for initial ground investigation (50mm diameter well) and subsequent treatment (125mm wells). Groundwater levels were recorded at a number of locations during the walkover to inform investigation design and indicated resting groundwater levels to be between circa 5 and 6m below ground level (bgl).
 - 2.9 Surrounding land use was largely agricultural, with Bourne Brook present along the western and northern boundary (c. 1-2m below the level of the site), and a storage facility/warehouse located to the east.

3. PUBLISHED GROUND CONDITIONS

Published Geology

- 3.1 BGS mapping indicates that the site is underlain by superficial Head Deposits (clay, silt, sand and gravel). The underlying bedrock geology is indicated to comprise undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations.
- 3.2 BGS borehole logs mapped 100m south of the site recorded ground conditions to comprise head deposits to between 3.75m and 4.75m bgl overlying chalk. The Head deposits were recorded as soft to stiff silty sandy clay with increased gravels at depth. The thickness of Head deposits was reduced/ absent with increased distance from Bourne Brook.
- 3.3 Five pollution incidents are listed between 165m and 290m north east relating to tyres, metal waste, household waste and commercial waste indicated to have a minor impact on land quality. These are likely related to the landfill site.

Hydrogeology

- 3.4 The Head deposits are categorised by the Environment Agency as undifferentiated Secondary Aquifer. The underlying Chalk is classified as a Principal Aquifer.
- 3.5 The site lies within a Zone 1 Source Protection Zone (SPZ) – Inner Catchment. The inner catchment covers a large area of land extending to over 1.5km to the north east.
- 3.6 The nearest groundwater abstraction is listed 890m south east of the site and is for potable purposes. It is likely that this abstraction forms the centre of the SPZ.
- 3.7 A discharge consent is listed 360m south east issuing to groundwater relating to treated sewage effluent.
- 3.8 Groundwater strikes recorded in the historical off site BGS boreholes were recorded as seepages at between 8m and 8.3m.

Hydrology

- 3.9 The closest mapped surface water feature to the site is Bourne Brook which is present along the northern and western site boundaries. It is understood that Bourne Brook is an ephemeral water course which only flows following heavy rainfall (c. 10% of the year). Based on the anticipated depth to groundwater (c. 6m bgl), and the elevation of Bourne Brook (c. 2m below site level), it is considered that Bourne Brook is not in continuity with the groundwater in the Chalk Aquifer.
- 3.10 The site holds an active discharge consent issuing treated effluent into Bourne Brook. No further active discharge consents are listed as issuing into Bourne Brook within 500m of the site.
- 3.11 There are no other surface water receptors within 1km of the site.

Site History

On site

- 3.12 The site has remained undeveloped from the earliest mapping (1876) until 1950. From 1960, a small building is present in the north of the site. 1974 mapping shows the site in its current layout with the office building in the north and tanks towards the south.

Off site

- 3.13 The surrounding land use is largely agricultural from the earliest mapping with Bourne Brook immediately north and west of site, with Farnham Road 40m north and an old chalk pit 125m north east. 1921 plans indicate a building mapped immediately north east of the site, with the chalk pit to the north east no longer referred to as 'old'. Between 1950 and 1981, the chalk pit is expanding and is referred to as a Lime Quarry from the 1970s. The site immediately north east is described as a depot from 1974 plans, and the A120 is mapped 100m south from 1978.
- 3.14 Only from 2020 is the quarry to the north east described as The Old Lime Works.

Mining

- 3.15 The Groundsure Report confirmed that two former mines are present in close proximity to the site, Foxdells Chalk Pit, also known as The Old Lime Works and Stortford Lime Works, located between 160m and 270m north east of site adjacent to each other. These entries correlate with the quarrying observed in the historical mapping review.
- 3.16 There is no indication that mining has occurred at the site.

Landfill

- 3.17 The aforementioned opencast quarry sites have subsequently been utilised as a single landfill site covering both quarries, with the Groundsure Report indicating that the landfill was operational between 1950 and 1994, and handled inert waste.
- 3.18 According to a due diligence report provided by the Client, a separate landfill license listed in the same location handled waste streams including cement & similar bonded asbestos, inert/non-hazardous/non-toxic construction/demolition materials, hardcore and rubble, and non-hazardous waste.
- 3.19 Given the location, the landfill sites may represent a source of leachate and elevated ground gasses which could migrate towards the site.

Ground Gas

- 3.20 The site is not located in an area where naturally elevated Radon is indicated to occur, as less than 1% of properties are above the Action Level.

- 3.21 The nearby landfill site could possibly represent a source of ground gas, as could any contamination within the underlying soils and groundwater.

Permits, Consents and Authorisations

- 3.22 A full listing of permits, consents and authorisations including discharge consents, pollution incidences and other environmental information included in the Groundsure® Report, is presented in **Appendix 2**. There are no significant permits in close proximity to the site other than those described above.

4. PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

Introduction

- 4.1 The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.
- 4.2 The following sections discuss all the identified potential on and off-site sources, pathways and receptors in the context of the proposed development and plausible pollutant linkages which may represent a risk to identified receptors such as human health and/or controlled waters from the data gained from the desk study. At this stage, the assessment is qualitative and aimed to determine all pollutant linkages, irrespective of significance or allowing for uncertainty.
- 4.3 Three impact potentials exist for any given site; these are:
- The site impacting upon itself;
 - The site impacting on its surroundings; and
 - The surroundings impacting on the site.
- 4.4 All three impacts need to be considered in a risk assessment.
- 4.5 A Source, Pathway, Receptor analysis has been undertaken for the site based on the information provided in the preceding sections. This is presented as **Table 4:1** and further information about the risk classification scheme is included within **Appendix 5**.
- Sources (S); These are potential or known sources of contamination that may relate to a former land use or present site feature or process (e.g. fuel storage tanks).
 - Pathways (P); A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development.
 - Receptors (R); Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures, and utilities that could be adversely affected by contaminant(s).

Table 4:1: Preliminary Conceptual Site Model

Source	Pathway	Receptor	Con	Prob	Risk	Mitigation/Investigation
S1: On site: Made Ground – Potential contaminants may include heavy metals, hydrocarbons, VOCs/SVOCs, asbestos	P1: Direct contact, incidental ingestion and inhalation of particulates.	R1: Construction/ services personnel	Md	Lw	M/L	Contaminants present in the Made Ground represent a risk to construction/ maintenance workers who may come into contact with contaminated soils. Adoption of appropriate PPE is likely to mitigate the risk. It is unlikely that future site users would come into contact with Made Ground soils. Ground investigation is required to quantify the pollutant linkage.
		R2: Future site users	Md	UI	L	
	P2: Vertical migration of contaminants in the soil leachate.	R3: Underlying undifferentiated Secondary Aquifer	Mi	Li	M/L	If present, contamination in Made Ground is likely to directly impact upon the underlying head Deposits. It is possible that the Head Deposits, which are indicated to be principally cohesive, could restrict migration to the underlying Chalk. Ground investigation is required to quantify the pollutant linkage.
		R4: Underlying Principal Aquifer and SPZ	Sv	Lw	M	
	P3: Surface water run off	R5: Bourne Brook	Mi	Li	M/L	There is a plausible pathway for perched groundwater or surface water run off (via drainage routes) from the site directly into the brook.
	P4: Lateral Migration of perched groundwater.	R5: Bourne Brook	Mi	Li	M/L	
	P5: Direct contact.	R6: Water utility pipes	Md	Lw	M/L	Organic compounds in the shallow soils could taint the water supply. A ground investigation and subsequent laboratory analysis should be undertaken to inform the design of new services.
	P6: Inhalation of vapours	R1: Construction/ services personnel	Md	Lw	M/L	Vapours present in the Made Ground may represent a risk to construction workers in enclosed/confined spaces, and future site users within buildings. Ground investigation is required to quantify the pollutant linkage. Mitigation could comprise adoption of RPE for workers, and/or vapour membranes in any new buildings. The presence of any vapour mitigation measures within buildings to be retained should be confirmed if elevated vapours are present.
		R2: Future site users	Md	UI	L	

Source	Pathway	Receptor	Con	Prob	Risk	Mitigation/Investigation
	P7: Migration and accumulation of ground gasses in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	R1: Construction/ services personnel	Sv	UI	M/L	The risk to construction personnel could be mitigated using personal monitors to assess gas concentrations in enclosed spaces.
		R2: Future site users	Sv	Lw	M	The risk to future site users could be mitigated by the installation of ground gas protection measures in proposed new buildings. The presence of gas protection measures within buildings to be retained should be confirmed if elevated gas concentrations are present.
S2: Natural soils associated with potentially leaking underground storage tanks and/or infrastructure – Hydrocarbons (kerosene, oil, diesel)	P1: Direct contact, incidental ingestion and inhalation of particulates.	R1: Construction/ services personnel	Md	Lw	M/L	Contaminants present in the shallow soils represent a risk to construction/ maintenance workers who may come into contact with contaminated soils. Adoption of appropriate PPE is likely to mitigate the risk.
		R2: Future site users	Md	UI	L	It is unlikely that future site users would come into contact with shallow natural soils. Ground investigation is required to quantify the pollutant linkage.
	P2: Vertical migration of contaminants in the soil leachate.	R3: Underlying undifferentiated Secondary Aquifer	Mi	Li	M/L	The underground storage tanks and infrastructure are likely to be situated close to the top of the chalk, making vertical migration a lot more viable.
		R4: Underlying Principal Aquifer and SPZ	Sv	Li	H	Ground investigation is required to quantify the pollutant linkage.
	P5: Direct contact.	R6: Water utility pipes	Md	Lw	M/L	Organic compounds in the shallow soils could taint the water supply. A ground investigation and subsequent laboratory analysis should be undertaken to inform the design of new services.
	P6: Inhalation of vapours	R1: Construction/ services personnel	Md	Lw	M/L	Vapours present in the natural soils may represent a risk to construction workers in enclosed/confined spaces, and future site users within buildings.
R2: Future site users		Md	UI	L	Ground investigation is required to quantify the pollutant linkage. Mitigation could comprise adoption of RPE for workers, and/or vapour membranes in any	

Source	Pathway	Receptor	Con	Prob	Risk	Mitigation/Investigation
						new buildings positioned over impacted soils. Vapours around the underground tanks are unlikely to impact upon the existing buildings.
	P6: Migration and accumulation of ground gasses in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	R1: Construction/ services personnel	Sv	UI	M/L	The risk to construction personnel could be mitigated by the use of personal monitors to assess gas concentrations in enclosed spaces.
R2: Future site users		Sv	Lw	M	The risk to future site users could be mitigated by the installation of ground gas protection measures in proposed new buildings. The presence of gas protection measures within buildings to be retained should be confirmed if elevated gas concentrations are present.	
S3: Contaminated Groundwater - Hydrocarbons (kerosene, oil, diesel)	P6: Inhalation of vapours	R1: Construction/ services personnel	Md	Lw	M/L	Vapours emitted from contaminated groundwater may represent a risk to construction workers in enclosed/confined spaces, and future site users within buildings.
		R2: Future site users	Md	UI	L	Ground investigation is required to quantify the pollutant linkage. Mitigation could comprise adoption of RPE for workers, and/or vapour membranes in any new buildings. The presence of any vapour mitigation measures within buildings to be retained should be confirmed if elevated vapours are present.
	P4: Lateral Migration of perched groundwater.	R4: Underlying Principal Aquifer and SPZ	Sv	Li	H	If contamination is present within the groundwater, it could freely migrate throughout the highly sensitive aquifer and SPZ. Ground investigation is required to quantify the pollutant linkage.
	P7: Migration and accumulation of ground gasses in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	R1: Construction/ services personnel	Sv	UI	M/L	The risk to construction personnel could be mitigated by the use of personal monitors to assess gas concentrations in enclosed spaces.
R2: Future site users		Sv	Lw	M	The risk to future site users could be mitigated by the installation of ground gas protection measures in proposed new buildings. The presence of gas	

Source	Pathway	Receptor	Con	Prob	Risk	Mitigation/Investigation
						protection measures within buildings to be retained should be confirmed if elevated gas concentrations are present.
S4: Off site – Landfill sites and Made Ground at neighbouring site.	P5: Migration and accumulation of ground gasses in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	R1: Construction/ services personnel	Sv	UI	M/L	It is possible that ground gasses from the landfill sites could migrate towards the site. The risk to construction personnel could be mitigated by the use of personal monitors to assess gas concentrations in enclosed spaces.
		R2: Future site users	Sv	Lw	M	The risk to future site users could be mitigated by the installation of ground gas protection measures in proposed new buildings. The presence of gas protection measures within buildings to be retained should be confirmed if elevated gas concentrations are present.
	P3: Migration of contaminated groundwater	R4: Underlying Principal Aquifer and SPZ	Md	UI	L	It is possible that contaminated groundwater from the landfill site could migrate towards the site. Ground investigation is required to quantify the pollutant linkage.
<p style="text-align: center;"> VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low </p> <p style="text-align: center;">KEY: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor Hi = High, Li = Likely, Lw = Low Likelihood, UI = Unlikely</p>						

5. PHASE II ENVIRONMENTAL GROUND INVESTIGATION

- 5.1 Intrusive ground investigation works were undertaken between 18th and 19th June 2020 and comprised the following works:
- Clearance of investigation locations by a specialist buried services tracing company;
 - Collection of coordinates and elevations of exploratory hole locations (including historic boreholes);
 - Advancement of five boreholes (DS01 – DS05) by dynamic sampling drilling techniques, to a maximum depth of 8.0m bgl with installations of gas and groundwater monitoring wells;
 - The advancement of one hand excavated pits (DS06) to a maximum depth of 0.8m bgl;
 - Collection of environmental soil and groundwater water samples for chemical analysis at a UKAS and MCERTS accredited laboratory; and
 - Eight post investigation ground gas and groundwater level monitoring visits between June 2020 and June 2022.
- 5.2 An exploratory hole location plan is presented as **Drawing 1**. BWB exploratory hole records are presented as **Appendix 6** and the post investigation gas and groundwater monitoring data is presented as **Appendix 7**.
- 5.3 The site investigation works were carried out in general accordance with BS5930:2015 'Code of Practice for Site Investigations' and BS10175:2011 'Investigation of Potentially Contaminated Sites'.

Chemical Sampling Strategy

- 5.4 Investigation locations were situated around the USTs and ASTs as the primary source of contamination at the site, whilst also maintaining good coverage across the site.
- 5.5 Five of the historic boreholes were also utilised for groundwater sampling across the site. With the absence of any borehole logs for these locations, they have been labelled HBH1 – HBH5 as shown on **Drawing 1**.
- 5.6 Boreholes were advanced to sufficient depths to install response zones within the groundwater table.

Chemical Analytical Strategy

Soil Strategy

- 5.7 Selected soil samples collected from exploratory hole locations were sent to i2 Analytical (UKAS and MCERTS accredited) for chemical analysis. The following chemical analytical testing was undertaken:

- Ten soil samples tested for a soil suite (BWB Standard Suite) comprising arsenic, barium, beryllium, water soluble boron, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate (2:1 extract), total phenols, total cyanide, free cyanide, complex cyanide, fraction of organic carbon, pH, Polycyclic Aromatic Hydrocarbons (PAHs) (United States Environment Protection Agency priority 16 compounds) and Total Petroleum Hydrocarbons (TPH) C6-C40;
- Ten soil samples tested for TPH speciated to the UK Criteria Working Group (TPHCWG) aliphatic and aromatic compounds;
- Six soil samples for asbestos screening;
- Six soil samples for asbestos quantification; and
- Two soil samples tested for a suite of common leachable contaminants, namely arsenic, barium, beryllium, water soluble boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate (2:1 extract), sulphate, total cyanide and pH.

5.8 The results of the soil chemical testing are presented as **Appendix 8**.

Groundwater Strategy

5.9 Groundwater samples were obtained during both monitoring visits. Samples were obtained using a bailer following the removal of 3 times the well volume of water during the first two monitoring visits. The subsequent monitoring visits were undertaken using low flow sampling techniques to reduce the impact associated with free phase product impacting on the lab results. The groundwater samples obtained during the first visits were sent to i2 Analytical (UKAS and MCERTS accredited) for the following suite of groundwater chemical testing:

- Ten water samples tested for arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, conductivity, soluble sulphate, ammoniacal nitrogen, total phenols, total cyanide, pH, total organic carbon; and
- Ten water samples tested for PAHs (US EPA priority 16 compounds) and TPHCWG.

5.10 The subsequent groundwater samples from the second to eighth visits were scheduled for PAH and TPHCWG. The results of the water chemical testing are presented as **Appendix 9**.

Limitations and Uncertainty

- 5.11 Accurate coordinates and ground level data could not be obtained for selected boreholes (DS02, DS04, HBH3 and HBH4) due to the presence of high trees interfering with GPS signal. Where this has occurred, coordinates have been estimated from online mapping websites, and ground levels estimated from topographical drawings.
- 5.12 DS06 encountered asbestos containing materials (ACMs) within the hand pit and was terminated for health and safety reasons. The arisings were dampened and reintroduced into the hole.

6. GROUND CONDITIONS ENCOUNTERED

Geological Summary

- 6.1 The ground conditions recorded confirmed the published geology discussed in the above sections. The recorded ground conditions are summarised in **Table 6:1** below.

Table 6:1: Summary of Ground Conditions

Stratum	Top Depth (m)		Base Depth (m)		Thickness (m)	
	Min	Max	Min	Max	Min	Max
Made Ground	Ground Level		0.30	>0.80	0.30	>0.80
Head Deposits	0.30	0.45	3.90	5.50	3.60	5.10
Lewes Nodular Chalk Formation and Seaford Chalk Formation	3.90	5.50	>7.00	>8.00	>1.70	>4.10

Geological Descriptions

Made Ground

- 6.2 Made Ground was encountered within all exploratory holes with thicknesses ranging between 0.3m and >0.8m.
- 6.3 In the south of the site, Made Ground was relatively thin, predominantly comprising occasionally clayey gravelly sand. Concrete was encountered in DS01 (0.1m - 0.2m), DS02 (0 – 0.3m), DS04 (0 – 0.3m), DS05 (0 – 0.2m) and DS06 (0 – 0.08m).
- 6.4 Made Ground was only encountered in excess of 0.45m in one location; DS06, where it was recorded in excess of 0.8m. Under the concrete in this location was sandy gravel over a layer of large concrete and brick boulders to a depth of 0.4m. Below this, the Made Ground was recorded as soft gravelly clay with inclusions (becoming abundant below 0.7m) of glass, wood, metal, fabric, rubber and possible ACMs. It is unlikely that this material originated from site, and it is considered that this area could possibly have been built up historically using imported waste materials to increase site levels. This type of Made Ground could possibly be localised, or it could possibly extend along the western and northern boundary where levels may have been historically lower adjacent to Bourne Brook.

Head Deposits

- 6.5 Head Deposits were recorded across the site, under the Made Ground (excluding DS06) to depths of between 3.9m and 5.5m bgl. The depth of the Head deposits was slightly increased in the south east (DS02 and DS04), however, this is likely representative of the typically undulating topography of the surface of the underlying chalk.
- 6.6 The Head Deposits were commonly encountered as firm to stiff light brown clay typically with minor gravel, silt and sand fractions, over a very soft to firm greenish grey gravelly

clay at between 3m and 3.5m bgl. At DS05, the initial light brown horizon was not encountered, with greenish grey slightly gravelly clay present from 0.3m to 4.1m bgl. At DS04, the soft greenish grey clay was only present to 1.8m bgl, with varying bands of very soft to soft light brown, orangish brown and greyish brown gravelly clay recorded to 5.3m bgl.

- 6.7 At the boundary with the underlying chalk, the Head Deposits were occasionally recorded as soft pale brown gravelly clay (DS02), or a light brown clayey sandy gravel (DS04).

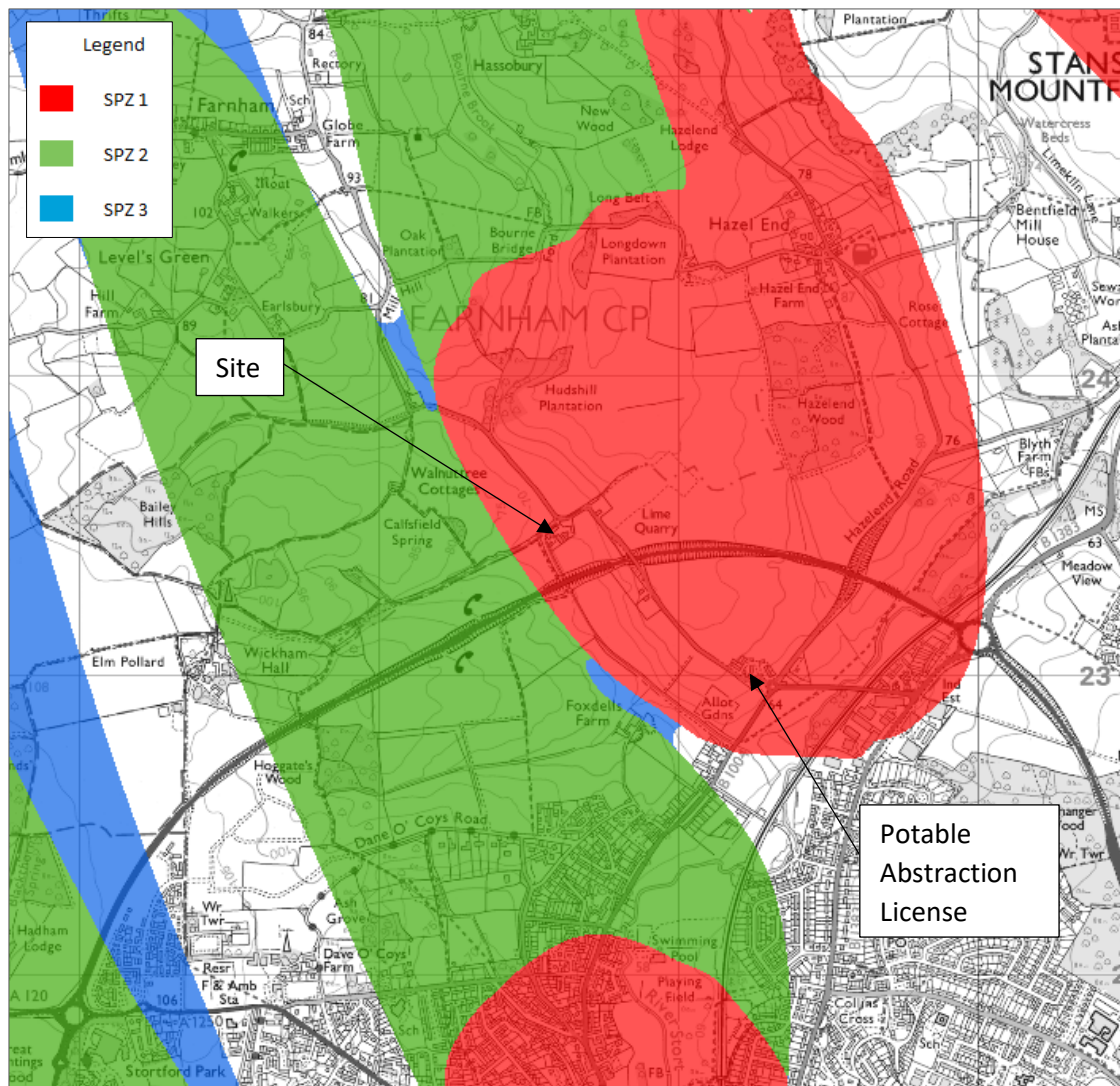
Lewes Nodular Chalk Formation and Seaford Chalk Formation

- 6.8 The chalk was encountered underlying the Head Deposits in all borehole locations and was described as white gravelly putty chalk with occasional grey staining. Gravels were recorded as subangular chalk and rounded to angular flint.
- 6.9 The chalk was proven to depths in excess of 8m bgl.

Hydrogeology

- 6.10 During the ground investigation, groundwater strikes were not readily observable due to the drilling techniques. During the first two post investigation monitoring events, groundwater levels were recorded between 4.63m and 5.9m bgl or 58.03m to 59.12m AOD.
- 6.11 Groundwater recharge rates were noted to be relatively poor during the groundwater sampling, with the majority of monitoring wells bailed dry and allowed to recharge prior to sampling.
- 6.12 An indicative groundwater flow diagram is presented in **Drawing 2**. Due to the difficulties encountered with obtaining accurate coordinates and ground levels across much of the site, only a limited number of data points were able to be used. Groundwater levels from DS03, DS05, HBH1 and HBH2 were used to infer the groundwater flow direction, with the indicative flow indicated to be to the north and east. Considering the limited data points used to create **Drawing 2**, the accuracy of the modelling is limited and the flow direction is considered to be an estimate at this stage.
- 6.13 Based on the layout of the SPZ Inner Catchment, it is considered likely that in the context of the regional groundwater regime, the site lies up hydraulic gradient of the potable abstraction 890m south east (**Figure 6:1**).

Figure 6:1: Source Protection Zone Map



Hydrology

- 6.14 The levels of Bourne Brook were not measured; however, they were noted to be between 1m and 2m below the levels of the site. The brook was noted to be dry during the site walkover in 2020, but flowing following heavy rainfall during the ground investigation. Based on the groundwater levels recorded the groundwater is not considered to be in continuity with water flow within Bourne Brook.
- 6.15 As discussed in the site walkover section, the outflow from the interceptor drain and the septic tank feed directly into Bourne Brook. Based on the drainage plans, it is likely that all surface water drainage feeds into the Brook, whether it is via standard drainage, the interceptor, or infiltrating through soft landscaping and migrating laterally across the top of the Head Deposits.

Contamination Observations

6.16 A summary of the contamination observations and volatile vapour concentrations recorded using a photo ionisation detector (PID) (calibrated against isobutylene) noted during the intrusive investigation works are summarised in **Table 6:2** below.

Table 6:2: Summary of Contamination Observations

Location	Depth (m bgl)	Observations	PID Concentration (ppm)
DS01	3.5 – 4.3	Hydrocarbon odour	183
	4.3 – 5.0	Mild hydrocarbon odour and grey staining	20
	5.0 – 6.0	Mild hydrocarbon odour with less grey staining	-
	6.0 -8.0	Strong hydrocarbon odour	289
DS02	3.5 – 3.9	Hydrocarbon odour	132
	4.9 – 5.1	Grey staining and hydrocarbon odour	-
	5.3 – 6.0	Grey staining and hydrocarbon odour	16.1
	6.0 - 7.0	Faint hydrocarbon odour	345
DS03	3.0 – 3.9	Hydrocarbon odour	125
	3.9 – 8.0	Grey staining and mild hydrocarbon odour	17.7 at 4.5m 236 at 7.5m
DS04	3.3 – 4.0	Hydrocarbon odour and black staining at 3.9 – 4.0m	0
	4.3 – 4.4	Black staining	1
	5.5 – 8.0	Grey staining and hydrocarbon odour. Strong hydrocarbon odour below 6.0m	363
DS05	2.0 – 2.5	Faint hydrocarbon odour	253 at 2.5m
	2.5 – 4.1	Hydrocarbon odour	411 at 4.2m
	4.6 – 8.0	Hydrocarbon odour and occasional grey staining	114
DS06	0.5	Made Ground with inclusion of waste	8.6
	0.8	Made Ground with abundant inclusion of waste	14.2

6.17 The observations identified hydrocarbon contamination roughly at the interface between the Head Deposits and underlying Chalk, with increased contamination odours and PID readings noted below 6m, associated with impact in the groundwater.

6.18 During the eight groundwater monitoring visits the oil/water interface metre was inconsistent at recording light non-aqueous phase liquids (LNAPL), also referred to as free phase product, within each monitoring well. This can be caused following the introduction of an oxygen releasing compound into the groundwater which can emulsify the free phase contamination and affect the readings. Due to the issues with the interface meter, the product thicknesses were also measured by the observed thicknesses within the bailer. A summary of the LNAPL thicknesses is presented in **Table**

6:3 and 6:4. Whilst slightly inconsistent, the data indicates the presence of LNAPL sporadically around the tanks, with the worst impact to the east (DS02, DS04, and DS05) and south west (DS01).

Table 6:3: Summary of LNAPL Observations – Interphase Meter

Location	LNAPL - Interphase meter readings (mm)							
	Rd1	Rd2	Rd3	Rd4	Rd5	Rd6	Rd7	Rd8
DS01	NR	<10	NR	30	10	NR	NR	20
DS02	NR	70	NR	110	NR	NR	90	150
DS03	NR	NR	NR	NR	NR	NR	NR	NR
DS04	310	10	NR	160	NR	410	410	310
DS05	NR	60	NR	120	70	NR	NR	200
HBH1	10	NR	NR	NR	NR	NR	NR	10
HBH2	NR	NR	NR	NR	NR	NR	NR	NR
HBH3	NR	<10	NR	10	10	30	40	30
HBH4	<10	NR	NR	NR	NR	NR	NR	10
HBH5	10	NR	NR	NR	NR	NR	NR	NR

NR = Not recorded. * Does not include foamy emulsion between LNAPL and groundwater

Table 6:4: Summary of LNAPL Observations – Bailer Observations

Location	LNAPL Bailer Observations (mm)							
	Rd1	Rd2	Rd3	Rd4	Rd5	Rd6	Rd7	Rd8
DS01	700	400*	NR	30	10	10	10	NR
DS02	100	100*	NR	110	10	70	50	NR
DS03	NR	NR	NR	NR	NR	NR	NR	NR
DS04	NR	160	NR	160*	20	380	340	310
DS05	NR	50	NR	120*	70*	200	60	200
HBH1	NR	NR	NR	NR*	NR	NR	NR	10
HBH2	NR	NR	NR	NR	NR	NR	NR	NR
HBH3	30	50	NR	10	10	10	5	30
HBH4	NR	NR	NR	NR	NR	NR	NR	5
HBH5	NR	NR	NR	NR	NR	NR	NR	NR

NR = Not recorded. * Does not include foamy emulsion between LNAPL and groundwater

7. GROUND GAS ASSESSMENT

Introduction

- 7.1 BWB have undertaken two gas monitoring visits separated by one week to provide an indication of the ground gas risk at the site.

Methodology

- 7.2 The assessment of potential ground gas generation is based on the observation of trends and changes in gas evolution by the direct measurement of ground gases from gas wells. The works included measurement of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and barometric pressure. A PID survey was undertaken to measure volatile organic compounds within the borehole response zones.
- 7.3 The primary aim of this environmental assessment was to target groundwater with response zones to obtain groundwater information. Therefore, gas concentrations associated with shallow deposits (principally Made ground) have not been assessed, although no significant organic matter has been identified at shallow depth that would suggest shallow soils would give rise to a significant gas generation concern.

Results

- 7.4 The concentrations recorded for borehole flow, oxygen, carbon dioxide and methane are summarised below in **Table 7:3**. The full ground gas monitoring results are presented in **Appendix 5**.

Table 7:1: Summary of Recorded Ground Gas Results

Borehole ID	Targeted Geology	Steady Flow (l/hr)		Carbon Dioxide (%v/v)		Methane (%v/v)	
		min.	max.	min.	max.	min.	max.
DS01	Chalk	<0.1	<0.1	13.9	14.3	4.3	5.3
DS02		<0.1	<0.1	6.3	9.9	8.9	18.4
DS03		<0.1	<0.1	7.3	14.4	<0.1	<0.1
DS04		<0.1	<0.1	2.0	5.3	27.7	42.0
DS05		<0.1	<0.1	4.0	13.9	13.7	41.8

- 7.5 The atmospheric pressures were recorded at 1004mB and 1007mB, with regional trends over the previous 12 hours indicated to have been falling.
- 7.6 Hydrogen sulphide concentrations were not recorded above the limit of detection of the equipment during the monitoring visits. Carbon monoxide concentrations were recorded at a maximum of 33ppm during the first visit, and 10ppm during the second visits. Low concentrations such as these are commonly recorded during the initial monitoring rounds and is commonly associated with the drilling processes. It is likely that a further monitoring visit would find that the carbon monoxide concentrations would be below zero.

- 7.7 PID concentrations were recorded between <0.4ppm and a maximum of 125ppm in DS01 during the second monitoring visit.

Risk Assessment

- 7.8 CIRIA Report 665 "Assessing Risks Posed by Hazardous Ground Gases to Buildings" presents current best practice on the assessment of ground gases for commercial and residential buildings (with the exception of low-rise traditional housing). The report presents a risk-based approach based on gas screening levels which depend on both the concentration and emission rate of gas from the ground. Gas screening levels are calculated as follows:

$$\text{Gas screening value (l/hr)} = \frac{\text{gas concentration (\%)} \times \text{measured borehole flow rate (l/h)}}{100}$$

- 7.9 Maximum gas screening levels of 0.042 were recorded giving a classification of Characteristic Situation 1 (CS1). Where elevated carbon dioxide (>5%) or methane (>1%) are encountered, guidance recommends that consideration should be given to increasing the CS level.
- 7.10 Considering the response zones are within the chalk, and the source of the elevated ground gasses is considered to be associated with the aerobic and anaerobic degradation of the contaminated groundwater at depths in the region of 5m bgl, it is likely that the overlying cohesive Head Deposits would prevent migration to ground level. This would need to be demonstrated by monitoring data at shallow depths to confirm the risk. Based on the preliminary ground gas monitoring data, it is considered that increasing the classification to CS2 would be appropriate until additional data can prove otherwise.
- 7.11 Confirmation of the presence of any ground gas protection measures incorporated into the current building should be sought. Given the age of the building, it is possible that no ground gas protection measures were incorporated into the building. It would be prudent to conduct some gas monitoring in internal confined spaces to assess the risk prior to purchase.
- 7.12 For any new buildings, further ground gas monitoring would be required to assess the risk. However, in line with a CS2 site, it is considered that ground gas protection measures would be required.

8. CONTAMINANT DISTRIBUTION

Soils

- 8.1 Contamination data have been compared to screening criteria for a commercial end use. The soil chemical laboratory results are presented as **Appendix 8**. The criteria include reference to the Land Quality Management Suitable for Use Levels (LQM S4ULs) for Human Health Risk Assessment Copyright Land Quality Management Limited reproduced with permission; publication number S4UL3271.

Made Ground

- 8.2 Generally low levels of heavy metals were recorded in the Made Ground, with concentrations all appearing in a similar order of magnitude. Slightly elevated lead was recorded at DS02 (890mg/kg at 0.4m), DS05 (410mg/kg at 0.25m), and DS06 (420mg/kg – 0.8m), with marginally elevated copper (870mg/kg) and zinc (1,900mg/kg) at DS06 (0.8m).
- 8.3 Slightly elevated Total TPH was recorded at DS03 (580mg/kg at 0.2m) and DS06 (1,200mg/kg at 0.8m). Elevated Total PAH was recorded in most Made Ground samples with a maximum of 105mg/kg recorded at DS02 (0.4m).
- 8.4 Asbestos has been recorded in all six samples of Made Ground tested, the results are summarised in **Table 8:1**. Across much of the site, the quantity of asbestos is either below, or around, the limit of detection (<0.001%), however, two types of asbestos have been recorded in the Made Ground at DS06 constituting nearly 10% of the material analysed.

Table 8:1: Asbestos Testing Results

Location	Depth	Asbestos Type	Asbestos Quantification
DS02	0.40	Chrysotile - Hard/Cement Type Material & Loose Fibres	0.002
DS03	0.20	Amosite - Loose Fibres	< 0.001
DS01	0.30	Chrysotile - Loose Fibrous Debris	0.006
DS06	0.50	Chrysotile & Amosite - Loose Fibres	< 0.001
DS06	0.80	Chrysotile & Crocidolite - Hard/Cement Type Material & Insulation Board/Tile	9.85
DS05	0.25	Chrysotile - Loose Fibres	< 0.001

- 8.5 Leachate analysis was undertaken on the Made Ground samples obtained from DS06. A summary of the recorded concentrations is presented in **Appendix 10** with the exceedances summarised in **Table 8:2**. Generally low concentrations of leachable heavy metals were recorded in the two samples, with slightly increased concentrations recorded in the deeper of the two samples (DS06 at 0.8m).

Table 8:2: Summary of Leachate Exceedances

Contaminant	Range of Concentrations	UKDWS Screening level (µg/l)	EQS Screening level (µg/l)	No of Exceedances
Copper	5.9 – 6.8	2,000	1	2 EQS
Lead	2.9 – 6.0	10	1.2	2 EQS
Nickel	1.5 – 5.0	20	4	1 EQS
Zinc	19.0 – 56.0	NA	10.9	2 EQS

Natural Soils

- 8.6 Eight samples from the Head Deposits and three from the chalk were scheduled for analysis. Low concentrations of heavy metals were recorded in both strata, at a similar order of magnitude.
- 8.7 Slightly elevated total TPH was recorded in several locations, with only one sample where total TPH was recorded above 500mg/kg (790mg/kg at 4.2m in DS05). Relatively low concentrations of speciated TPH were recorded in the natural soils, with a maximum Aliphatic C5-35 of 600mg/kg (4.2m in DS05) and Aromatic C5-35 of 460mg/kg (DS01 at 3.9m), both within the Head Deposits. The TPH fractions were both short and long chain, with Aliphatic in the C6-35 range and Aromatic in the C8-35 range. TPH concentrations in the chalk were noted to be either below the limits of detection, or marginally above them.
- 8.8 Concentrations of ethylbenzene (16µg/kg) and xylene (75µg/kg) were recorded at 5.9m in DS02, located immediately adjacent to the USTs.
- 8.9 PAH concentrations within the natural soils were all below the limits of detection.

Groundwater

- 8.10 Eight rounds of groundwater sampling have been undertaken at the site. Some tests could not be conducted due to the presence of trace concentrations of LNAPL within the samples interfering with the analysis process. These test results are labelled US on the lab report (**Appendix 9**) and summary table (**Appendix 11**).
- 8.11 Low concentrations of heavy metals were recorded during the first round of groundwater sampling. Marginally elevated localised arsenic (max 43.1µg/l at HBH1), nickel (max 120µg/l at HBH3) and zinc (max 15µg/l at DS05) concentrations were recorded. Heavy metal analysis was not conducted during subsequent monitoring visits. When compared to the screening criteria (10µg/l, 20µg/l and 10.9µg/l respectively), the recorded concentrations are noted to be at a similar order of magnitude.
- 8.12 Significantly elevated hydrocarbons and BTEX have been recorded in the groundwater with a summary of TPH concentrations presented in **Table 8:3** and BTEX presented in **Table 8:4 – 8:7**. The most significant TPH impact has been recorded at DS01, DS02 and DS04 where very high concentrations have been recorded, however DS03, DS04 and DS05 also recorded some elevated concentrations. These concentrations vary between the sampling rounds and are indicative of LNAPL impacting upon the testing.

Concentrations within the newly installed boreholes have generally been recorded above the limits of detection.

- 8.13 The most significant elevated benzene concentration was found in Round one at DS02, whilst DS05 and HBH3 have recorded elevated benzene concentrations throughout the eight visits. Toluene concentrations were generally consistent across all sites excluding an elevated concentration during Round 2 at location DS04. Ethylbenzene concentrations were highest during rounds one and two at DS02 and DS04 and rounds two, three and eight at DS05.
- 8.14 Toluene has largely been recorded below the limits of detection, with the exception of an elevated concentration at during the second visit. Ethylbenzene concentrations have fluctuated within the newer boreholes, with a slightly elevated concentrations recorded during the latest visit at DS05. Xylene concentrations have broadly reduced over the eight monitoring visits, however, concentrations have commonly been recorded at DS04.
- 8.15 Elevated Total PAH has been recorded in the groundwater samples also, with the most significant impact recorded in recently installed BWB wells (DS01 to DS05) (**Table 8:8**). Speciated analysis indicates that naphthalene, fluorene and phenanthrene are more elevated than the other PAH compounds. As with the TPH results, the significantly elevated PAH compounds are likely reflective of product within the sample. PAH concentrations were elevated in several locations across the site, with significantly elevated concentrations sporadically recorded at DS01, DS04 and DS05.
- 8.16 The most significant hydrocarbon impact has been observed within the newly installed boreholes, with lower concentrations recorded in the historic boreholes. This is considered to be reflective of the previous remedial works conducted at the site, as the historical boreholes appear to have been used for remedial works. This perhaps suggests that the lateral zone of influence of the remedial works is restricted to the locations of the injection/treatment wells.

Table 8:3: Summary of Groundwater Chemical Testing Results – TPH

Location	Round 1 (mg/l)		Round 2 (mg/l)		Round 3 (mg/l)		Round 4 (mg/l)	
	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35
DS01	15,000	3,400	200	78	12	5.1	<0.01	2.7
DS02	180,000	49,000	260	100	11	6.6	160	150
DS03	25	7.3	190	100	4,200	1,200	<0.01	5
DS04	1,000	110	99,000	34,000	61	21	3	3.9
DS05	390	170	860	420	1,400	660	110	120
HBH1	22	5	17	8.4	7.4	5.7	53	54
HBH2	19	6	23	12	0.55	0.75	0.85	1.2
HBH3	38	11	190	99	2	2.3	1.9	5.4
HBH4	130	56	51	12	2.6	2.4	650	190
HBH5	11	2.9	88	38	5.1	4.1	14	9.2
Location	Round 5 (mg/l)		Round 6 (mg/l)		Round 7 (mg/l)		Round 8 (mg/l)	
	Aliphatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35	Aromatics C5-35	Aromatics C5-35	Aliphatics C5-35	Aromatics C5-35
DS01	100	16	17	0.16	49	12	12,000	5,600
DS02	68	9.4	28	0.61	61	19	1,100	510
DS03	32	7.8	1.5	1.5	2.5	2.2	6.7	3.5
DS04	100	38	12	2.5	9.5	4.9	U/S*	U/S*
DS05	85	21	2000	1,400	3	3	3,100	1,700
HBH1	50	10	59	19	45	13	49	29
HBH2	1.5	0.45	5.9	2.2	0.3	1.4	420	200
HBH3	8.2	4	14	6.1	21	6.4	320	170
HBH4	430	50	170	48	78	19	52	19
HBH5	3.2	2.4	3.6	2.1	0.44	1	0.8	1.5

Table 8:4: Summary of Groundwater Chemical Testing Results – Benzene

Location	Benzene (µg/l)							
	Rd 1	Rd 2	Rd3	Rd4	Rd5	Rd6	Rd 7	Rd 8
DS01	< 1.0	< 1.0	4.4	<1.0	<1.0	2.5	<1.0	<1.0
DS02	578	< 1.0	42.6	<1.0	<1.0	5.2	<1.0	<1.0
DS03	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DS04	< 1.0	927	5.3	<1.0	<1.0	<1.0	<1.0	<1.0
DS05	48.2	< 1.0	130	67.6	90	16.8	55	<1.0
HBH1	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH2	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH3	55.1	70.7	112	27.8	54.3	61.8	<1.0	67.4
HBH4	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH5	< 1.0	< 1.0	11.2	1.5	<1.0	3.7	<1.0	<1.0

Table 8:5: Summary of Groundwater Chemical Testing Results – Toluene

Location	Toluene (µg/l)							
	Rd 1	Rd 2	Rd3	Rd4	Rd5	Rd6	Rd 7	Rd 8
DS01	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DS02	< 1.0	< 1.0	9.9	<1.0	<1.0	<1.0	<1.0	<1.0
DS03	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DS04	< 1.0	2,220	< 1.0	<1.0	<1.0	5	<1.0	<1.0
DS05	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH1	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH2	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH3	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH4	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH5	< 1.0	< 1.0	< 1.0	1.5	<1.0	<1.0	<1.0	<1.0

Table 8:6: Summary of Groundwater Chemical Testing Results – Ethylbenzene

Location	Ethylbenzene (µg/l)							
	Rd 1	Rd 2	Rd3	Rd4	Rd5	Rd6	Rd 7	Rd 8
DS01	< 1.0	387	< 1.0	<1.0	2.1	6.3	<1.0	58.1
DS02	22,000	2,600	16.4	<1.0	<1.0	20.7	<1.0	22.4
DS03	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DS04	4,350	24,000	78.9	<1.0	<1.0	52.8	26.4	<1.0
DS05	< 1.0	99.8	228	<1.0	<1.0	<1.0	<1.0	1,850
HBH1	< 1.0	< 1.0	7.4	<1.0	5	<1.0	<1.0	<1.0
HBH2	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH3	14	187	8.8	<1.0	<1.0	3.2	<1.0	<1.0
HBH4	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH5	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Table 8:7: Summary of Groundwater Chemical Testing Results – Xylene

Location	Xylene (µg/l)							
	Rd 1	Rd 2	Rd3	Rd4	Rd5	Rd6	Rd 7	Rd 8
DS01	1,240	1540	44.6	<1.0	6.3	19.3	<1.0	<1.0
DS02	37,700	5,640	739	66.5	71.2	76	<1.0	<1.0
DS03	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DS04	19,340	50,400	760.9	<1.0	300.8	312.4	191.3	<1.0
DS05	< 1.0	260	71.6	18.1	32.2	<1.0	<1.0	<1.0
HBH1	< 1.0	< 1.0	12.5	<1.0	8.1	<1.0	<1.0	39.1
HBH2	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH3	96.5	820	98.4	9.2	14.2	12.5	<1.0	45.1
HBH4	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HBH5	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Table 8:8: Summary of Groundwater Chemical Testing Results – Total PAH

Location	Total PAH (µg/l)							
	Rd 1	Rd 2	Rd3	Rd4	Rd5	Rd6	Rd 7	Rd 8
DS01	6,370	1,080	22.1	5.63	48.3	50.2	37	11,500
DS02	5,430	250	84	158	114	154	119	1,050
DS03	233	2320	1,970	4.97	26.9	5.49	5.59	6.35
DS04	112	215,000	68.1	23.9	133	16.8	68.1	U/S*
DS05	2,120	6,810	2,060	185	137	5,870	38.6	3,240
HBH1	286	44.3	33.6	18.3	16.8	28.7	12.2	52.3
HBH2	16.1	10.2	< 0.16	2.41	1.16	2.55	0.66	426
HBH3	96.4	3210	68.6	20.9	28.1	57.6	72.8	538
HBH4	201	36	22.2	210	483	89.4	42.7	29.2
HBH5	22.4	456	22.6	8.47	7.87	10	1.18	1.74

9. HUMAN HEALTH RISK ASSESSMENT

- 9.1 Soil contaminant data have been compared against the LQM S4UL screening criteria. The results of the soil chemical laboratory results are provided within **Appendix 8**, with the CLEA screening sheets presented as **Appendix 12**.
- 9.2 The screening criteria have been developed with the following assumptions which have been changed from the CLEA default parameter set. Soil type is a sandy loam with an organic matter content of 1%. This is considered to be more representative of shallow Made Ground found on most Brownfield sites than the CLEA default of 6% organic matter. The building type for a commercial development is assumed to be a post 1970s office which is representative of new commercial buildings.

Pathways

- 9.3 Contamination data have been compared to screening criteria for a commercial end use (i.e. using all pathways for that end use) based on an organic matter content of 1%.
- 9.4 The site is to be developed for commercial end use and therefore the key receptor is considered to be an adult female worker and GSACs for a commercial industrial end use have been adopted.
- 9.5 Exposure pathways considered in this assessment are presented in **Table 9:1**.

Table 9:1: Commercial Exposure Pathways

Source	Shallow Soils		Deep Soils
	Commercial / Industrial with managed landscaped areas	Commercial / Industrial with Hard standing areas	Commercial / Industrial
Ingestion of Soil	✓	✗	✗
Ingestion of site derived household dust	✓	✗	✗
Ingestion of contaminated vegetables	✗	✗	✗
Ingestion of soil attached to vegetables	✗	✗	✗
Dermal contact with Soil	✓	✗	✗
Dermal contact with site derived household dust	✓	✗	✗
Inhalation of fugitive soil dust	✓	✗	✗
Inhalation of fugitive site derived household dust	✓	✗	✗
Inhalation of vapours outside	✓	✓	✓
Inhalation of vapours inside	✓	✓	✓

Sources

- 9.6 The contaminant concentrations have been compared directly to the screening criteria for a commercial end use.
- 9.7 When compared against the screening criteria, all contaminants are below the guidance concentrations adopted with the exception of the total TPH concentrations recorded at DS03 (580mg/kg at 0.2m), DS06 (1,200mg/kg at 0.8), and DS05 (790mg/kg at 4.2m), which exceed the initial BWB screening criteria value of 500mg/kg prompting additional consideration. Speciated analysis on the same sample from DS05 has not identified concentrations above the screening criteria, and therefore does not represent a risk to human health. Given the similar order of magnitude that the other total TPH were recorded at, it is unlikely that they would represent a risk to human health.
- 9.8 Asbestos has been recorded in all Made Ground samples at the site which represents a risk to human health, especially given the high quantities indicated in the north west (DS06). Any redevelopment of the site will require clean capping installed in areas of soft landscaping to prevent human contact with Made Ground.

10. CONTROLLED WATERS RISK ASSESSMENT

- 10.1 The results of soil leachate analysis and groundwater sampling are presented as **Appendix 8** and **Appendix 9** respectively.
- 10.2 The controlled waters assessment considers the potential impact of on-site contamination to pertinent controlled waters receptors identified at the site including:
- Principal Aquifer beneath the site within the Chalk bedrock;
 - Source Protection Zone – Inner Catchment / potable water abstraction; and
 - Bourne Brook to the west.
- 10.3 Given the predominantly cohesive nature of the Head Deposits and the lack of groundwater encountered within the strata, the Head Deposits at the site are not considered to represent an aquifer and are therefore not considered to represent a potentially sensitive receptor.

Pathways

- 10.4 Controlled water risk assessment has been undertaken through assessment of leachable concentrations of contaminants in soil referring to exposure pathways considered and referencing **Table 10:1**.

Table 10:1: Controlled Water Exposure Pathways

Controlled Waters Exposure Pathway	Receptor
Leaching of soil contamination into recharge infiltration	✓
Vertical migration of impacted pore water through unsaturated zone into underlying aquifer	✓
Horizontal migration of groundwater through aquifer to off site receptors	✓

- 10.5 Given that the main controlled waters receptor at the site is considered to be the underlying Principal Aquifer and a Zone 1 SPZ, the UK Drinking Water Standards (DWS) have been adopted as the relevant screening criteria. When considering the risks to surface water receptors, it is considered appropriate to adopt environmental quality standards (EQS). Where EQS and UKDWS are not available, World Health Organisation Standards (WHO) will be adopted.

Soil Leachability

- 10.6 A summary of the soil leachate concentrations and adopted guideline concentrations are presented within **Appendix 10**. The recorded concentrations of heavy metal leachate were marginally above the screening criteria. Given the shallow depth, and the presence of predominantly cohesive Head Deposits that are likely to be underlying the Made Ground, they are not considered to represent a risk to the deeper Principal Aquifer/SPZ.
- 10.7 Given the presence of hardstand overlying these deposits, it is unlikely that the leachate would be mobilised towards Bourne Brook given the lack of surface water infiltration.

Furthermore, given the ephemeral nature of the brook, the low concentrations would have a negligible impact upon the water course.

Groundwater

- 10.8 A summary of the groundwater concentrations from the first two monitoring visits and adopted guideline screening criteria are presented within **Appendix 11**. Marginal exceedances of arsenic, nickel and zinc were recorded at a similar order of magnitude to the screening criteria and are not considered to represent a significant risk to the wider aquifer.
- 10.9 Significantly elevated TPH, BTEX and PAH have been recorded in the groundwater, with the worst impact recorded at DS01 and DS02, along the southern boundary, and also DS04 and DS05.
- 10.10 The recorded levels of both LNAPL and dissolved phase hydrocarbons within the new boreholes (DS01 – DS05) is considerably higher than those recorded in the older boreholes (HBH1 – HBH5). This is considered to be due to the historical boreholes being previously used as treatment/LNAPL abstraction wells. This localised reduction in contaminant mass within the older boreholes suggests that the remedial works carried out had a limited lateral zone of influence upon the wider groundwater quality, and was not able to pull through LNAPL from the rest of the site.
- 10.11 The localised effect of the previous remedial works may also provide an indication that the lateral migration from the site to the wider aquifer may also be relatively localised. However, the presence of significant quantities of LNAPL along the southern boundary is a cause for concern.
- 10.12 Given the distance to the abstraction well (890m south east) and based on the low permeability within the shallow chalk, it is unlikely that elevated contaminants would migrate that far in the short term. However, there could be a risk over the longer term if the ongoing source (USTs and LNAPL) remain in the ground.
- 10.13 Remedial works would likely be required by the EA prior to them granting a permit for the site. This would also require a detailed quantitative risk assessment (DQRA) to inform the scale of remedial works.

Summary

- 10.14 Given the high levels of contamination in the groundwater, and the presence of an ongoing source in the form of the underground tanks and LNAPL within groundwater, the site is considered to represent a high risk to the underlying Principal Aquifer/SPZ1.
- 10.15 Prior to permitting or redevelopment the EA are likely to require remedial works to be undertaken. A detailed quantitative risk assessment will be required to inform the extents of the remediation and would be required to support planning applications for redevelopment or change of use.

11. ENVIRONMENTAL RISK ASSESSMENT

Introduction

- 11.1 Based upon the findings of the ground investigation, the Preliminary Conceptual Site Model presented in **Table 4:1** has been updated below in **Table 11:1**.

Table 11:1: Updated Conceptual Site Model

Source	Pathway	Receptor	Con	Prob	Risk	Mitigation/Investigation
ACMs within Made Ground	Inhalation of particulates	Construction/ services personnel	Md	Li	M	<p>Whilst minimal Made Ground has been encountered on site, ACMs have been encountered in all samples tested. It is therefore likely that any construction or maintenance personnel working on the site is likely to be exposed to ACMs, especially in the waste materials recorded at DS06.</p> <p>The recommendations of the Control of Asbestos Regulations 2012, CAR-SOIL, CIRIA Report 132 – 'A Guide for Safe Working on Contaminated Sites' and CIRIA Report C741 – 'Environmental Good Practice on Site' should be considered during ground works at the site to ensure the appropriate PPE is worn, good hygiene practices are adopted and correct procedures are followed.</p>
		Future site users	Md	UI	L	<p>It is unlikely that future site users would come into contact with Made Ground based on the current site layout. Should the site undergo redevelopment works, a clean capping layer would need to be incorporated in areas of soft landscaping to sever the pathway.</p>
Elevated hydrocarbons within groundwater	Lateral migration of contaminated groundwater	Wider underlying Principal Aquifer and SPZ	Sv	Li	H	<p>High levels of hydrocarbon contamination are present in the groundwater, and given the presence of an ongoing source in the form of the underground tanks and LNAPL within groundwater, the site is considered to represent a high risk to the underlying Principal Aquifer/SPZ1.</p> <p>Remedial works are likely to be required to reduce the risk to the underlying aquifer.</p>

Source	Pathway	Receptor	Con	Prob	Risk	Mitigation/Investigation
Elevated ground gasses associated with hydrocarbons in soils and groundwater	Migration and accumulation of ground gasses in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	Construction/ services personnel	Sv	UI	M/L	Elevated carbon dioxide and methane have been recorded at the site associated with the hydrocarbon impact within the deeper soils and groundwater. Overlying Head Deposits may provide a degree of protection from vertical migration towards ground level.
		Future site users	Sv	UI	M/L	It is considered that the gas risk represents a CS2 site and gas protection measures would be required in any new buildings. It would be prudent to obtain details relating to any gas protection measures included within the existing buildings. Alternatively, if the building was bought back into use it would be recommended to conduct some internal gas monitoring to provide confidence that the deeper ground gasses are not accumulating in enclosed spaces.
Elevated ground gasses associated with Made Ground	Migration and accumulation of ground gasses in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	Construction/ services personnel	Md	UI	L	The preliminary ground gas assessment was based on monitoring wells installed around the contaminated groundwater. Limited Made Ground is present on site, however, the lateral and vertical extent of the Made Ground at DS06 has not been proven, and the waste materials could give rise to elevated ground gasses.
		Future site users	Md	Lw	M/L	If new buildings are being considered for the site, delineation of the Made Ground at DS06 would be required, and shallow ground gas monitoring would be required. It would be prudent to obtain details relating to any gas protection measures included within the existing buildings. Alternatively, it is recommended to conduct internal gas monitoring to provide confidence that the deeper ground gasses are not accumulating in enclosed spaces.

Source	Pathway	Receptor	Con	Prob	Risk	Mitigation/Investigation
Elevated VOC vapours associated with hydrocarbons in soils and groundwater	Inhalation of vapours	Construction/ services personnel	Md	Lw	M/L	Significantly elevated PID readings have been recorded in the soils, particularly below 3m, and also during the ground gas monitoring. Overlying Head Deposits are likely to provide a degree of protection from vertical migration towards ground level.
		Future site users	Md	Lw	M/L	Vapour protective measures may be required in any new buildings. It would be prudent to obtain details relating to any vapour protection measures included within the existing buildings. Alternatively, it is recommended to conduct internal vapour monitoring to provide confidence that the deeper volatile vapours are not accumulating in enclosed spaces.
Hydrocarbon spillages at ground level	Surface water run off	Bourne Brook	Mi	Li	M/L	The drainage system at the site is not currently fit for purpose and the interceptor drain was visibly overrun during the ground investigation following a heavy rainfall event. Whilst this does not represent a significant risk to Bourne Brook whilst the site is not operational, it could act as a direct pathway for hydrocarbons to enter Bourne Brook once the site is active. Remedial works are understood to be proposed to assess and improve the condition of the on site drainage.

12. ENVIRONMENT LIABILITY ASSESSMENT

Statutory Liability

- 12.1 Under statutory guidance for definition of contaminated land site may be classified into 4 categories. Categories 1 and 2 would meet the definition of contaminated land and categories 3 and 4 would not meet the definition. Sites assessed under planning would normally be expected to fall within Category 4 as a minimum standard, to allow for a suitable factor of safety should standards change in the future.
- 12.2 It is considered that the site would fall within Category 1 or 2 based on the presence of LNAPL and phase separated hydrocarbons within the Principal Aquifer and Source Protection Zone.
- 12.3 The contaminated land regime has implications for those who cause or knowingly permit land to be contaminated, or who own or occupy land that is contaminated. Contaminated land is defined in Section 78A(2) of Part IIA of the Environmental Protection Act 1990 as:
- a) *Significant harm is being caused or there is a significant possibility of such harm being caused; or*
 - b) *Pollution of controlled waters is being or is likely to be, caused."*
- 12.4 Harm is defined in Section 78(4) of the Environmental Protection Act 1990 as:
- 12.5 "Harm to the health of living organisms or other interference with ecological systems of which they form part and, in the case of man, includes harm to property."
- 12.6 Once an area of land has been identified as contaminated land, appropriate persons will be identified as being responsible for the cost of cleaning up the land by the enforcing authority. The appropriate person will be liable for all or part of the remediation of the land. Two classes of appropriate person have been identified:
- Class A appropriate persons are those who cause or knowingly permit the pollutants to be in, on or under the land.
 - Class B appropriate persons are the owners(s) or occupier(s) of the land.
 - Where no Class A appropriate persons can be identified, then Class B appropriate persons may become liable.
- 12.7 Based on the information available regarding the site, the potential for Statutory Authority action based on "*pollution of controlled water*" or "*significant harm*" as defined by Part IIA of the Environmental Protection Act 1990 is considered to be **Moderate to High** based on the presence of LNAPL within groundwater.

Third Party Liability

- 12.8 The contamination has been observed across the entire site, with the highest quantities of LNAPL product recorded adjacent to the site boundary. It is therefore considered highly likely that the site borne contamination has migrated beyond the site.

- 12.9 It is considered that the previous remedial works have locally improved groundwater quality at the site, however, this has resulted in pockets of contaminated groundwater remaining across the site rather than a single plume. The alterations to the plume dynamics make it difficult to understand the pre-remediation contamination levels, and therefore, the migration potential of contaminants.
- 12.10 Based on the unknown levels of impact pre-remediation, and the nearest abstraction license being the potable abstraction at the centre of the SPZ1 (890m south east), it is opinion of BWB that the potential for legal action by surrounding landowners, based on the potential for contamination to migrate off-site, is considered to be **Moderate**.

Public Relations

- 12.11 Given the isolated location of the site, it is unlikely that ownership or redevelopment of the site at present time would represent a significant issue associated with contaminated land impacting upon public relations.

13. CONCLUSION AND RECOMMENDATIONS

Conclusions

- 13.1 The site is currently occupied by a disused oil storage depot located on Farnham Road, on the outskirts of Bishop Stortford. A small one storey office building is present in the north of the site, with fuel pumps and a gantry in the centre of the site and a tank farm in the south of the site. Two 45,000 litre underground storage tanks (USTs) were indicated to be present in the south of the site. Bourne Brook is an ephemeral water course which flows along the northern and western site boundary following heavy rainfall events.
- 13.2 The site is underlain by superficial Head Deposits (clay, silt, sand and gravel). The underlying bedrock geology is indicated to comprise undifferentiated Lewes Nodular Chalk and Seaford Chalk Formations. The Head Deposits are categorised by the Environment Agency as undifferentiated Secondary Aquifers. The underlying Chalk is classified as a Principal Aquifer. The site lies within a Zone 1 Source Protection Zone centred around a potable groundwater abstraction 890m south east.
- 13.3 Historically, the site has remained undeveloped until the 1960s when a small building is mapped in the north of the site. From 1974 site appears in its current layout with the office building in the north and tanks towards the south. A former quarry located 125m north east has subsequently been used as a landfill site.
- 13.4 Ground investigation has identified limited Made Ground (typically less than 0.5m) over cohesive Head Deposits proven to between 3.9m and 5.5m bgl, overlying chalk. Deeper Made Ground with abundant waste was identified in one location in the west of the site, possibly reflective of imported waste materials used to raise site levels. Groundwater levels were recorded between 4.63m and 5.9m bgl or 58.03m to 59.12m AOD.
- 13.5 Preliminary gas monitoring has recorded elevated carbon dioxide, methane and VOC vapours at the site, emanating from the contaminated soils and groundwater at concentrations which represent a risk to future site users. Ground gas protection measures commensurate with a characteristic situation 2 site would be required for new buildings but should be reassessed following remedial works.
- 13.6 Contaminant levels within the soils are not indicated to represent a risk to future site users in the context of a commercial end use. However, asbestos has been recorded in all Made Ground samples. A clean capping layer would be required in areas of soft landscaping if the site were to be redeveloped.
- 13.7 Relatively low leachate concentrations in the Made Ground are not considered to represent a risk to Bourne Brook given the lack of surface water infiltration at the site, and the ephemeral nature of the water course making it a relatively low sensitivity receptor. The proposed upgrade works to the site drainage system would further reduce the risk to Bourne Brook.
- 13.8 High concentrations of hydrocarbons and LNAPL have been recorded in the groundwater, and given the presence of an ongoing source in the form of the underground tanks and LNAPL within groundwater, the site is considered to represent a high risk to the underlying Principal Aquifer/SPZ1.

13.9 It is considered that the site would meet the definition of Category 1 or 2 Contaminated Land due to the presence of significant contamination within a Principal Aquifer and Zone 1 Source Protection Zone. It is likely that the Environment Agency would require some form of groundwater remediation prior to providing a permit to use the site as a waste oil transfer station. It is considered that this would, as a minimum, comprise removal of the underground tank, associated infrastructure, and any grossly impacted soils, as well as removal of any LNAPL from groundwater to ensure that there is no source remaining at the site. Dissolved phase hydrocarbon contamination in the groundwater is also likely to require treatment to reduce the migration risk to the wider, sensitive aquifer.

Recommendations

13.10 It is likely that remedial works are expected to be required by the EA prior to them granting a permit for the site. Further ground investigation will be required to assess the vertical extents of hydrocarbon impact through the groundwater column in the chalk aquifer and a detailed quantitative risk assessment will be required to inform the extents of the remediation and would be required to support a planning application for redevelopment and/or change of use.

13.11 Should redevelopment be considered, additional gas and vapour monitoring points will be required to assess the vertical and lateral extents of the Made Ground containing abundant waste materials to assess the implications to future site users with respect to possibly elevated ground gasses.

13.12 If the buildings are to be retained on site, it is recommended that details are requested as to the levels of gas and vapour protection installed within them. Should this not be made available, or none exist, it is recommended to undertake internal monitoring to provide greater confidence in the risk to future site users.

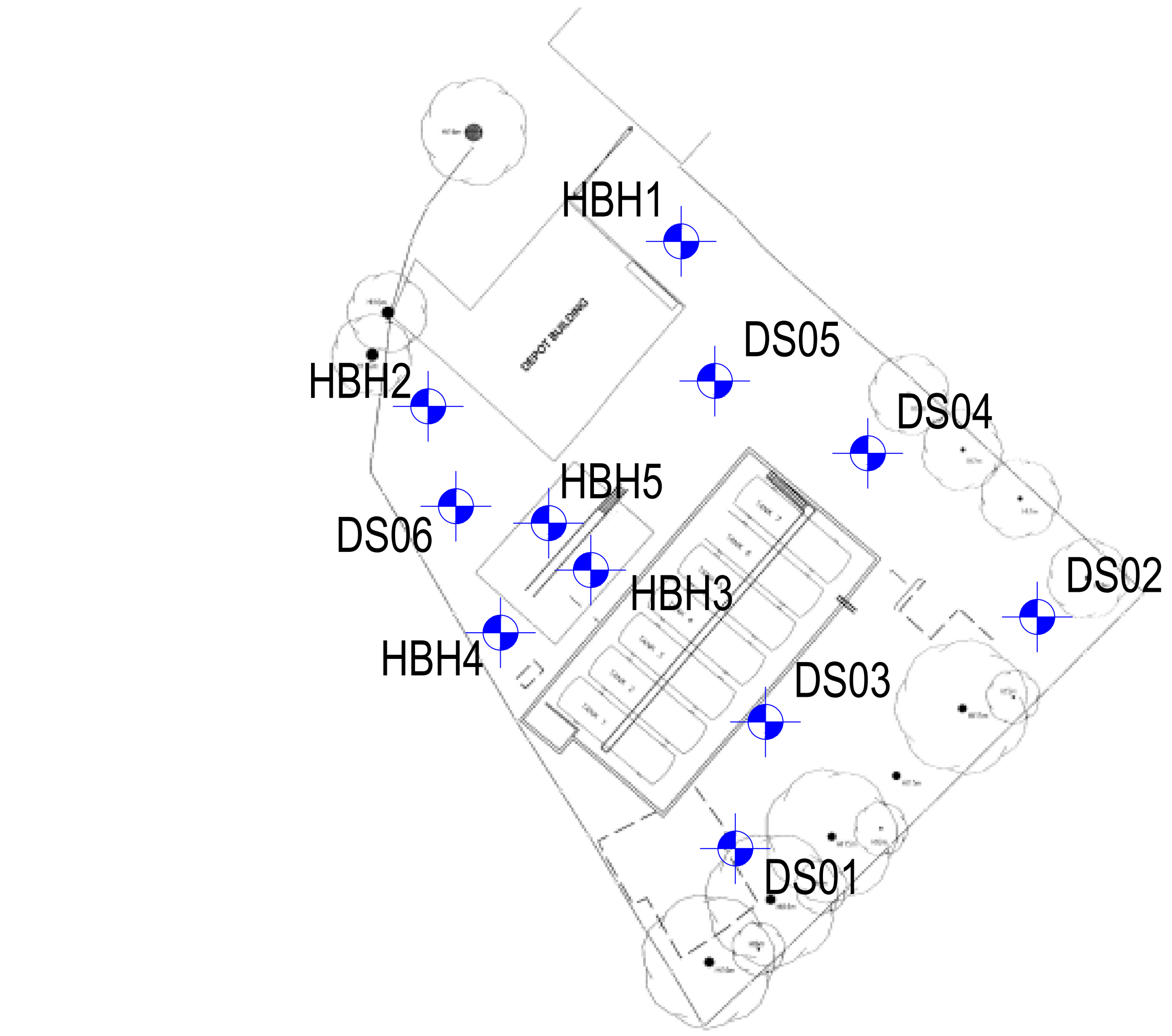
14. REFERENCES

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2. British Standards Institution, (BSI), BS 8576:2013, Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)
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-
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 19. Environment Agency, 2006, Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination
 20. Health and Safety Executive (HSE) 'Protection of workers and the general public during the Development of Contaminated Land (1991).
 21. NHBC Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008.

DRAWINGS

Drawing 1: Site Layout



- Notes**
1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

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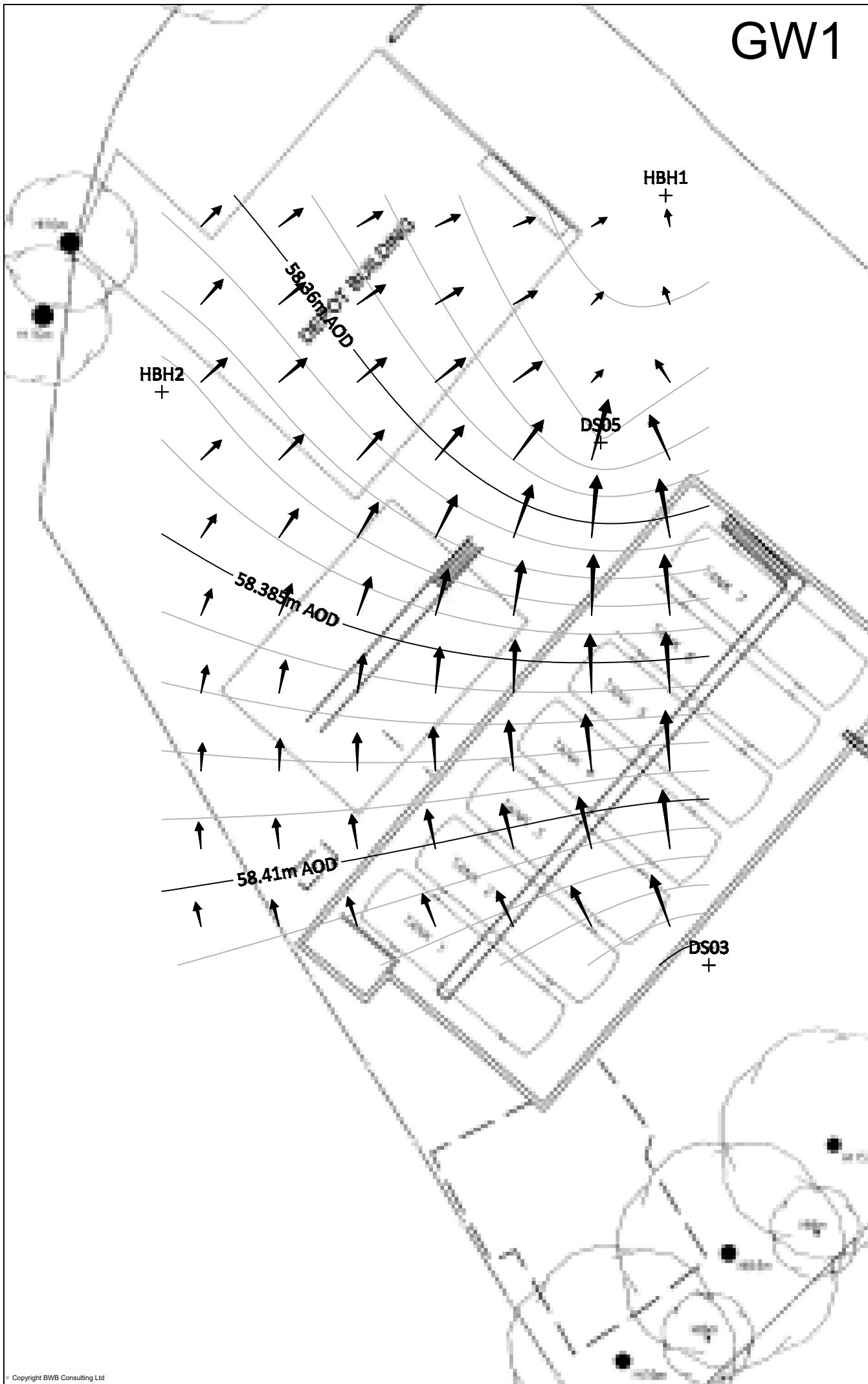
Client
Oil Salvage Ltd

Project Title
Farnham Road, Bishop's Stortford

Drawing Title
Indicative Exploratory Hole Location Plan

Drawn:	CR	Reviewed:	
BWB Ref:	NTG2113	Date:	July 2020
Scale:	A3	NTS	
Drawing Status			
Final			
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev	
BFFR-BWB-ZZ-XX-DR-YE-0001	S1	P1	

Drawing 2: Inferred Groundwater Flow Plot



- Notes**
1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

Rev	Date	Details of issue / revision	Dwg	Rev

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Client
Oil Salvage Ltd

Project Title
Farnham Road, Bishop's Stortford

Drawing Title
Inferred Groundwater Flow Direction

Drawn:	CR	Reviewed:	
BWB Ref:	NTG2113	Date:	July 2020
Scale:	A3	NTS	
Drawing Status			
Final			
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev	
BFFR-BWB-ZZ-XX-DR-YE-0002	S1	P1	

APPENDICES

Appendix 1: Site Photographs

Project Number: NTG2113
Project Name: Farnham Road, Bishop's Stortford
Site Photographs

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Photo 1—ASTs, with USTs present under soft landscaping.



Photo 2—refilling point and gantry

Project Number: NTG2113
Project Name: Farnham Road, Bishop's Stortford
Site Photographs

BWB



Photo 3—2500l kerosene AST for heating system.



Photo 4— ORC indicating possible former remedial works have taken place.

Project Number: NTG2113
Project Name: Farnham Road, Bishop's Stortford
Site Photographs



Photo 5—Site entrance.



Photo 6— Small brick bund around ASTs.

Appendix 2: Groundsure Report

FARNHAM ROAD, BISHOPS STORTFORD, CM23 1JJ

Order Details

Date: 08/07/2020
Your ref: NTG2113-POR031690
Our Ref: HMD-214-6853808
Client: BWB Consulting Limited

Site Details

Location: 548585 223452
Area: 0.22 ha
Authority: [East Hertfordshire District Council](#)



Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.12

groundsure.com/insightuserguide

Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	<u>Historical industrial land uses</u>	2	0	11	7	-
14	1.2	<u>Historical tanks</u>	1	0	0	0	-
15	1.3	Historical energy features	0	0	0	0	-
15	1.4	Historical petrol stations	0	0	0	0	-
15	1.5	Historical garages	0	0	0	0	-
16	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
17	2.1	<u>Historical industrial land uses</u>	2	0	14	8	-
18	2.2	<u>Historical tanks</u>	1	0	0	0	-
19	2.3	Historical energy features	0	0	0	0	-
19	2.4	Historical petrol stations	0	0	0	0	-
19	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
20	3.1	Active or recent landfill	0	0	0	0	-
20	3.2	Historical landfill (BGS records)	0	0	0	0	-
21	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
21	3.4	<u>Historical landfill (EA/NRW records)</u>	0	0	1	0	-
21	3.5	Historical waste sites	0	0	0	0	-
21	3.6	Licensed waste sites	0	0	0	0	-
22	3.7	Waste exemptions	0	0	0	0	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
23	4.1	<u>Recent industrial land uses</u>	8	1	0	-	-
24	4.2	Current or recent petrol stations	0	0	0	0	-
24	4.3	Electricity cables	0	0	0	0	-
24	4.4	Gas pipelines	0	0	0	0	-
24	4.5	Sites determined as Contaminated Land	0	0	0	0	-



25	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
25	4.7	Regulated explosive sites	0	0	0	0	-
25	4.8	Hazardous substance storage/usage	0	0	0	0	-
25	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
25	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
26	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
26	4.12	Radioactive Substance Authorisations	0	0	0	0	-
26	4.13	<u>Licensed Discharges to controlled waters</u>	0	1	2	1	-
27	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
27	4.15	Pollutant release to public sewer	0	0	0	0	-
27	4.16	List 1 Dangerous Substances	0	0	0	0	-
27	4.17	List 2 Dangerous Substances	0	0	0	0	-
28	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	4	1	-
28	4.19	Pollution inventory substances	0	0	0	0	-
29	4.20	Pollution inventory waste transfers	0	0	0	0	-
29	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
30	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
32	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
34	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
35	5.4	<u>Groundwater vulnerability- soluble rock risk</u>	Identified (within 0m)				
35	5.5	Groundwater vulnerability- local information	None (within 0m)				
36	5.6	<u>Groundwater abstractions</u>	0	0	0	0	7
38	5.7	<u>Surface water abstractions</u>	0	0	0	0	3
39	5.8	<u>Potable abstractions</u>	0	0	0	0	5
41	5.9	<u>Source Protection Zones</u>	1	0	1	1	-
41	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
42	6.1	<u>Water Network (OS MasterMap)</u>	0	4	2	-	-



43	<u>6.2</u>	<u>Surface water features</u>	1	2	1	-	-
43	<u>6.3</u>	<u>WFD Surface water body catchments</u>	1	-	-	-	-
44	<u>6.4</u>	<u>WFD Surface water bodies</u>	0	1	0	-	-
44	<u>6.5</u>	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
45	<u>7.1</u>	<u>Risk of Flooding from Rivers and Sea (RoFRaS)</u>	High (within 50m)				
46	<u>7.2</u>	<u>Historical Flood Events</u>	1	0	1	-	-
46	7.3	Flood Defences	0	0	0	-	-
46	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
47	7.5	Flood Storage Areas	0	0	0	-	-
48	<u>7.6</u>	<u>Flood Zone 2</u>	Identified (within 50m)				
49	<u>7.7</u>	<u>Flood Zone 3</u>	Identified (within 50m)				
Page	Section	Surface water flooding					
50	<u>8.1</u>	<u>Surface water flooding</u>	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
52	<u>9.1</u>	<u>Groundwater flooding</u>	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
53	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
54	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
54	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
54	10.4	Special Protection Areas (SPA)	0	0	0	0	0
54	10.5	National Nature Reserves (NNR)	0	0	0	0	0
55	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
55	<u>10.7</u>	<u>Designated Ancient Woodland</u>	0	0	0	0	6
55	10.8	Biosphere Reserves	0	0	0	0	0
56	10.9	Forest Parks	0	0	0	0	0
56	10.10	Marine Conservation Zones	0	0	0	0	0
56	<u>10.11</u>	<u>Green Belt</u>	1	1	0	0	0
56	10.12	Proposed Ramsar sites	0	0	0	0	0



57	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
57	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
57	10.15	Nitrate Sensitive Areas	0	0	0	0	0
57	10.16	<u>Nitrate Vulnerable Zones</u>	1	0	0	0	2
59	10.17	<u>SSSI Impact Risk Zones</u>	1	-	-	-	-
60	10.18	SSSI Units	0	0	0	0	0

Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
61	11.1	World Heritage Sites	0	0	0	-	-
61	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
61	11.3	National Parks	0	0	0	-	-
61	11.4	Listed Buildings	0	0	0	-	-
62	11.5	Conservation Areas	0	0	0	-	-
62	11.6	Scheduled Ancient Monuments	0	0	0	-	-
62	11.7	Registered Parks and Gardens	0	0	0	-	-

Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
63	12.1	<u>Agricultural Land Classification</u>	Grade 3b (within 250m)				
64	12.2	Open Access Land	0	0	0	-	-
65	12.3	Tree Felling Licences	0	0	0	-	-
65	12.4	Environmental Stewardship Schemes	0	0	0	-	-
65	12.5	Countryside Stewardship Schemes	0	0	0	-	-

Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
66	13.1	Priority Habitat Inventory	0	0	0	-	-
66	13.2	Habitat Networks	0	0	0	-	-
67	13.3	<u>Open Mosaic Habitat</u>	0	0	1	-	-
67	13.4	Limestone Pavement Orders	0	0	0	-	-

Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
68	14.1	<u>10k Availability</u>	Identified (within 500m)				
69	14.2	<u>Artificial and made ground (10k)</u>	0	0	1	0	-
70	14.3	<u>Superficial geology (10k)</u>	1	0	6	3	-



71	14.4	Landslip (10k)	0	0	0	0	-
72	14.5	<u>Bedrock geology (10k)</u>	1	0	2	1	-
73	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
74	15.1	<u>50k Availability</u>	Identified (within 500m)				
75	15.2	<u>Artificial and made ground (50k)</u>	0	0	1	1	-
76	15.3	Artificial ground permeability (50k)	0	0	-	-	-
77	15.4	<u>Superficial geology (50k)</u>	1	0	3	3	-
78	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
78	15.6	Landslip (50k)	0	0	0	0	-
78	15.7	Landslip permeability (50k)	None (within 50m)				
79	15.8	<u>Bedrock geology (50k)</u>	1	0	2	1	-
80	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
80	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
81	16.1	<u>BGS Boreholes</u>	0	0	11	-	-
Page	Section	Natural ground subsidence					
83	17.1	<u>Shrink swell clays</u>	Very low (within 50m)				
84	17.2	<u>Running sands</u>	Very low (within 50m)				
85	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
86	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
87	17.5	<u>Landslides</u>	Very low (within 50m)				
88	17.6	<u>Ground dissolution of soluble rocks</u>	High (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
90	18.1	Natural cavities	0	0	0	0	-
91	18.2	<u>BritPits</u>	0	0	1	2	-
91	18.3	<u>Surface ground workings</u>	0	0	14	-	-
92	18.4	Underground workings	0	0	0	0	0
92	18.5	<u>Historical Mineral Planning Areas</u>	0	0	1	1	-



93	18.6	<u>Non-coal mining</u>		1	0	2	0	0
93	18.7	Mining cavities		0	0	0	0	0
94	18.8	JPB mining areas	None (within 0m)					
94	18.9	Coal mining	None (within 0m)					
94	18.10	Brine areas	None (within 0m)					
94	18.11	Gypsum areas	None (within 0m)					
94	18.12	Tin mining	None (within 0m)					
95	18.13	Clay mining	None (within 0m)					
Page	Section	Radon						
96	19.1	<u>Radon</u>	Less than 1% (within 0m)					
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m	
97	20.1	<u>BGS Estimated Background Soil Chemistry</u>	1	1	-	-	-	
97	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-	
97	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-	
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m	
98	21.1	Underground railways (London)	0	0	0	-	-	
98	21.2	Underground railways (Non-London)	0	0	0	-	-	
98	21.3	Railway tunnels	0	0	0	-	-	
98	21.4	Historical railway and tunnel features	0	0	0	-	-	
98	21.5	Royal Mail tunnels	0	0	0	-	-	
99	21.6	Historical railways	0	0	0	-	-	
99	21.7	Railways	0	0	0	-	-	
99	21.8	Crossrail 1	0	0	0	0	-	
99	21.9	Crossrail 2	0	0	0	0	-	
99	21.10	HS2	0	0	0	0	-	



Recent aerial photograph

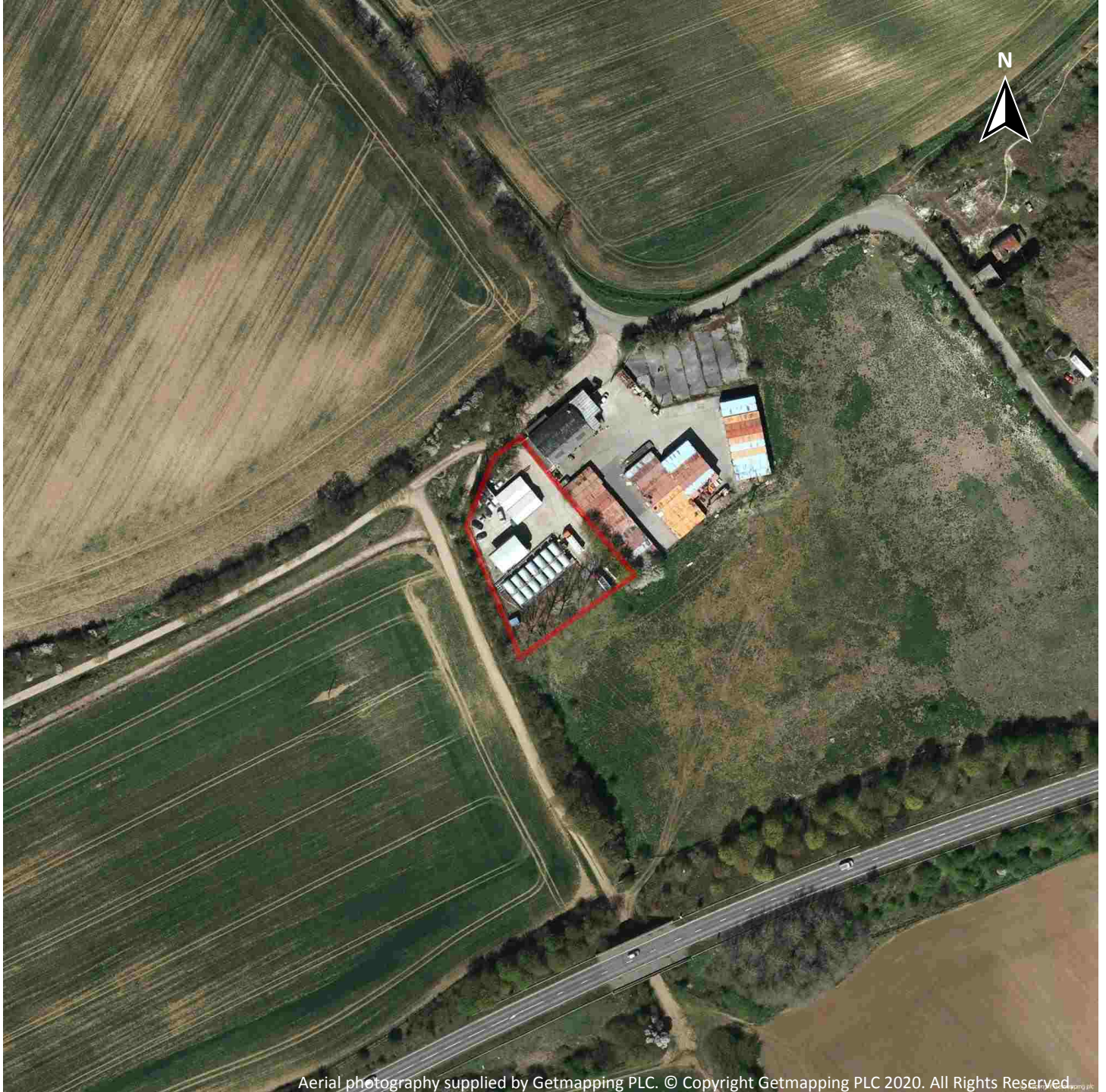


Capture Date: 22/08/2015

Site Area: 0.22ha



Recent site history - 2013 aerial photograph



Capture Date: 02/05/2013

Site Area: 0.22ha



Recent site history - 2010 aerial photograph

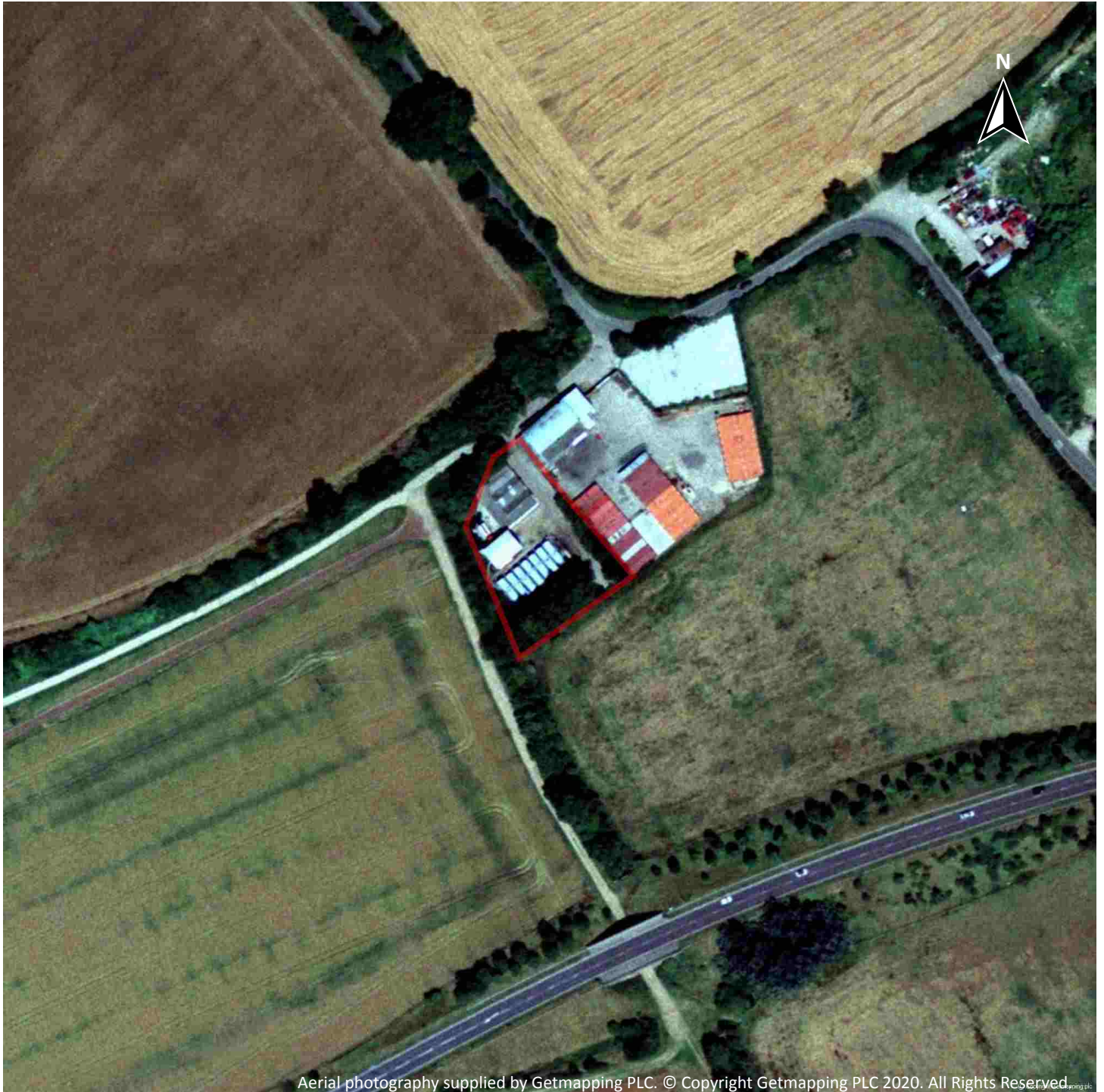


Capture Date: 27/04/2010

Site Area: 0.22ha



Recent site history - 1999 aerial photograph



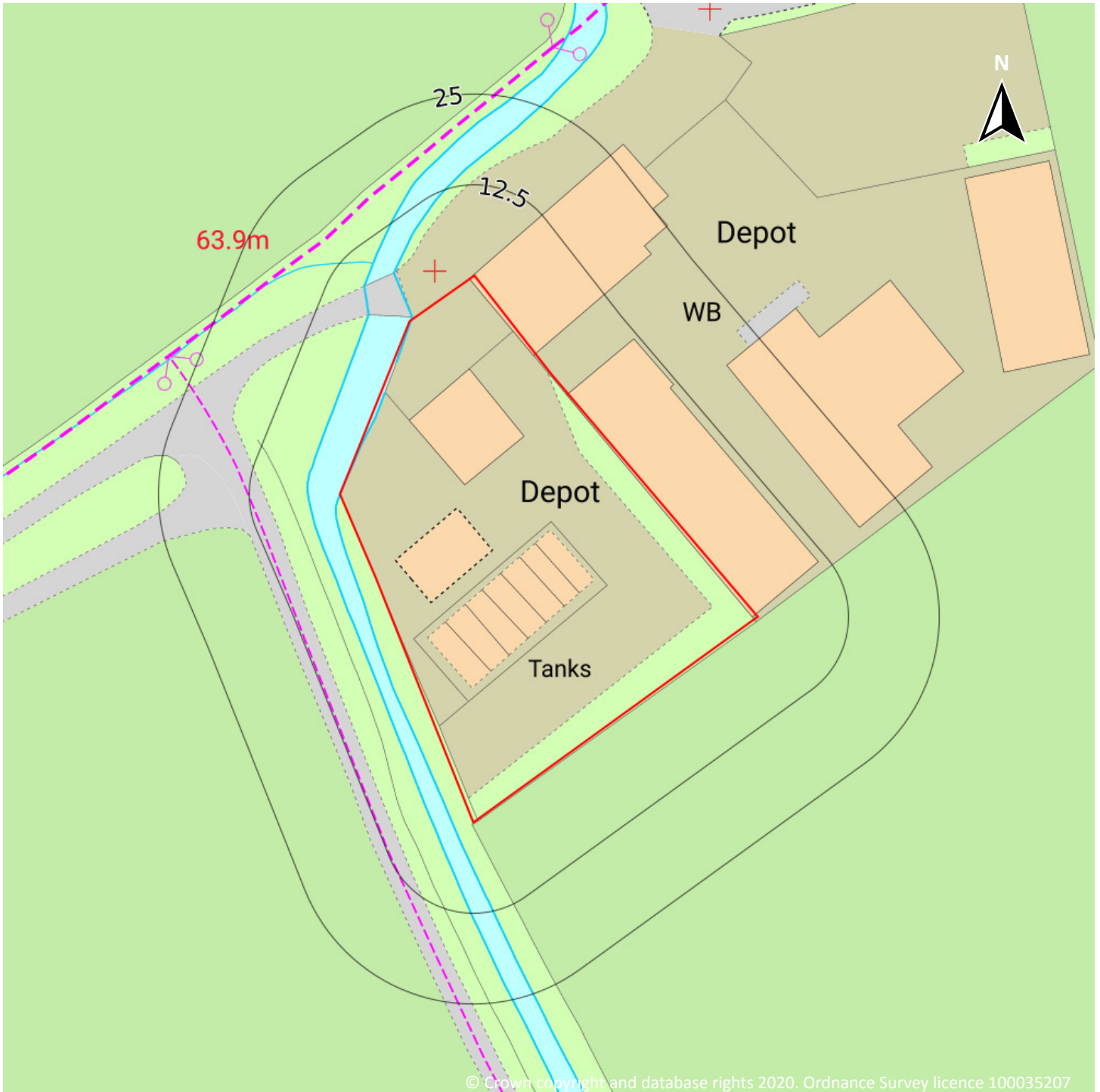
Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2020. All Rights Reserved.

Capture Date: 18/07/1999

Site Area: 0.22ha



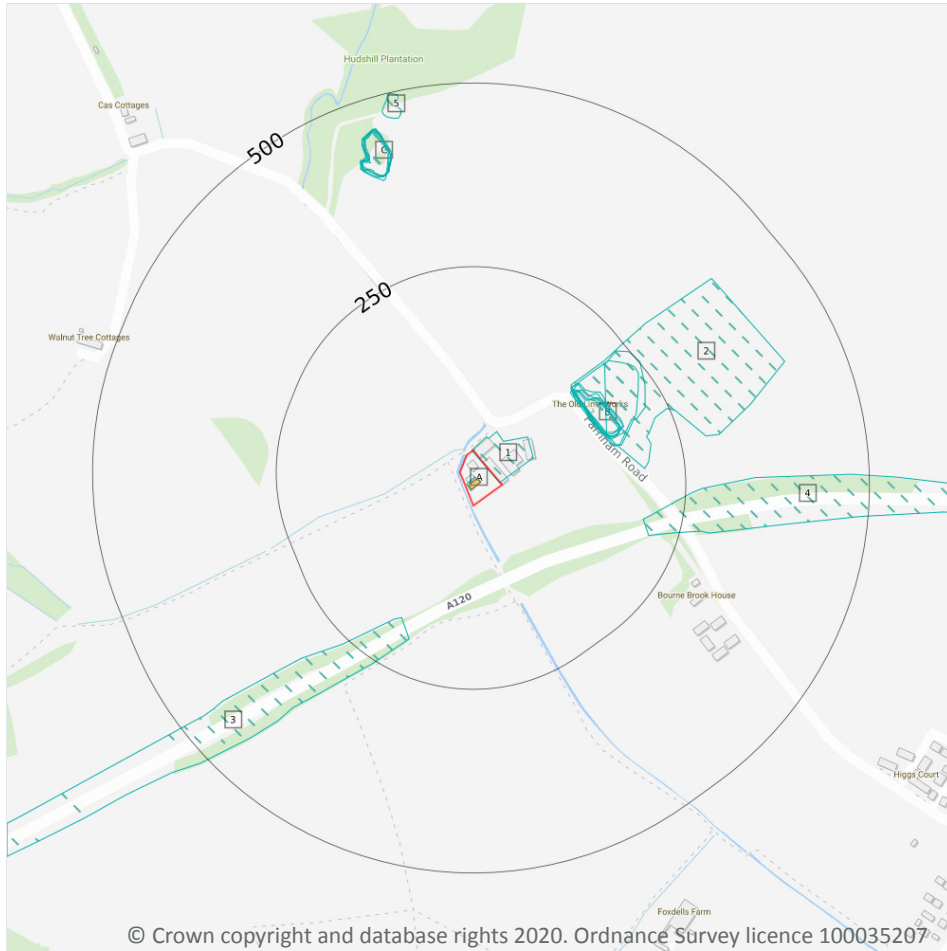
OS MasterMap site plan



Site Area: 0.22ha



1 Past land use



1.1 Historical industrial land uses

Records within 500m **20**

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

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	On site	Unspecified Depot	1981	2048121

ID	Location	Land use	Dates present	Group ID
A	On site	Unspecified Tanks	1981	2055266
B	149m NE	Unspecified Pit	1879	2040663
B	149m NE	Old Chalk Pit	1898 - 1899	2100613
B	151m NE	Old Chalk Pit	1896	2086973
2	151m NE	Lime Quarry	1981	2054771
B	152m NE	Chalk Pit	1938	2081081
B	152m NE	Chalk Pit	1923 - 1938	2093060
B	153m NE	Chalk Pit	1923	2100189
B	155m NE	Chalk Pit	1946	2069760
B	156m NE	Chalk Pit	1960	2084634
3	181m SW	Cuttings	1981	2061919
4	198m E	Cuttings	1981	2061917
C	387m N	Unspecified Pit	1938	2074494
C	392m N	Unspecified Pit	1938	2099434
C	393m N	Unspecified Pit	1923	2086012
C	393m N	Unspecified Quarry	1960	2053175
C	394m N	Quarry	1946	2045227
C	394m N	Unspecified Pit	1923	2085613
5	464m N	Refuse Heap	1876	2063383

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

1

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

Features are displayed on the Past land use map on **page 13**



ID	Location	Land use	Dates present	Group ID
A	On site	Tanks	1974	348999

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

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

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

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

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

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

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

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

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

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

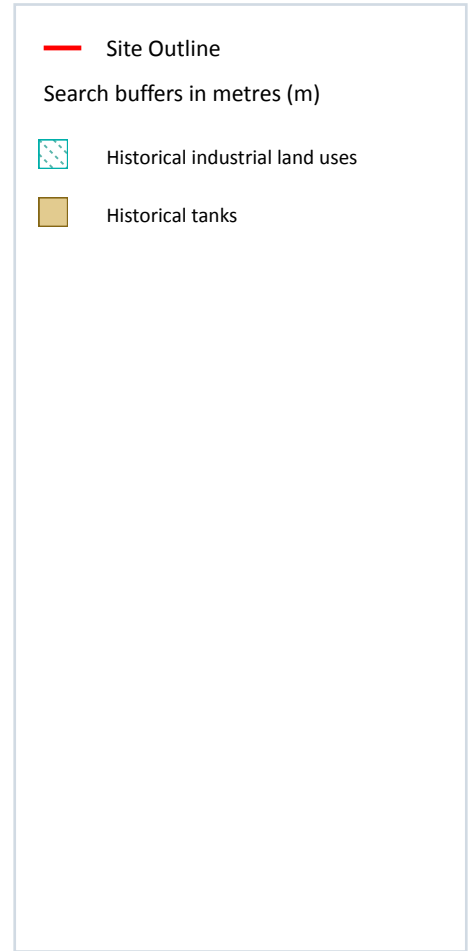
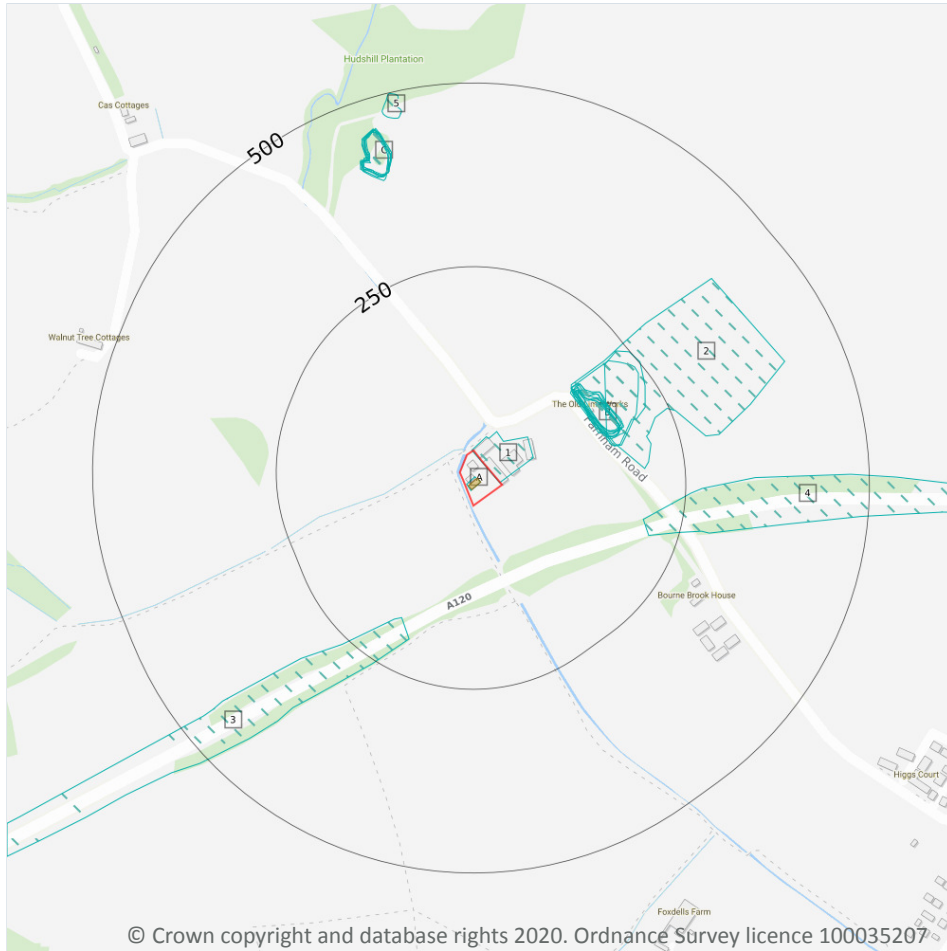
0

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

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



2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m

24

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

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
1	On site	Unspecified Depot	1981	2048121
A	On site	Unspecified Tanks	1981	2055266
B	149m NE	Unspecified Pit	1879	2040663

ID	Location	Land Use	Date	Group ID
B	149m NE	Old Chalk Pit	1898	2100613
B	151m NE	Old Chalk Pit	1896	2086973
2	151m NE	Lime Quarry	1981	2054771
B	152m NE	Chalk Pit	1938	2081081
B	152m NE	Chalk Pit	1938	2093060
B	153m NE	Chalk Pit	1923	2100189
B	154m NE	Old Chalk Pit	1899	2100613
B	155m NE	Chalk Pit	1946	2069760
B	156m NE	Chalk Pit	1960	2084634
B	156m NE	Chalk Pit	1923	2093060
B	157m NE	Chalk Pit	1938	2093060
3	181m SW	Cuttings	1981	2061919
4	198m E	Cuttings	1981	2061917
C	387m N	Unspecified Pit	1938	2074494
C	392m N	Unspecified Pit	1938	2099434
C	393m N	Unspecified Pit	1923	2086012
C	393m N	Unspecified Quarry	1960	2053175
C	394m N	Quarry	1946	2045227
C	394m N	Unspecified Pit	1923	2085613
C	395m N	Unspecified Pit	1938	2099434
5	464m N	Refuse Heap	1876	2063383

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m

1

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

Features are displayed on the Past land use - un-grouped map on **page 17**



ID	Location	Land Use	Date	Group ID
A	On site	Tanks	1974	348999

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

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

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

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

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

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

This data is sourced from Ordnance Survey / Groundsure.

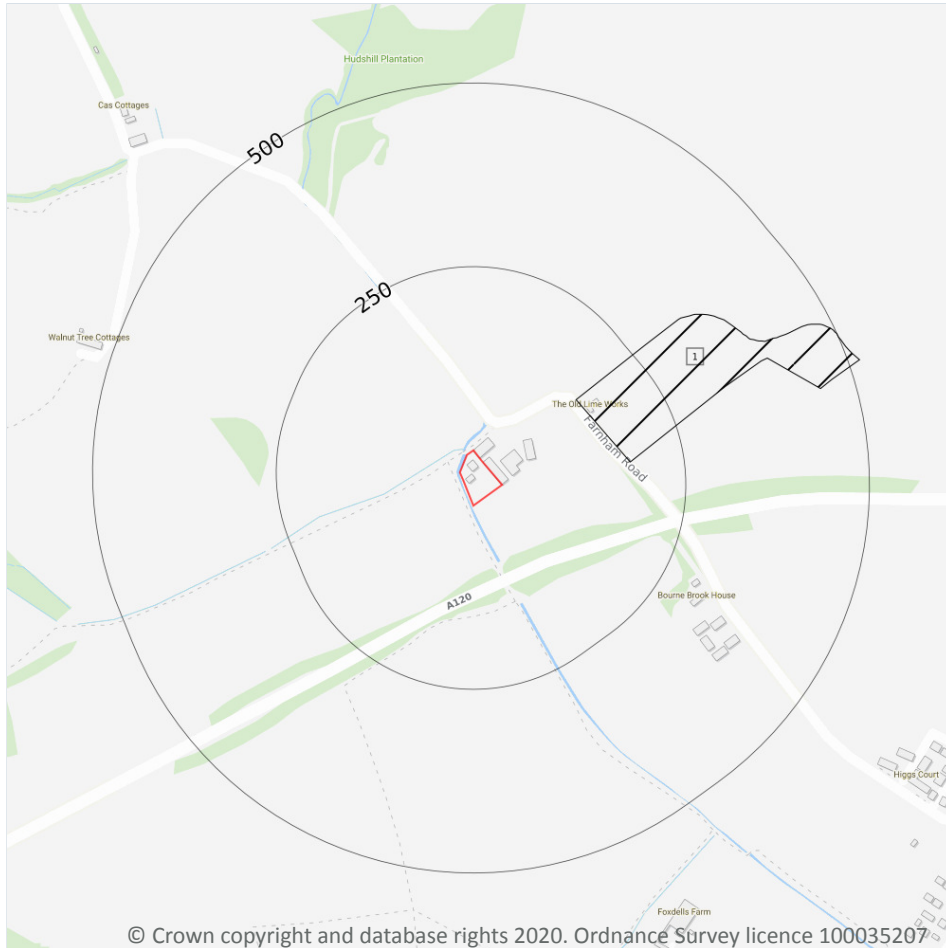
2.5 Historical garages

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

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

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- / / / / Historical landfill (EA/NRW)

3.1 Active or recent landfill

Records within 500m

0

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

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

3.2 Historical landfill (BGS records)

Records within 500m

0

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

This data is sourced from the British Geological Survey.



3.3 Historical landfill (LA/mapping records)

Records within 500m

0

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

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

3.4 Historical landfill (EA/NRW records)

Records within 500m

1

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

Features are displayed on the Waste and landfill map on **page 20**

ID	Location	Details		
1	151m NE	Site Address: Stortford Limeworks, Farnham Road, Bishops Stortford, Hertfordshire Licence Holder Address: -	Waste Licence: Yes Site Reference: 85/180 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 15/02/1985 Licence Surrender: 30/04/1994	Operator: - Licence Holder: Stortford Lime Works Limited First Recorded 31/12/1950 Last Recorded: 30/04/1994

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

3.5 Historical waste sites

Records within 500m

0

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

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

3.6 Licensed waste sites

Records within 500m

0

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

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

3.7 Waste exemptions

Records within 500m

0

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

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



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m **9**

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 23**

ID	Location	Company	Address	Activity	Category
A	On site	Tank	Hertfordshire, CM23	Tanks (Generic)	Industrial Features
A	On site	Tank	Hertfordshire, CM23	Tanks (Generic)	Industrial Features
A	On site	Tank	Hertfordshire, CM23	Tanks (Generic)	Industrial Features
A	On site	Tank	Hertfordshire, CM23	Tanks (Generic)	Industrial Features

ID	Location	Company	Address	Activity	Category
A	On site	Tank	Hertfordshire, CM23	Tanks (Generic)	Industrial Features
A	On site	Tank	Hertfordshire, CM23	Tanks (Generic)	Industrial Features
A	On site	Tank	Hertfordshire, CM23	Tanks (Generic)	Industrial Features
A	On site	Depot	Hertfordshire, CM23	Container and Storage	Transport, Storage and Delivery
A	32m NE	Depot	Hertfordshire, CM23	Container and Storage	Transport, Storage and Delivery

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m **0**

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m **0**

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m **0**

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m **0**

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.



4.6 Control of Major Accident Hazards (COMAH)

Records within 500m

0

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

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m

0

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

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m

0

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

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m

0

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

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m

0

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

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



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

Records within 500m

0

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

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

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

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

4.13 Licensed Discharges to controlled waters

Records within 500m

4

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

Features are displayed on the Current industrial land use map on **page 23**

ID	Location	Address	Details	
A	On site	BUTLER FUELS LIMITED, BISHOP'S STORTFORD DEPOT, FARNHAM ROAD, BISHOP'S STORTFORD, HERTFORDSHIRE, CM23 1JB	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: EPRXP3320GA Permit Version: 1 Receiving Water: BOURNE BROOK	Status: NEW ISSUED UNDER EPR 2010 Issue date: 02/10/2012 Effective Date: 02/10/2012 Revocation Date: -
B	78m W	FARNHAM ROAD, BISHOP'S STORTFORD, H, FARNHAM ROAD BISHOP'S STORTFORD, HERTS	Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - NOT WATER COMPANY Permit Number: CLCR.0268 Permit Version: 1 Receiving Water: FARNHAM BOURNE	Status: REVOKED - UNSPECIFIED Issue date: 20/03/1979 Effective Date: 20/03/1979 Revocation Date: 25/02/1992
B	96m W	OAK HOUSE, FARNHAM ROAD, BISHOPS ST, OAK HOUSE FARNHAM ROAD BISHOPS, STORTFORD HERTFORDSHIRE	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CNTM.0112 Permit Version: 1 Receiving Water: FARNHAM BOURNE	Status: LAPSED UNDER SCHEDULE 23 ENVIRONMENT ACT 1995 Issue date: 26/02/1992 Effective Date: 26/02/1992 Revocation Date: 01/10/1996



ID	Location	Address	Details	
2	360m SE	THE PARTRIDGES, FARNHAM ROAD, BISHOPS STORTFORD	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: EPRHB3999VS Permit Version: 1 Receiving Water: GROUNDWATER	Status: NEW ISSUED UNDER EPR 2010 Issue date: 12/06/2018 Effective Date: 12/06/2018 Revocation Date: -

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

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0
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Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

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

4.15 Pollutant release to public sewer

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

Discharges of Special Category Effluents to the public sewer.

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

4.16 List 1 Dangerous Substances

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

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

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

4.17 List 2 Dangerous Substances

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

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

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



4.18 Pollution Incidents (EA/NRW)

Records within 500m

5

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

Features are displayed on the Current industrial land use map on **page 23**

ID	Location	Details	
C	166m NE	Incident Date: 30/04/2002 Incident Identification: 75729 Pollutant: Specific Waste Materials:Specific Waste Materials:Specific Waste Materials Pollutant Description: Household Waste:Metal Wastes:Tyres	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
C	166m NE	Incident Date: 30/04/2002 Incident Identification: 75729 Pollutant: Specific Waste Materials Pollutant Description: Tyres	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
C	166m NE	Incident Date: 30/04/2002 Incident Identification: 75729 Pollutant: Specific Waste Materials Pollutant Description: Metal Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
C	166m NE	Incident Date: 30/04/2002 Incident Identification: 75729 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
1	292m NE	Incident Date: 02/09/2002 Incident Identification: 104627 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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

4.19 Pollution inventory substances

Records within 500m

0

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

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



4.20 Pollution inventory waste transfers

Records within 500m

0

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

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

4.21 Pollution inventory radioactive waste

Records within 500m

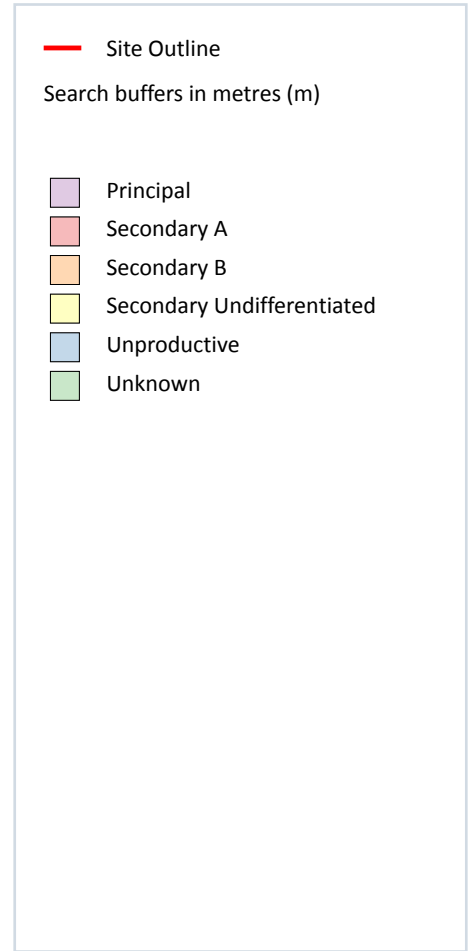
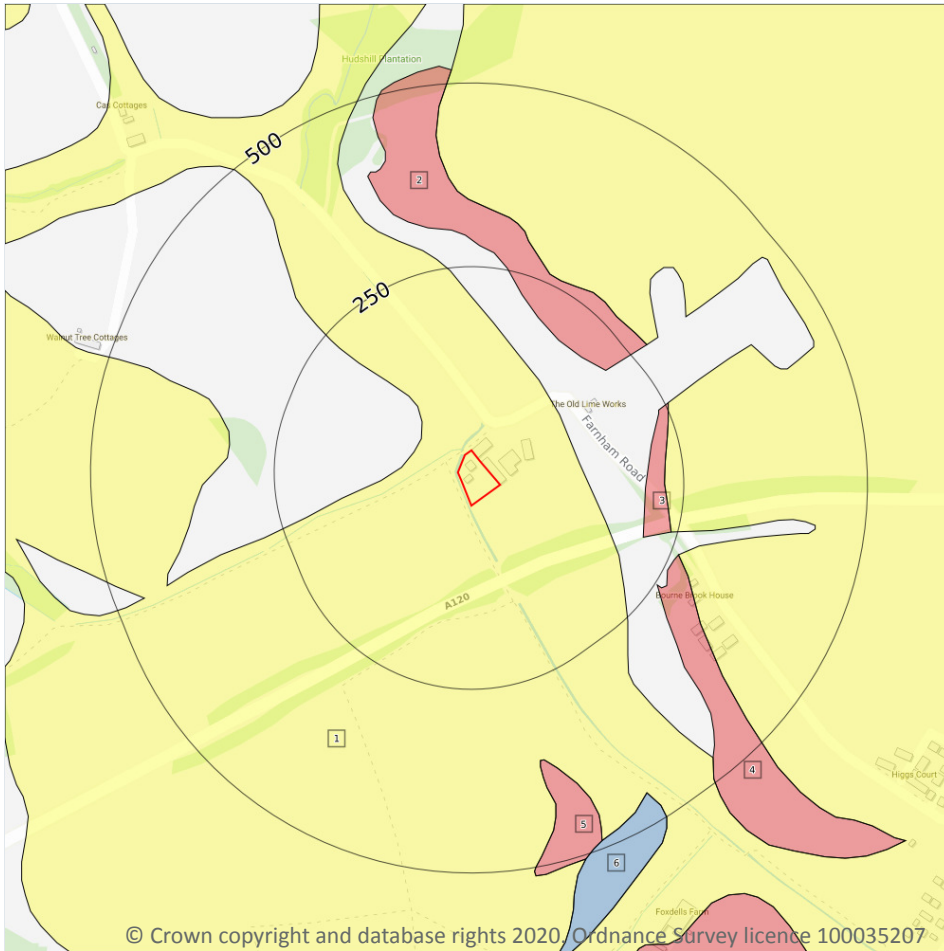
0

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

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



5 Hydrogeology - Superficial aquifer



5.1 Superficial aquifer

Records within 500m

6

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 30**

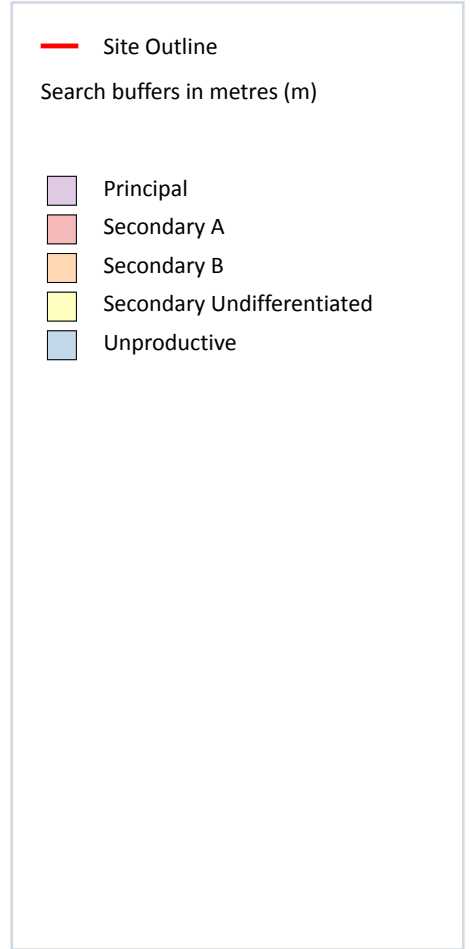
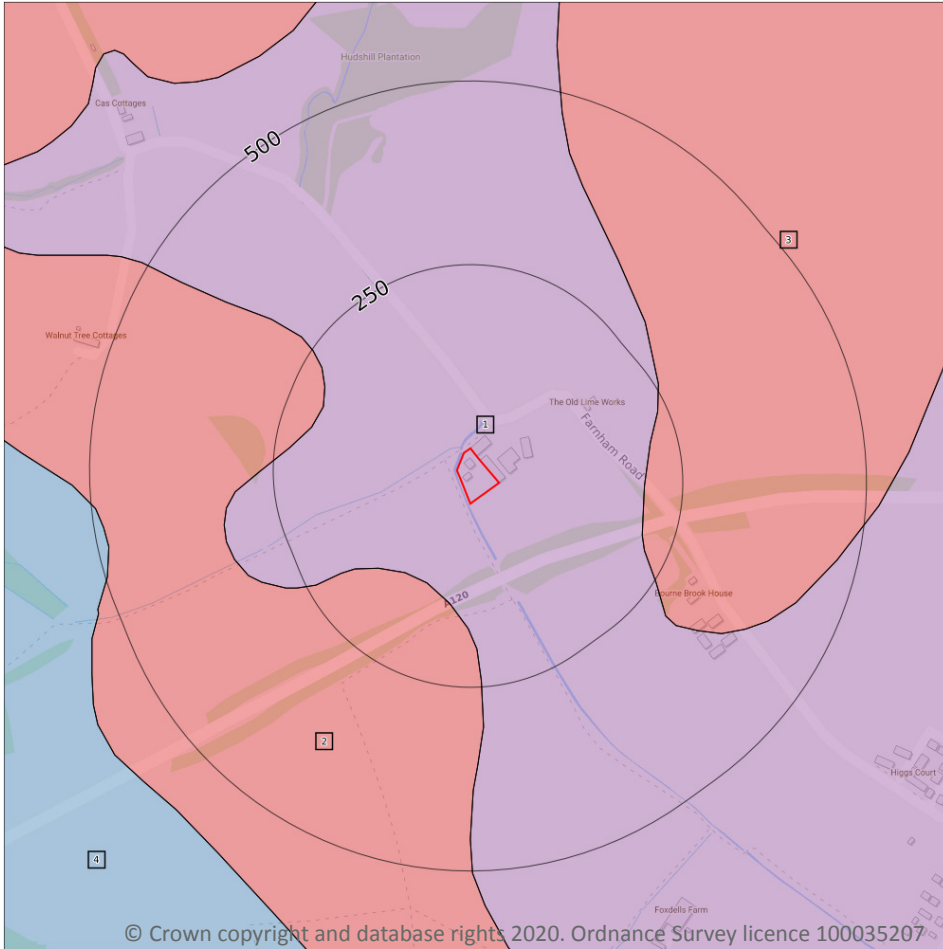
ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	191m NE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

ID	Location	Designation	Description
3	198m E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	254m SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	359m S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
6	458m SE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

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



Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m

4

Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 32**

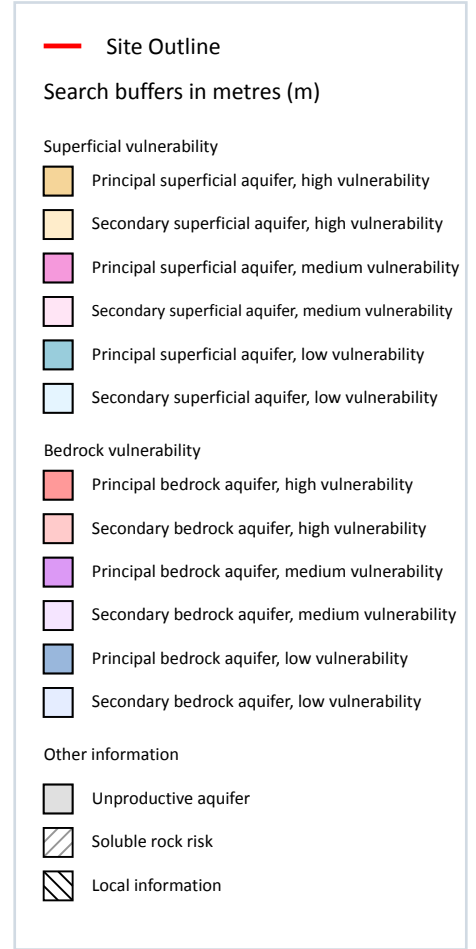
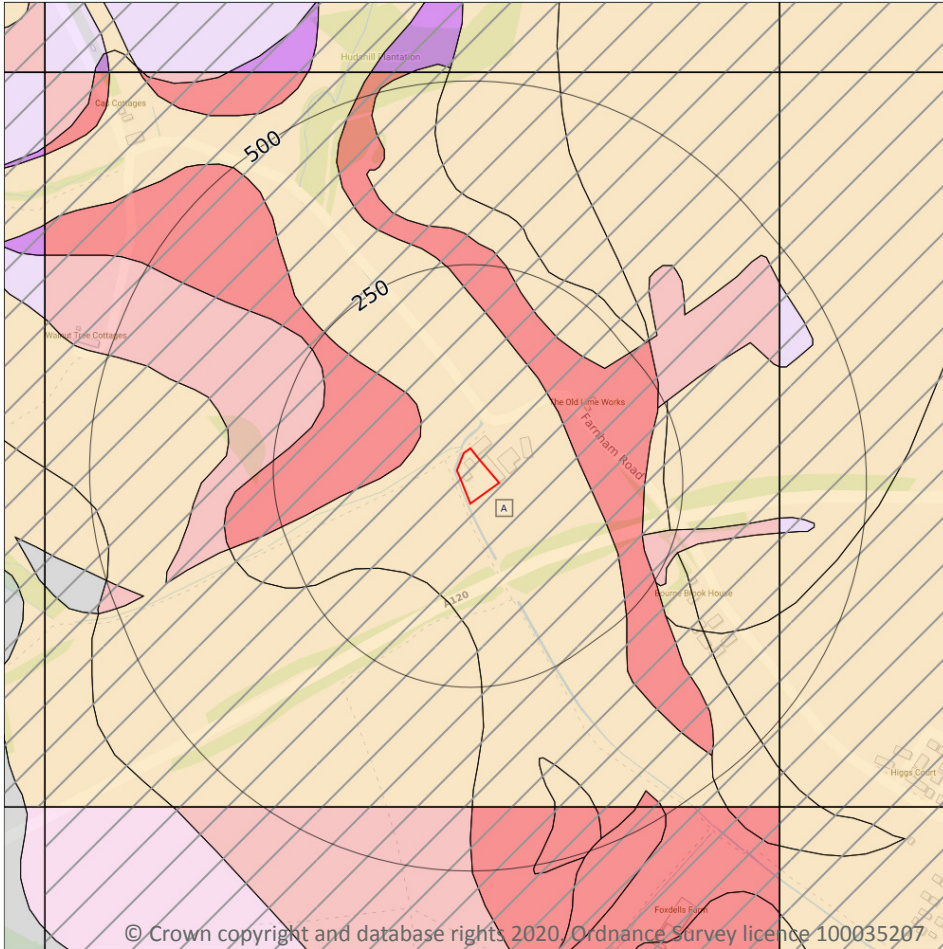
ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	123m SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

ID	Location	Designation	Description
3	198m E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	485m W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

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



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

1

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

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

Features are displayed on the Groundwater vulnerability map on **page 34**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
A	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: High Aquifer type: Secondary Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: High Aquifer type: Principal Flow mechanism: Well connected fractures

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

5.4 Groundwater vulnerability- soluble rock risk

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

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

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
A	Very significant soluble rocks are likely to be present with a high possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, especially in adverse conditions such as concentrated surface or subsurface water flow.	15.0%

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

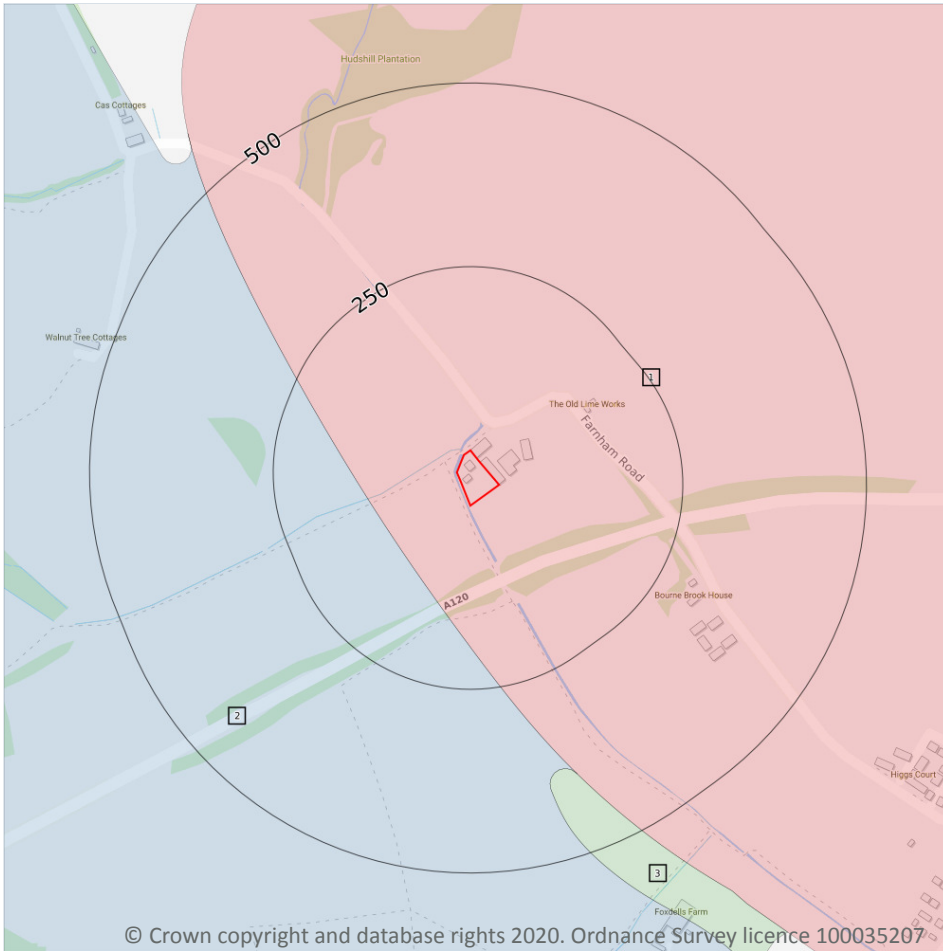
5.5 Groundwater vulnerability- local information

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

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

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

Abstractions and Source Protection Zones



5.6 Groundwater abstractions

Records within 2000m

7

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 36**

ID	Location	Details	
-	889m SE	Status: Historical Licence No: 29/38/06/0170 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION Data Type: Line Name: Affinity Water Limited Easting: 549397 Northing: 223010	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10830 Original Application No: - Original Start Date: 23/12/2005 Expiry Date: 31/03/2018 Issue No: 3 Version Start Date: 14/11/2012 Version End Date: -
-	889m SE	Status: Active Licence No: 29/38/06/0170/R01 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION - POINT B Data Type: Point Name: Affinity Water Limited Easting: 549395 Northing: 223008	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10,830 Original Application No: - Original Start Date: 01/04/2018 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -
-	890m SE	Status: Active Licence No: 29/38/06/0170/R01 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION - POINT A Data Type: Point Name: Affinity Water Limited Easting: 549397 Northing: 223010	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10,830 Original Application No: - Original Start Date: 01/04/2018 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -
-	897m SE	Status: Historical Licence No: 29/38/06/0146 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION Data Type: Point Name: THREE VALLEYS WATER PLC Easting: 549400 Northing: 223000	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 06/10/1995 Expiry Date: 31/12/2005 Issue No: 100 Version Start Date: 09/10/1995 Version End Date: -
-	897m SE	Status: Historical Licence No: 29/38/06/0170 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION Data Type: Point Name: Affinity Water Limited Easting: 549400 Northing: 223000	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10830 Original Application No: - Original Start Date: 23/12/2005 Expiry Date: 31/03/2018 Issue No: 3 Version Start Date: 14/11/2012 Version End Date: -



ID	Location	Details	
-	1072m W	Status: Historical Licence No: 29/38/06/0069 Details: General Farming & Domestic Direct Source: THAMES GROUNDWATER Point: WICKHAM HALL, BISHOPS STORTFORD - WELL Data Type: Point Name: F & F E HARVEY Easting: 547500 Northing: 223300	Annual Volume (m ³): 6637.16 Max Daily Volume (m ³): 18.184 Original Application No: - Original Start Date: 20/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/05/1966 Version End Date: -
-	1247m W	Status: Historical Licence No: 29/38/06/0067 Details: General Farming & Domestic Direct Source: THAMES GROUNDWATER Point: WICKHAM HALL, BISHOPS STORTFORD - BOREHOLE Data Type: Point Name: F & F E HARVEY Easting: 547400 Northing: 223000	Annual Volume (m ³): 6637.306 Max Daily Volume (m ³): 18.184 Original Application No: - Original Start Date: 20/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/05/1966 Version End Date: -

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

5.7 Surface water abstractions

Records within 2000m

3

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 36**

ID	Location	Details	
-	1039m E	Status: Active Licence No: 29/38/06/0113 Details: Spray Irrigation - Direct Direct Source: THAMES SURFACE WATER - NON TIDAL Point: HAZEL END FARMS, FARNHAM - RIVER STORT Data Type: Point Name: HAZEL END FARMS Easting: 549600 Northing: 223100	Annual Volume (m ³): 4,546 Max Daily Volume (m ³): 205 Original Application No: - Original Start Date: 31/05/1977 Expiry Date: - Issue No: 100 Version Start Date: 31/05/1977 Version End Date: -



ID	Location	Details	
-	1895m S	Status: Historical Licence No: TH/038/0006/007 Details: Transfer Between Sources (Post Water Act 2003) Direct Source: THAMES SURFACE WATER - NON TIDAL Point: RIVER STORT AT WAYTEMORE CASTLE Data Type: Point Name: Bishop's Stortford Town Council Easting: 548963 Northing: 221557	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 09/05/2012 Expiry Date: 31/03/2018 Issue No: 1 Version Start Date: 09/05/2012 Version End Date: -
-	1895m S	Status: Active Licence No: TH/038/0006/007/R01 Details: Transfer Between Sources (Post Water Act 2003) Direct Source: THAMES SURFACE WATER - NON TIDAL Point: RIVER STORT AT WAYTEMORE CASTLE Data Type: Point Name: Bishop's Stortford Town Council Easting: 548963 Northing: 221557	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 01/04/2018 Expiry Date: 31/03/2030 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -

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

5.8 Potable abstractions

Records within 2000m	5
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Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 36**

ID	Location	Details	
-	889m SE	Status: Historical Licence No: 29/38/06/0170 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION Data Type: Line Name: Affinity Water Limited Easting: 549397 Northing: 223010	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10830 Original Application No: - Original Start Date: 23/12/2005 Expiry Date: 31/03/2018 Issue No: 3 Version Start Date: 14/11/2012 Version End Date: -



ID	Location	Details	
-	889m SE	Status: Active Licence No: 29/38/06/0170/R01 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION - POINT B Data Type: Point Name: Affinity Water Limited Easting: 549395 Northing: 223008	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10,830 Original Application No: - Original Start Date: 01/04/2018 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -
-	890m SE	Status: Active Licence No: 29/38/06/0170/R01 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION - POINT A Data Type: Point Name: Affinity Water Limited Easting: 549397 Northing: 223010	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10,830 Original Application No: - Original Start Date: 01/04/2018 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -
-	897m SE	Status: Historical Licence No: 29/38/06/0146 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION Data Type: Point Name: THREE VALLEYS WATER PLC Easting: 549400 Northing: 223000	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 06/10/1995 Expiry Date: 31/12/2005 Issue No: 100 Version Start Date: 09/10/1995 Version End Date: -
-	897m SE	Status: Historical Licence No: 29/38/06/0170 Details: Potable Water Supply - Direct Direct Source: THAMES GROUNDWATER Point: NORTH STORTFORD PUMPING STATION Data Type: Point Name: Affinity Water Limited Easting: 549400 Northing: 223000	Annual Volume (m ³): 3,318,580 Max Daily Volume (m ³): 10830 Original Application No: - Original Start Date: 23/12/2005 Expiry Date: 31/03/2018 Issue No: 3 Version Start Date: 14/11/2012 Version End Date: -

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



5.9 Source Protection Zones

Records within 500m**3**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination. Features are displayed on the Abstractions and Source Protection Zones map on **page 36**

ID	Location	Type	Description
1	On site	1	Inner catchment
2	112m SW	2	Outer catchment
3	379m S	3	Total catchment

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

5.10 Source Protection Zones (confined aquifer)

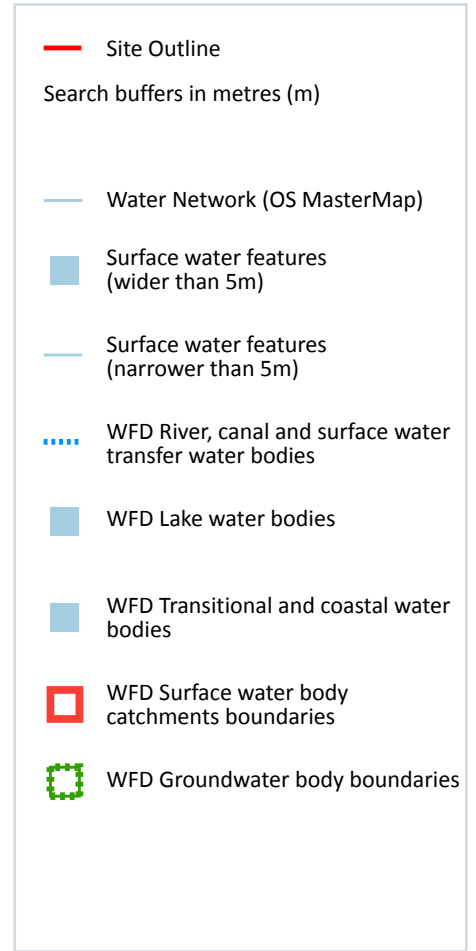
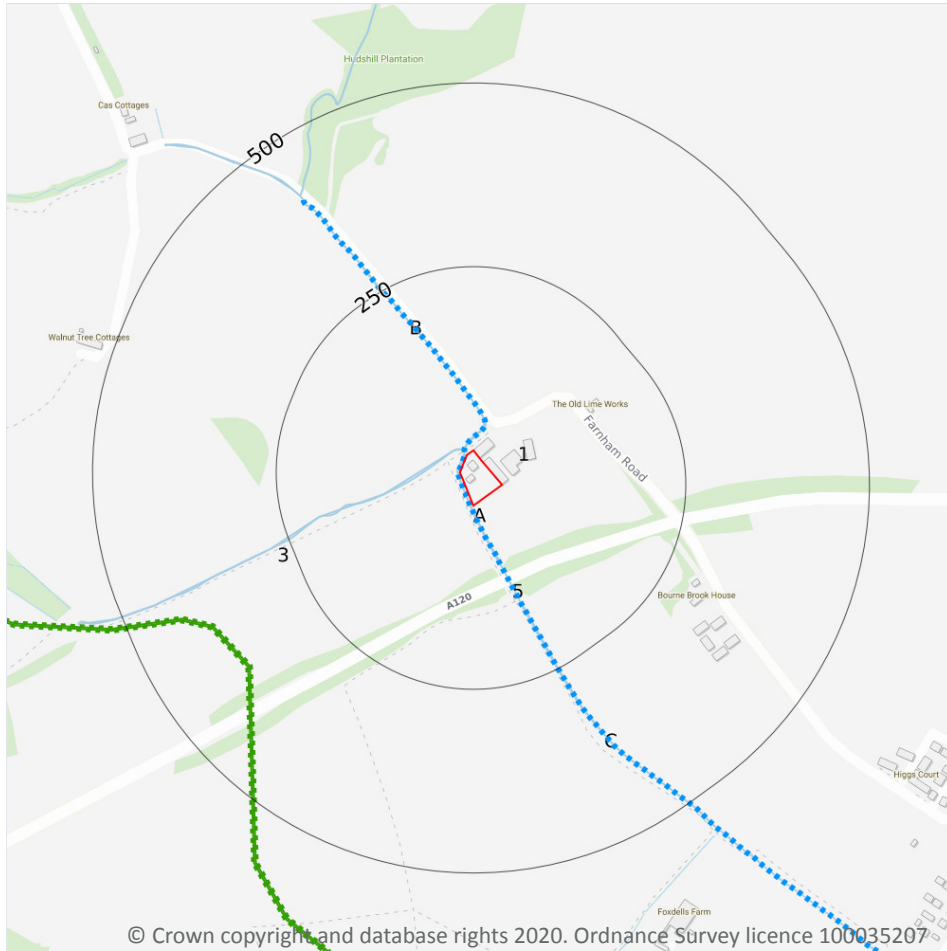
Records within 500m**0**

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

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



6 Hydrology



6.1 Water Network (OS MasterMap)

Records within 250m

6

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

Features are displayed on the Hydrology map on **page 42**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	1m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Bourne Brook

ID	Location	Type of water feature	Ground level	Permanence	Name
A	8m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	8m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Bourne Brook
3	9m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	84m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Bourne Brook
C	148m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Bourne Brook

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

4

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

Features are displayed on the Hydrology map on **page 42**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site

1

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

Features are displayed on the Hydrology map on **page 42**



ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	River WB catchment	Stort and Bourne Brook	GB106038033340	Upper Lee	Upper Lee

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

6.4 WFD Surface water bodies

Records identified	1
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Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 42**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
2	2m W	River	Stort and Bourne Brook	GB106038033340	Moderate	Good	Moderate	2016

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

6.5 WFD Groundwater bodies

Records on site	1
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Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

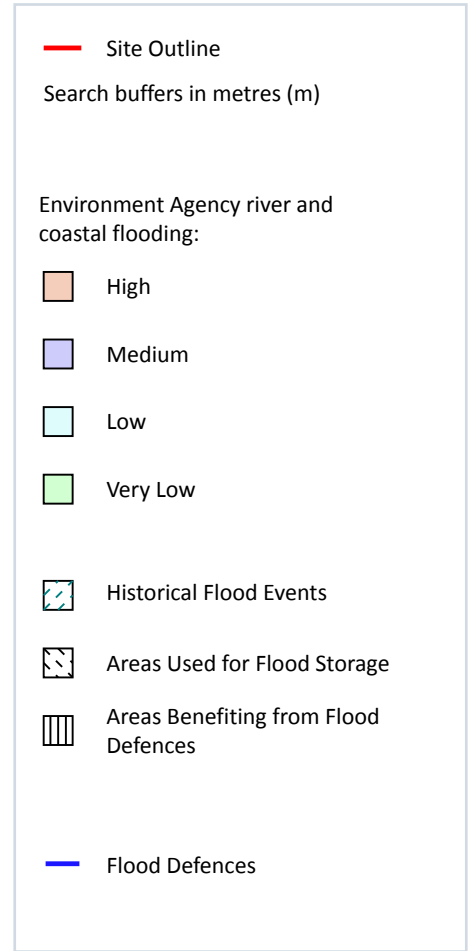
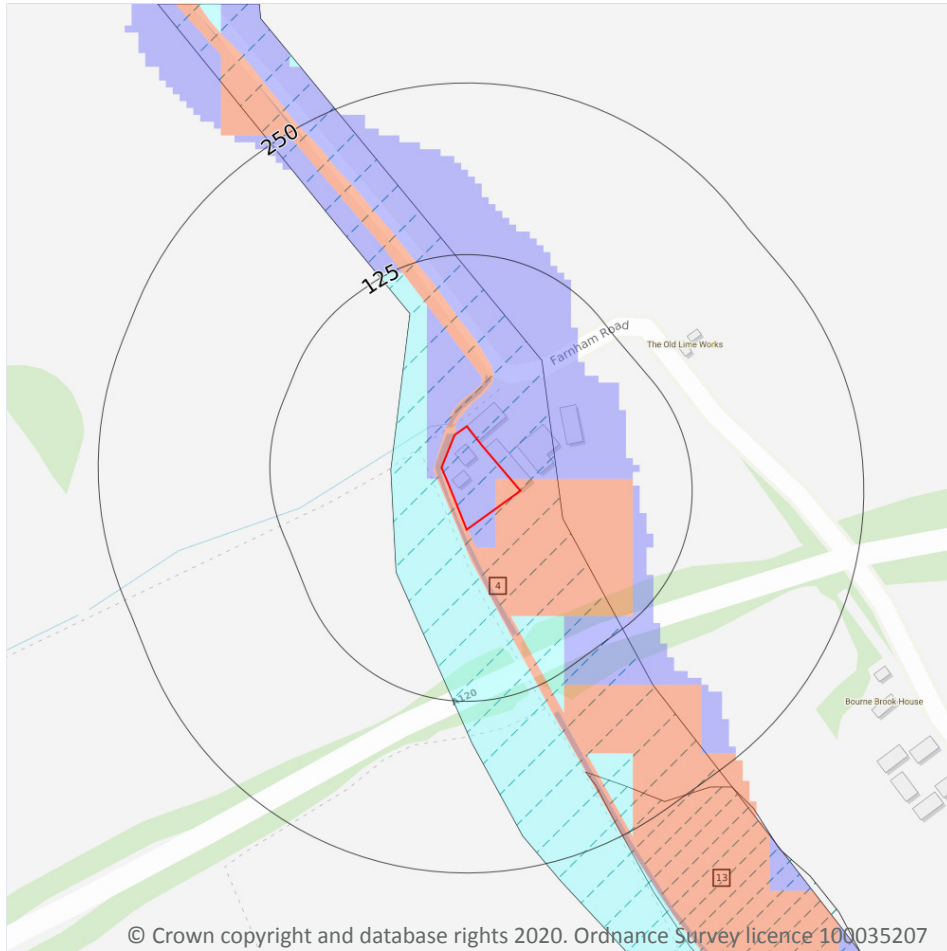
Features are displayed on the Hydrology map on **page 42**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	Upper Lee Chalk	GB40601G602900	Poor	Poor	Poor	2015

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



7 River and coastal flooding



7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m

5

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 45**

Distance	RoFRaS flood risk
On site	High
0 - 50m	High

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

7.2 Historical Flood Events

Records within 250m

2

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

Features are displayed on the River and coastal flooding map on **page 45**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
4	On site	06octoberautumn2001	2001-10-21 2001-10-22	Main river	Channel capacity exceeded (no raised defences)	Fluvial
13	197m SE	Ea06februarywinter2009	2009-02-09 2009-02-10	Other	Channel capacity exceeded (no raised defences)	Fluvial

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

7.3 Flood Defences

Records within 250m

0

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

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

7.4 Areas Benefiting from Flood Defences

Records within 250m

0

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

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



7.5 Flood Storage Areas

Records within 250m

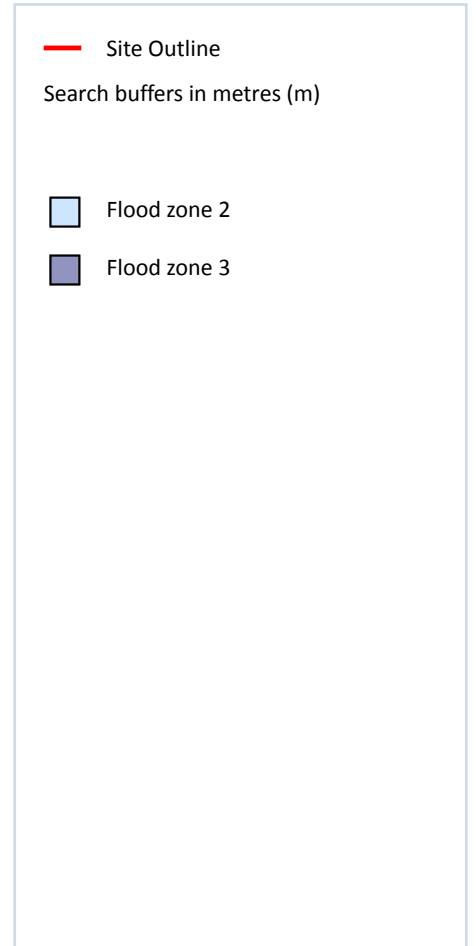
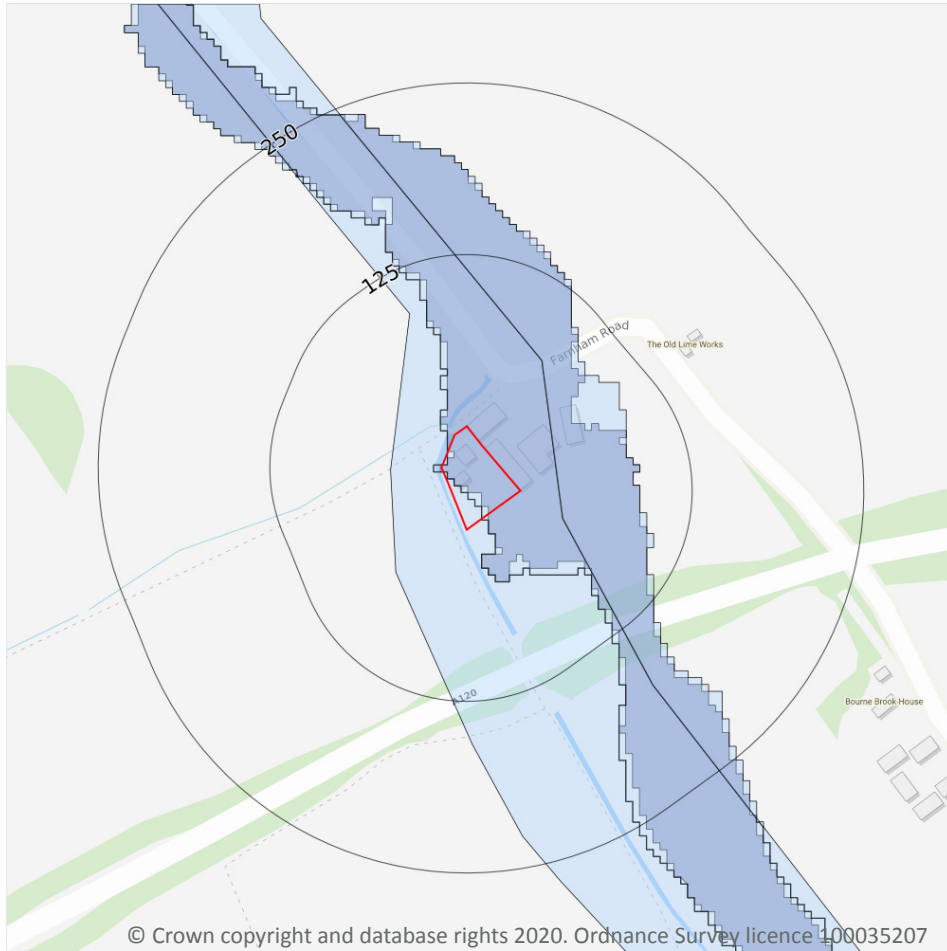
0

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

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



River and coastal flooding - Flood Zones



7.6 Flood Zone 2

Records within 50m

1

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

Features are displayed on the River and coastal flooding map on **page 45**

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

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

7.7 Flood Zone 3

Records within 50m

1

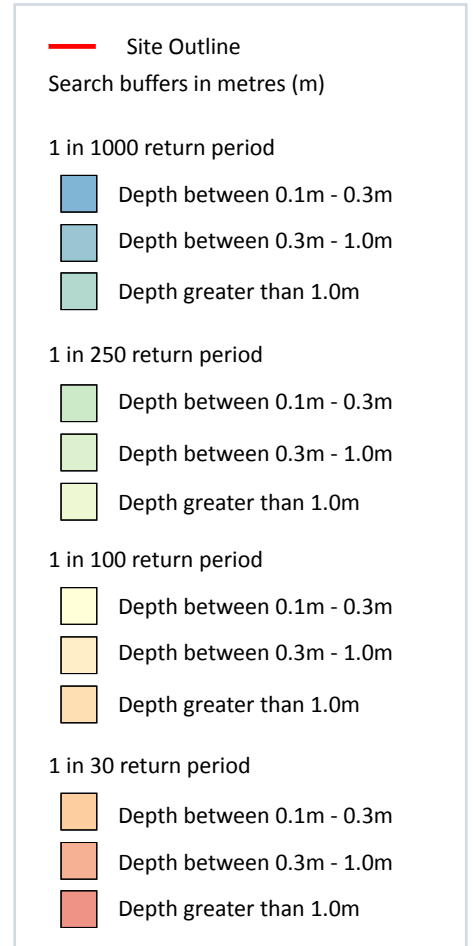
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 45**

Location	Type
On site	Zone 3 - (Fluvial Models)

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

8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

1 in 30 year, Greater than 1.0m

Highest risk within 50m

1 in 30 year, Greater than 1.0m

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

Features are displayed on the Surface water flooding map on **page 50**

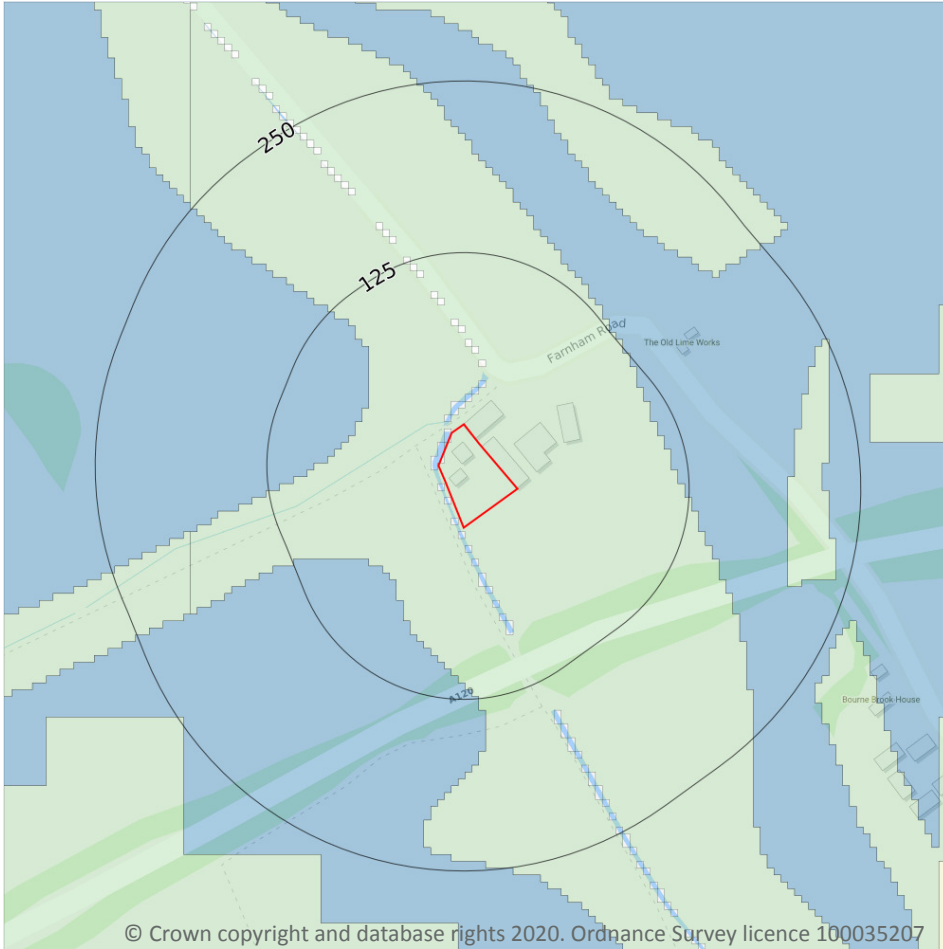
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

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

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Low

Highest risk within 50m

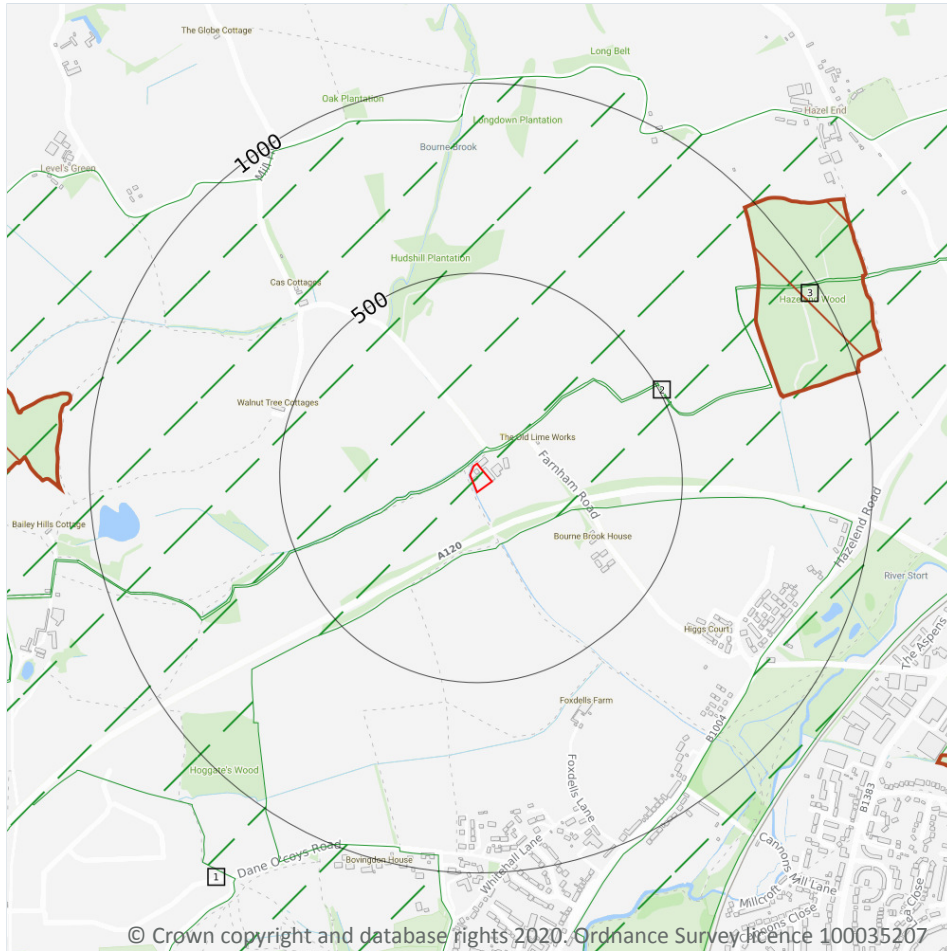
Low

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

Features are displayed on the Groundwater flooding map on **page 52**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Designated Ancient Woodland
- Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

0

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

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

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

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

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

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

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

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

10.4 Special Protection Areas (SPA)

Records within 2000m

0

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

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

10.5 National Nature Reserves (NNR)

Records within 2000m

0

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

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



10.6 Local Nature Reserves (LNR)

Records within 2000m

0

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

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

10.7 Designated Ancient Woodland

Records within 2000m

6

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

Features are displayed on the Environmental designations map on **page 53**

ID	Location	Name	Woodland Type
3	791m E	HAZELEND WOOD	Ancient & Semi-Natural Woodland
4	1069m W	BAILEY HILLS	Ancient & Semi-Natural Woodland
5	1383m SE	BIRCHANGER WOOD	Ancient & Semi-Natural Woodland
-	1815m W	BLOODHOUNDS WOOD	Ancient & Semi-Natural Woodland
-	1934m SW	BLOODHOUNDS WOOD	Ancient Replanted Woodland
-	1944m SE	BIRCHANGER WOOD	Ancient & Semi-Natural Woodland

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

10.8 Biosphere Reserves

Records within 2000m

0

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

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



10.9 Forest Parks

Records within 2000m

0

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

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

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

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

10.11 Green Belt

Records within 2000m

2

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

Features are displayed on the Environmental designations map on **page 53**

ID	Location	Name	Local Authority name
1	On site	London area	East Hertfordshire
2	17m NW	London area	Uttlesford

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

10.12 Proposed Ramsar sites

Records within 2000m

0

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

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0
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Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

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

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0
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Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0
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Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	3
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Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	LEE NVZ	Surface Water	S443	Existing

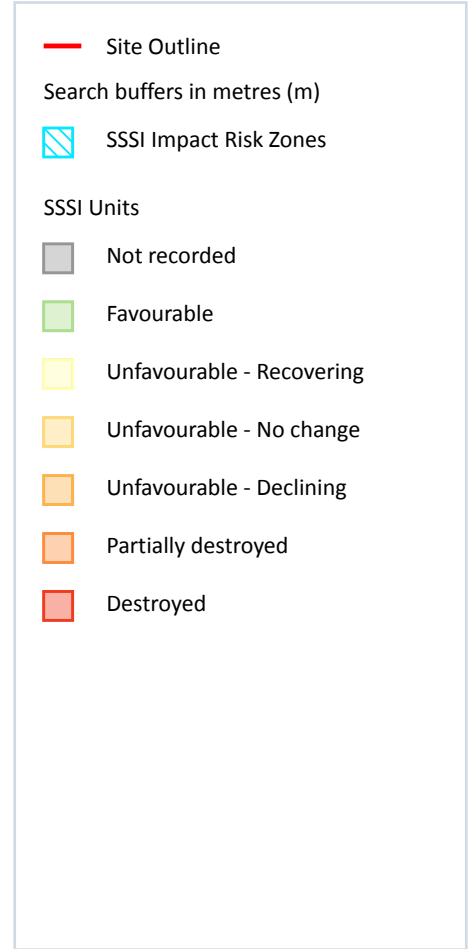
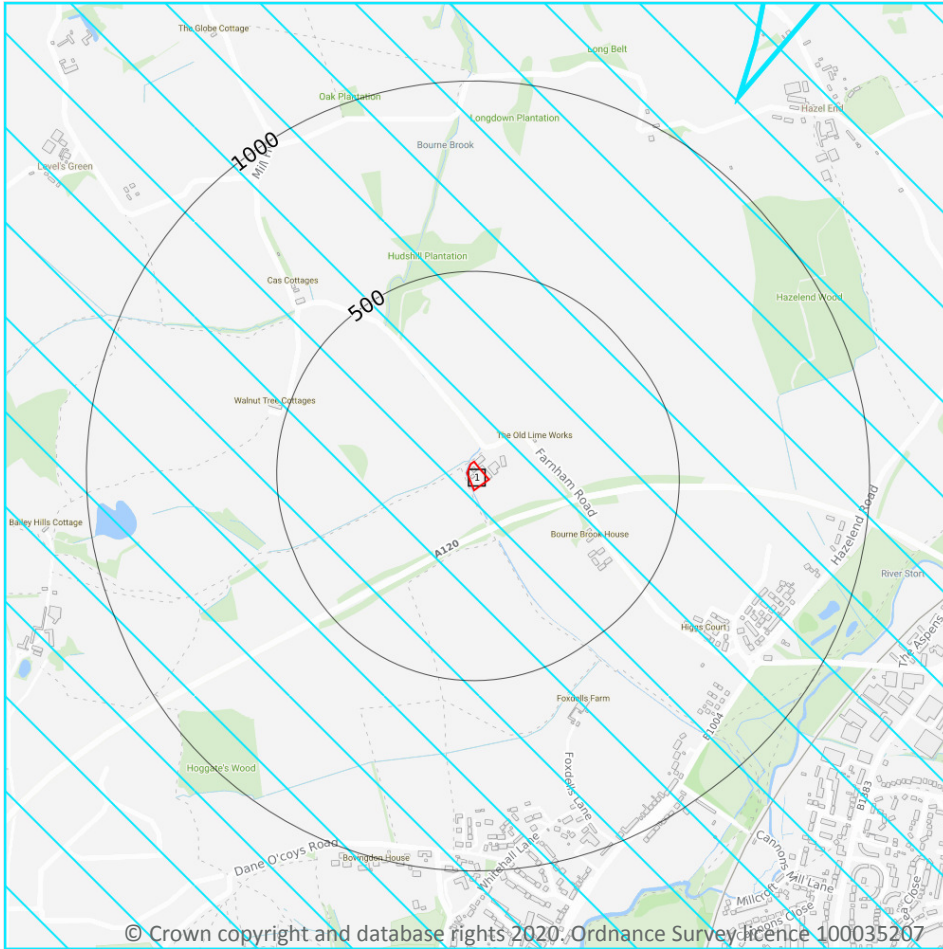


Location	Name	Type	NVZ ID	Status
1230m N	Clavering	Groundwater	G720	New
1847m NE	Stansted Mountfitchet	Groundwater	G152	Existing

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



SSSI Impact Zones and Units



10.17 SSSI Impact Risk Zones

Records on site

1

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

Features are displayed on the SSSI Impact Zones and Units map on **page 59**

ID	Location	Type of developments requiring consultation
1	On site	<p>Infrastructure - Airports, helipads and other aviation proposals.</p> <p>Residential - Residential development of 50 units or more.</p> <p>Rural residential - Any residential development of 50 or more houses outside existing settlements/urban areas.</p> <p>Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons > 750m² & manure stores > 3500t.</p> <p>Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location).</p>

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0
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Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

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

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m

0

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

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

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

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

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

11.3 National Parks

Records within 250m

0

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

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

11.4 Listed Buildings

Records within 250m

0

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



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

11.5 Conservation Areas

Records within 250m

0

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

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

11.6 Scheduled Ancient Monuments

Records within 250m

0

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

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

11.7 Registered Parks and Gardens

Records within 250m

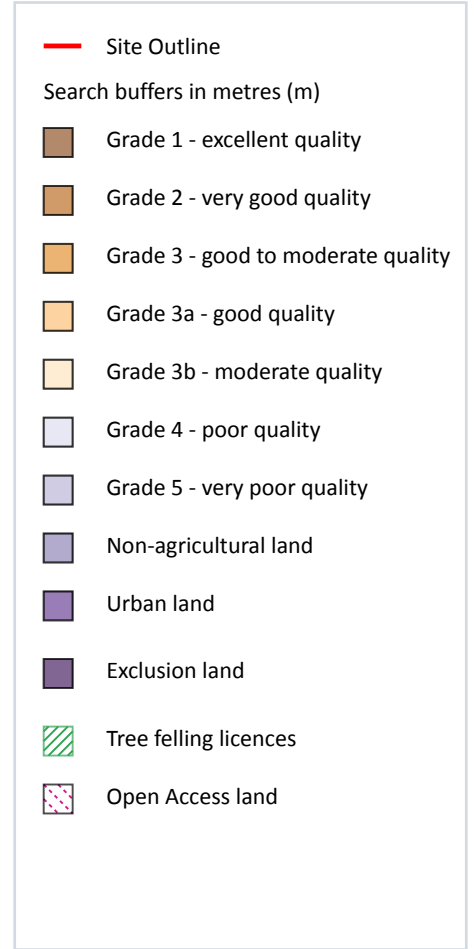
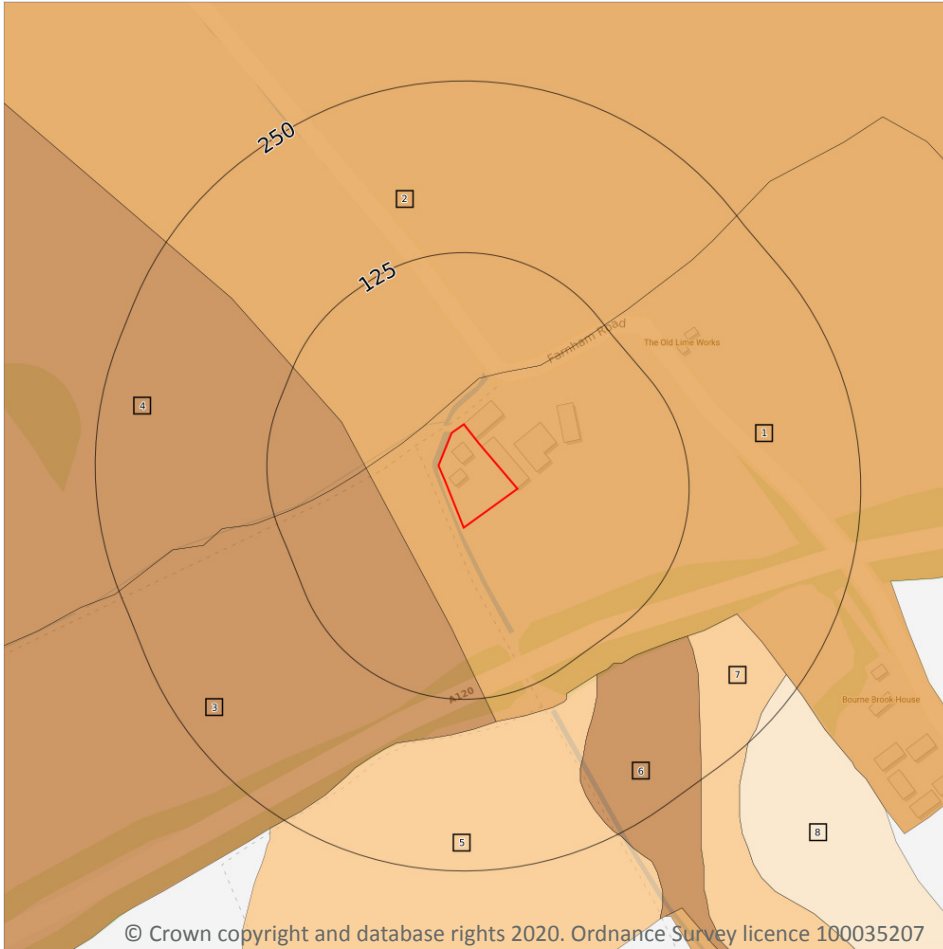
0

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

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



12 Agricultural designations



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12.1 Agricultural Land Classification

Records within 250m

8

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

Features are displayed on the Agricultural designations map on **page 63**

ID	Location	Classification	Description
1	On site	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

ID	Location	Classification	Description
2	17m NW	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.
3	42m SW	Grade 2	Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.
4	53m W	Grade 2	Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.
5	142m SE	Grade 3a	Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.
6	144m SE	Grade 2	Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.
7	164m SE	Grade 3a	Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.
8	238m SE	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m

0

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



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

12.3 Tree Felling Licences

Records within 250m

0

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

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

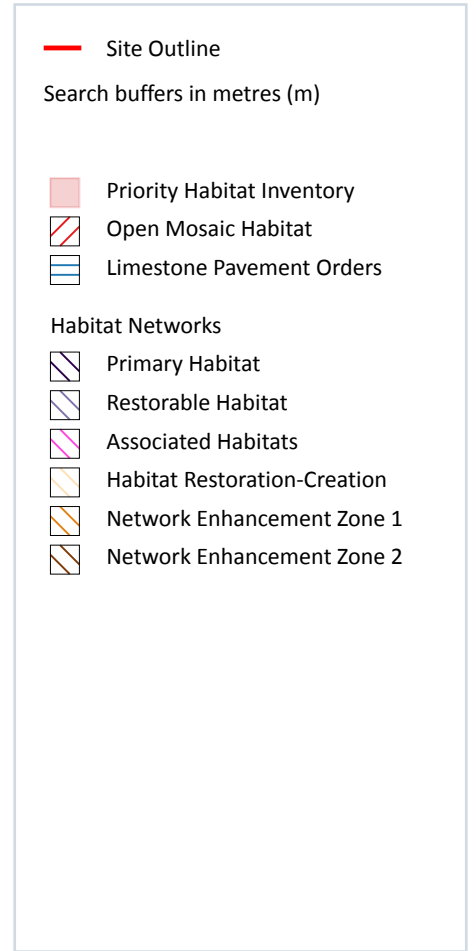
Records within 250m

0

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

This data is sourced from Natural England.

13 Habitat designations



13.1 Priority Habitat Inventory

Records within 250m

0

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

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

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

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m **1**

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

Features are displayed on the Habitat designations map on **page 66**

ID	Location	Site reference	Identification confidence	Primary source	Secondary source	Tertiary source
1	145m NE	BRITPITS ref: 2306; HLD_refs: EAHLD12185	Low	British Geological Survey BRITPITS database	Environment Agency Historic Landfill Sites	UK Perspectives Aerial Photography

This data is sourced from Natural England.

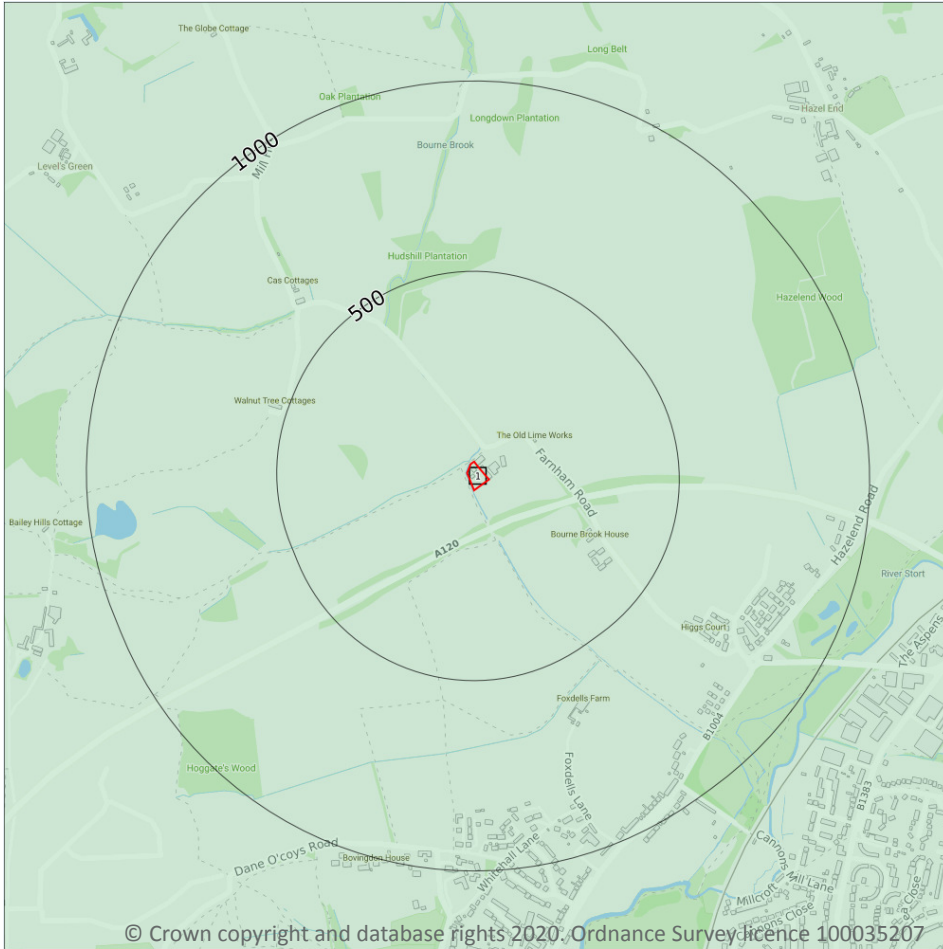
13.4 Limestone Pavement Orders

Records within 250m **0**

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

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



— Site Outline
 Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

1

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

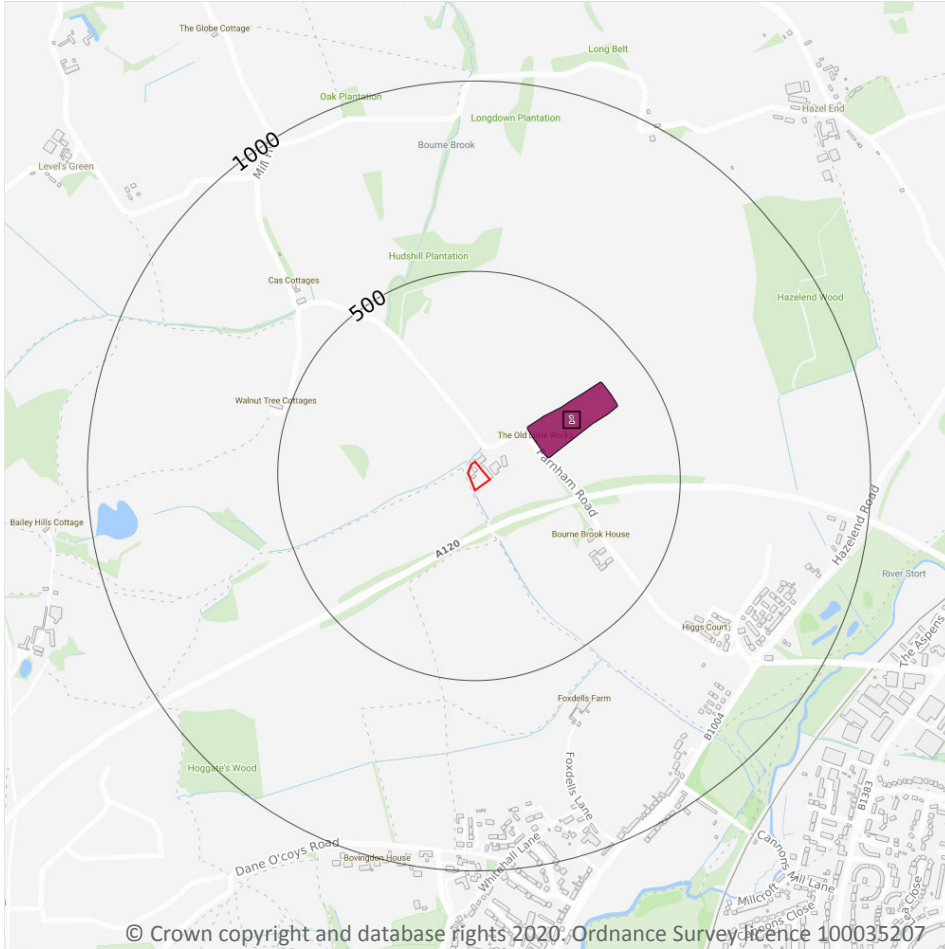
Features are displayed on the Geology 1:10,000 scale - Availability map on **page 68**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	No coverage	TL42SE

This data is sourced from the British Geological Survey.



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



— Site Outline
Search buffers in metres (m)

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

14.2 Artificial and made ground (10k)

Records within 500m

1

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

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 69**

ID	Location	LEX Code	Description	Rock description
1	155m NE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

ID	Location	LEX Code	Description	Rock description
4	188m NE	GFDMP-SVC	Glaciofluvial Deposits, Mid Pleistocene - Sand, Gravelly Clayey (unlithified Deposits Coding Scheme)	Sand, Gravelly, Clayey
5	201m E	GFDMP-SVC	Glaciofluvial Deposits, Mid Pleistocene - Sand, Gravelly Clayey (unlithified Deposits Coding Scheme)	Sand, Gravelly, Clayey
6	217m E	LOFT-DMTN	Lowestoft Formation - Diamicton	Diamicton
7	237m E	GFDMP-SVC	Glaciofluvial Deposits, Mid Pleistocene - Sand, Gravelly Clayey (unlithified Deposits Coding Scheme)	Sand, Gravelly, Clayey
8	367m S	GFDMP-SVC	Glaciofluvial Deposits, Mid Pleistocene - Sand, Gravelly Clayey (unlithified Deposits Coding Scheme)	Sand, Gravelly, Clayey
9	387m NE	GFDMP-SVC	Glaciofluvial Deposits, Mid Pleistocene - Sand, Gravelly Clayey (unlithified Deposits Coding Scheme)	Sand, Gravelly, Clayey
10	457m SE	GLLMP-CZ	Glaciolacustrine Deposits, Mid Pleistocene - Clay, Silty (unlithified Deposits Coding Scheme)	Clay, Silty

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

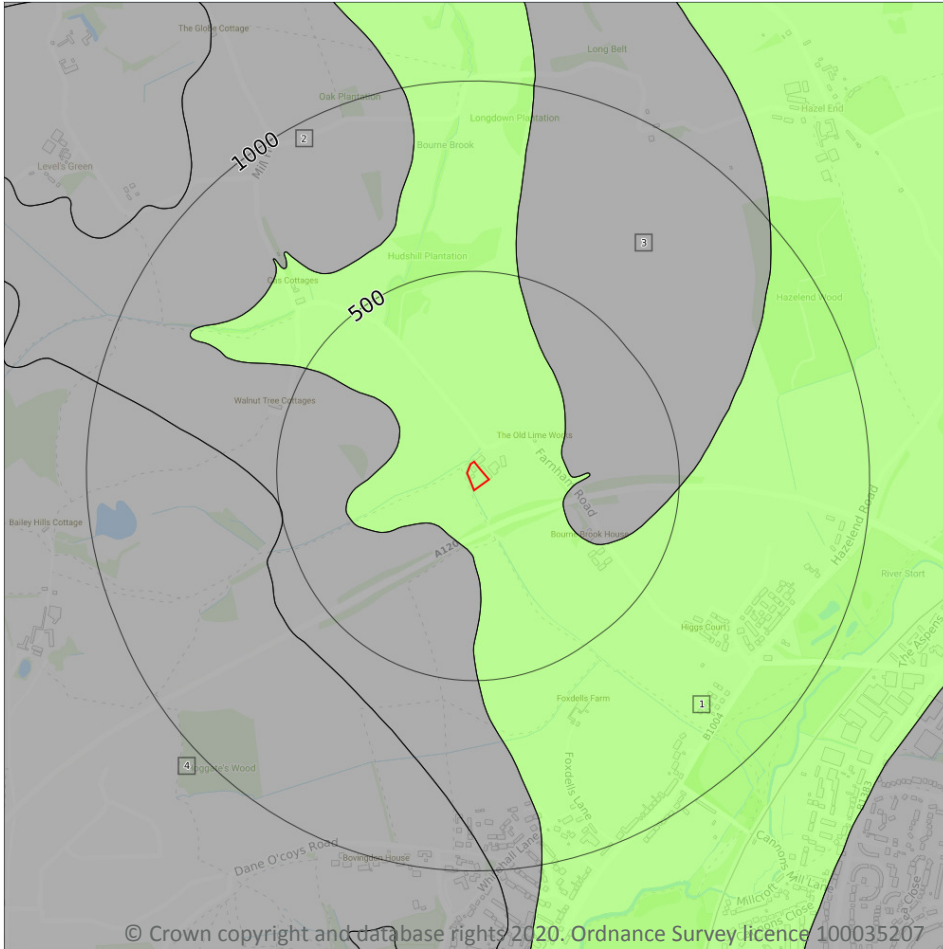
0

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

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (10k)
- Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

4

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

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 72**

ID	Location	LEX Code	Description	Rock age
1	On site	LESE-CHLK	Lewes Nodular Chalk Formation And Seaford Chalk Formation (undifferentiated) - Chalk	Santonian Age - Turonian Age
2	132m SW	TALM-CLSA	Thanet Sand Formation And Lambeth Group (undifferentiated) - Clayey Sand	Paleocene Epoch



ID	Location	LEX Code	Description	Rock age
3	201m E	TALM-CLSA	Thanet Sand Formation And Lambeth Group (undifferentiated) - Clayey Sand	Paleocene Epoch
4	497m W	LC-CLSISA	London Clay Formation - Clay, Silt And Sand	Eocene Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

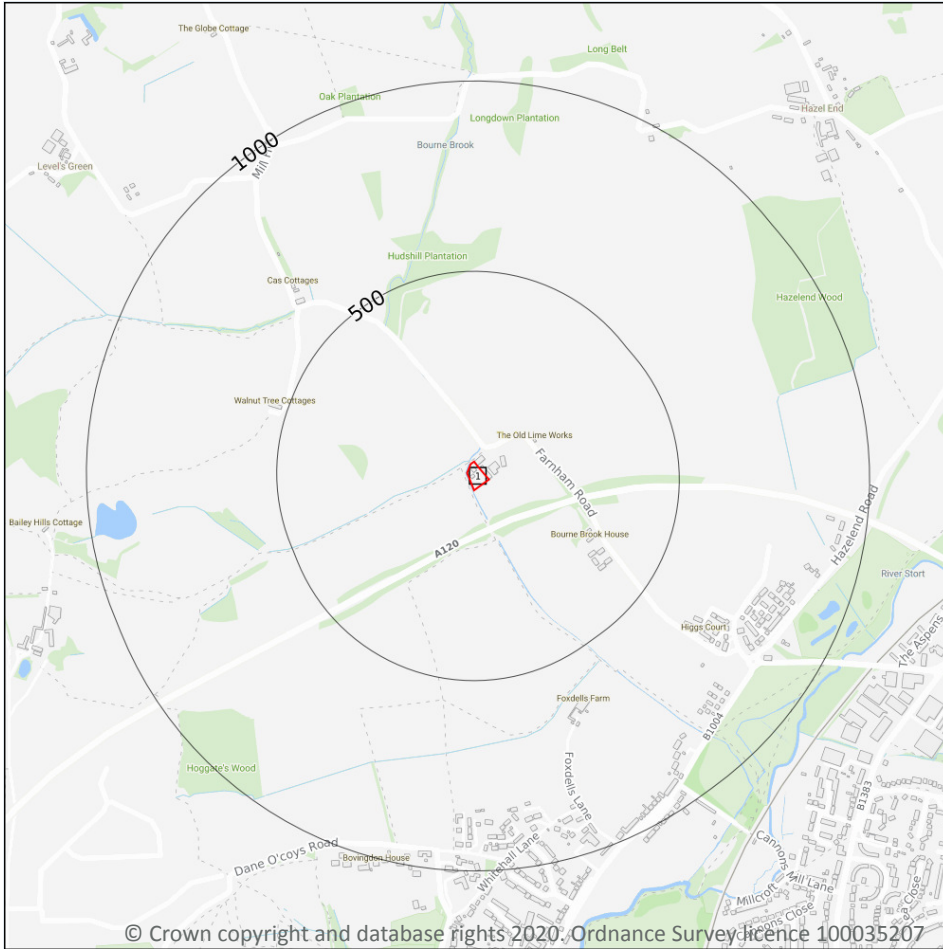
0

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

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline

Search buffers in metres (m)

○ 500 Geographical map tile

○ 1000 Geographical map tile

15.1 50k Availability

Records within 500m

1

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

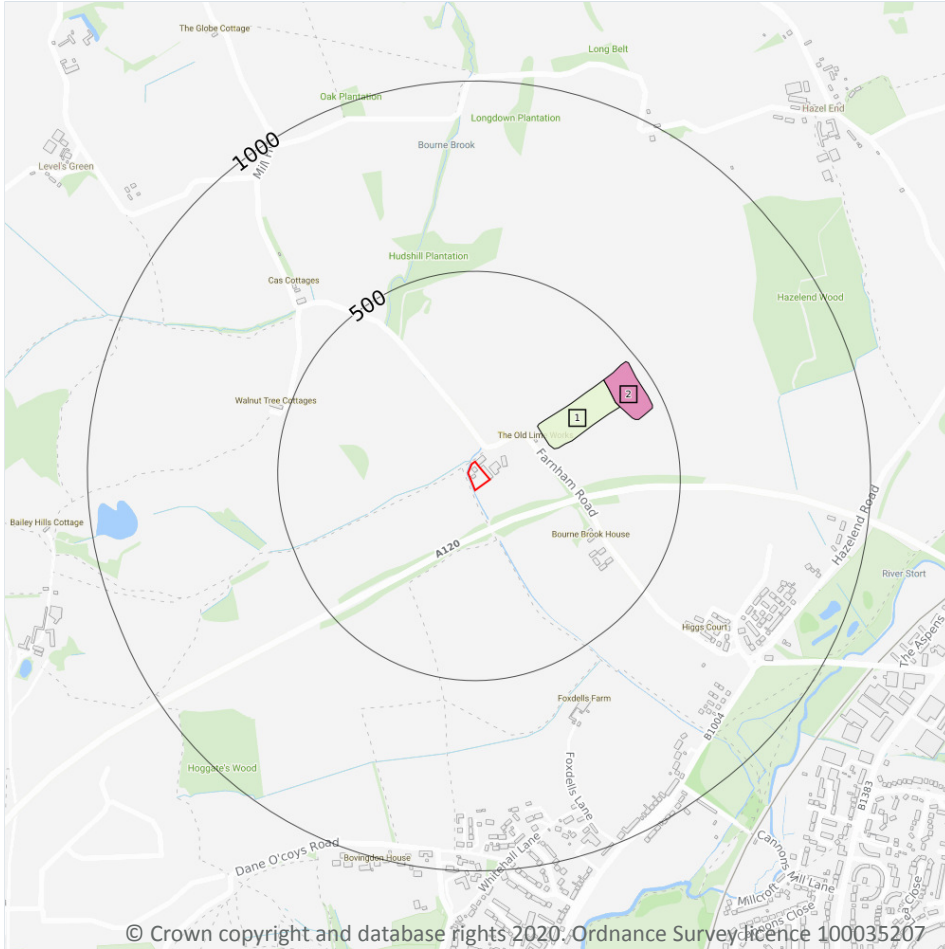
Features are displayed on the Geology 1:50,000 scale - Availability map on **page 74**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	No coverage	EW222_great_dunmow_v4

This data is sourced from the British Geological Survey.



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



— Site Outline
Search buffers in metres (m)

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

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15.2 Artificial and made ground (50k)

Records within 500m

2

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

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 75**

ID	Location	LEX Code	Description	Rock description
1	180m NE	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
2	387m NE	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

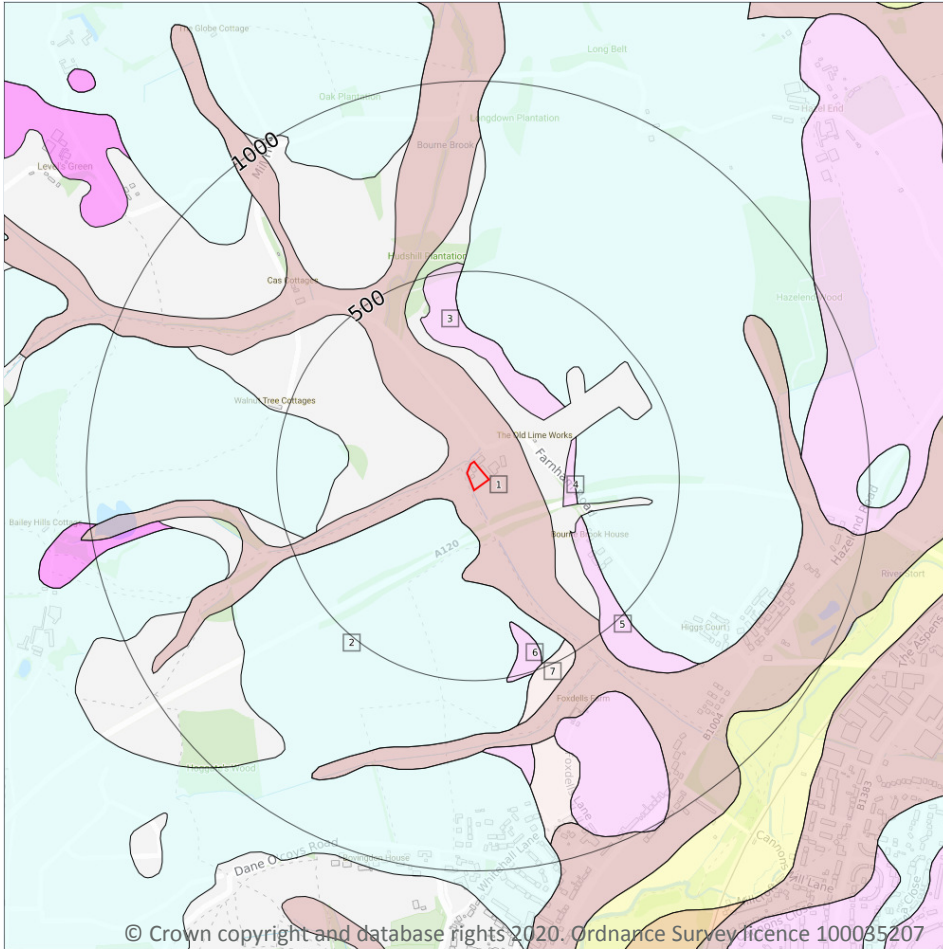
0

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

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (50k)
- Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

7

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

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 77**

ID	Location	LEX Code	Description	Rock description
1	On site	HEAD- XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL
2	64m SW	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
3	191m NE	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL



ID	Location	LEX Code	Description	Rock description
4	198m E	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL
5	254m SE	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL
6	359m S	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL
7	458m SE	GLLMP-XCZ	GLACIOLACUSTRINE DEPOSITS, MID PLEISTOCENE	CLAY AND SILT

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m

1

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

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

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m

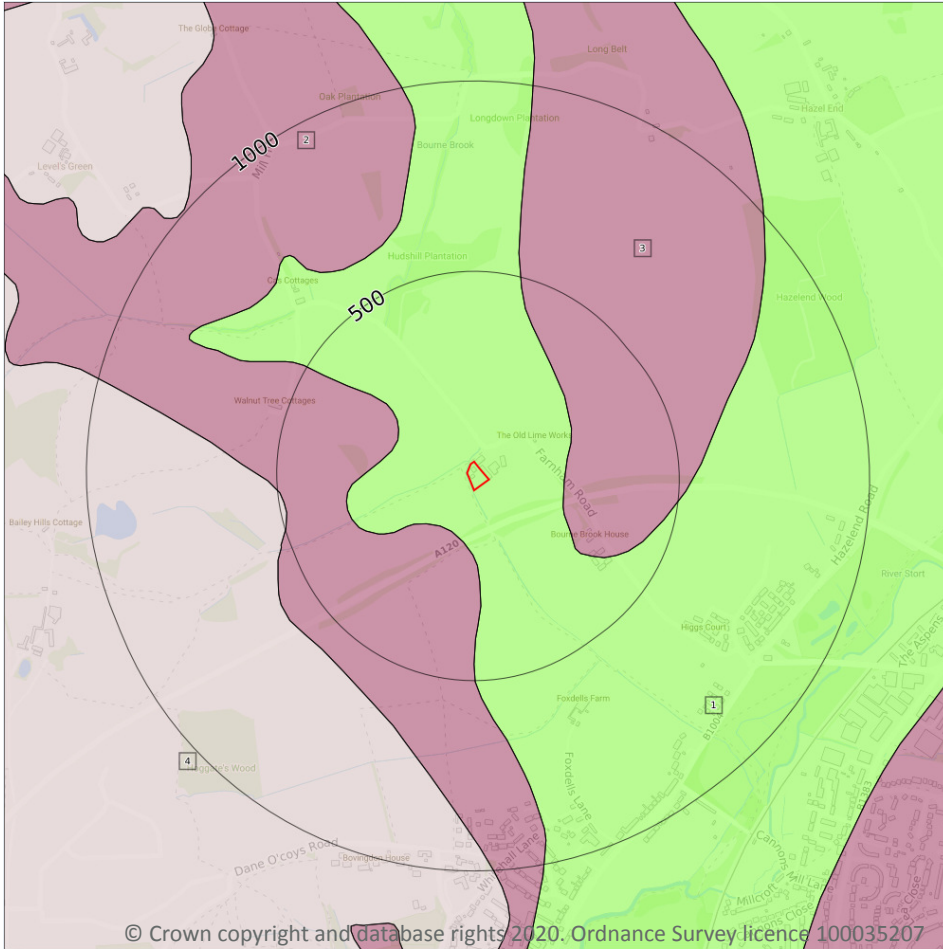
0

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

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

4

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

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 79**

ID	Location	LEX Code	Description	Rock age
1	On site	LESE-CHLK	LEWES NODULAR CHALK FORMATION AND SEAFORD CHALK FORMATION (UNDIFFERENTIATED) - CHALK	TURONIAN
2	123m SW	TALM-XCZS	THANET FORMATION AND LAMBETH GROUP (UNDIFFERENTIATED) - CLAY, SILT AND SAND	-



ID	Location	LEX Code	Description	Rock age
3	198m E	TALM-XCZS	THANET FORMATION AND LAMBETH GROUP (UNDIFFERENTIATED) - CLAY, SILT AND SAND	-
4	485m W	LC-XCZS	LONDON CLAY FORMATION - CLAY, SILT AND SAND	YPRESIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m

1

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Very High	Very High

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

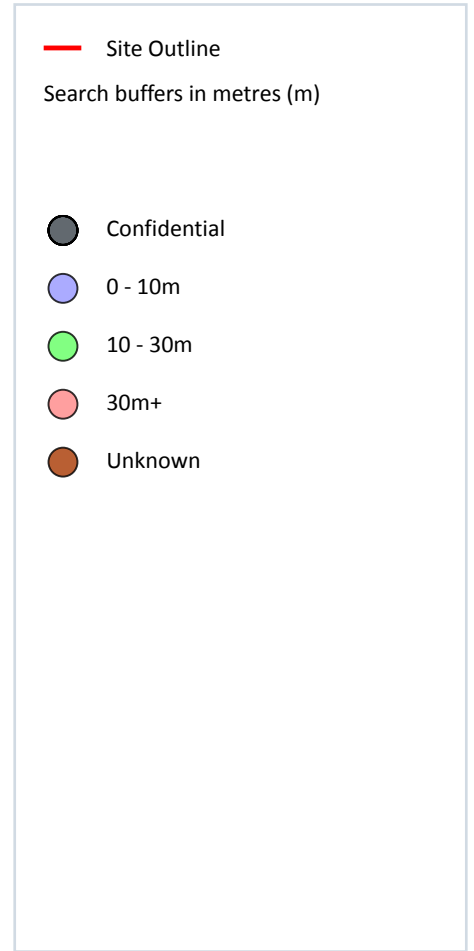
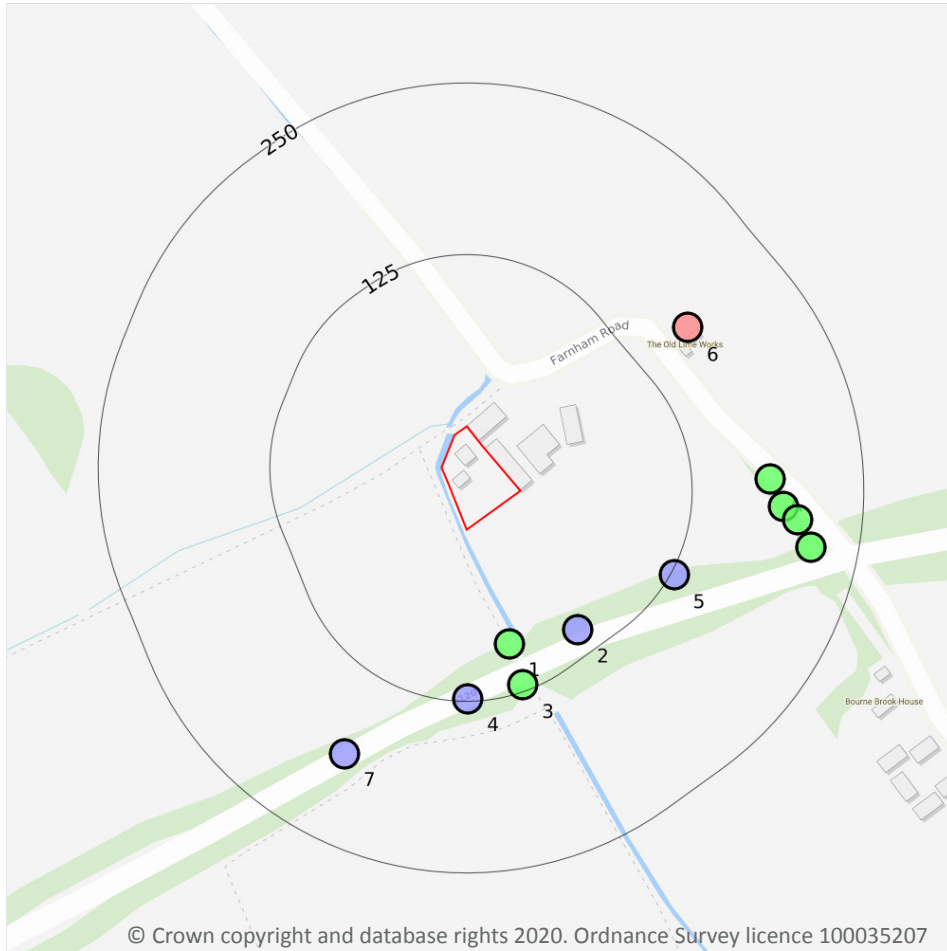
Records within 500m

0

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

This data is sourced from the British Geological Survey.

16 Boreholes



16.1 BGS Boreholes

Records within 250m

11

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

Features are displayed on the Boreholes map on **page 81**

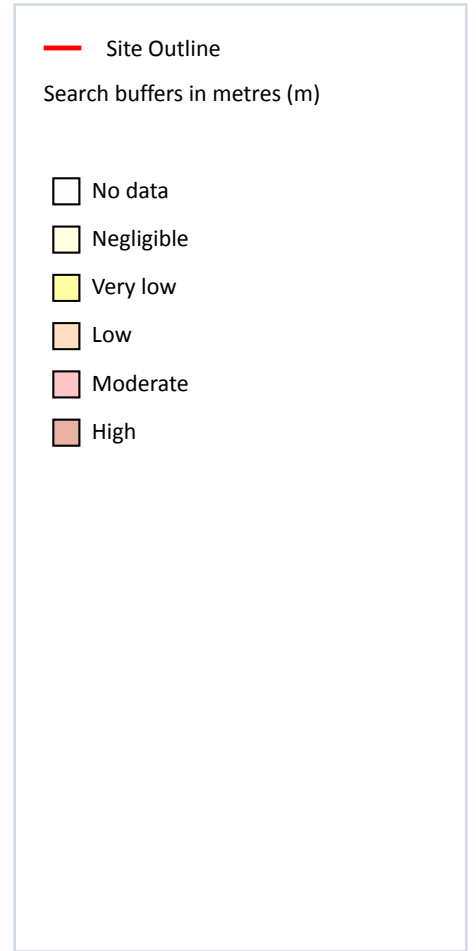
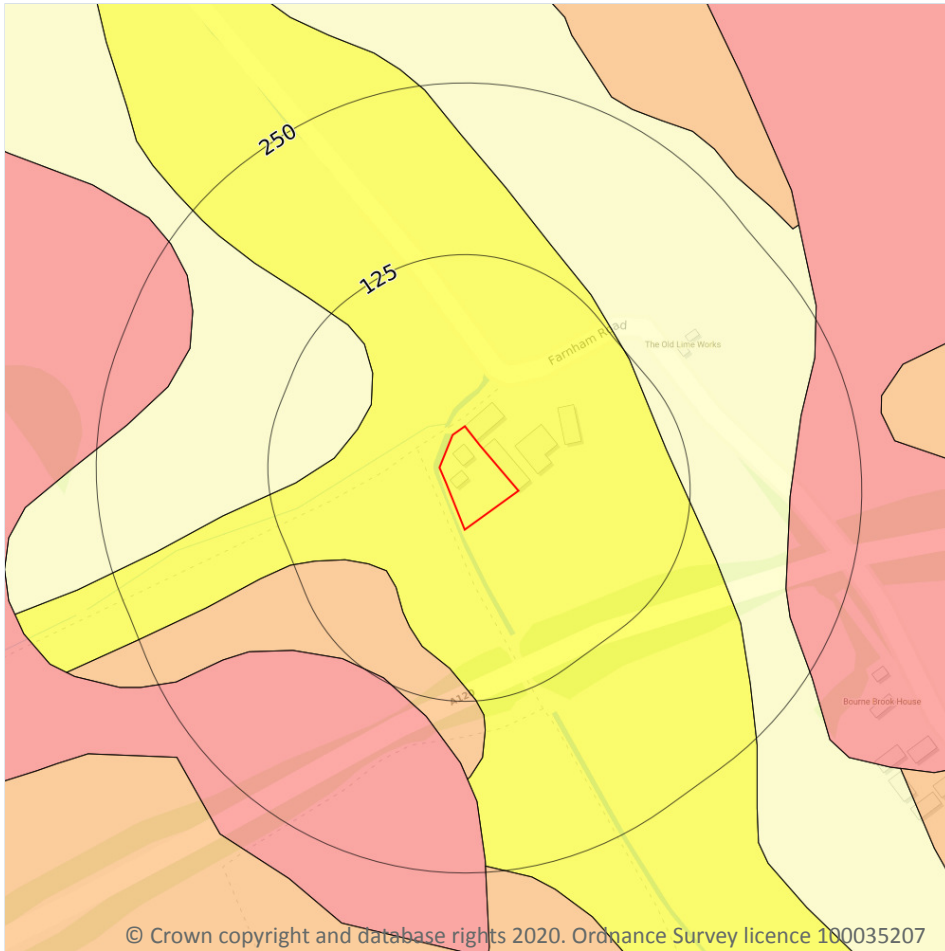
ID	Location	Grid reference	Name	Length	Confidential	Web link
1	89m S	548610 223330	A120 BISHOP'S STORTFORD 40	22.5	N	541290
2	107m SE	548660 223340	A120 BISHOP'S STORTFORD 42	10.0	N	541292
3	120m S	548620 223300	A120 BISHOP'S STORTFORD 41	24.0	N	541291

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	123m S	548580 223290	A120 BISHOP`S STORTFORD 39	8.0	N	541289
5	128m SE	548730 223380	A120 BISHOP`S STORTFORD 43	10.0	N	541293
6	170m NE	548740 223560	FARNHAM ROAD, BISHOP`S STORTFORD	79.24	N	541336
A	182m E	548800 223450	A120 BISHOP`S STORTFORD 44	30.0	N	541294
7	186m SW	548490 223250	A120 BISHOP`S STORTFORD 38	8.0	N	541288
A	192m E	548810 223430	A120 BISHOP`S STORTFORD 45	28.5	N	541295
A	203m E	548820 223420	A120 BISHOP`S STORTFORD 46	30.0	N	541296
A	216m E	548830 223400	A120 BISHOP`S STORTFORD 47	28.5	N	541297

This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



17.1 Shrink swell clays

Records within 50m

1

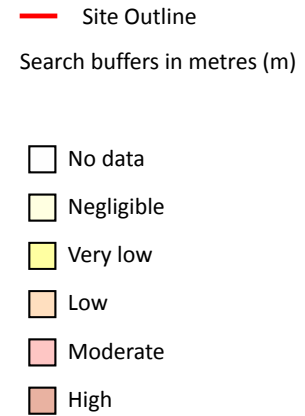
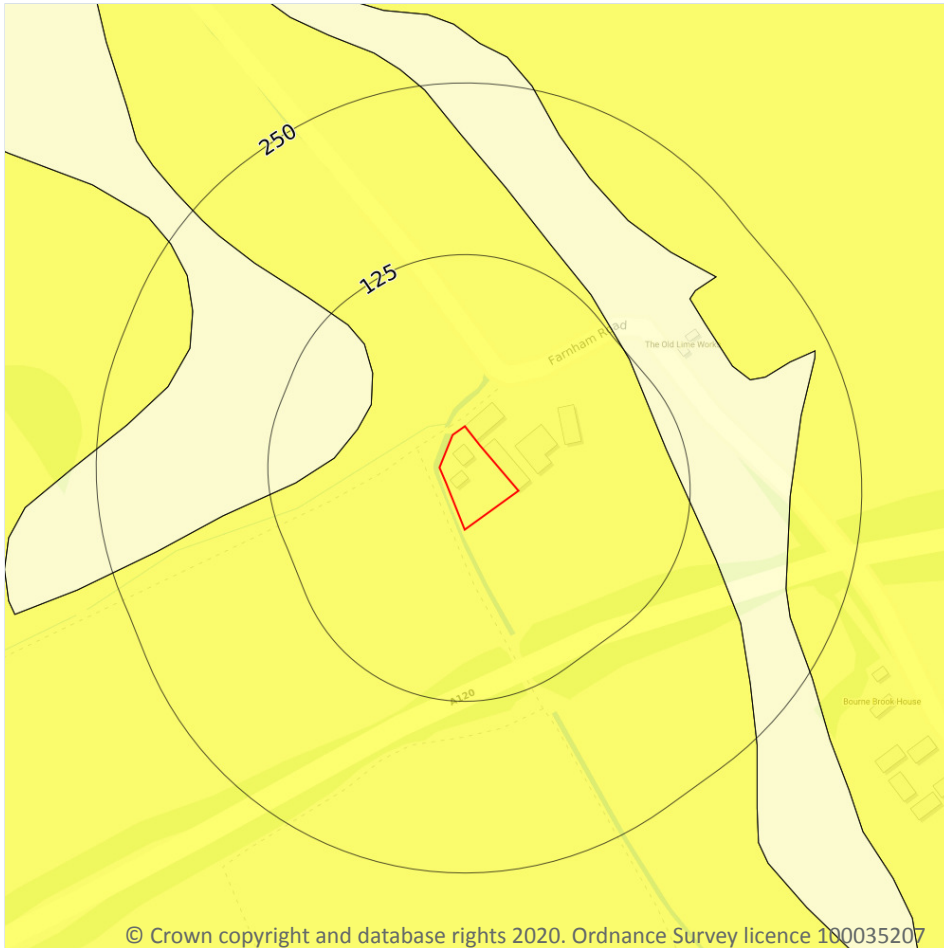
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and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

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 83**

Location	Hazard rating	Details
On site	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



17.2 Running sands

Records within 50m

1

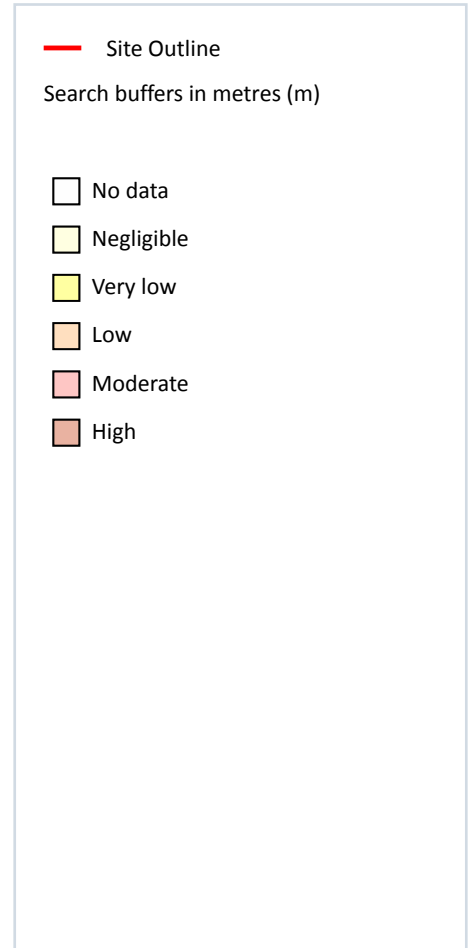
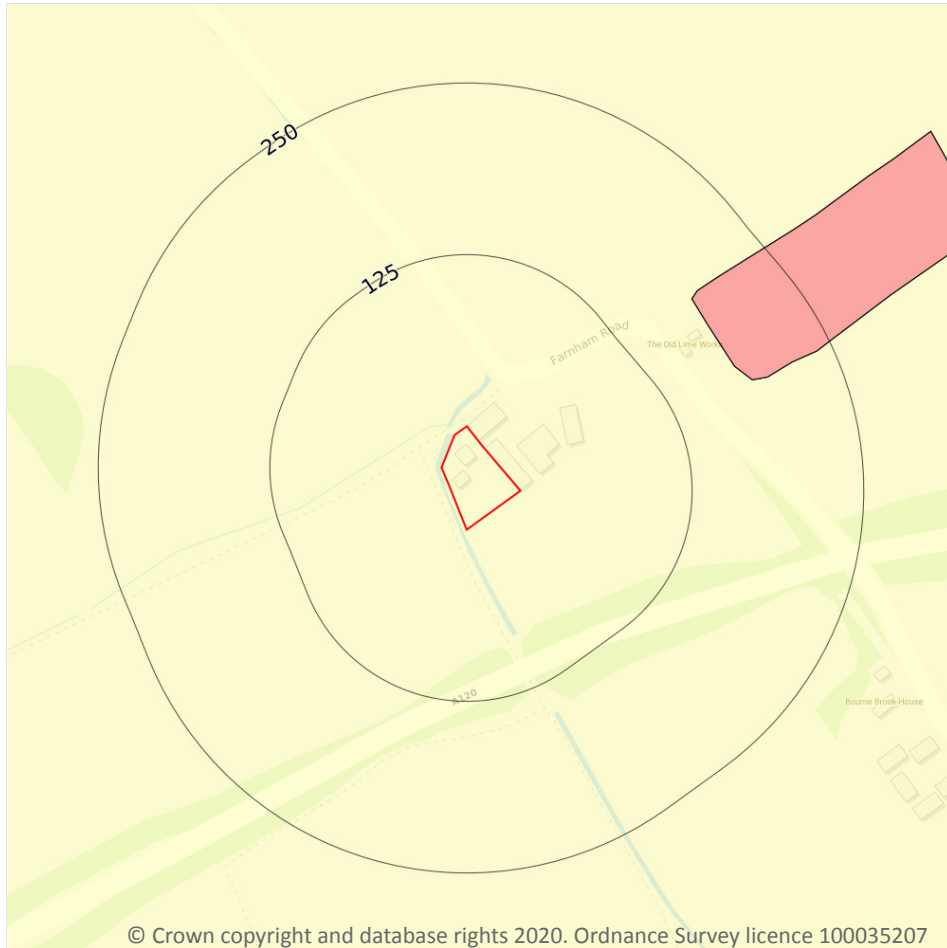
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 84**

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

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

1

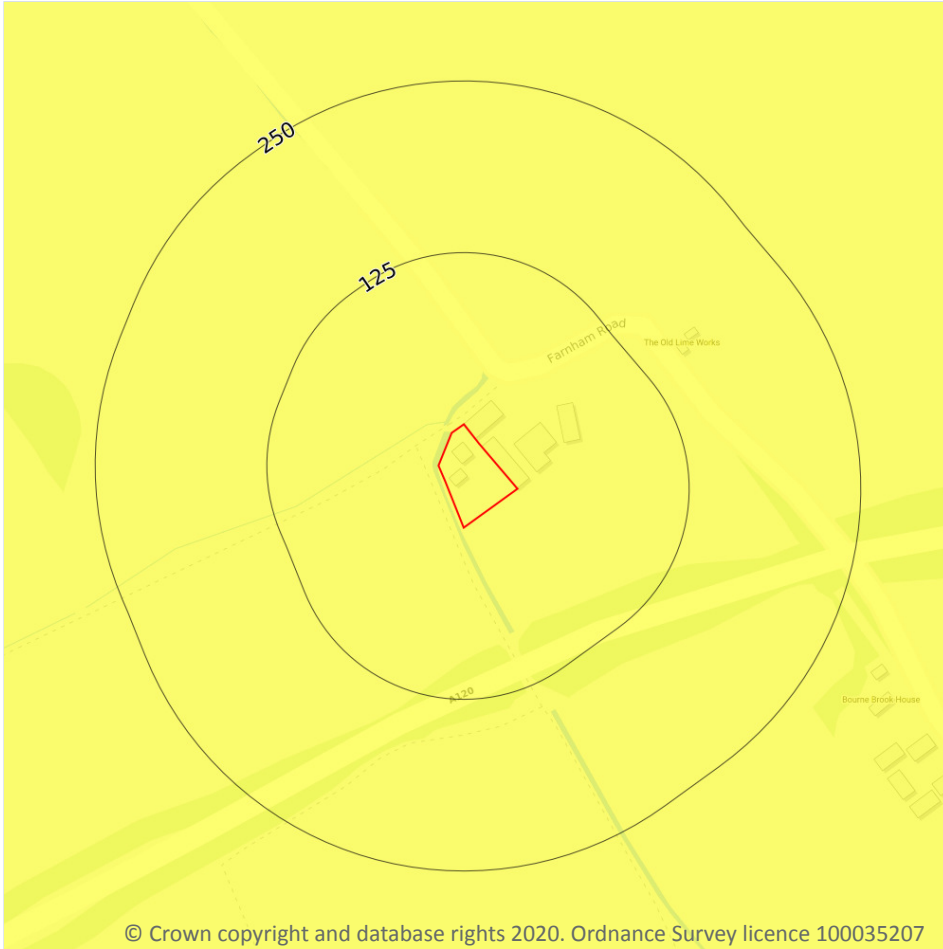
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 85**

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

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



17.4 Collapsible deposits

Records within 50m

1

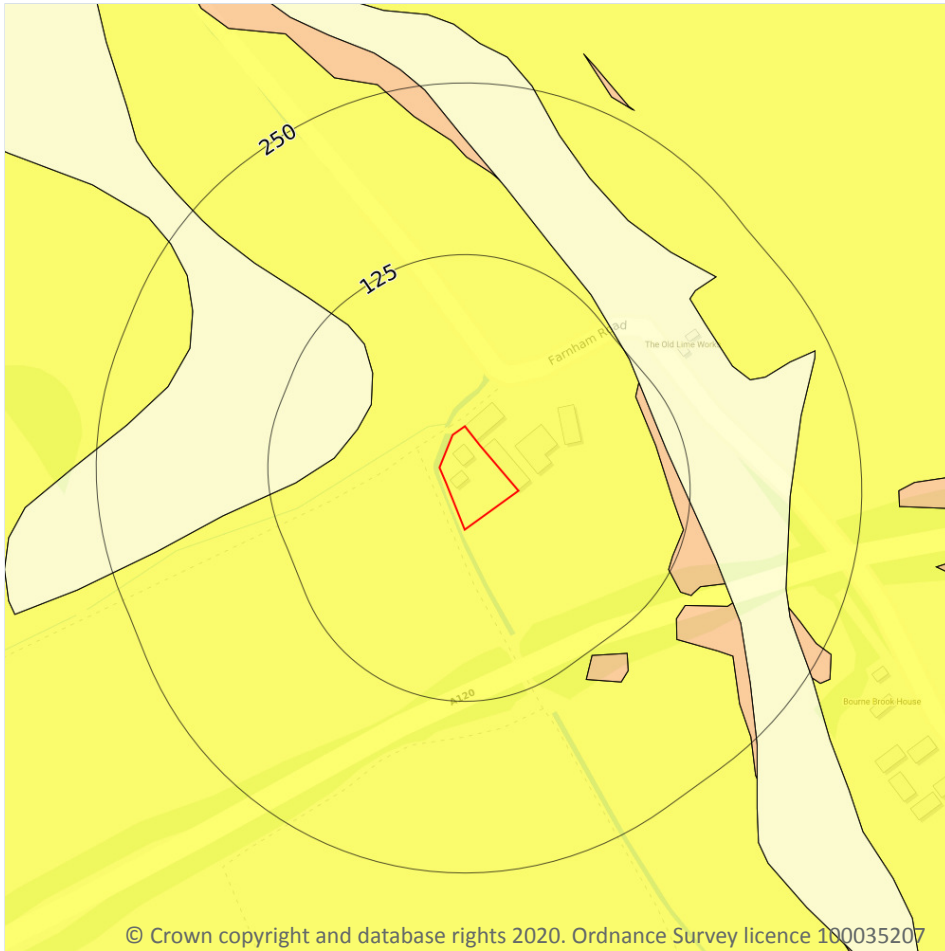
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 86**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



— Site Outline
Search buffers in metres (m)

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

17.5 Landslides

Records within 50m

1

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

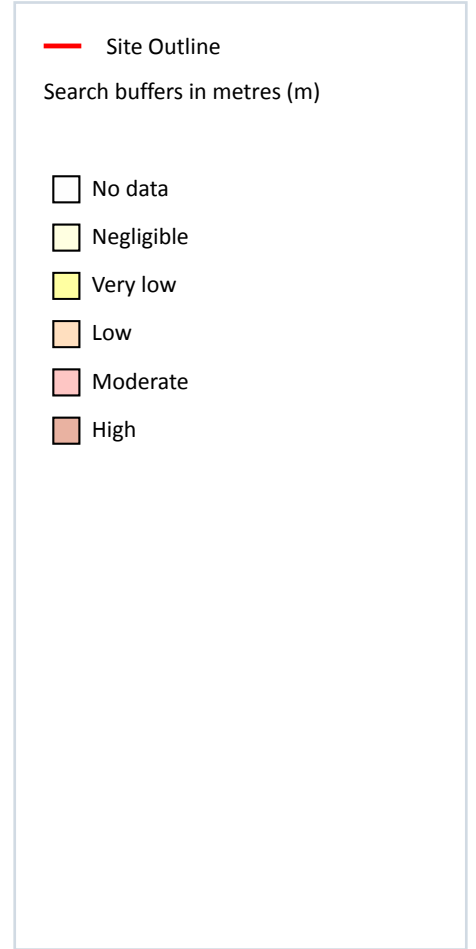
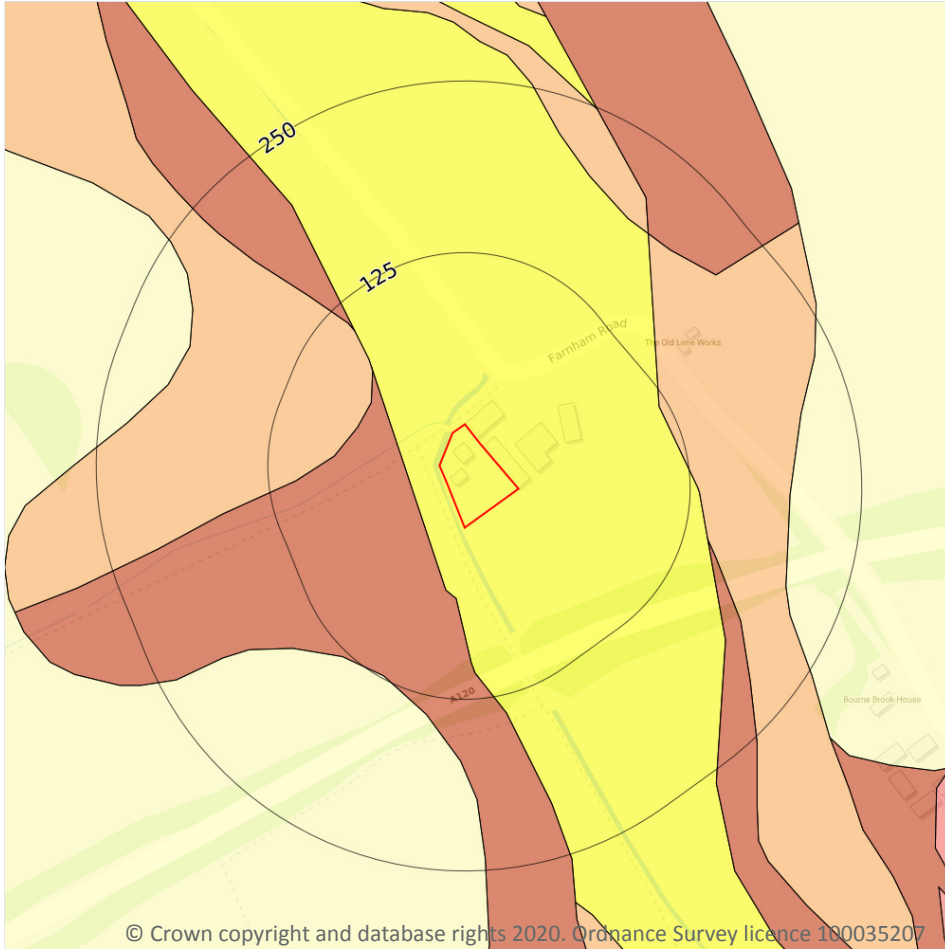
Features are displayed on the Natural ground subsidence - Landslides map on **page 87**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m

2

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

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 88**

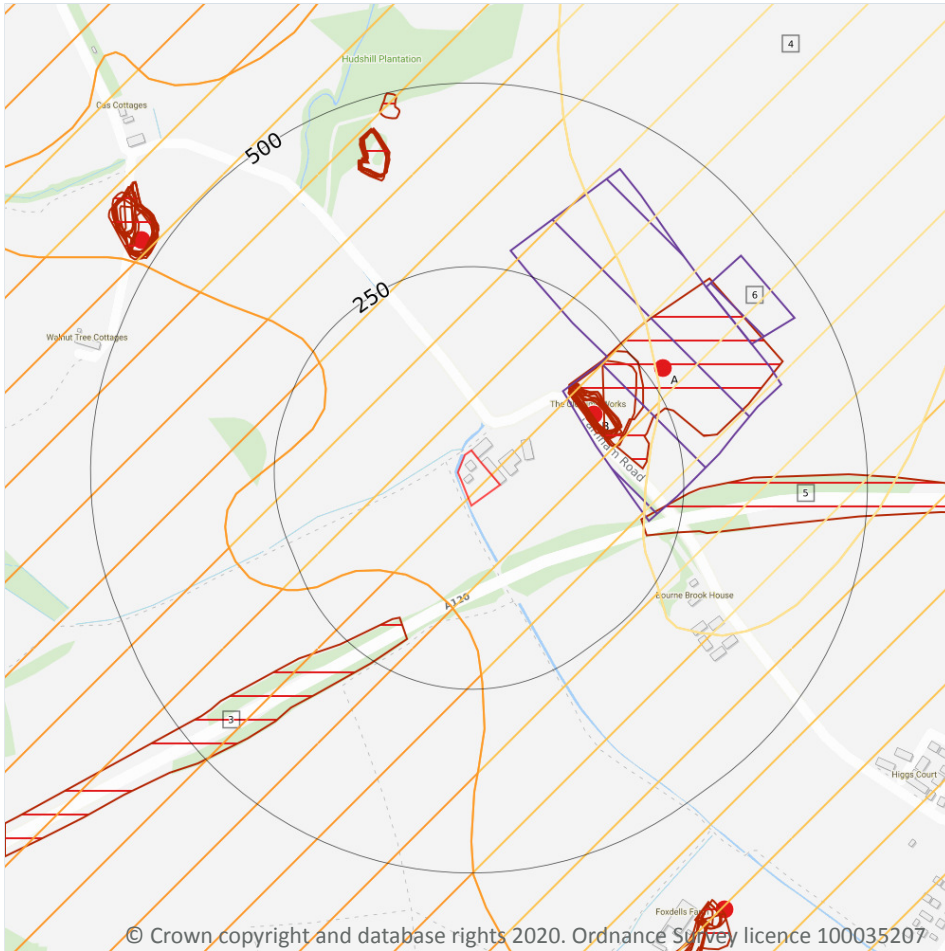
Location	Hazard rating	Details
On site	Very low	Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.

Location	Hazard rating	Details
24m W	High	Soluble rocks are present within the ground. Numerous dissolution features may be present. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered.

This data is sourced from the British Geological Survey.



18 Mining, ground workings and natural cavities



18.1 Natural cavities

Records within 500m

0

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

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m

3

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 90**

ID	Location	Details	Description
B	159m NE	Name: Foxdells Chalk Pit Address: BISHOP'S STORTFORD, Hertfordshire Commodity: Chalk Status: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Type: Ceased Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
A	272m NE	Name: Stortford Limeworks Address: BISHOP'S STORTFORD, Hertfordshire Commodity: Chalk Status: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Type: Ceased Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
A	272m NE	Name: Stortford Limeworks Address: BISHOP'S STORTFORD, Hertfordshire Commodity: Sand & Gravel Status: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Type: Ceased Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

14

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 90**

ID	Location	Land Use	Year of mapping	Mapping scale
B	149m NE	Unspecified Pit	1879	1:10560
B	149m NE	Old Chalk Pit	1898	1:10560
B	151m NE	Old Chalk Pit	1896	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
A	151m NE	Lime Quarry	1981	1:10000
B	152m NE	Chalk Pit	1938	1:10560
B	152m NE	Chalk Pit	1938	1:10560
B	153m NE	Chalk Pit	1923	1:10560
B	154m NE	Old Chalk Pit	1899	1:10560
B	155m NE	Chalk Pit	1946	1:10560
B	156m NE	Chalk Pit	1960	1:10560
B	156m NE	Chalk Pit	1923	1:10560
B	157m NE	Chalk Pit	1938	1:10560
3	181m SW	Cuttings	1981	1:10000
5	198m E	Cuttings	1981	1:10000

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

0

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

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

2

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 90**

ID	Location	Site Name	Mineral	Type	Planning Status	Planning Status Date
A	139m NE	Bishop Stantford Limeworks	Chalk	Surface mineral working	Valid	10/01/47



ID	Location	Site Name	Mineral	Type	Planning Status	Planning Status Date
6	387m NE	Bishop Stantford Limeworks	Sand and gravel	Surface mineral working	Valid	26/06/73

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

3

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 90**

ID	Location	Name	Commodity	Class	Likelihood
1	On site	Not available	Chalk	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
2	123m SW	Not available	Chalk	C	Small scale underground mining may have occurred; mine adits, shafts and tunnels may be present. Potential for localised difficult ground conditions are at a level where they should be considered
4	198m E	Not available	Chalk	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m

0

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

This data is sourced from Peter Brett Associates (PBA).



18.8 JPB mining areas

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

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

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

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

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

This data is sourced from the Coal Authority.

18.10 Brine areas

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

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

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

18.11 Gypsum areas

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

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

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

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

18.13 Clay mining

Records on site

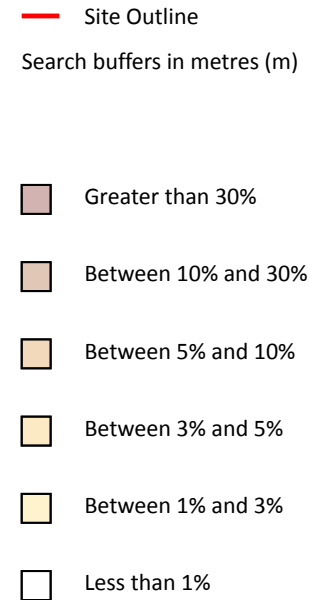
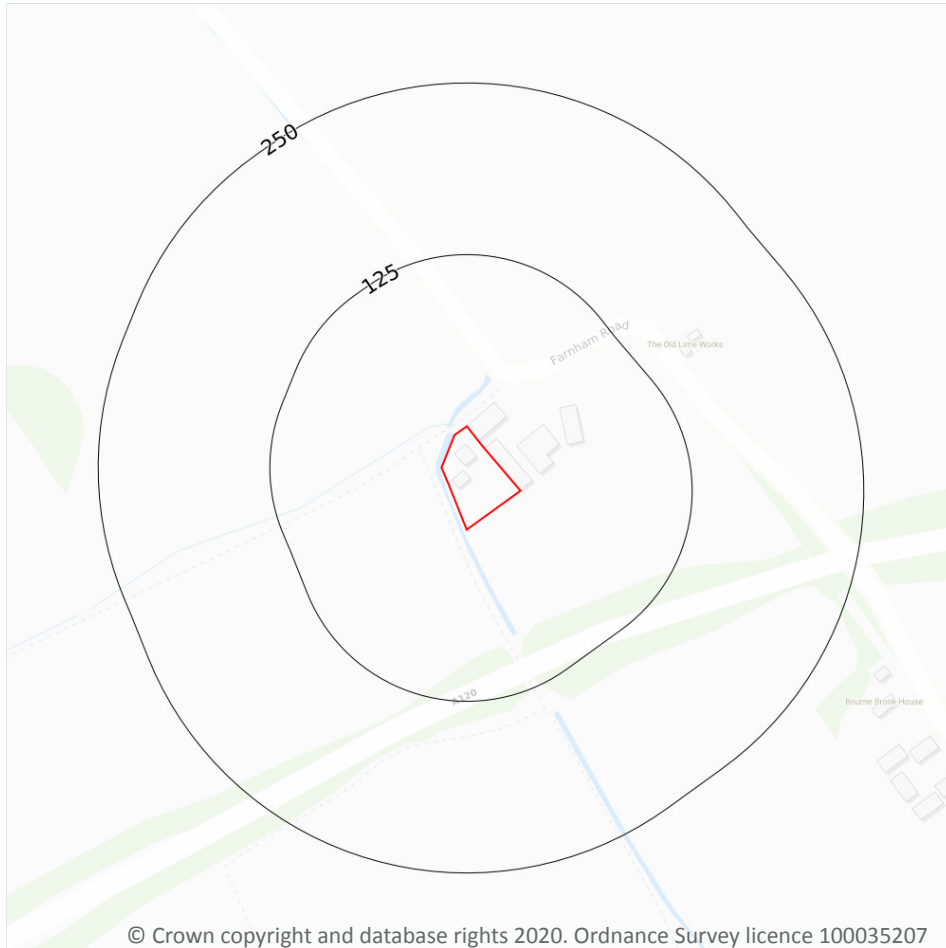
0

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

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



19 Radon



19.1 Radon

Records on site

1

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

Features are displayed on the Radon map on [page 96](#)

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

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

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

2

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

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
12m N	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

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

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

0

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

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m

0

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

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m

0

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

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m

0

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

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m

0

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



This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m

0

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

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m

0

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

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m

0

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

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m

0

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

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

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

This data is sourced from HS2 Ltd.



Data providers

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

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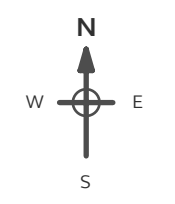
Appendix 3: Historical Mapping

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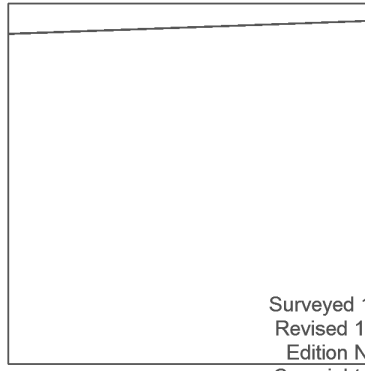
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STORTFORD, CM23 1JJ

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Report Ref: HMD-214-6853807
Grid Ref: 548589, 223451

Map Name: County Series
Map date: 1875-1876
Scale: 1:2,500
Printed at: 1:2,500



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 Edition N/A
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 Levelled N/A



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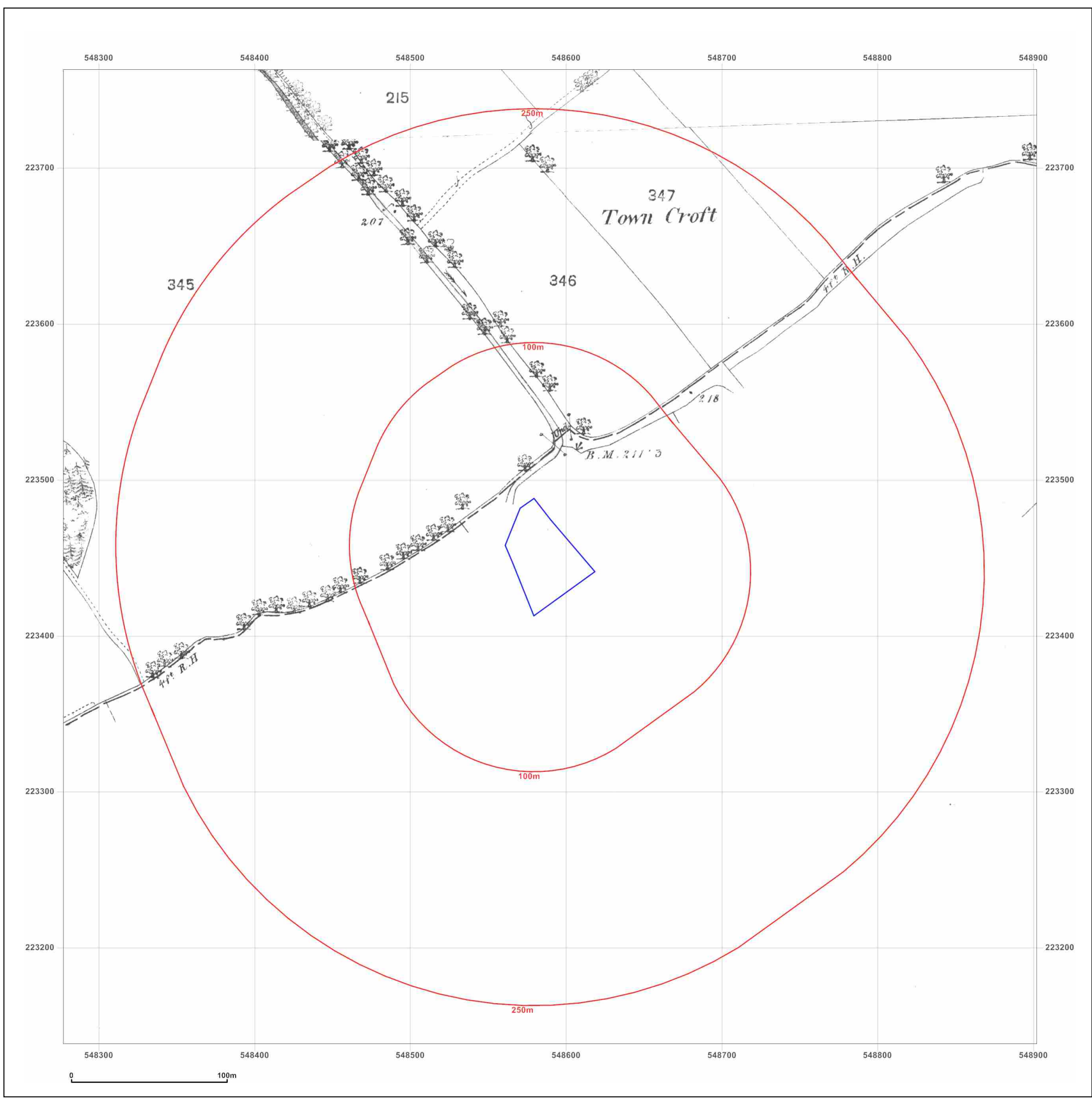


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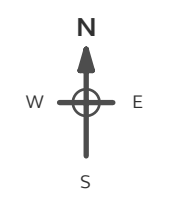
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Scale: 1:2,500

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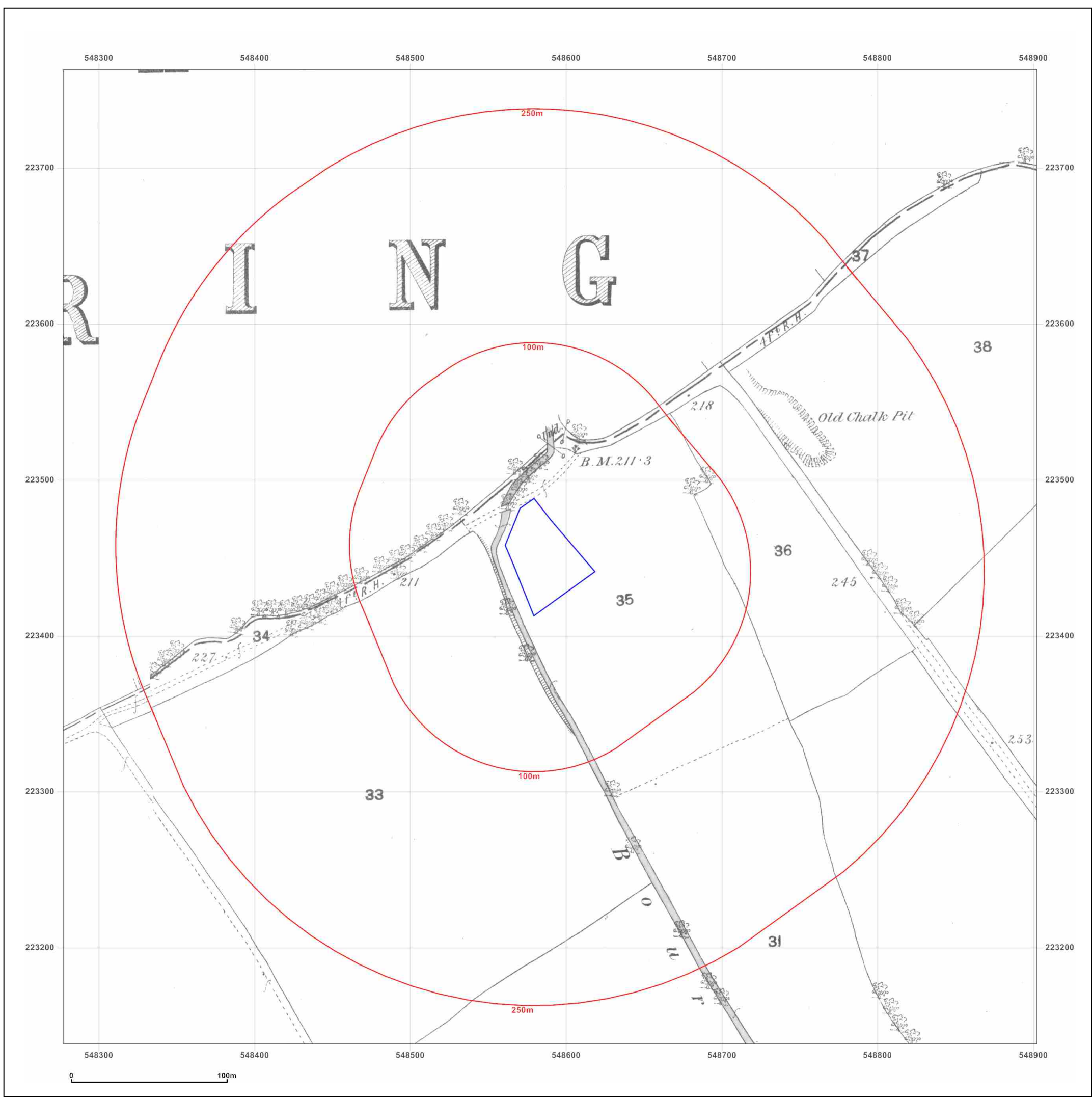


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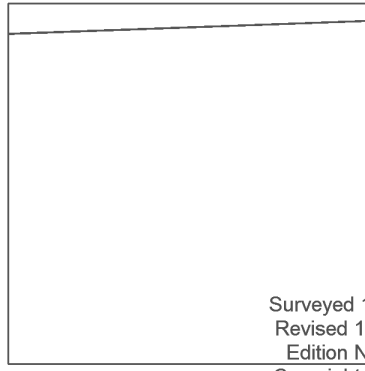
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Scale: 1:2,500

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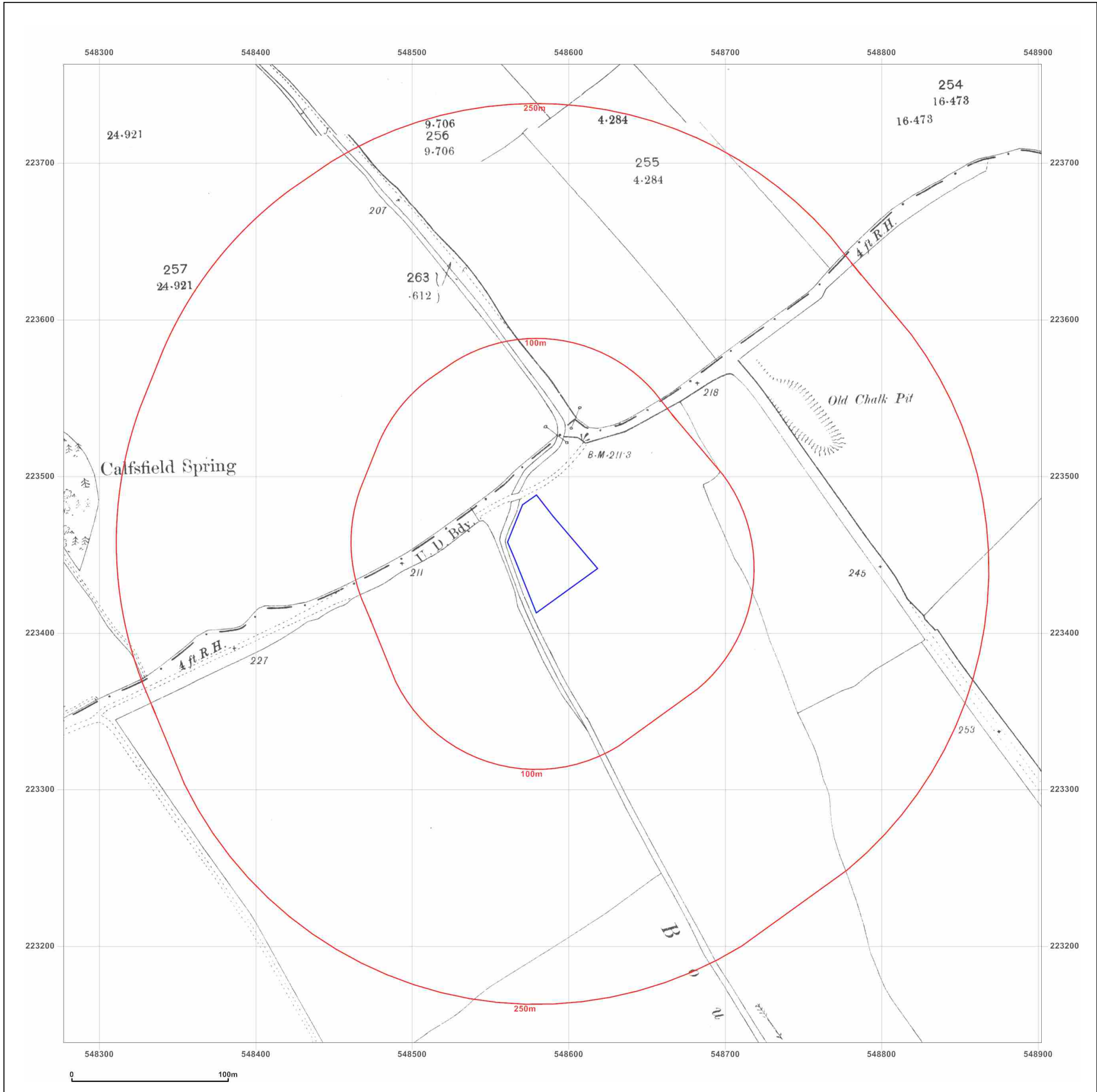


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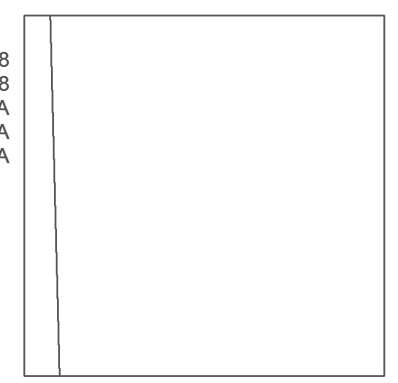
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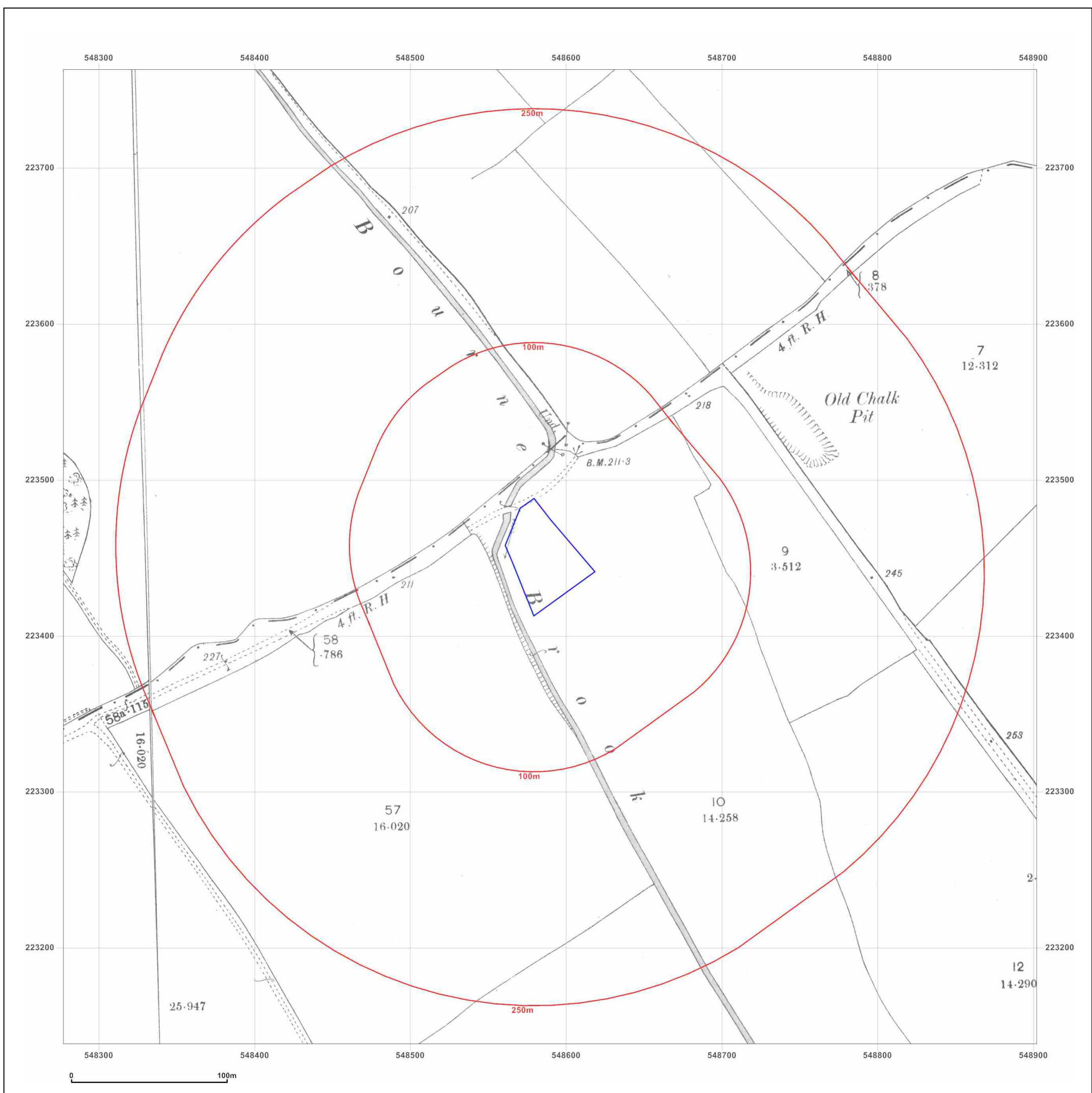


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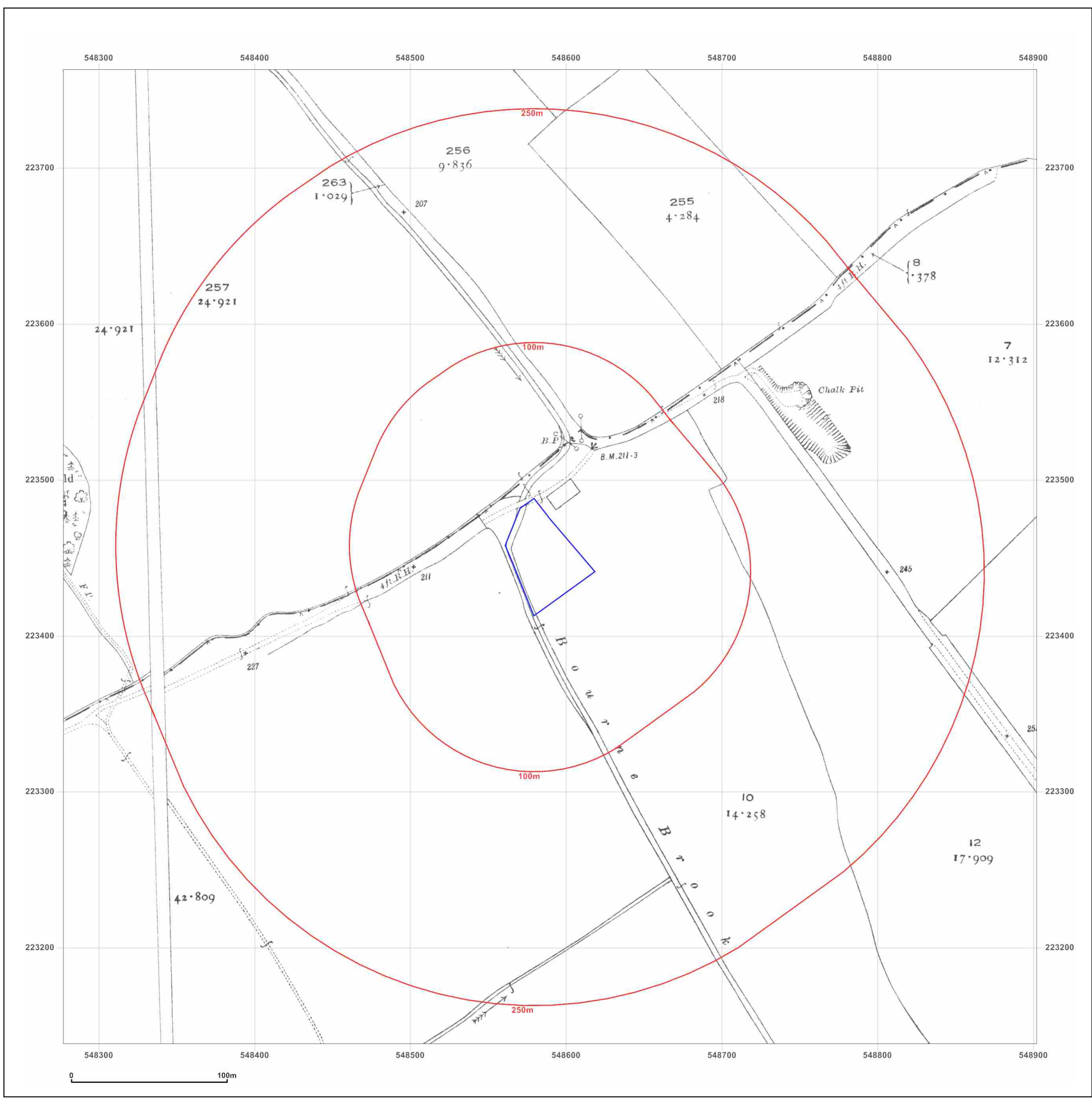


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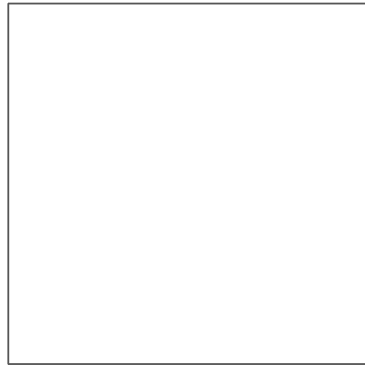
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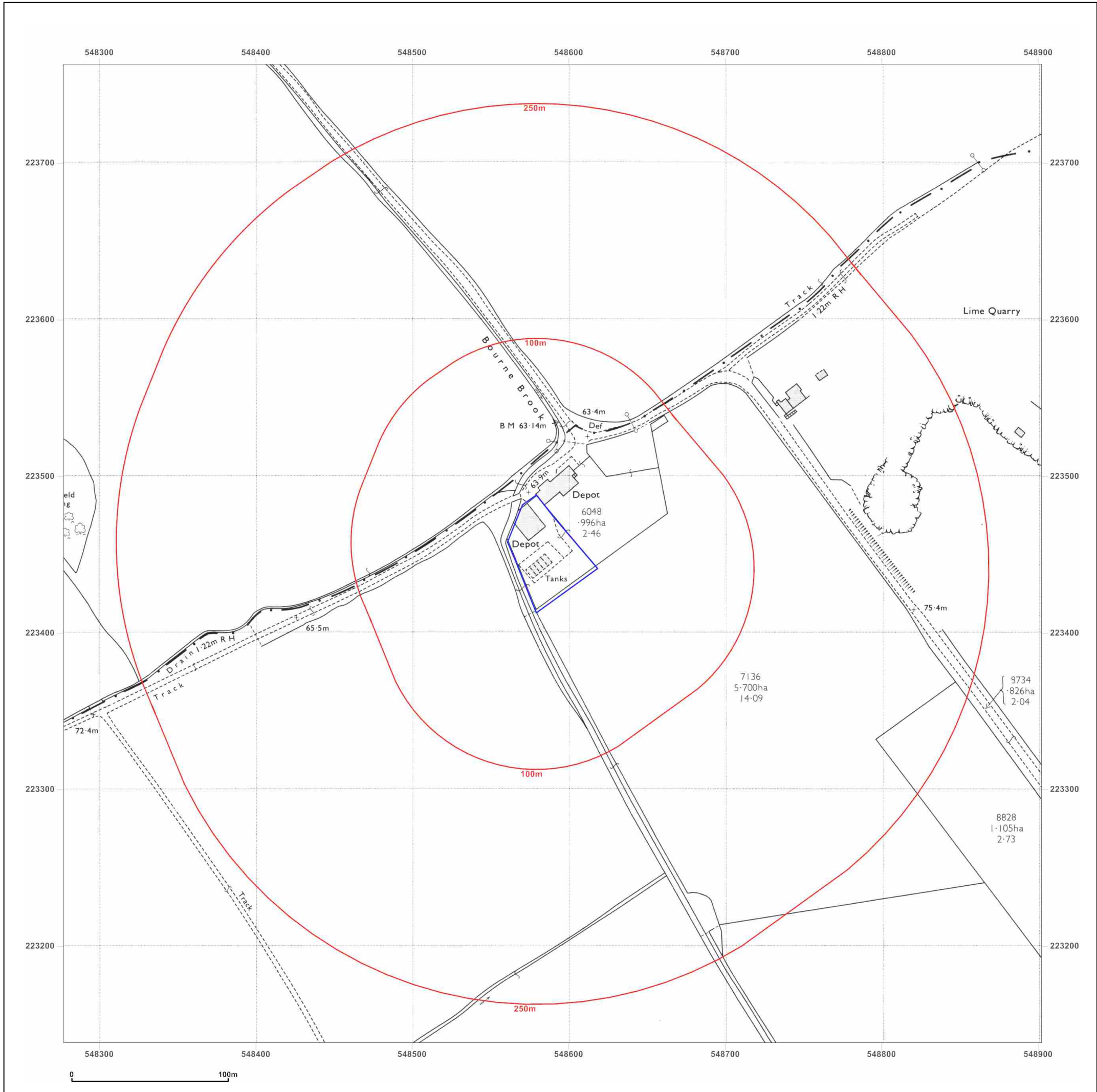
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Map Name: National Grid

Map date: 1976

Scale: 1:2,500

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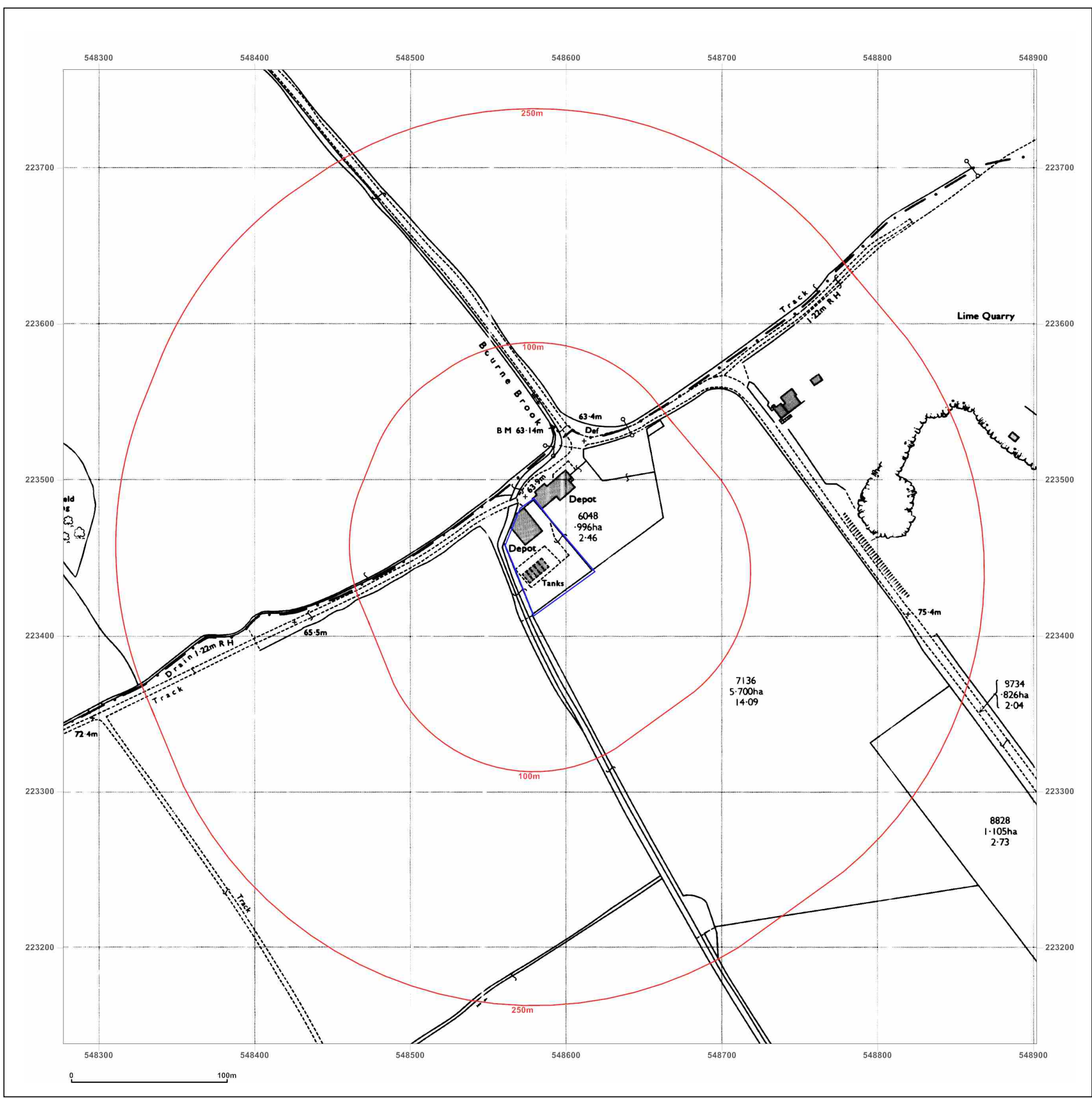


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Map Name: National Grid

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Edition N/A
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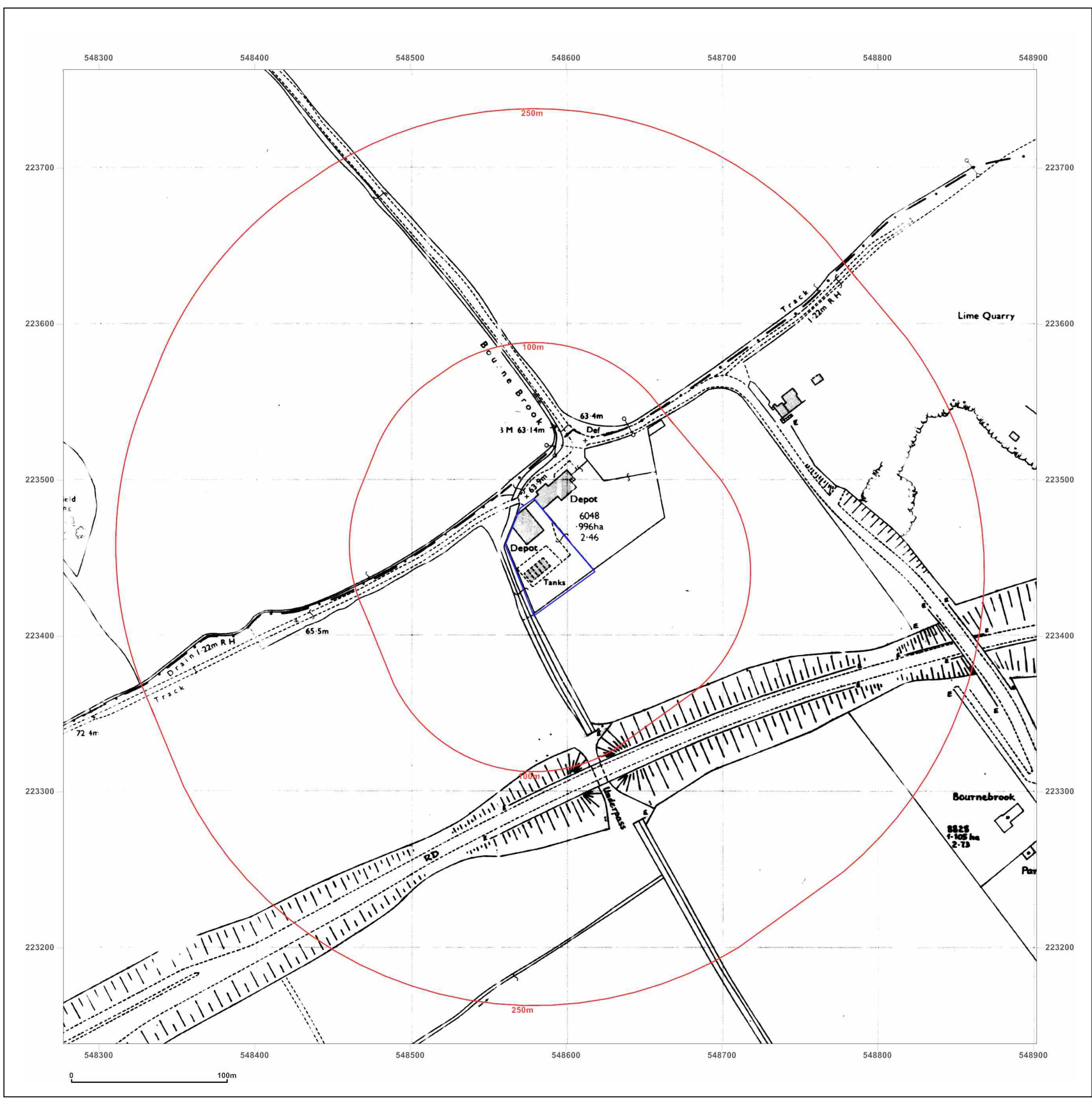


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Grid Ref: 548589, 223451

Map Name: National Grid

Map date: 1993

Scale: 1:2,500

Printed at: 1:2,500



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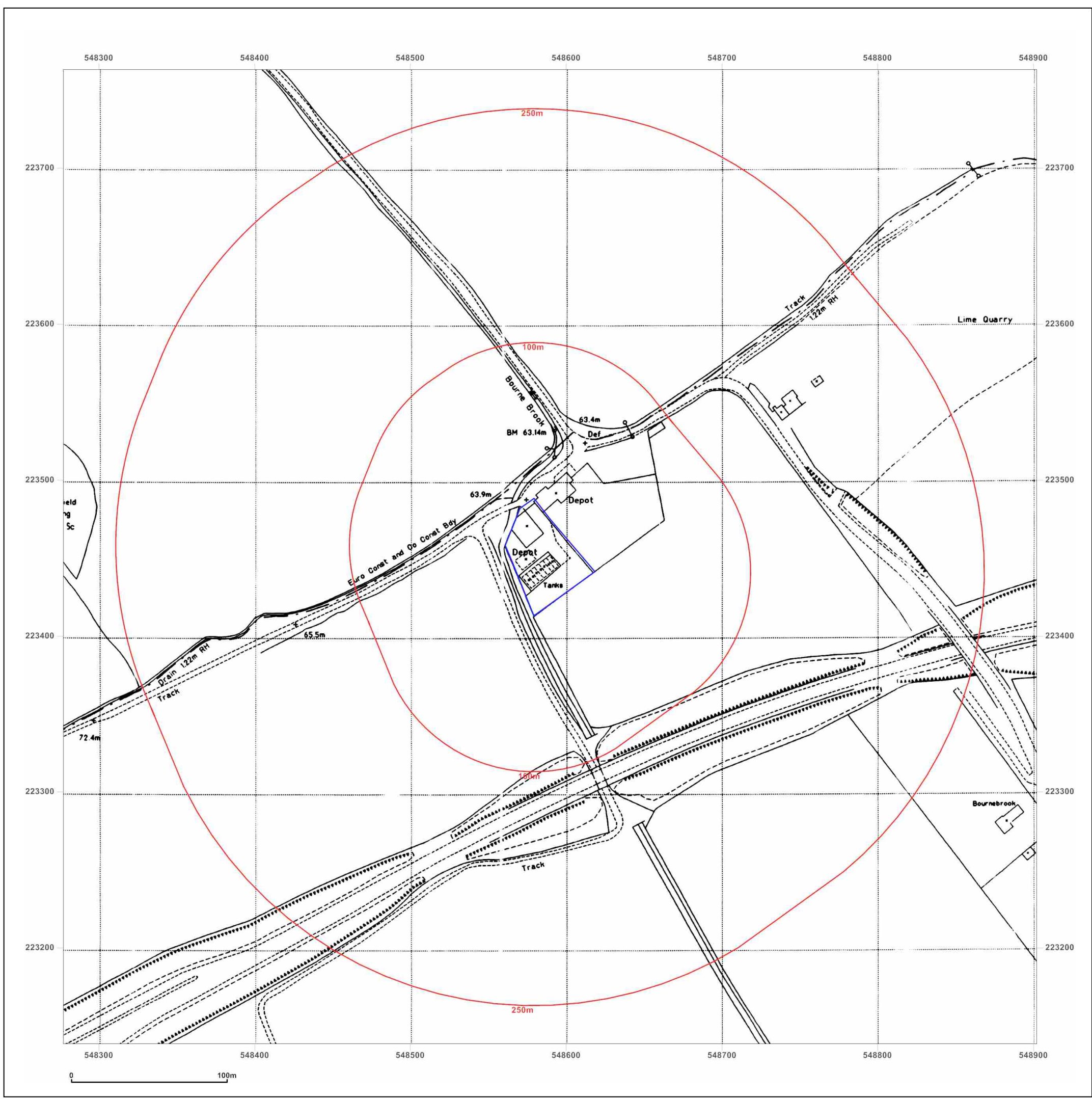


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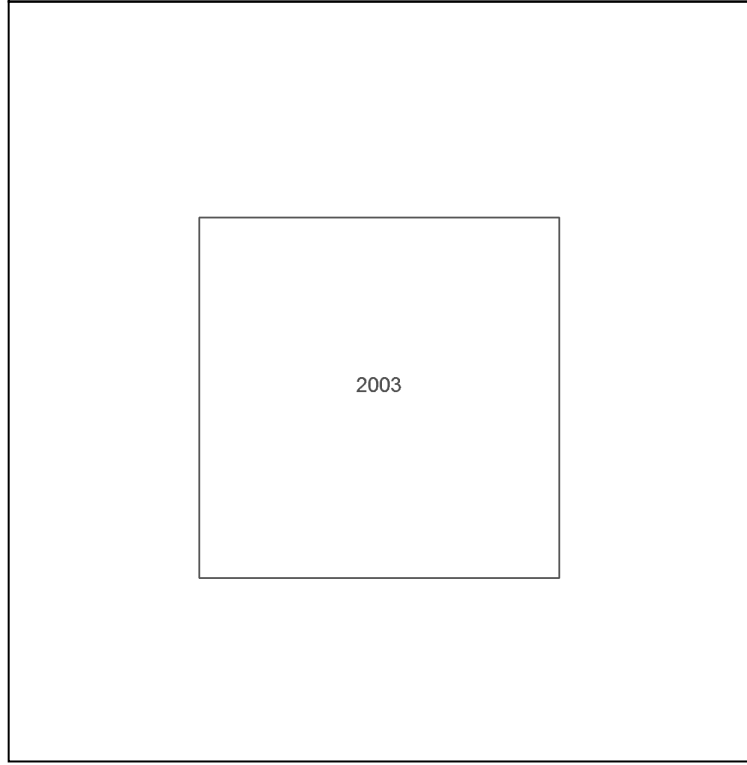
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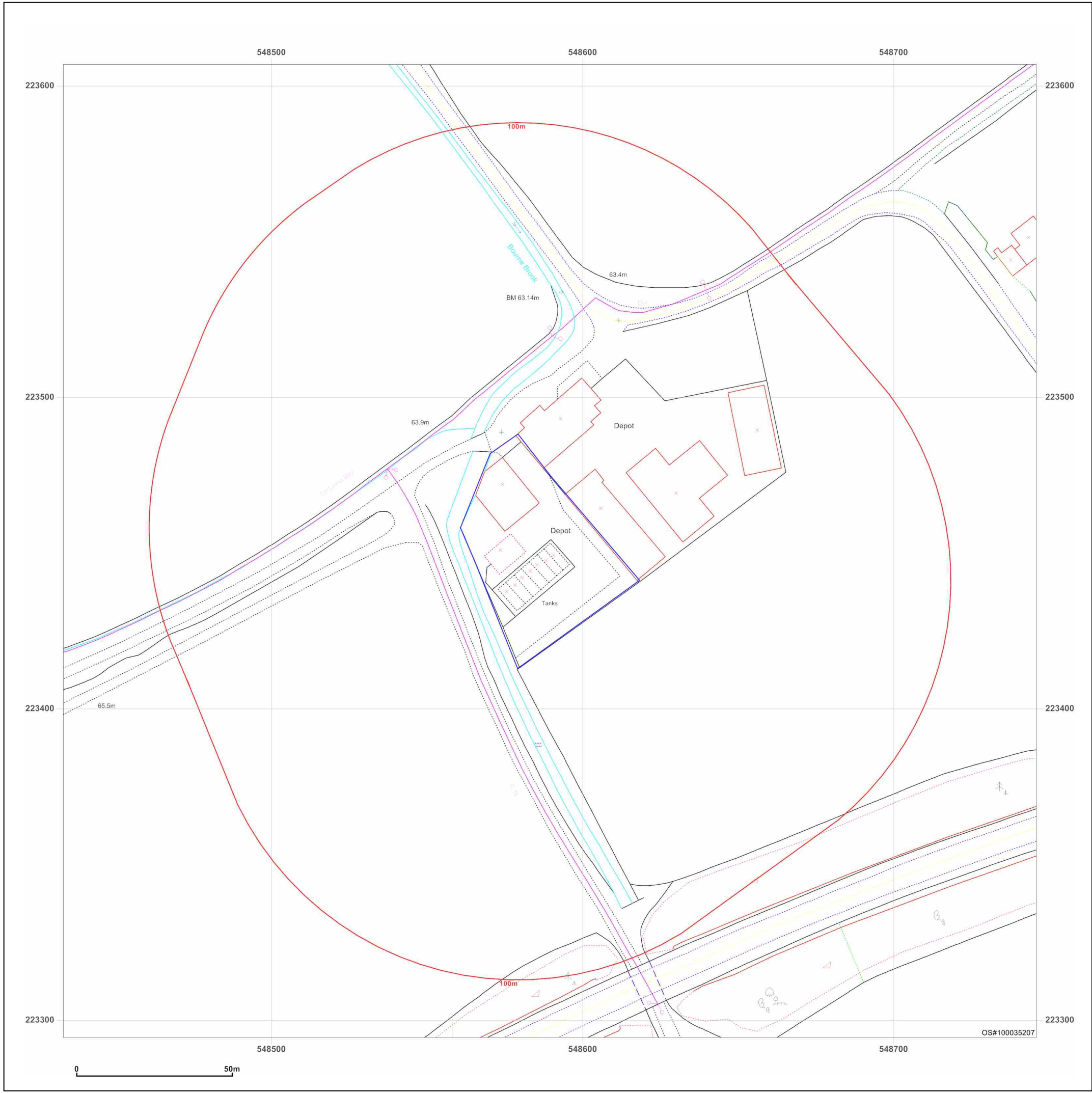


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Report Ref: HMD-214-6853807
Grid Ref: 548589, 223451

Map Name: County Series

Map date: 1876

Scale: 1:10,560

Printed at: 1:10,560



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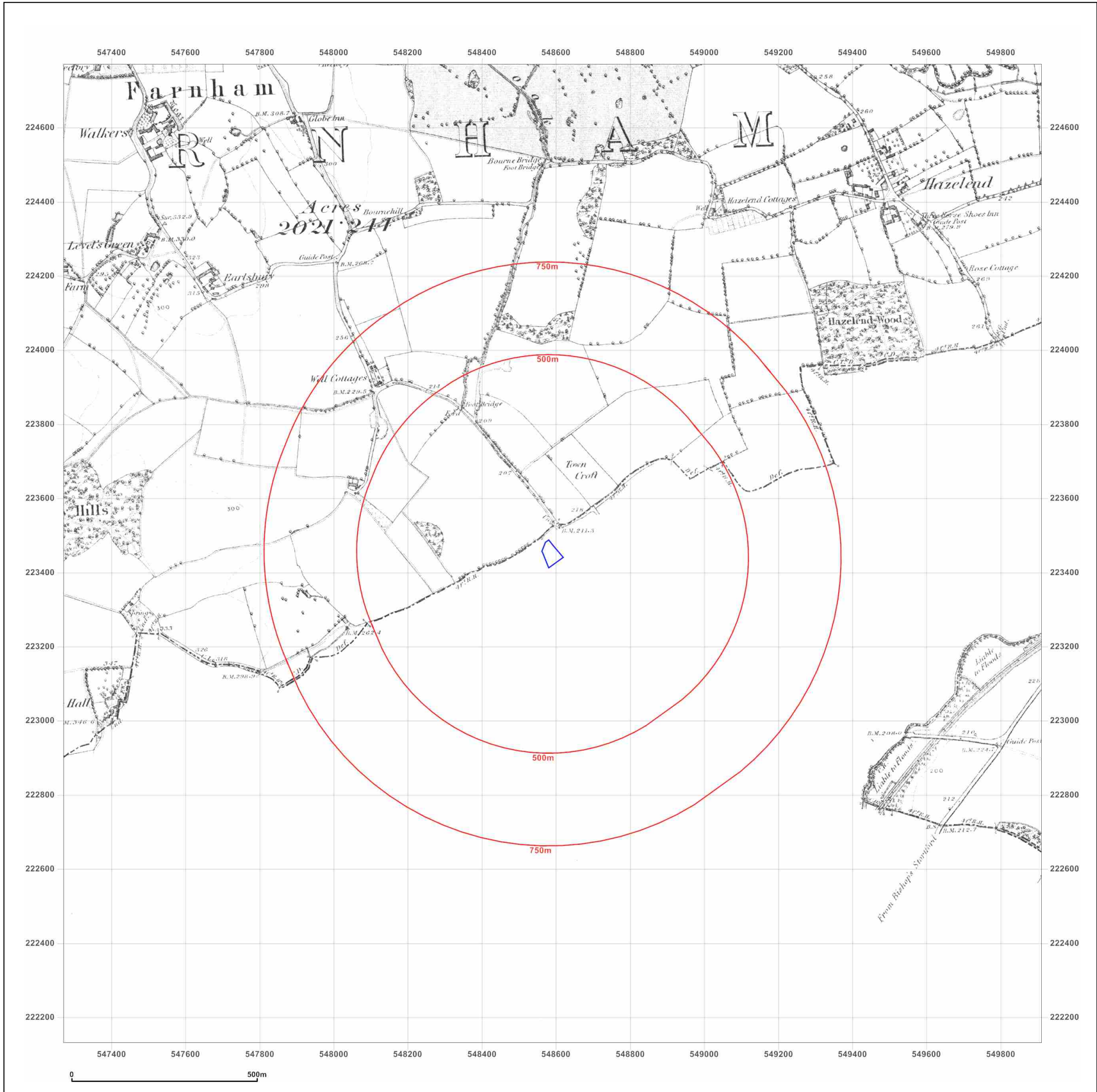


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Site Details:

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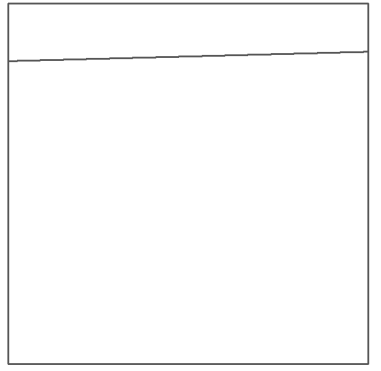
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Report Ref: HMD-214-6853807
Grid Ref: 548589, 223451

Map Name: County Series

Map date: 1883

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Printed at: 1:10,560

Surveyed 1879
Revised N/A
Edition 1883
Copyright N/A
Levelled N/A

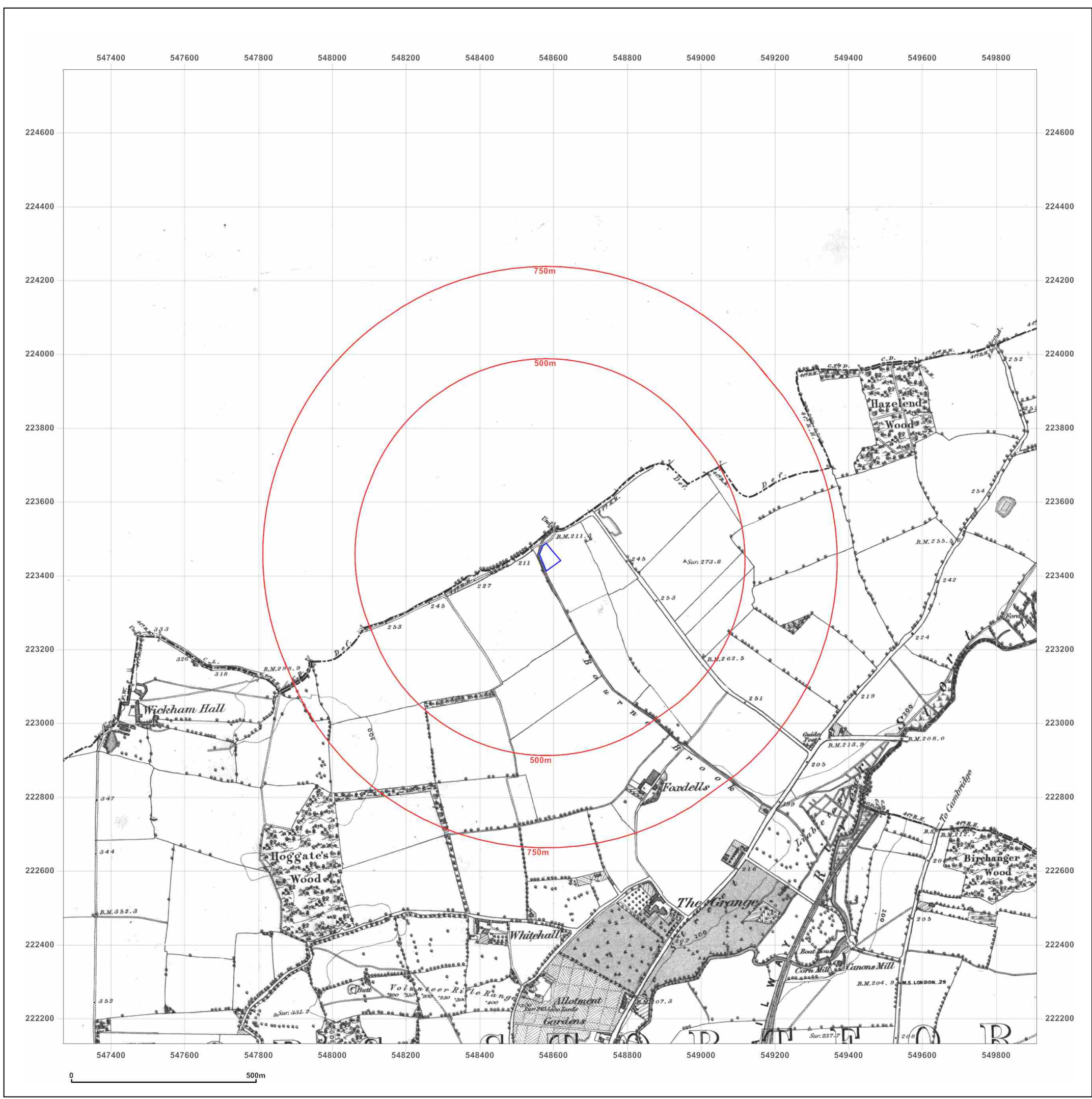


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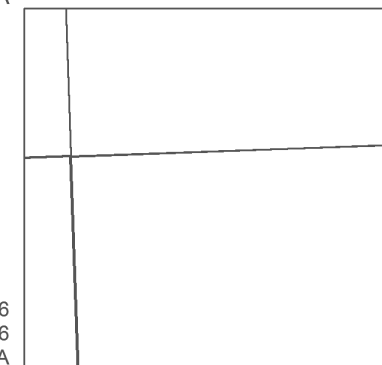
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 Edition N/A
 Copyright N/A
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Surveyed 1878
 Revised 1896
 Edition N/A
 Copyright N/A
 Levelled N/A



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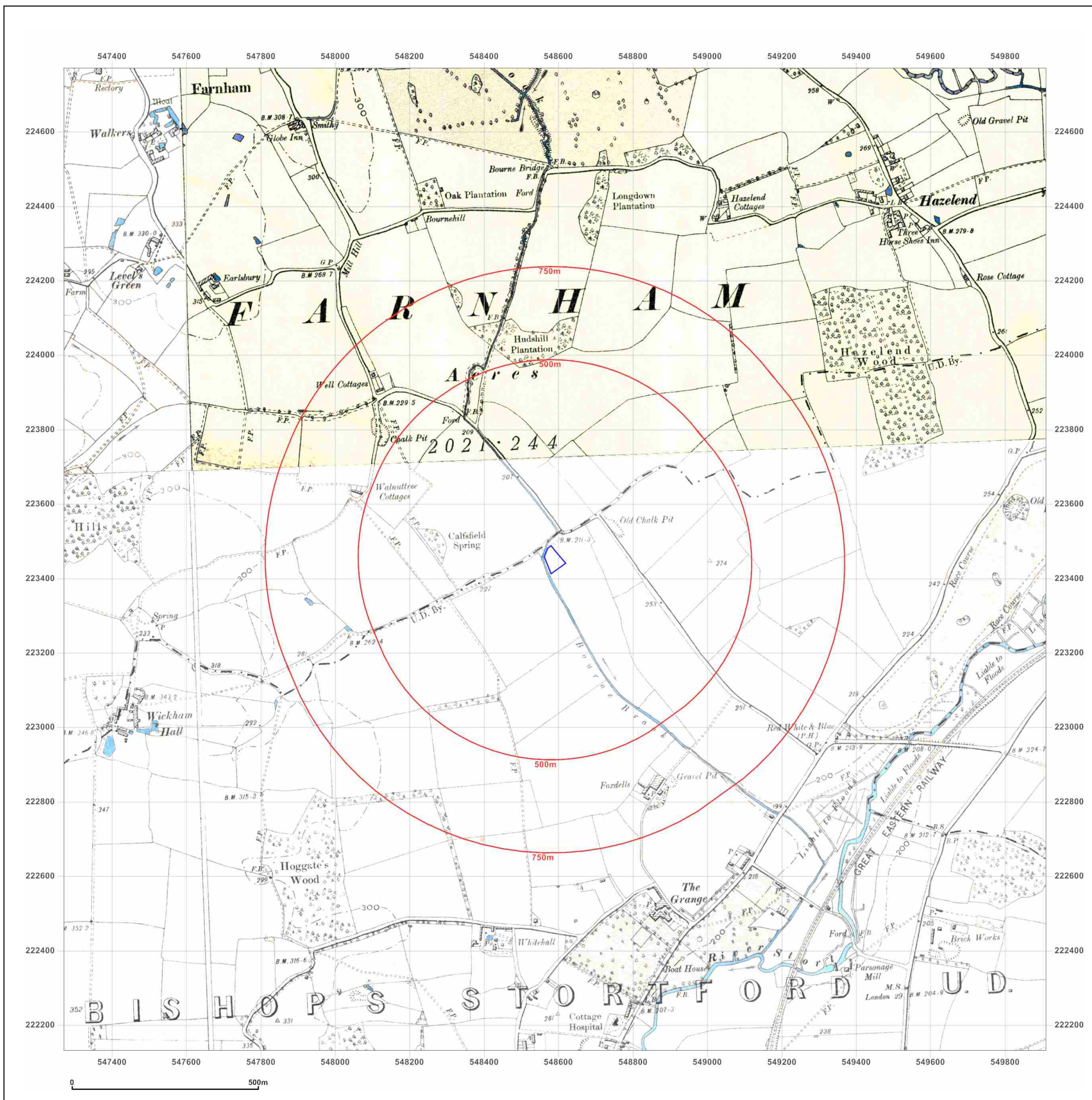


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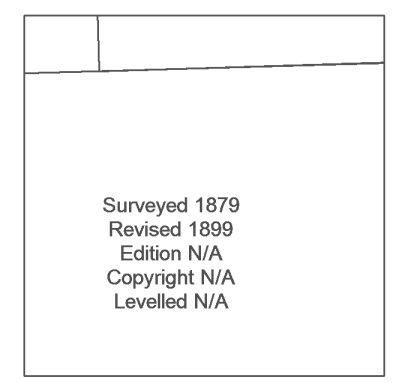
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 Levelled N/A



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 Revised 1899
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 Levelled N/A

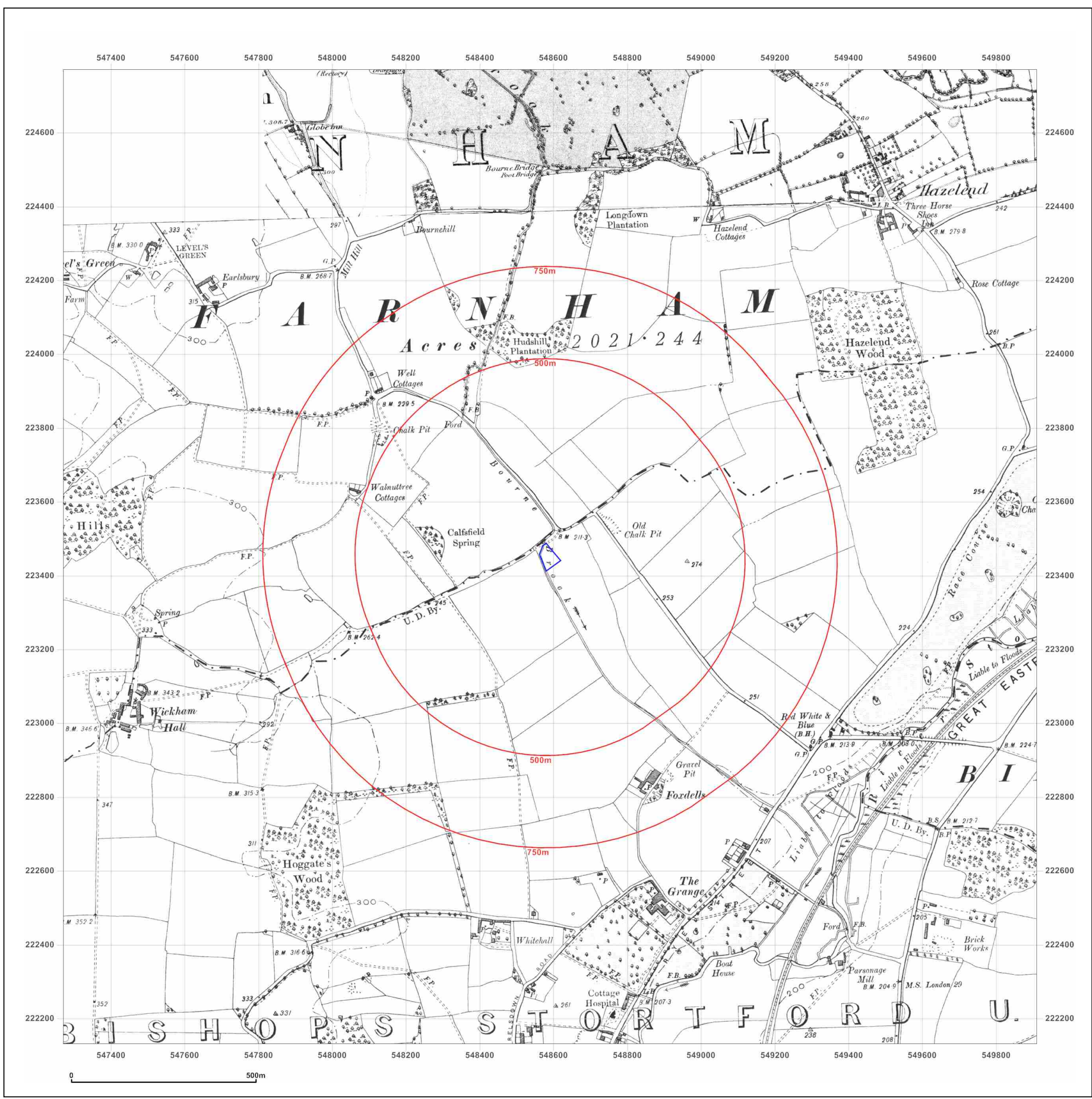


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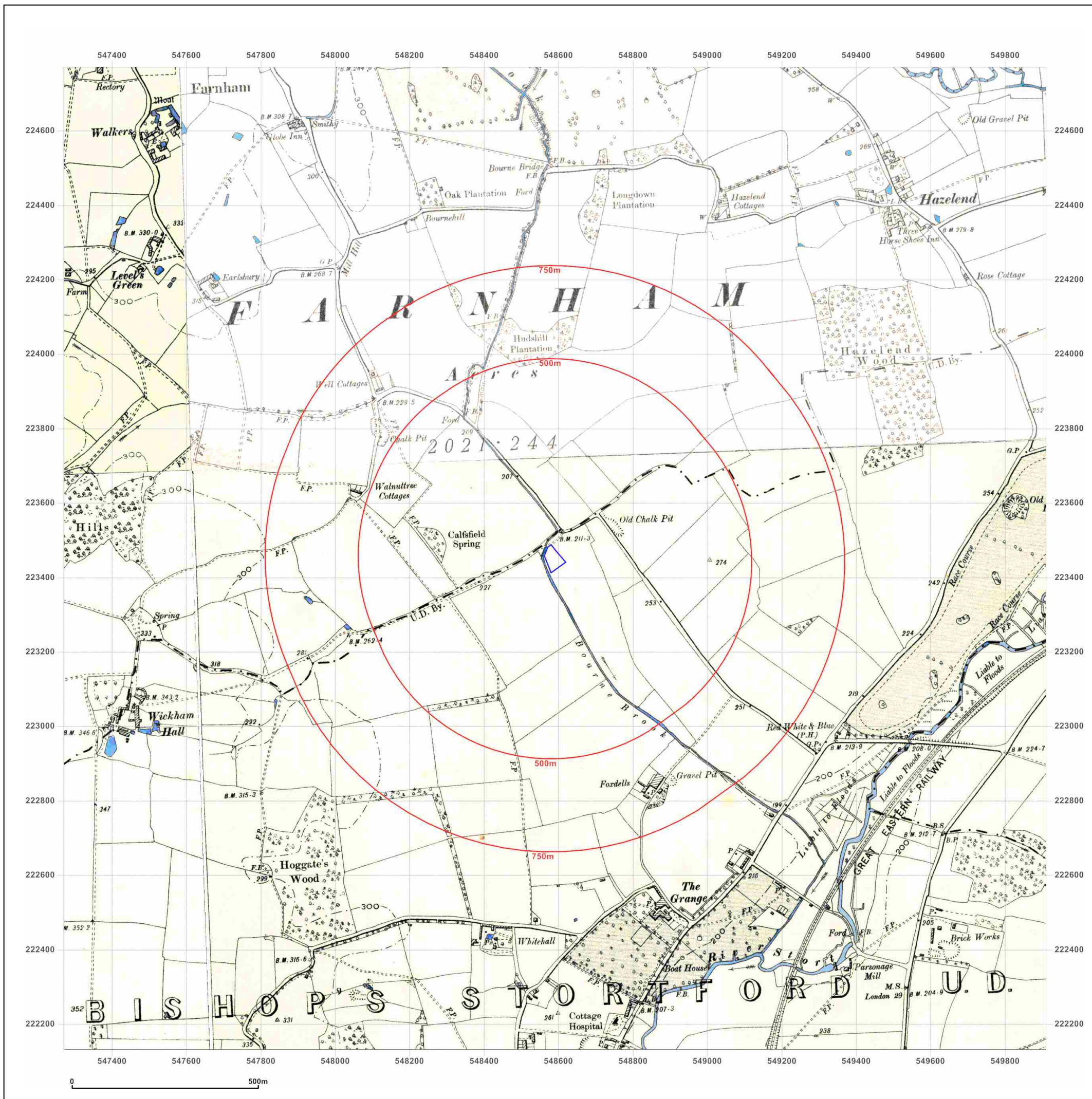


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Client Ref: NTG2113-POR031690
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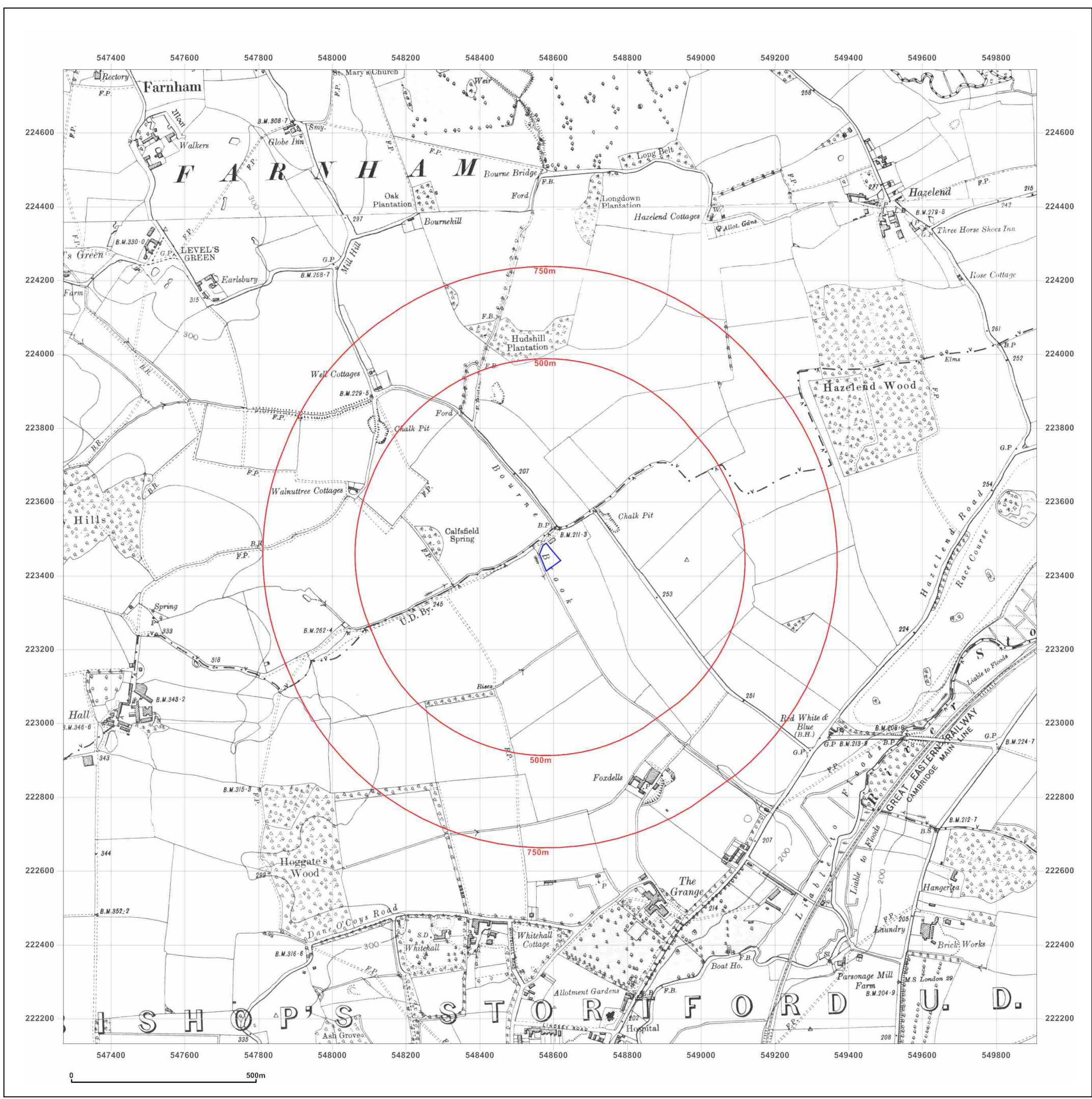


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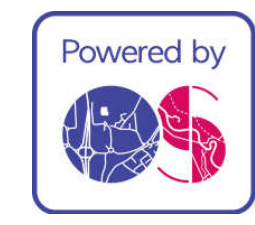
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Surveyed 1875
Revised 1916
Edition N/A
Copyright N/A
Levelled N/A

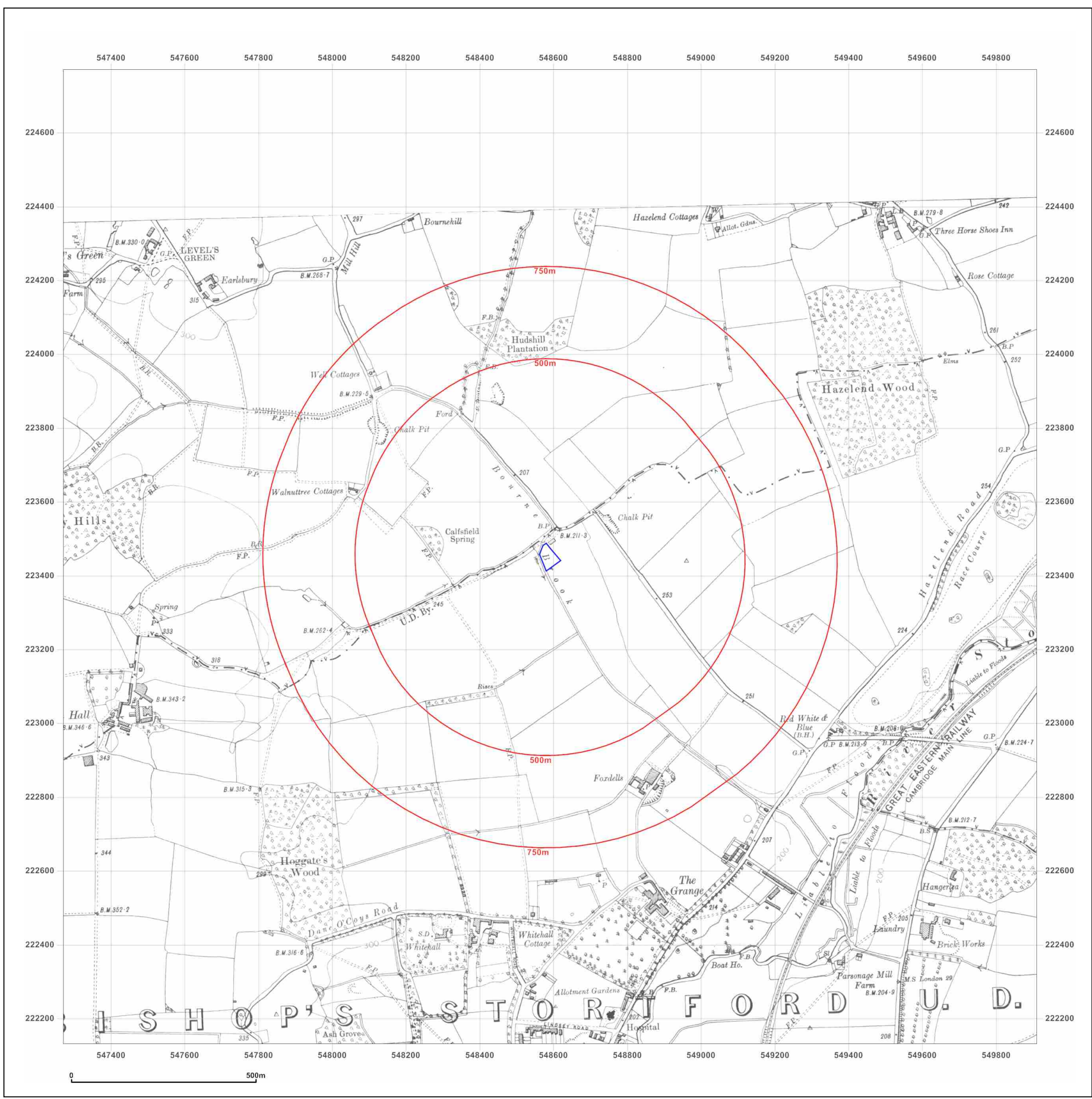


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Client Ref: NTG2113-POR031690
Report Ref: HMD-214-6853807
Grid Ref: 548589, 223451

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1878
Revised 1938
Edition N/A
Copyright N/A
Levelled 1896

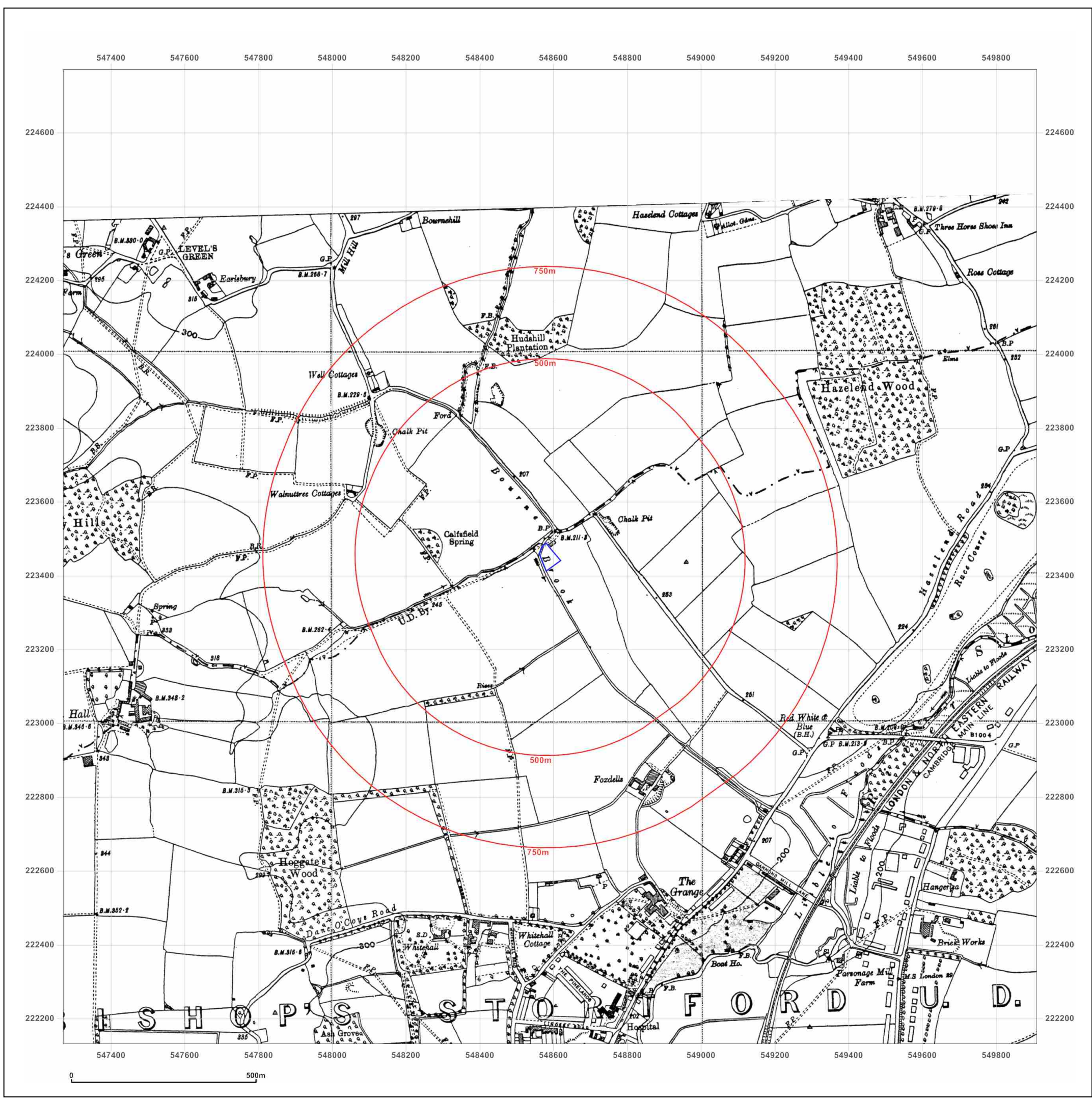


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Client Ref: NTG2113-POR031690
Report Ref: HMD-214-6853807
Grid Ref: 548589, 223451

Map Name: County Series

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Surveyed 1878
Revised 1938
Edition N/A
Copyright N/A
Levelled 1869

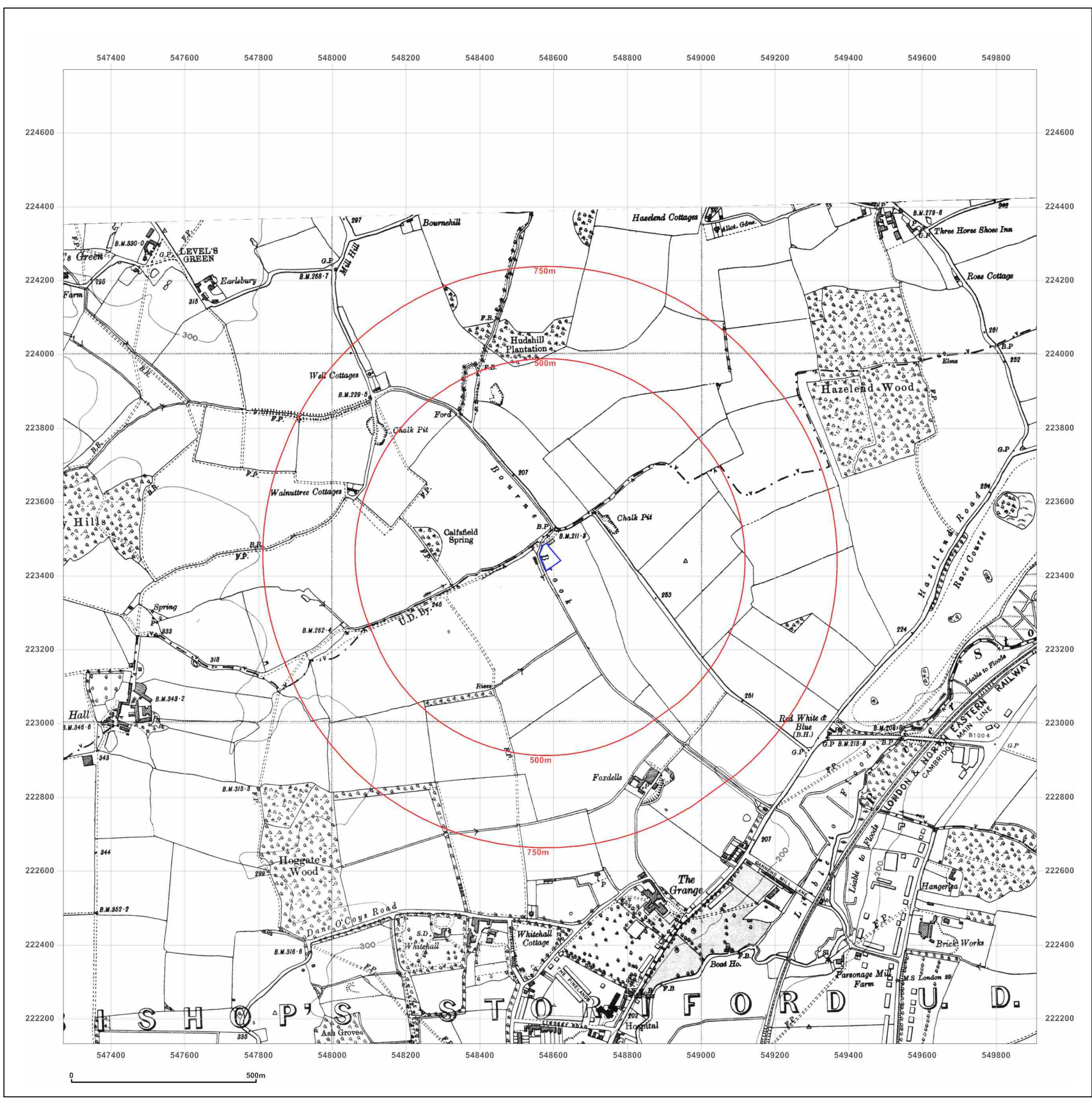


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Client Ref: NTG2113-POR031690
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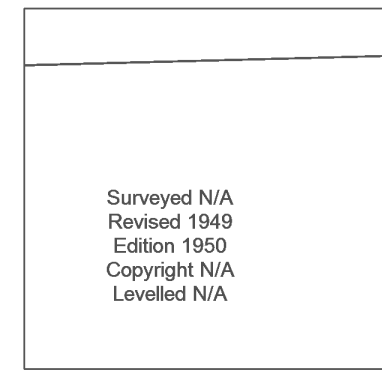
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 Revised 1949
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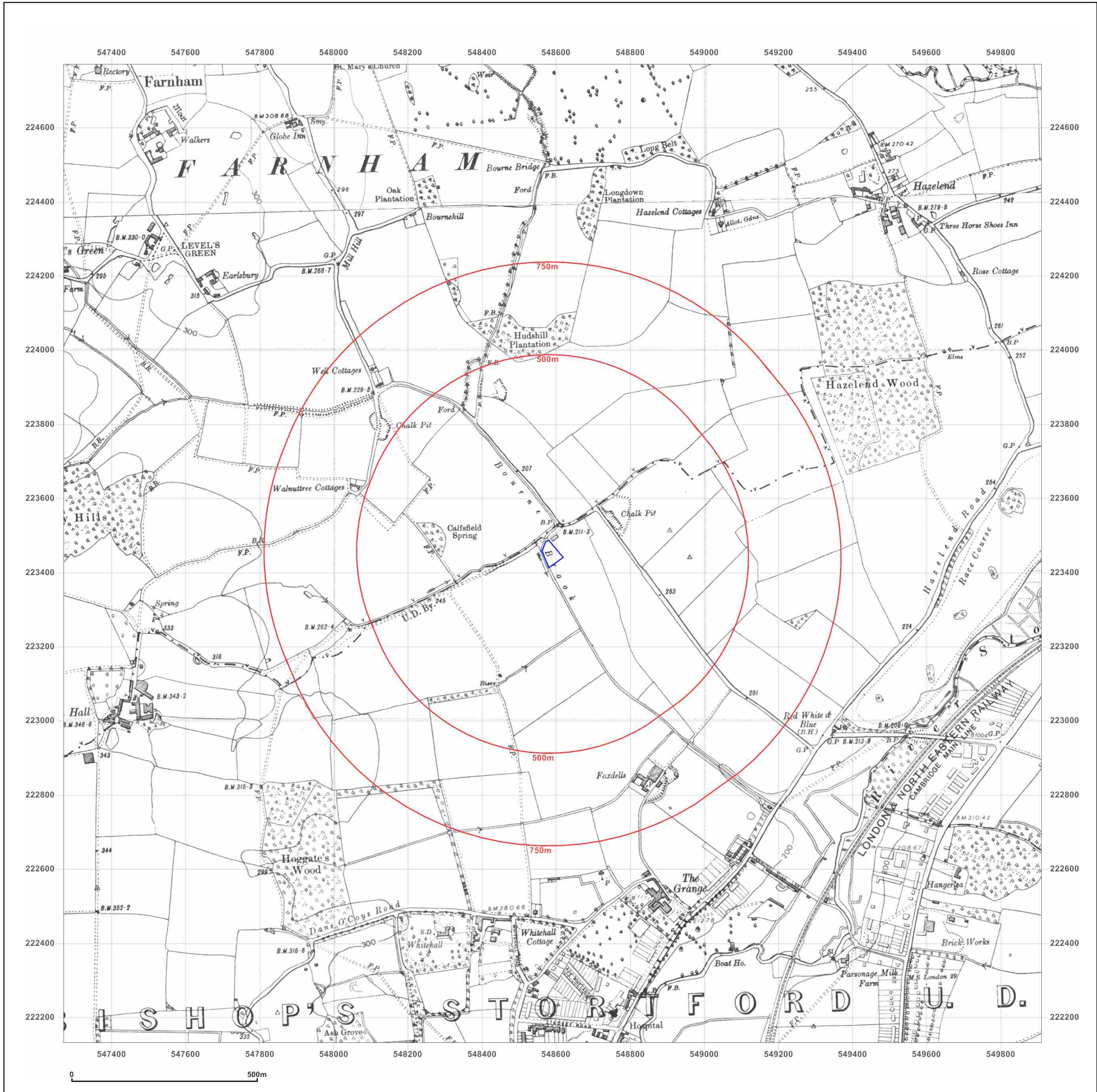


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Client Ref: NTG2113-POR031690
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Printed at: 1:10,560



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 Revised 1959
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 Levelled N/A

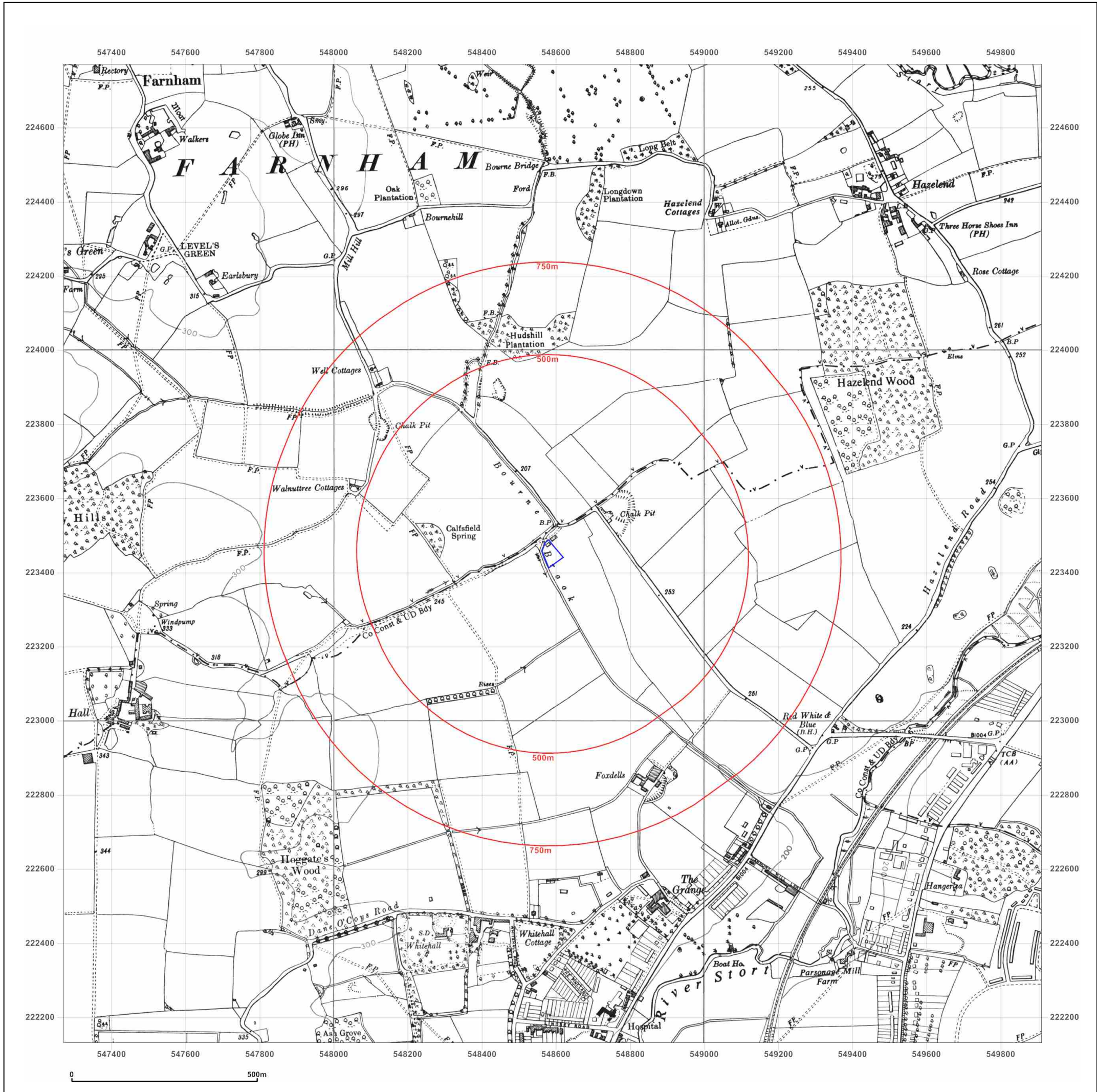


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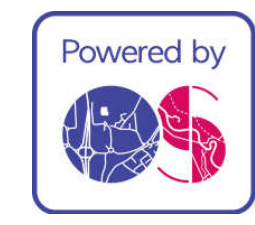
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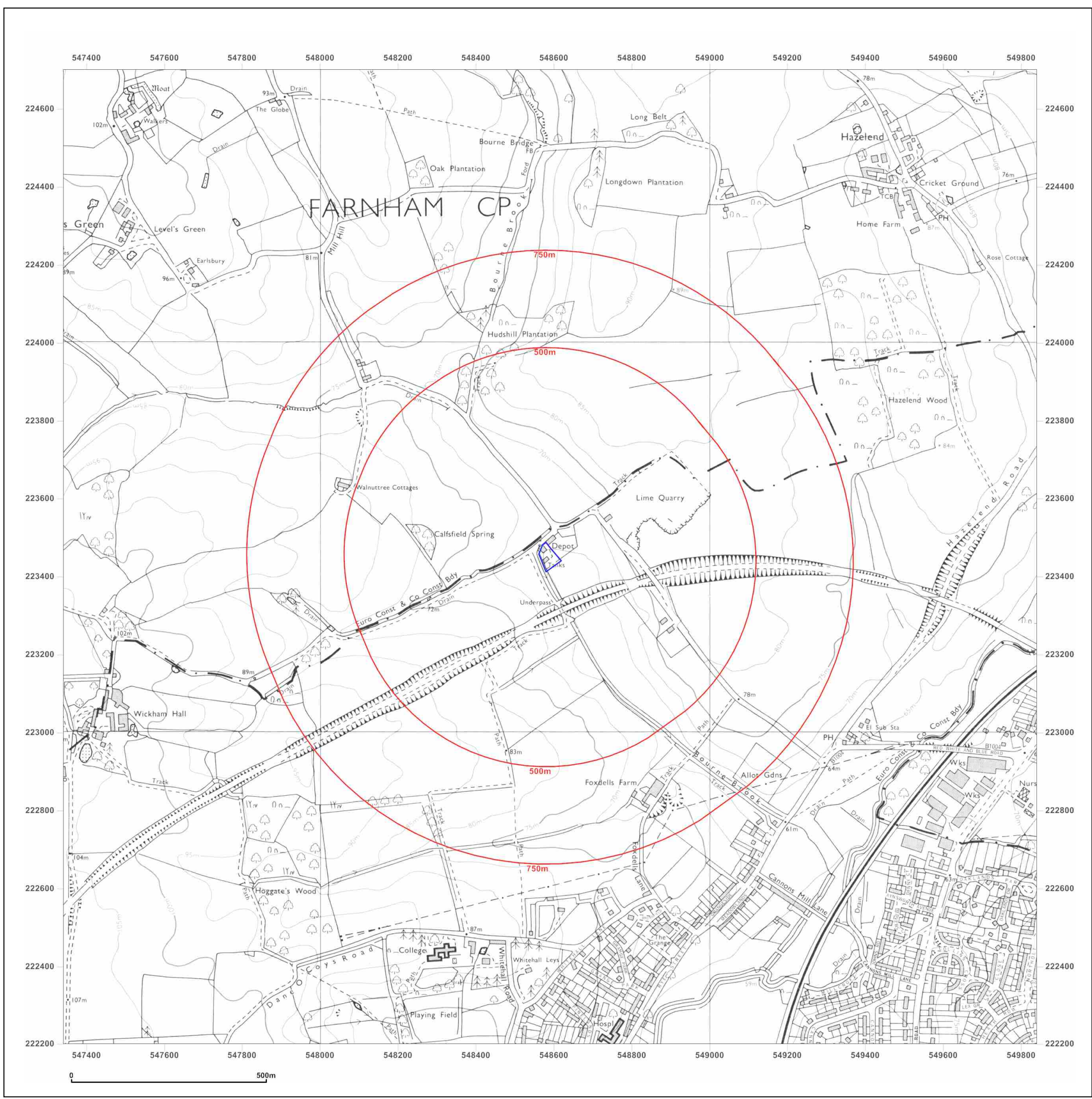


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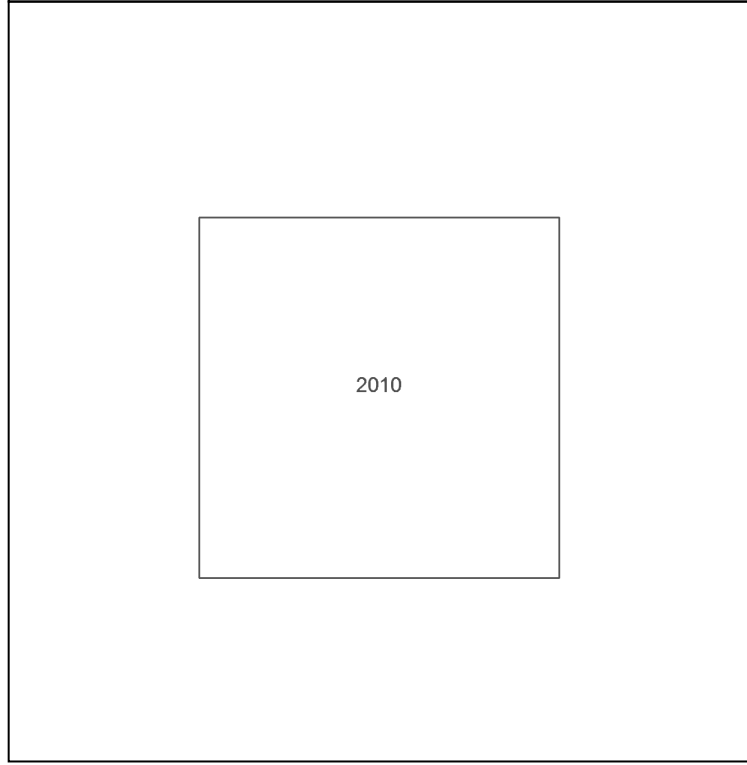
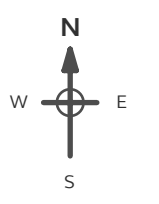


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Map Name: National Grid
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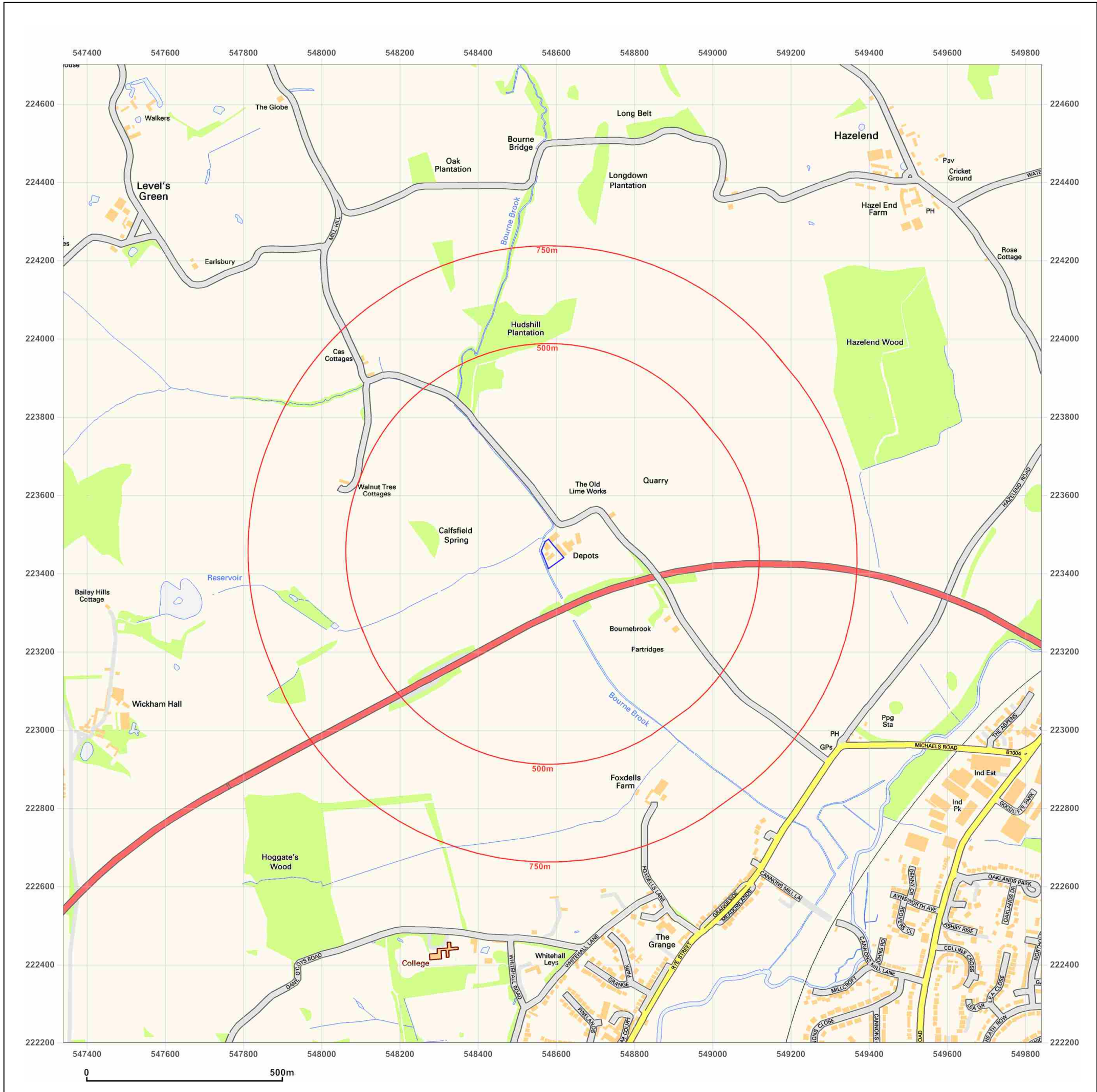


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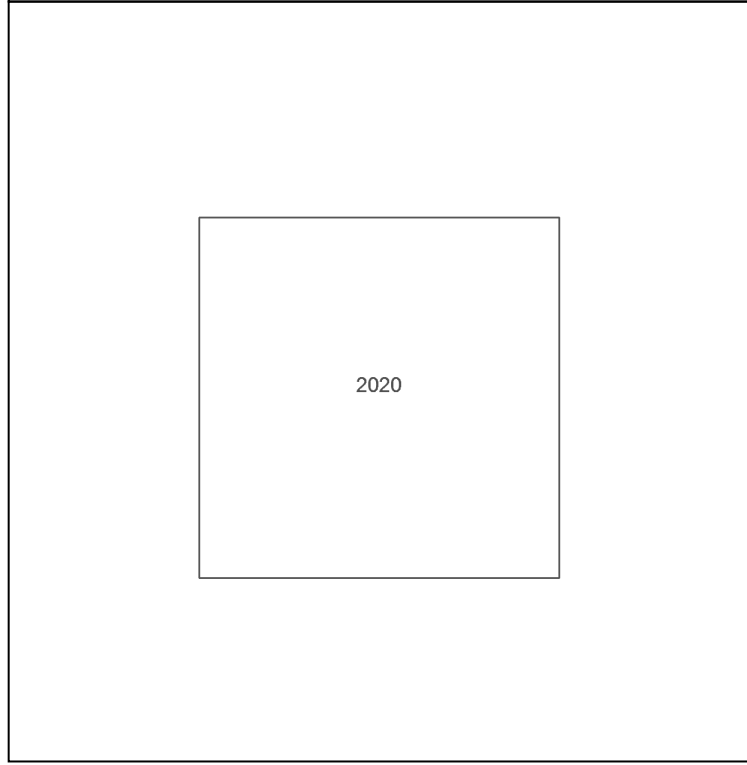
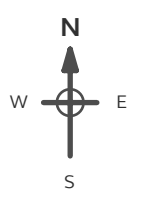


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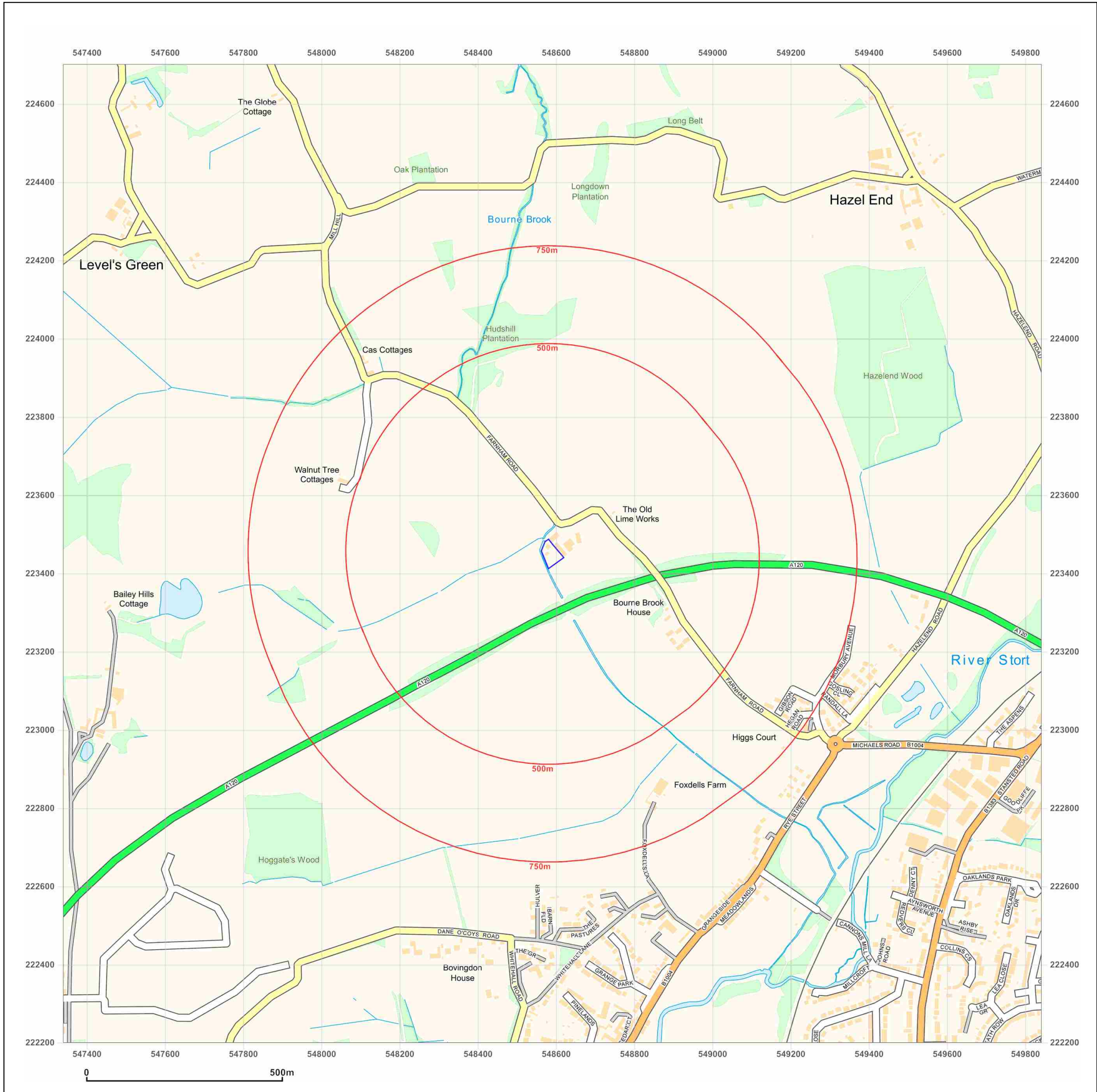



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Appendix 4: Express UXO Assessment



Express Preliminary UXO Risk Assessment

Client	BWB Consulting Ltd
Project	Land off Farnham Road, Bishop's Stortford
Site Address	Land off Farnham Road, Bishop's Stortford, Hertfordshire, CM23 1JB
Report Reference	EP11341-00
Date	05/06/2020
Originator	AB

Assessment Objective

This preliminary risk assessment is a qualitative screening exercise to assess the likely potential of encountering unexploded ordnance (UXO) at the Land off Farnham Road site. The assessment involves the consideration of the basic factors that affect the potential for UXO to be present at a site as outlined in Stage One of the UXO risk management process.

Background

This assessment uses the sources of information available in-house to 1st Line Defence Ltd to enable the placement of a development site in context with events that may have led to the presence of German air-delivered or Allied military UXO. The report will identify any immediate necessity for risk mitigation or additional research in the form of a Detailed UXO Risk Assessment. It makes use of 1st Line Defence's extensive historical archives, library and unique geo-databases, as well as internet resources, and is researched and compiled by UXO specialists and graduate researchers.

The assessment directly follows CIRIA C681 guidelines "Unexploded Ordnance, a Guide for the Construction Industry". The document will therefore assess the following factors:

- Basic Site Data
- Previous Military Use
- Indicators of potential aerial delivered UXO threat
- Consideration of any Mitigating Factors
- Extent of Proposed Intrusive Works
- Any requirement for Further Work

It should be noted that the vast majority of construction sites in the UK will have a low or negligible risk of encountering UXO and should be able to be screened out at this preliminary stage. The report is meant as a common sense 'first step' in the UXO risk management process. The content of the report and conclusions drawn are based on basic, preliminary research using the information available to 1st Line Defence at the time this report was produced. It should be noted that the only way to entirely negate risk from UXO to a project would be to support the works proposed with appropriate UXO risk mitigation measures. It is rarely possible to state that there is absolutely 'no' risk from UXO to a project.





Risk Assessment Considerations	
<p>Site location and description/current use</p>	<p>The site is located in Bishop’s Stortford, Hertfordshire. Farnham Road forms the border between the counties of Hertfordshire and Essex.</p> <p>A two-storey commercial structure is located in the northern portion of the site, with two small garage structures situated in the site’s western portion. A number of shipping containers are stored in the southern and eastern portions of the site.</p> <p>The site is bound by Farnham Road to the north, with Bourne Brook (a narrow tributary of the River Stort) forming the site’s western boundary. The site’s southern and eastern boundaries are bound by an open field.</p> <p>The site is approximately centred on the OS grid reference: TL 48609 23482.</p> 
<p>Are there any indicators of current/historical military activity on/close to the site?</p>	<p>In-house records indicate that there is no evidence that any military activity has taken place on (or in the immediate vicinity of) the site. No typical features such as WWII defensive positions, encampments or firing ranges have been recorded at this location. Furthermore, evidence of ordnance being stored, produced or disposed of within the site boundary could not be found.</p> <p>The closest recorded Heavy Anti-Aircraft (HAA) battery was situated approximately 18km south of the site.</p>
<p>What was the pre- and post-WWII history of the site?</p>	<p>Historic OS mapping from 1921 indicates that the site was located within an open field, with a single, small structure of unknown usage located in its northern section. <i>Farnham Road</i> formed the northern boundary, with <i>Bourne Brook</i> to the west, and open grassland to the south and east.</p> <p>Post-WWII OS mapping from 1960 shows another small structure located in the western portion of the site. No other significant structural changes can be observed within the site or its immediate vicinity.</p>
<p>Was the area subject to bombing during WWII?</p>	<p>During WWII, the site was located within the Urban District of Bishop’s Stortford, though Farnham Road formed the border with the Rural District of Saffron Walden. Bishop’s Stortford sustained an overall low-moderate density of bombing, with an average of 42.6 items of ordnance recorded per 1,000 acres of land; a total of 160 HE bombs were recorded in the district, as well as two oil bombs and one V-2 long-range rocket. Saffron Walden sustained a very-low density of bombing, with only 7.3 items of ordnance recorded per 1,000 acres; specifically, 532 HE bombs were recorded, as well as eleven parachute mines, six oil bombs, ten phosphorous bombs, eight ‘fire pots’, eight V-1 pilotless aircraft bombs and six V-2’s.</p> <p>Air Raid Damage files previously obtained by 1st Line Defence from Hertfordshire Archives list the general locations of bomb strikes in Bishop’s Stortford. This resource notes a V-2 long range rocket to have landed ‘in a field, near Farnham Road’. However, anecdotal evidence found online suggests that the actual location of this strike was approximately 1.5km to the south of the site area, near Cricketfield Lane.</p>





	These files also record ‘five High Explosives one mile north of Bishop’s Stortford’ and ‘eight high explosives in northern outskirts of Bishop’s Stortford’ on 16 th October 1940. The site itself is located approximately 1.5 miles north of Bishop’s Stortford.
Is there any evidence of bomb damage on/close to the site?	With the exception of a single, small structure, the site area was occupied by open land, which damage cannot be attributed to. Therefore, it is not possible to accurately assess damage levels within the boundary at this stage. However, the one small structure on-site does appear unchanged within post-war OS mapping.
To what degree would the site have been subject to access?	The site was mostly occupied by open land and therefore it is unlikely that it would have been subject to post-raid checks. However, given that a roadway was situated adjacent to the site’s northern boundary, with a structure also located on-site, it is thought likely that the site would have been subject to a degree of observation.
To what degree has the site been developed post-WWII?	OS mapping from 1972 indicates that the site was likely developed to its current layout during the 1960s or early 1970s.
What is the nature and extent of the intrusive works proposed?	The nature and extent of works proposed is understood to comprise dynamic sampling to 5m bgl.

Summary and Conclusions

During WWII, the site was situated within the Urban District of Bishop’s Stortford, which according to Home Office statistics sustained an overall low-moderate density of bombing, with an average of 42.6 items of ordnance recorded per 1,000 acres of land. Farnham Road formed the district border with the Rural District of Saffron Walden, which sustained a very-low density of bombing, with an average of 7.3 items of ordnance per 1,000 acres. Pre and post-war OS mapping indicates that the site was mostly occupied by open ground, though a small structure was also located in the site’s northern portion. No viable bombing targets were noted on or close to the site which may have increased the localised bomb density.

Air Raid Damage files for Bishops Stortford indicate that five HE bombs landed ‘one mile north of Bishop’s Stortford’, with a further eight HE bomb strikes in the ‘northern outskirts of Bishop’s Stortford’. No references could be found to indicate that the site itself was subject to bombing, although the record set for Bishop’s Stortford is limited. Given that a roadway was located adjacent to the site’s northern boundary, with a structure also situated on-site, it is considered likely that the site would have been subject to a general level of observation.

Recommendations

Given the findings of this preliminary report, it is considered that the risk of encountering UXO at the land off Farnham Road is not above the ‘background level’ for this area of the UK. Whilst it would be possible to conduct a Detailed UXO Risk Assessment and obtain additional historical documentation, it is not anticipated that such research would significantly alter the findings of this report. **It is therefore not recommended that any further action is taken for this site.**

If the client has any anecdotal or empirical evidence of UXO risk on site, please contact 1st Line Defence.





It should be noted that although the risk from unexploded ordnance on this site has been assessed as low/minimal, this does not mean there is 'no' risk of encountering UXO. This preliminary report has been undertaken with due diligence, and all reasonable care has been taken to access and analyse relevant historical information. By necessity, when dealing with historical evidence, and when making assessments of UXO risk, various assumptions have to be made which we have discussed and justified within this report. Our reports take a common-sense and practical approach to the assessment of UXO risk, and we strive to be reasonable and pragmatic in our conclusions. As referenced, it would be possible to undertake further research into this site, but based on the evidence to hand, this is not deemed strictly necessary, and no reasonably justifiable requirement for proactive on-site mitigation has been identified.

It should however be stressed that if any suspect items are encountered during the proposed works, 1st Line Defence should be contacted for advice/assistance, and to re-assess the risk as necessary. Furthermore, we would recommend that ground personnel are always made aware of the potential for encountering UXO, what to look out for and what to do in the unlikely event that a suspect item is encountered, and that a UXO Risk Management Plan is put together for the proposed works. We would be happy to provide a template and guidance for this – contact us on 01992 245020. Should the scope of works change or additional works be proposed, 1st Line Defence should be contacted to re-evaluate the risk.



Appendix 5: Risk Classification Scheme

BWB RISK ASSESSMENT CLASSIFICATION (REFERENCE CIRIA C552, CONTAMINATED LAND RISK ASSESSMENT: A GUIDE TO GOOD PRACTICE, 2001)

CIRIA C552, *Contaminated Land Risk Assessment A Guide to Good Practice*, 2001 sets out a methodology for estimating risk. The methodology for risk evaluation is a qualitative method for interpreting the output for the risk estimation stage of the assessment. It involves the classification of the:

- Magnitude of the potential consequence (severity) of risk occurring; and
- Magnitude of the probability (likelihood) of the risk occurring.

The classification of consequence and probability are replicated in **Table 1** and **Table 2**, respectively.

Table 1: Classification of Consequence

Classification	Definition	Examples
Severe (Sv)	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium (Md)	Chronic damage to Human Health ("significant harm"). Pollution of sensitive water resources. A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of a contaminant from site exceeding the generic or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of species within a designated nature reserve.
Mild (Mi)	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor (Mr)	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by measures such as protective clothing etc.). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentration that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

The classification of consequence does not take into account the probability of the consequence being realised. Therefore, there may be more than one consequence for a particular pollutant linkage. Both a severe and medium classification can result in death.

Severe relates to short term (acute) risk while medium relates to long term (chronic) risk. Mild relates to significant harm but to less sensitive receptors. Minor classification relates to harm which is not significant but could have a financial cost.

Table 2: Classification of Probability

Classification	Definition
High likelihood (Hi)	There is a pollutant linkage and an event that either appears very likely in the short term and almost inevitable in the long term, or there is evidence at the receptor of harm or pollution.
Likely (Li)	There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood (Lw)	There is a pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely (Ui)	There is a pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

The classification gives a guide as to the severity and consequence of identified risk when compared with other risk presented on the site. It should be noted that if a risk is identified it cannot be classified as “no risk” but as “very low risk”. Differing stakeholders may have a different view on the acceptability of a risk.

Once the consequence and probability have been classified these can be compared using a matrix to identify an overall risk category, as shown in **Table 3**. These categories and the actions required are categorised in **Table 4**.

Table 3: Risk Evaluation Matrix

Consequence		Severe (Sv)	Medium (Md)	Mild (Mi)	Minor (Mr)
Probability	High likelihood (Hi)	Very High Risk (VH)	High Risk (H)	Moderate Risk (M)	Mod/Low Risk (M/L)
	Likely (Li)	High Risk (H)	Moderate Risk (M)	Mod/Low Risk (M/L)	Low Risk (L)
	Low likelihood (Lw)	Moderate Risk (M)	Mod/Low Risk (M/L)	Low Risk (L)	Very Low Risk (VL)
	Unlikely (Ui)	Mod/Low Risk (M/L)	Low Risk (L)	Very Low Risk (VL)	Very Low Risk (VL)

Table 4: Risk Categorisations

Very High Risk (VH)	<p>There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening.</p> <p>This risk, if realised, is likely to result in a substantial liability.</p> <p>Urgent investigation (if not undertaken already) and remediation are likely to be required.</p>
High Risk (H)	<p>Harm is likely to arise to a designated receptor from an identified hazard.</p> <p>Realisation of the risk is likely to present a substantial liability.</p> <p>Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.</p>
Moderate Risk (M)	<p>It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.</p> <p>Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.</p>
Low Risk (L)	<p>It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.</p>
Very Low Risk (VL)	<p>There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.</p>

Reference:

CIRIA C552 *Contaminated land risk assessment. A guide to good practice*. Rudland, D J, Lancefield, R M, Mayell, P N, 2001.

Appendix 6: Exploratory Hole Logs

BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS01	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.90		
	Project Number: NTG2113	Eastings: 548584.70		
	Client: Oil Salvage Ltd	Northings: 223425.61		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 18/06/2020	Engineer: CR	Checker:

Boring		Strata			Samples			In-Situ Tests				
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		63.90 [0.10] 63.80 [0.10] 63.70 [0.20] 63.50 [3.10]	Brown gravelly SAND with frequent rootlets. (Made Ground)		0.10							
			Weak concrete. (Made Ground)		0.20	ES7	0.30	0.30	PID	0.30	0ppm	
			Brown gravelly SAND. Gravel is fine to coarse angular to rounded quartzite flint, and brick. (Made Ground)		0.40							
			Stiff light brown slightly gravelly slightly silty CLAY with low cobble content. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits)									
			<i>Slightly sandy at 2.8 - 3.0m.</i>									
		60.40 [0.80]	Soft to firm greenish grey gravelly CLAY. Gravel is fine to coarse angular to rounded flint and quartzite. Hydrocarbon odour. (Head Deposits)		3.50	ES8	3.90	3.90	PID	3.90	183ppm	
		59.60 [3.70]	White gravelly putty chalk with grey staining and mild hydrocarbon odour. Gravel is fine to coarse subangular to rounded chalk and flint. (Lewes Nodular Chalk Formation And Seaford Chalk Formation)		4.30	ES9	4.90	4.90	PID	4.90	20ppm	
			<i>Less staining below 5.0m.</i>									
			<i>Strong hydrocarbon odour below 6m.</i>									
		55.90	Hole Terminated at 8.00m bgl.									

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated at target depth.
			Groundwater Remarks: No groundwater encountered.
Water Added			Other Remarks: 1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits. 3. Coordinates and ground level could not be obtained and estimated from plans.
From (m bgl)	To (m bgl)	Volume (l)	



BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS02	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.80		
	Project Number: NTG2113	Eastings: 548614.00		
	Client: Oil Salvage Ltd	Northings: 223441.00		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 18/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		0.20	Concrete. (Made Ground)	[Cross-hatch pattern]	0.20							
		0.10 0.15	Weak concrete. (Made Ground)	[Diagonal lines]	0.30 0.45	ES1	0.40	0.40	PID	0.40	0.3ppm	
		0.15 0.35 3.05	Light brown slightly clayey gravelly SAND. Gravel is fine to coarse angular to rounded brick, concrete, quartzite, flint and chalk. Occasional inclusion of metal and possible ACM. (Made Ground)	[Stippled pattern]								
			Stiff friable light brown slightly gravelly slightly sandy CLAY. Gravel is fine angular chalk. Occasional carbonaceous flecks. (Head Deposits)	[Horizontal lines]								
			<i>Slightly gravelly from 2.0m. Gravel is fine to coarse angular to rounded flint.</i>									
		60.30 [0.40]	Soft to firm greenish grey gravelly CLAY. Gravel is fine to coarse angular to rounded flint and quartzite. Hydrocarbon odour. (Head Deposits)	[Vertical lines]	3.50	ES2	3.70	3.70	PID	3.70	132ppm	
		59.90 [1.40]	Soft to firm pale brown gravelly CLAY. Gravel is fine to coarse subangular to angular chalk and occasional flint. (Head Deposits)	[Horizontal lines]	3.90							
			<i>Grey staining and hydrocarbon odour at 4.9 - 5.1m.</i>									
		58.50 [1.70]	White putty chalk with grey staining and hydrocarbon odour. (Lewes Nodular Chalk Formation And Seaford Chalk Formation)	[Brick pattern]	5.30	ES3	5.90	5.90	PID	5.90	16.1ppm	
			<i>Faint hydrocarbon odour below 6.0m.</i>									
		56.80	Hole Terminated at 7.00m bgl.		7.00	D1	6.90	6.90	PID	6.90	345ppm	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated at target depth.
Water Added			Groundwater Remarks: No groundwater encountered.
From (m bgl)	To (m bgl)	Volume (l)	Other Remarks: 1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits. 3. Coordinates and ground level could not be obtained and estimated from plans.

BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS03	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 64.02		
	Project Number: NTG2113	Eastings: 548588.45		
	Client: Oil Salvage Ltd	Northings: 223435.22		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 18/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		0.10 63.92 [0.20] 63.72 [0.30]	Dark brown sandy GRAVEL. Gravel is fine to coarse angular to rounded quartzite and flint. (Made Ground)		0.10	ES4	0.20	0.20	PID	0.20	4ppm	
		63.42 [2.40]	Light brown slightly clayey sandy GRAVEL. Gravel is fine to coarse angular to rounded quartzite, flint, brick, concrete and limestone. (Made Ground)		0.60							
			Firm to stiff friable brown slightly silty CLAY. (Head Deposits)									
			Firm to stiff friable light brown slightly silty slightly gravelly CLAY. Gravel is fine to coarse angular to subangular flint. Low cobble content of flint. (Head Deposits)									
		61.02 [0.90]	Firm greenish greyish brown slightly gravelly CLAY. Gravel is fine to coarse angular to subangular flint. Low cobble content of flint. Hydrocarbon odour. (Head Deposits)		3.00	ES5	3.50	3.50	PID	3.50	125ppm	
		60.12 [4.10]	White gravelly putty chalk with grey staining and mild hydrocarbon odour. Gravel is fine to coarse subangular to rounded chalk and flint. (Lewes Nodular Chalk Formation And Seaford Chalk Formation)		3.90	ES6	4.50	4.50	PID	4.50	17.7ppm	
		56.02	Hole Terminated at 8.00m bgl.		8.00	D2	7.50	7.50	PID	7.50	236ppm	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
Reason for Termination:			
Terminated at target depth.			
Groundwater Remarks:			
No groundwater encountered.			
Water Added			Other Remarks:
From (m bgl)	To (m bgl)	Volume (l)	
1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits.			

BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS04	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.75		
	Project Number: NTG2113	Eastings: 548601.00		
	Client: Oil Salvage Ltd	Northings: 223454.00		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 19/06/2020	Engineer: CR	Checker:

Boring		Strata			Samples			In-Situ Tests				
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		63.35 [1.40]	Reinforced concrete. (Made Ground)	[Cross-hatch pattern]	0.30							
		63.45 [0.10]	Light brown and dark grey sandy GRAVEL. Gravel is fine to coarse angular to rounded flint, brick and quartzite. (Made Ground)	[X pattern]	0.40							
			Soft greenish greyish brown silty CLAY. (Head Deposits)	[Dotted pattern]								
		61.95 [0.90]	Soft light brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. (Head Deposits)	[X pattern]	1.80	ES10	1.50	1.50	PID	1.50	1ppm	
		61.05 [0.60]	Very soft orangish brown and white gravelly CLAY with low cobble content. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits)	[Dotted pattern]	2.70							
		60.45 [0.70]	Very soft greyish brown gravelly CLAY. Gravel is fine to coarse angular to rounded flint. Hydrocarbon odour. (Head Deposits)	[X pattern]	3.30	ES11	3.50	3.50	PID	3.50	0ppm	
		59.75 [1.30]	<i>Very gravelly and black stained at 3.9 - 4.0m</i> Soft light brown slightly sandy very gravelly CLAY. Gravel is fine to coarse angular flint and chalk. (Head Deposits) <i>Black staining in sandy clayey gravel band at 4.3 - 4.4m.</i>	[X pattern]	4.00	ES12	4.30	4.40	PID	4.30	1ppm	
		58.45 [0.20]	Light brown clayey sandy GRAVEL. Gravel is fine to coarse angular to rounded chalk and flint. (Head Deposits)	[X pattern]	5.30							
		58.25 [2.50]	White gravelly putty chalk with grey staining and hydrocarbon odour. Gravel is fine to coarse subangular to rounded chalk and flint. (Lewes Nodular Chalk Formation And Seaford Chalk Formation) <i>Strong hydrocarbon odour below 6m.</i>	[Horizontal lines]	5.50							
		55.75	Hole Terminated at 8.00m bgl.		8.00	D4	7.50	7.50	PID	7.50	363ppm	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
			Reason for Termination: Terminated at target depth.
Water Added			Groundwater Remarks: No groundwater encountered.
From (m bgl)	To (m bgl)	Volume (l)	Other Remarks: 1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits. 3. Coordinates and ground level could not be obtained and estimated from plans.



BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS05	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.83		
	Project Number: NTG2113	Eastings: 548583.70		
	Client: Oil Salvage Ltd	Northings: 223458.10		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 19/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (Blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		0.20	Concrete. (Made Ground)		0.20							
		63.63 (0.10) 63.53 (2.20)	Black clayey GRAVEL. Gravel is fine to coarse angular to rounded brick and flint. (Made Ground) Soft greenish grey slightly gravelly CLAY. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits) <i>Grey speckled to 0.5m.</i>		0.30	ES15	0.25	0.25	PID	0.25	5.6ppm	
			<i>Faint hydrocarbon odour from 2.0m.</i>									
		61.33 (1.60)	Soft to firm greenish grey very gravelly CLAY with hydrocarbon odour. (Head Deposits) <i>Gravelly below 3.5m.</i>		2.50	ES16	2.50	2.50	PID	2.50	253ppm	
		59.73 (0.50)	Very soft greyish brown, grey and white very gravelly CLAY. Gravel is fine to coarse angular to rounded flint and chalk. (Head Deposits)		4.10	ES17	4.20	4.20	PID	4.20	411ppm	
		50.33 (3.40)	White gravelly putty chalk with occasional grey staining and hydrocarbon odour throughout. Gravel is fine to coarse subangular to rounded chalk and flint. (Lewes Nodular Chalk Formation And Seaford Chalk Formation) <i>Very gravelly from 4.8 - 4.9m.</i> <i>White below 5.5m.</i>		4.60							
			<i>White mottled pale brown from 7.0m.</i>									
		55.83	Hole Terminated at 8.00m bgl.		8.00	DS	7.80	7.80	PID	7.80	114ppm	

Chiseling			Remarks
From (m bgl)	To (m bgl)	Time (hh:mm)	
Reason for Termination:			Terminated at target depth.
Groundwater Remarks:			
Water Added			No groundwater encountered.
From (m bgl)	To (m bgl)	Volume (l)	Other Remarks: 1. Borehole installed with 50mm HDPE pipe, rubber bung, gas tap and flush cover. 2. Hydrocarbon contamination encountered in Chalk and directly overlying Head Deposits.

BOREHOLE LOG

Scale 1:50

Sheet 1 of 1

LOCATION ID DS06	Project Name: Butler Fuels, Farnham Road	Ground Level (m AOD): 63.68		
	Project Number: NTG2113	Eastings: 548566.69		
	Client: Oil Salvage Ltd	Northings: 223451.13		
Hole Type: WLS	Rig: Premier 110	Start & End Date: 19/06/2020	Engineer: CR	Checker:

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		0.08 63.60 [0.22] 63.38 [0.10] 63.28 [0.30] 62.98 [0.10] 62.88	Concrete. (Made Ground) Light brown and greyish brown sandy GRAVEL, Gravel is fine to coarse angular to rounded flint, quartzite and chalk. (Made Ground) Boulders of concrete and brick. (Made Ground) Soft greyish brown gravelly CLAY. Gravel is fine to coarse angular to subangular brick, concrete and flint, Inclusions of glass and wood. (Made Ground) Soft greyish brown gravelly CLAY. Gravel is fine to coarse angular to subangular brick, concrete and flint. Abundant inclusions of glass, metal, material, rubber and possible ACMs. (Made Ground)		0.08 0.30 0.40 0.70 0.80							
			Hole Terminated at 0.80m bgl.									

<table border="1"> <tr> <th colspan="3">Chiselling</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Time (hh:mm)</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>			Chiselling			From (m bgl)	To (m bgl)	Time (hh:mm)				<p>Remarks</p> <p>Reason for Termination: Terminated due to possible ACMs.</p> <p>Groundwater Remarks: No groundwater encountered.</p> <p>Other Remarks: 1. Borehole backfilled with arisings. 2. Possible ACM encountered in hand pit.</p>
Chiselling												
From (m bgl)	To (m bgl)	Time (hh:mm)										
<table border="1"> <tr> <th colspan="3">Water Added</th> </tr> <tr> <th>From (m bgl)</th> <th>To (m bgl)</th> <th>Volume (l)</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>			Water Added			From (m bgl)	To (m bgl)	Volume (l)				
Water Added												
From (m bgl)	To (m bgl)	Volume (l)										

Appendix 7: Ground Gas and Groundwater Monitoring Results

Appendix 8: Soil Chemical Analysis Results



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Analytical Report Number : 20-15385

Project / Site name:	Farnham Rd	Samples received on:	19/06/2020
Your job number:	NTG2113	Sample instructed/ Analysis started on:	22/06/2020
Your order number:	POR031686	Analysis completed by:	26/06/2020
Report Issue Number:	1	Report issued on:	26/06/2020
Samples Analysed:	2 leachate samples - 14 soil samples		

Signed:

Will Fardon

Technical Reviewer (CS 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.

Iss No 20-15385-1 Farnham Rd NTG2113.XLS

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

Page 1 of 12

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540346	1540347	1540348	1540349	1540350			
Sample Reference	DS02	DS02	DS02	DS03	DS03			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	0.40	3.70	5.90	0.20	3.50			
Date Sampled	18/06/2020	18/06/2020	18/06/2020	18/06/2020	18/06/2020			
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	8.5	14	22	8.6	15
Total mass of sample received	kg	0.001	NONE	1.2	0.60	0.60	1.2	0.60

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	Amosite	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	Detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.002	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.002	-	-	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	-	-	8.4	-
Total Cyanide	mg/kg	1	MCERTS	3	-	-	< 1	-
Complex Cyanide	mg/kg	1	MCERTS	3	-	-	< 1	-
Free Cyanide	mg/kg	1	MCERTS	< 1	-	-	< 1	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.6	-	-	0.021	-
Total Sulphur	mg/kg	50	MCERTS	3200	-	-	330	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.012	-	-	0.016	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
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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	4.6	-	-	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	3.5	-	-	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	20	-	-	< 0.05	-
Pyrene	mg/kg	0.05	MCERTS	19	-	-	< 0.05	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	13	-	-	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	7.5	-	-	< 0.05	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	12	-	-	< 0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	4.9	-	-	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	9.9	-	-	< 0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	5.5	-	-	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	5.8	-	-	< 0.05	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	105	-	-	< 0.80	-
-----------------------------	-------	-----	--------	-----	---	---	--------	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	-	-	15	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	450	-	-	43	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.62	-	-	0.58	-
Boron (water soluble)	mg/kg	0.2	MCERTS	3.5	-	-	1.6	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	-	-	1.3	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	-	< 4.0	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	-	-	19	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	96	-	-	30	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	890	-	-	34	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.7	-	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	-	-	20	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	-	-	29	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	620	-	-	190	-



Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540346			1540347			1540348			1540349			1540350		
Sample Reference	DS02			DS02			DS02			DS03			DS03		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.40			3.70			5.90			0.20			3.50		
Date Sampled	18/06/2020			18/06/2020			18/06/2020			18/06/2020			18/06/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status												

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
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	16	-	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	46	-	< 1.0
o-xylene	µg/kg	1	MCERTS	-	< 1.0	29	-	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0

Petroleum Hydrocarbons

TPH C10 - C40	mg/kg	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
TPH C10 - C40	mg/kg	10	MCERTS	190	-	-	580	-

TPH2 (C6 - C10)	mg/kg	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
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	-	1.2	< 0.001	-	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	15	0.36	-	15
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	39	< 1.0	-	100
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	170	< 2.0	-	230
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	86	< 8.0	-	100
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	8.7	< 8.0	-	9.5
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	320	< 10	-	460

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	Limit of detection	Accreditation Status	1540346	1540347	1540348	1540349	1540350
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	-	7.7	0.18	-	4.2
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	18	< 1.0	-	78
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	86	< 2.0	-	200
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	56	< 10	-	130
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	< 10	< 10	-	34
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	170	< 10	-	440



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Environmental Science

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540351	1540352	1540353	1540354	1540355			
Sample Reference	DS03	DS01	DS01	DS01	DS06			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	4.50	0.30	3.90	4.90	0.50			
Date Sampled	18/06/2020	18/06/2020	18/06/2020	18/06/2020	18/06/2020			
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	25	9.1	16	23	18
Total mass of sample received	kg	0.001	NONE	0.60	1.2	0.60	0.60	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	Chrysotile & Amosite
Asbestos in Soil	Type	N/A	ISO 17025	-	Detected	-	-	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	0.006	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	0.006	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	8.2	-	8.7	9.7
Total Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Complex Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	-	< 1	-	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.050	-	0.015	0.52
Total Sulphur	mg/kg	50	MCERTS	-	370	-	230	1600
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	0.016	-	0.0013	0.018

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	1.2	-	< 0.05	1.8
Anthracene	mg/kg	0.05	MCERTS	-	0.37	-	< 0.05	0.37
Fluoranthene	mg/kg	0.05	MCERTS	-	3.5	-	< 0.05	3.8
Pyrene	mg/kg	0.05	MCERTS	-	3.7	-	< 0.05	3.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	2.0	-	< 0.05	1.2
Chrysene	mg/kg	0.05	MCERTS	-	1.6	-	< 0.05	1.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	3.2	-	< 0.05	1.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	1.1	-	< 0.05	0.98
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	2.6	-	< 0.05	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	1.9	-	< 0.05	0.83
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	0.63	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	2.4	-	< 0.05	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	24.1	-	< 0.80	18.9
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	16	-	< 1.0	16
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	180	-	9.9	190
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	0.93	-	< 0.06	0.75
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.6	-	< 0.2	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	0.5	-	0.2	2.9
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	27	-	1.8	36
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	52	-	3.1	94
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	120	-	1.0	190
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	25	-	2.1	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	39	-	3.1	34
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	270	-	9.4	260

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540351	1540352	1540353	1540354	1540355			
Sample Reference	DS03	DS01	DS01	DS01	DS06			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	4.50	0.30	3.90	4.90	0.50			
Date Sampled	18/06/2020	18/06/2020	18/06/2020	18/06/2020	18/06/2020			
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 C10 - C40	mg/kg	10	MCERTS	-	110	-	< 10	490
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	-	< 0.1	-	3.6	< 0.1
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	11	-	0.78	2.5	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	2.3	-	54	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	14	-	230	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	-	110	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	-	38	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	35	-	430	< 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	0.72	-	0.19	0.81	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	3.4	-	50	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	27	-	220	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	30	-	130	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	22	-	53	< 10	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	83	-	460	< 10	-

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540356			1540357			1540358			1540359		
Sample Reference	DS06			DS04			DS04			DS04		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.80			1.50			3.50			4.30-4.40		
Date Sampled	18/06/2020			18/06/2020			18/06/2020			18/06/2020		
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	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	24	14	16	8.9					
Total mass of sample received	kg	0.001	NONE	1.2	0.60	0.60	0.60					

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile & Crocidolite				
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	-	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	9.852	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	9.85	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	7.7	-	-	-
Total Cyanide	mg/kg	1	MCERTS	2	< 1	-	-	-
Complex Cyanide	mg/kg	1	MCERTS	2	< 1	-	-	-
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.34	0.018	-	-	-
Total Sulphur	mg/kg	50	MCERTS	2200	200	-	-	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.042	0.0077	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
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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	2.1	< 0.05	-	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	5.5	< 0.05	-	-	-
Pyrene	mg/kg	0.05	MCERTS	6.2	< 0.05	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.0	< 0.05	-	-	-
Chrysene	mg/kg	0.05	MCERTS	2.3	< 0.05	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.7	< 0.05	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	< 0.05	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.9	< 0.05	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.6	< 0.05	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.9	< 0.05	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	27.3	< 0.80	-	-	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25	11	-	-	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	340	72	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.54	1.1	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	2.6	1.4	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	22	0.2	-	-	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	89	29	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	870	13	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	420	15	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	< 0.3	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	59	25	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29	46	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	1900	61	-	-	-

Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number	1540356			1540357			1540358			1540359		
Sample Reference	DS06			DS04			DS04			DS04		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	0.80			1.50			3.50			4.30-4.40		
Date Sampled	18/06/2020			18/06/2020			18/06/2020			18/06/2020		
Time Taken	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 C10 - C40	mg/kg	10	MCERTS	1200	< 10	-	-		
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-		
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	3.1		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	45		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	< 8.0	40		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	28	50		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	28	140		
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	1.8		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	33		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	< 10	36		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	< 10	12		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	< 10	83		



Analytical Report Number: 20-15385
Project / Site name: Farnham Rd
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
1540346	DS02	0.40	127	Hard/Cement Type Material & Loose Fibres	Chrysotile	0.002	0.002
1540349	DS03	0.20	157	Loose Fibres	Amosite	< 0.001	< 0.001
1540352	DS01	0.30	138	Loose Fibrous Debris	Chrysotile	0.006	0.006
1540355	DS06	0.50	159	Loose Fibres	Chrysotile & Amosite	< 0.001	< 0.001
1540356	DS06	0.80	119	Hard/Cement Type Material & Insulation Board/Tile	Chrysotile & Crocidolite	9.852	9.85

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



Analytical Report Number: 20-15385

Project / Site name: Farnham Rd

Lab Sample Number				1540360	1540361			
Sample Reference				DS06	DS06			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.50	0.80			
Date Sampled				18/06/2020	18/06/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.8	7.6			
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10			
Sulphate as SO ₄	mg/l	0.1	ISO 17025	102	93.4			

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	4.8			
Barium (dissolved)	µg/l	0.05	ISO 17025	83	120			
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Boron (dissolved)	µg/l	10	ISO 17025	83	220			
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08			
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4	< 0.4			
Copper (dissolved)	µg/l	0.7	ISO 17025	5.9	6.8			
Lead (dissolved)	µg/l	1	ISO 17025	6.0	2.9			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.5	5.0			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0			
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7			
Zinc (dissolved)	µg/l	0.4	ISO 17025	19	56			



Analytical Report Number : 20-15385

Project / Site name: Farnham Rd

* 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 *
1540346	DS02	None Supplied	0.40	Brown loam and sand with gravel and brick.
1540347	DS02	None Supplied	3.70	Brown loam and clay with gravel and chalk.
1540348	DS02	None Supplied	5.90	Grey clay with chalk and gravel
1540349	DS03	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1540350	DS03	None Supplied	3.50	Brown loam and clay with gravel.
1540351	DS03	None Supplied	4.50	White clay with chalk and gravel
1540352	DS01	None Supplied	0.30	Brown loam and clay with gravel and vegetation.
1540353	DS01	None Supplied	3.90	Brown clay with gravel and vegetation.
1540354	DS01	None Supplied	4.90	White clay with chalk and gravel
1540355	DS06	None Supplied	0.50	Brown clay and loam with rubble and vegetation.
1540356	DS06	None Supplied	0.80	Brown clay and loam with rubble and fibres.
1540357	DS04	None Supplied	1.50	Brown clay.
1540358	DS04	None Supplied	3.50	Brown clay.
1540359	DS04	None Supplied	4.30-4.40	Brown clay with gravel.

Analytical Report Number : 20-15385

Project / Site name: Farnham Rd

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
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
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
Complex Cyanide in soil	Determination of complex cyanide by calculation.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-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
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Free cyanide in soil	Determination of free 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
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
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
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
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

Analytical Report Number : 20-15385

Project / Site name: Farnham Rd

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
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 in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025
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 cyanide in leachate	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	ISO 17025
Total Sulphur in soil	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
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPH2 (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	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.



Chris Rhodes

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Analytical Report Number : 20-15427

Project / Site name:	Farnham Road	Samples received on:	22/06/2020
Your job number:	BTG2113	Sample instructed/ Analysis started on:	22/06/2020
Your order number:	POR031686	Analysis completed by:	29/06/2020
Report Issue Number:	1	Report issued on:	29/06/2020
Samples Analysed:	3 soil samples		

Signed:

Will Fardon

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

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

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

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

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

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

Analytical Report Number: 20-15427

Project / Site name: Farnham Road

Lab Sample Number	1540516	1540517	1540518			
Sample Reference	DS05	DS05	DS05			
Sample Number	None Supplied	None Supplied	None Supplied			
Depth (m)	0.25	2.50	4.20			
Date Sampled	19/06/2020	19/06/2020	19/06/2020			
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	15	8.3	7.7
Total mass of sample received	kg	0.001	NONE	1.0	0.50	0.50

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	
Asbestos in Soil	Type	N/A	ISO 17025	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	8.0	8.4	
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	
Complex Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.80	0.018	0.033	
Total Sulphur	mg/kg	50	MCERTS	4100	110	130	
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.014	0.0031	0.0041	

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	3.0	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	1.7	< 0.05	< 0.05	
Anthracene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05	
Fluoranthene	mg/kg	0.05	MCERTS	6.7	< 0.05	< 0.05	
Pyrene	mg/kg	0.05	MCERTS	5.4	< 0.05	< 0.05	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.3	< 0.05	< 0.05	
Chrysene	mg/kg	0.05	MCERTS	2.0	< 0.05	< 0.05	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.5	< 0.05	< 0.05	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.57	< 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	0.77	< 0.05	< 0.05	

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	27.5	< 0.80	< 0.80	
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Analytical Report Number: 20-15427

Project / Site name: Farnham Road

Lab Sample Number	1540516			1540517			1540518		
Sample Reference	DS05			DS05			DS05		
Sample Number	None Supplied			None Supplied			None Supplied		
Depth (m)	0.25			2.50			4.20		
Date Sampled	19/06/2020			19/06/2020			19/06/2020		
Time Taken	None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status						

Heavy Metals / Metalloids

Element	Units	Limit of detection	Accreditation Status	1540516	1540517	1540518
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	6.5	16
Barium (aqua regia extractable)	mg/kg	1	MCERTS	230	38	36
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.89	0.63	0.92
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.3	0.3
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	21	22	31
Copper (aqua regia extractable)	mg/kg	1	MCERTS	85	8.1	12
Lead (aqua regia extractable)	mg/kg	1	MCERTS	410	9.6	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	18	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	33	29	50
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	180	45	83

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1540516	1540517	1540518
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

Parameter	Units	Limit of detection	Accreditation Status	1540516	1540517	1540518
TPH C10 - C40	mg/kg	10	MCERTS	410	460	790
TPH2 (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	11	20
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	-	11	18
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	20	44
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	130	390
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	52	110
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	100	45
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	320	600
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	2.0
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	9.0	12
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	85	120
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	27	58
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	18	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	140	200



Analytical Report Number: 20-15427
Project / Site name: Farnham Road
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
1540516	DS05	0.25	126	Loose Fibres	Chrysotile	< 0.001	< 0.001

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



Analytical Report Number : 20-15427

Project / Site name: Farnham Road

* 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 *
1540516	DS05	None Supplied	0.25	Brown loam and clay with gravel.
1540517	DS05	None Supplied	2.50	Brown loam and clay with gravel.
1540518	DS05	None Supplied	4.20	Brown loam and clay with gravel.

Analytical Report Number : 20-15427

Project / Site name: Farnham Road

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
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Complex Cyanide in soil	Determination of complex cyanide by calculation.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-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
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Free cyanide in soil	Determination of free 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
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
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
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



Analytical Report Number : 20-15427

Project / Site name: Farnham Road

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
Total Sulphur in soil	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
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPH2 (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	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.

Appendix 9: Groundwater Chemical Laboratory Testing Results



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Analytical Report Number : 20-16515

Project / Site name:	Bishops Stortford	Samples received on:	29/06/2020
Your job number:	NTG2113	Sample instructed/ Analysis started on:	29/06/2020
Your order number:	POR031689	Analysis completed by:	17/07/2020
Report Issue Number:	1	Report issued on:	17/07/2020
Samples Analysed:	10 water samples		

Signed:

Will Fardon

Technical Reviewer (CS 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.

Iss No 20-16515-1 Bishops Stortford NTG2113

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

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

Page 1 of 7



Analytical Report Number: 20-16515
Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number	1546496				1546497				1546498				1546499				1546500			
Sample Reference	DS01				DS02				DS03				DS04				DS05			
Sample Number	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Depth (m)	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Date Sampled	26/06/2020				26/06/2020				26/06/2020				26/06/2020				26/06/2020			
Time Taken	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status																	

General Inorganics

Parameter	Units	N/A	ISO 17025	6.5	6.8	6.7	6.8	6.5
pH	pH Units		ISO 17025	6.5	6.8	6.7	6.8	6.5
Electrical Conductivity at 20 °C	µS/cm	10	ISO 17025	690000	250000	630000	590000	1100000
Total Cyanide	µg/l	10	ISO 17025	< 10	U/S	< 10	U/S	< 10
Sulphate as SO ₄	µg/l	45	ISO 17025	U/S	U/S	5820	U/S	24300
Sulphate as SO ₄	mg/l	0.045	ISO 17025	U/S	U/S	5.82	U/S	24.3
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	U/S	U/S	5800	U/S	U/S
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	54.5	87.5	119	62.9	15.9

Total Phenols

Parameter	Units	Limit of detection	ISO 17025	< 10	U/S	< 10	U/S	11
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	U/S	< 10	U/S	11

Speciated PAHs

Parameter	Units	Limit of detection	ISO 17025	1020	U/S	18.5	102	374
Naphthalene	µg/l	0.01	ISO 17025	1020	U/S	18.5	102	374
Acenaphthylene	µg/l	0.01	ISO 17025	297	< 0.01	14.2	< 0.01	114
Acenaphthene	µg/l	0.01	ISO 17025	369	< 0.01	16.3	< 0.01	131
Fluorene	µg/l	0.01	ISO 17025	889	1510	17.6	6.55	156
Phenanthrene	µg/l	0.01	ISO 17025	907	1080	18.9	2.80	142
Anthracene	µg/l	0.01	ISO 17025	269	321	12.6	0.16	118
Fluoranthene	µg/l	0.01	ISO 17025	274	263	15.5	0.12	124
Pyrene	µg/l	0.01	ISO 17025	335	302	15.8	0.31	129
Benzo(a)anthracene	µg/l	0.01	ISO 17025	276	265	14.7	< 0.01	112
Chrysene	µg/l	0.01	ISO 17025	282	275	15.1	< 0.01	126
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	271	263	14.1	< 0.01	116
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	272	263	14.3	< 0.01	119
Benzo(a)pyrene	µg/l	0.01	ISO 17025	255	241	13.0	< 0.01	113
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	210	219	10.1	< 0.01	83.0
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	228	220	11.4	< 0.01	81.8
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	214	203	11.0	< 0.01	78.1

Total PAH

Parameter	Units	Limit of detection	ISO 17025	6370	5430	233	112	2120
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	6370	5430	233	112	2120

Heavy Metals / Metalloids

Parameter	Units	Limit of detection	ISO 17025	U/S	U/S	3.23	U/S	40.3
Arsenic (dissolved)	µg/l	0.15	ISO 17025	U/S	U/S	3.23	U/S	40.3
Barium (dissolved)	µg/l	0.06	ISO 17025	U/S	U/S	97	U/S	250
Beryllium (dissolved)	µg/l	0.1	ISO 17025	U/S	U/S	< 0.1	U/S	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	U/S	U/S	72	U/S	85
Cadmium (dissolved)	µg/l	0.02	ISO 17025	U/S	U/S	< 0.02	U/S	0.03
Calcium (dissolved)	mg/l	0.012	ISO 17025	U/S	U/S	190	U/S	200
Chromium (hexavalent)	µg/l	5	ISO 17025	U/S	U/S	U/S	U/S	U/S
Chromium (dissolved)	µg/l	0.2	ISO 17025	U/S	U/S	< 0.2	U/S	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	U/S	U/S	8.7	U/S	7.0
Lead (dissolved)	µg/l	0.2	ISO 17025	U/S	U/S	< 0.2	U/S	2.6
Mercury (dissolved)	µg/l	0.05	ISO 17025	U/S	U/S	< 0.05	U/S	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	U/S	U/S	20	U/S	110
Selenium (dissolved)	µg/l	0.6	ISO 17025	U/S	U/S	< 0.6	U/S	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	U/S	U/S	< 0.2	U/S	0.7
Zinc (dissolved)	µg/l	0.5	ISO 17025	U/S	U/S	5.8	U/S	15



Analytical Report Number: 20-16515
 Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number	1546496			1546497			1546498			1546499			1546500		
Sample Reference	DS01			DS02			DS03			DS04			DS05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	26/06/2020			26/06/2020			26/06/2020			26/06/2020			26/06/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Monoaromatics & Oxygenates

Parameter	Units	Limit of detection	Accreditation Status	1546496	1546497	1546498	1546499	1546500
Benzene	µg/l	1	ISO 17025	< 1.0	578	< 1.0	< 1.0	48.2
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	22000	< 1.0	4350	< 1.0
p & m-xylene	µg/l	1	ISO 17025	1240	37700	< 1.0	17200	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2140	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1546496	1546497	1546498	1546499	1546500
TPH1 (C10 - C40)	µg/l	10	NONE	17000000	230000000	27000	130000	550000
TPH2 (C6 - C10)	µg/l	10	ISO 17025	930000	2200000	5200	990000	8400
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	3800	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	150000	420000	< 1.0	75000	1600
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	720000	1600000	5200	840000	6500
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	3800000	68000000	5000	38000	140000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	7100000	97000000	7800	49000	200000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	2500000	11000000	3500	2800	26000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	620000	1700000	3300	200	13000
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	15000000	180000000	25000	1000000	390000
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	580	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	45000	180000	< 1.0	74000	370
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	1300000	14000000	2700	16000	81000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	1600000	31000000	2900	18000	80000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	500000	3100000	1200	1000	10000
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	35000	760000	500	< 10	3000
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	3400000	49000000	7300	110000	170000

Please note the sample matrix (oily/water) interfered with several of the analytical methods and viable results could not be produced
 U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number: 20-16515
Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number	1546501				1546502				1546503				1546504				1546505			
Sample Reference	HBH1				HBH2				HBH3				HBH4				HBH5			
Sample Number	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Depth (m)	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Date Sampled	26/06/2020				26/06/2020				26/06/2020				26/06/2020				26/06/2020			
Time Taken	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status																	

General Inorganics

Parameter	Units	N/A	ISO 17025	6.5	7.0	6.8	7.1	7.0
pH	pH Units		ISO 17025	6.5	7.0	6.8	7.1	7.0
Electrical Conductivity at 20 °C	µS/cm	10	ISO 17025	1000000	460000	960000	480000	720000
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Sulphate as SO ₄	µg/l	45	ISO 17025	1390	3570	2220	3960	1840
Sulphate as SO ₄	mg/l	0.045	ISO 17025	1.39	3.57	2.22	3.96	1.84
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	140	1100	8500	U/S	4800
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	11.2	5.42	24.9	28.2	15.9

Total Phenols

Parameter	Units	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10

Speciated PAHs

Parameter	Units	0.01	ISO 17025	37.4	10.3	78.2	97.5	15.5
Naphthalene	µg/l	0.01	ISO 17025	37.4	10.3	78.2	97.5	15.5
Acenaphthylene	µg/l	0.01	ISO 17025	16.7	0.72	1.70	8.02	0.79
Acenaphthene	µg/l	0.01	ISO 17025	18.5	0.65	2.35	11.6	1.10
Fluorene	µg/l	0.01	ISO 17025	19.1	1.67	6.08	33.4	2.22
Phenanthrene	µg/l	0.01	ISO 17025	18.8	1.68	5.87	37.1	2.21
Anthracene	µg/l	0.01	ISO 17025	15.4	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	18.6	0.49	0.77	4.08	0.17
Pyrene	µg/l	0.01	ISO 17025	18.6	0.55	1.37	9.72	0.43
Benzo(a)anthracene	µg/l	0.01	ISO 17025	16.5	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	17.8	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	17.0	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	17.1	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	17.0	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	13.2	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	12.5	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	12.1	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Parameter	Units	0.16	ISO 17025	286	16.1	96.4	201	22.4
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	286	16.1	96.4	201	22.4

Heavy Metals / Metalloids

Parameter	Units	0.15	ISO 17025	43.1	21.4	10.6	4.09	4.30
Arsenic (dissolved)	µg/l	0.15	ISO 17025	43.1	21.4	10.6	4.09	4.30
Barium (dissolved)	µg/l	0.06	ISO 17025	320	190	160	71	420
Beryllium (dissolved)	µg/l	0.1	ISO 17025	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	70	33	170	74	89
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Calcium (dissolved)	mg/l	0.012	ISO 17025	190	140	180	130	140
Chromium (hexavalent)	µg/l	5	ISO 17025	U/S	< 5.0	U/S	U/S	U/S
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	3.2	30	47	17	12
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.2	0.4	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	14	12	120	7.3	16
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	1.2	< 0.6	2.0	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	3.8	3.6	5.4	3.7	9.2



Analytical Report Number: 20-16515
Project / Site name: Bishops Stortford

Your Order No: POR031689

Lab Sample Number				1546501	1546502	1546503	1546504	1546505
Sample Reference				HBH1	HBH2	HBH3	HBH4	HBH5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				26/06/2020	26/06/2020	26/06/2020	26/06/2020	26/06/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

	µg/l	1	ISO 17025	< 1.0	< 1.0	55.1	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	14.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	96.5	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	15000	20000	35000	180000	6600
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TPH2 (C6 - C10)	µg/l	10	ISO 17025	12000	4700	15000	3400	7700
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TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	12000	4700	15000	3400	7700
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	2100	4300	6900	30000	1300
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	3600	8000	12000	54000	2000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	2500	1900	3300	30000	400
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	2000	< 10	1000	10000	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	22000	19000	38000	130000	11000

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	250	< 1.0	97	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	1400	2300	4900	18000	1400
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	1500	3000	5000	22000	1400
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	1000	700	1000	15000	150
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	800	< 10	400	1000	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	5000	6000	11000	56000	2900

Please note the sample matrix (oily/water) interfered with several of the analytical method
U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 20-16515

Project / Site name: Bishops Stortford

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
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
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
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Electrical conductivity at 20oC of water	Determination of electrical conductivity in water by electrometric measurement. Accredited Matrices SW, GW, PW	In-house method	L031-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
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-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	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L005-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
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
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
TPH2 (Waters)	Determination of hydrocarbons C6-C10 by headspace GC-MS. Accredited Matrices SW, PW. GW.	In-house method based on USEPA8260	L088-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.

Iss No 20-16515-1 Bishops Stortford NTG2113

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

Page 6 of 7

Sample Deviation Report



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
DS01		W	20-16515	1546496	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS01		W	20-16515	1546496	c	Electrical conductivity at 20oC of water	L031-PL	c
DS01		W	20-16515	1546496	c	pH at 20oC in water	L005-PL	c
DS02		W	20-16515	1546497	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS02		W	20-16515	1546497	c	Electrical conductivity at 20oC of water	L031-PL	c
DS02		W	20-16515	1546497	c	pH at 20oC in water	L005-PL	c
DS03		W	20-16515	1546498	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS03		W	20-16515	1546498	c	Electrical conductivity at 20oC of water	L031-PL	c
DS03		W	20-16515	1546498	c	pH at 20oC in water	L005-PL	c
DS04		W	20-16515	1546499	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS04		W	20-16515	1546499	c	Electrical conductivity at 20oC of water	L031-PL	c
DS04		W	20-16515	1546499	c	pH at 20oC in water	L005-PL	c
DS05		W	20-16515	1546500	c	Ammoniacal Nitrogen as N in water	L082-PL	c
DS05		W	20-16515	1546500	c	Electrical conductivity at 20oC of water	L031-PL	c
DS05		W	20-16515	1546500	c	pH at 20oC in water	L005-PL	c
HBH1		W	20-16515	1546501	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH1		W	20-16515	1546501	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH1		W	20-16515	1546501	c	pH at 20oC in water	L005-PL	c
HBH2		W	20-16515	1546502	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH2		W	20-16515	1546502	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH2		W	20-16515	1546502	c	pH at 20oC in water	L005-PL	c
HBH3		W	20-16515	1546503	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH3		W	20-16515	1546503	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH3		W	20-16515	1546503	c	pH at 20oC in water	L005-PL	c
HBH4		W	20-16515	1546504	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH4		W	20-16515	1546504	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH4		W	20-16515	1546504	c	pH at 20oC in water	L005-PL	c
HBH5		W	20-16515	1546505	c	Ammoniacal Nitrogen as N in water	L082-PL	c
HBH5		W	20-16515	1546505	c	Electrical conductivity at 20oC of water	L031-PL	c
HBH5		W	20-16515	1546505	c	pH at 20oC in water	L005-PL	c



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Analytical Report Number : 20-17830

Replaces Analytical Report Number : 20-17830, issue no. 1

Additional analysis undertaken.

Project / Site name:	Bishops Storford	Samples received on:	06/07/2020
Your job number:	NTG2113	Sample instructed/ Analysis started on:	06/07/2020
Your order number:		Analysis completed by:	23/07/2020
Report Issue Number:	2	Report issued on:	24/07/2020
Samples Analysed:	10 water samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska

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

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

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

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

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

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

Iss No 20-17830-2 Bishops Storford NTG2113.XLS

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

Page 1 of 4



Analytical Report Number: 20-17830

Project / Site name: Bishops Storford

Lab Sample Number				1553446	1553447	1553448	1553449	1553450
Sample Reference				HBH1	HBH2	HBH3	HBH4	HBH5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				03/07/2020	03/07/2020	03/07/2020	03/07/2020	03/07/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Speciated PAHs

	µg/l	0.01	ISO 17025					
Naphthalene	µg/l	0.01	ISO 17025	35.3	< 0.01	2520	27.0	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	1.50	< 0.01	72.5	0.86	19.0
Acenaphthene	µg/l	0.01	ISO 17025	1.21	< 0.01	80.2	1.18	< 0.01
Fluorene	µg/l	0.01	ISO 17025	4.38	< 0.01	242	3.10	131
Phenanthrene	µg/l	0.01	ISO 17025	1.93	8.45	231	3.84	212
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	21.5
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	0.38	15.3	< 0.01	15.0
Pyrene	µg/l	0.01	ISO 17025	< 0.01	1.39	53.3	< 0.01	40.4
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	5.33
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	5.52
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	2.46
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	0.84
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	1.57
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	0.56
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	0.70

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	44.3	10.2	3210	36.0	456
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Monoaromatics & Oxygenates

	µg/l	1	ISO 17025	< 1.0	< 1.0	70.7	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	70.7	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	187	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	820	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	2700	< 1.0	50000*	26000*	2700*
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	2200	3000	25000	3900	28000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	9200	17000	83000	6600	39000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	2700	2700	25000	4000	14000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	160	420	5900	11000	4800
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	17000	23000	190000	51000	88000

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	71	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	9700	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	3100	2100	45000	4700	8700
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	4700	8700	36000	3400	18000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	560	1400	8900	3600	6200
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	5100
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	8400	12000	99000	12000	38000

*Over range data, sample was diluted and results are estimated from an extrapolated calibration. Results should be interpreted with care.

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



Analytical Report Number: 20-17830

Project / Site name: Bishops Storford

Lab Sample Number	1553451			1553452			1553453			1553454			1553455		
Sample Reference	DS01			DS02			DS03			DS04			DS05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	03/07/2020			03/07/2020			03/07/2020			03/07/2020			03/07/2020		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1553451	1553452	1553453	1553454	1553455
Naphthalene	µg/l	0.01	ISO 17025	708	212	< 0.01	177000*	5330*
Acenaphthylene	µg/l	0.01	ISO 17025	48.1	6.32	191	6570*	187*
Acenaphthene	µg/l	0.01	ISO 17025	43.2	4.43	< 0.01	10100*	159*
Fluorene	µg/l	0.01	ISO 17025	109	15.5	743	14100*	621*
Phenanthrene	µg/l	0.01	ISO 17025	133	10.3	1190	6650*	434*
Anthracene	µg/l	0.01	ISO 17025	14.7	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	9.12	0.20	47.5	174*	19.1*
Pyrene	µg/l	0.01	ISO 17025	16.6	0.73	147	599*	61.0*
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	3.94	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.61	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	2.16	17.3*	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Parameter	µg/l	Limit of detection	Accreditation Status	1553451	1553452	1553453	1553454	1553455
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	1080	250	2320	215000	6810

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1553451	1553452	1553453	1553454	1553455
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	927	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2220	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	387	2600	< 1.0	24000*	99.8
p & m-xylene	µg/l	1	ISO 17025	1540	5640	< 1.0	40100*	260
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	10300*	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	Accreditation Status	1553451	1553452	1553453	1553454	1553455
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	95000	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	140000*	180000*	1500	300000*	31000*
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	17000	26000	58000	38000000*	220000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	33000	51000	78000	56000000*	480000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	11000	8400	43000	43000000*	100000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	3000	830	9800	450000*	21000
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	200000	260000	190000	99000000	860000

Parameter	µg/l	Limit of detection	Accreditation Status	1553451	1553452	1553453	1553454	1553455
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	930	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2200	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	35000	52000	170	160000*	4200
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	19000	23000	17000	9400000*	160000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	19000	22000	56000	23000000*	200000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	4900	5400	23000	1800000*	56000
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	7300	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	78000	100000	100000	34000000	420000

*Over range data, sample was diluted and results are estimated from an extrapolated calibration. Results should be interpreted with care.

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



Analytical Report Number : 20-17830

Project / Site name: Bishops Storford

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
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
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.



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Analytical Report Number : 20-32218

Project / Site name:	NTG2113	Samples received on:	25/09/2020
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	28/09/2020
Your order number:	POR032373	Analysis completed by:	05/10/2020
Report Issue Number:	1	Report issued on:	05/10/2020
Samples Analysed:	10 water samples		

Signed: _____

Rachel Bradley
 Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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



Analytical Report Number: 20-32218
Project / Site name: NTG2113

Your Order No: POR032373

Lab Sample Number	1631627	1631628	1631629	1631630
Sample Reference	DS01	DS02	DS03	DS04
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	23/09/2020	23/09/2020	23/09/2020	23/09/2020
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
Naphthalene	µg/l	0.01	ISO 17025	13.2	81.9	< 0.01	59.7
Acenaphthylene	µg/l	0.01	ISO 17025	0.84	0.53	196	1.52
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.77
Fluorene	µg/l	0.01	ISO 17025	3.57	1.6	776	3.73
Phenanthrene	µg/l	0.01	ISO 17025	3.59	< 0.01	848	1.35
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.3	< 0.01	34.9	< 0.01
Pyrene	µg/l	0.01	ISO 17025	0.61	< 0.01	112	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 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	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	22.1	84	1970	68.1

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
Benzene	µg/l	1	ISO 17025	4.4	42.6	< 1.0	5.3
Toluene	µg/l	1	ISO 17025	< 1.0	9.9	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	16.4	< 1.0	78.9
p & m-xylene	µg/l	1	ISO 17025	44.6	739	< 1.0	695
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	65.9
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	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
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	1100	3400	1200000	24000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	6000	7000	2200000	34000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3200	1000	700000	3000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	2000	< 10	160000	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	12000	11000	4200000	61000

TPH-CWG - Aromatic >C5 - C7	µg/l	Limit of detection	Accreditation Status	1631627	1631628	1631629	1631630
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	4.4	43	< 1.0	5.3
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	9.9	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	660	2200	18	1800
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	2000	2500	400000	10000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	1800	1900	530000	8000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	600	< 10	150000	700
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	120000	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	5100	6600	1200000	21000

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



Analytical Report Number: 20-32218
Project / Site name: NTG2113



Your Order No: POR032373

Lab Sample Number	1631631	1631632	1631633	1631634
Sample Reference	DS05	HBH1	HBH2	HBH3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	23/09/2020	24/09/2020	24/09/2020	24/09/2020
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
Naphthalene	µg/l	0.01	ISO 17025	1610	23.6	< 0.01	65
Acenaphthylene	µg/l	0.01	ISO 17025	76.2	1.86	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	2.05	< 0.01	0.46
Fluorene	µg/l	0.01	ISO 17025	208	4.35	< 0.01	1.19
Phenanthrene	µg/l	0.01	ISO 17025	135	1.75	< 0.01	1.45
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	8.36	< 0.01	< 0.01	0.15
Pyrene	µg/l	0.01	ISO 17025	21.4	< 0.01	< 0.01	0.33
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 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

Parameter	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	2060	33.6	< 0.16	68.6

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
Benzene	µg/l	1	ISO 17025	130	< 1.0	< 1.0	112
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	228	7.4	< 1.0	8.8
p & m-xylene	µg/l	1	ISO 17025	71.6	12.5	< 1.0	98.4
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	127	47.2	< 1.0	49.2

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
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	7900	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	50000	2500	< 10	990
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	1200000	4500	470	800
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	150000	400	80	180
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	1400000	7400	550	2000

Parameter	µg/l	Limit of detection	Accreditation Status	1631631	1631632	1631633	1631634
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	130	< 1.0	< 1.0	110
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	3400	120	< 1.0	420
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	300000	2200	400	1000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	330000	3000	300	700
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	30000	350	48	100
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	660000	5700	750	2300

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



Analytical Report Number: 20-32218
Project / Site name: NTG2113



Your Order No: POR032373

Lab Sample Number	1631635	1631636			
Sample Reference	HBH4	HBH5			
Sample Number	None Supplied	None Supplied			
Depth (m)	None Supplied	None Supplied			
Date Sampled	24/06/2020	24/09/2020			
Time Taken	None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accredi- tation Status		

Speciated PAHs

Compound	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
Naphthalene	µg/l	0.01	ISO 17025	15.8	8.58
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	1	1.86
Fluorene	µg/l	0.01	ISO 17025	2.74	6.08
Phenanthrene	µg/l	0.01	ISO 17025	2.16	4.54
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.15	0.33
Pyrene	µg/l	0.01	ISO 17025	0.43	1.18
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

Total PAH

Parameter	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	22.2	22.6

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
Benzene	µg/l	1	ISO 17025	< 1.0	11.2
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	15.3

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	1200	1800
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	1100	2500
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	240	800
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	2600	5100

Parameter	µg/l	Limit of detection	Accredi- tation Status	1631635	1631636
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	11
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	14	7.3
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	1300	1600
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	930	2000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	150	500
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	2400	4100

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



Analytical Report Number : 20-32218
Project / Site name: NTG2113

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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

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

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

Sample Deviation Report



Analytical Report Number : 20-32218
Project / Site name: NTG2113

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
HBH4	None Supplied	W	1631635	c	BTEX and MTBE in water (Monoaromatics)	L073B-PL	c
HBH4	None Supplied	W	1631635	c	Speciated EPA-16 PAHs in water	L102B-PL	c
HBH4	None Supplied	W	1631635	c	TPHCWG (Waters)	L070-PL	c



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Analytical Report Number : 20-46963

Project / Site name:	Bishops Stortford	Samples received on:	14/12/2020
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	14/12/2020
Your order number:	POR033147	Analysis completed by:	21/12/2020
Report Issue Number:	1	Report issued on:	21/12/2020
Samples Analysed:	10 water samples		

Signed: *A. Czerwińska*

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

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

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

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

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

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



Analytical Report Number: 20-46963
Project / Site name: Bishops Stortford

Your Order No: POR033147

Lab Sample Number	1715217			1715218		1715219		1715220		1715221	
Sample Reference	HBH2			HBH4		HBH5		HBH3		DS05	
Sample Number	None Supplied			None Supplied		None Supplied		None Supplied		None Supplied	
Depth (m)	None Supplied			None Supplied		None Supplied		None Supplied		None Supplied	
Date Sampled	09/12/2020			09/12/2020		09/12/2020		09/12/2020		09/12/2020	
Time Taken	None Supplied			None Supplied		None Supplied		None Supplied		None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status								

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	0.78	< 0.01	< 0.01	17.8	160
Naphthalene	µg/l	0.01	ISO 17025	0.78	< 0.01	< 0.01	17.8	160
Acenaphthylene	µg/l	0.01	ISO 17025	0.22	< 0.01	0.58	0.28	3.36
Acenaphthene	µg/l	0.01	ISO 17025	0.34	< 0.01	1.34	0.67	4.05
Fluorene	µg/l	0.01	ISO 17025	0.72	69.5	2.99	1.48	9.31
Phenanthrene	µg/l	0.01	ISO 17025	0.35	105	2.38	0.7	6.81
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	10.6	0.34	< 0.01	0.49
Pyrene	µg/l	0.01	ISO 17025	< 0.01	24.9	0.84	< 0.01	0.92
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	2.41	210	8.47	20.9	185
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Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	27.8	67.6
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	27.8	67.6
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	9.2	18.1
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	170000	2000	670	34000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	700	300000	9000	1300	56000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	150	140000	3000	< 10	12000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	44000	< 10	< 10	4400
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	850	650000	14000	1900	110000

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	28	68
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	1.5	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	6.8	< 1.0	11	110	350
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	600	47000	3800	2400	53000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	500	93000	4700	2900	47000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	99	41000	700	< 10	11000
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	11000	< 10	< 10	4000
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1200	190000	9200	5400	120000

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



Analytical Report Number: 20-46963
Project / Site name: Bishops Stortford

Your Order No: POR033147

Lab Sample Number	1715222				1715223	1715224	1715225	1715226
Sample Reference	HBH1				DS04	DS02	DS01	DS03
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	09/12/2020				09/12/2020	10/12/2020	10/12/2020	10/12/2020
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	9.28	22.1	133	3.09	1.07
Naphthalene	µg/l	0.01	ISO 17025	9.28	22.1	133	3.09	1.07
Acenaphthylene	µg/l	0.01	ISO 17025	1.42	0.17	3.87	0.2	0.27
Acenaphthene	µg/l	0.01	ISO 17025	1.74	0.51	4.62	0.41	0.74
Fluorene	µg/l	0.01	ISO 17025	4.22	0.97	9.46	1.28	1.81
Phenanthrene	µg/l	0.01	ISO 17025	1.68	0.23	6.15	0.65	1.08
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.3	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.58	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	18.3	23.9	158	5.63	4.97
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Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	59	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	7.5	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	55	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	21000	850	38000	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	26000	1400	110000	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3100	280	13000	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	2800	380	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	53000	3000	160000	< 10	< 10

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	2.2	4.6	220	19	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	30000	1200	30000	720	2000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	21000	2200	100000	1700	3000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	3400	520	19000	220	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	4100	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	54000	3900	150000	2700	5000

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



Analytical Report Number : 20-46963
Project / Site name: Bishops Stortford

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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.



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Analytical Report Number : 21-13224

Project / Site name:	Bishops Stortford	Samples received on:	29/09/2021
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	29/09/2021
Your order number:	POR036097	Analysis completed by:	13/10/2021
Report Issue Number:	1	Report issued on:	13/10/2021
Samples Analysed:	10 water samples		

Signed:

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

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

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

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

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

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



Analytical Report Number: 21-13224
Project / Site name: Bishops Stortford

Lab Sample Number	2029351				2029352	2029353	2029354	2029355
Sample Reference	HBH2				HBH4	HBH5	HBH3	DS05
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	27/09/2021				27/09/2021	27/09/2021	27/09/2021	27/09/2021
Time Taken	0900				0900	0900	0900	0900
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Speciated PAHs

	µg/l	0.01	ISO 17025	< 0.01	< 0.01	6.13	45.4	4220
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	6.13	45.4	4220
Acenaphthylene	µg/l	0.01	ISO 17025	0.42	9.98	0.27	1.48	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	0.44	15.0	0.93	1.76	508
Fluorene	µg/l	0.01	ISO 17025	1.22	34.0	1.78	4.35	662
Phenanthrene	µg/l	0.01	ISO 17025	0.47	< 0.01	0.92	3.39	385
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	11.9	< 0.01	0.36	39.7
Pyrene	µg/l	0.01	ISO 17025	< 0.01	18.5	< 0.01	0.86	55.5
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	2.55	89.4	10.0	57.6	5870
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Monoaromatics & Oxygenates

	µg/l	1	ISO 17025	< 1.0	< 1.0	3.7	61.8	16.8
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	3.7	61.8	16.8
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	3.2	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	12.5	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	10.5	29.1	70.0



Analytical Report Number: 21-13224
 Project / Site name: Bishops Stortford

Lab Sample Number				2029351	2029352	2029353	2029354	2029355
Sample Reference				HBH2	HBH4	HBH5	HBH3	DS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				27/09/2021	27/09/2021	27/09/2021	27/09/2021	27/09/2021
Time Taken				0900	0900	0900	0900	0900
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	830	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	770	4600	1200	4700	870000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	4200	68000	2100	6200	950000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	650	48000	340	2300	140000
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	210	51000	< 10	560	38000
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	5900	170000	3600	14000	2000000

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	3.7	62	17
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	17	< 1.0	120	2500
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	820	14000	1000	1500	300000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	1200	20000	890	3000	260000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	100	12000	250	1400	680000
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	2500	< 10	< 10	190000
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	2200	48000	2100	6100	1400000

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



Analytical Report Number: 21-13224
Project / Site name: Bishops Stortford

Lab Sample Number	2029356				2029357				2029358				2029359				2029360			
Sample Reference	HBH1				DS04				DS02				DS01				DS03			
Sample Number	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Depth (m)	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Date Sampled	27/09/2021				27/09/2021				27/09/2021				28/09/2021				28/09/2021			
Time Taken	1600				1600				1600				0900				0900			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status																	

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	13.4	13.6	143	39.0	0.94
Naphthalene	µg/l	0.01	ISO 17025	13.4	13.6	143	39.0	0.94
Acenaphthylene	µg/l	0.01	ISO 17025	3.69	0.82	2.53	1.84	0.37
Acenaphthene	µg/l	0.01	ISO 17025	2.97	1.16	2.74	2.27	1.11
Fluorene	µg/l	0.01	ISO 17025	6.35	1.23	5.31	5.27	2.07
Phenanthrene	µg/l	0.01	ISO 17025	2.27	< 0.01	< 0.01	< 0.01	1.00
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.65	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.23	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	28.7	16.8	154	50.2	5.49
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	28.7	16.8	154	50.2	5.49

Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	< 1.0	< 1.0	5.2	2.5	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	5.2	2.5	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	5.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	52.8	20.7	6.3	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	271	68.8	14.9	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	41.4	7.2	4.4	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	27.2	< 1.0	< 1.0	< 1.0	< 1.0



Analytical Report Number: 21-13224
Project / Site name: Bishops Stortford

Lab Sample Number				2029356	2029357	2029358	2029359	2029360
Sample Reference				HBH1	DS04	DS02	DS01	DS03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				27/09/2021	27/09/2021	27/09/2021	28/09/2021	28/09/2021
Time Taken				1600	1600	1600	0900	0900
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					
				Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	18000	2300	12000	4700	370
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	33000	4300	14000	8500	810
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	4500	4500	2200	4000	140
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	2800	1100	< 10	< 10	140
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	59000	12000	28000	17000	1500
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	5.2	2.5	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	5.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	7.7	920	450	110	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	7800	500	140	38	330
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	10000	700	10	10	1000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	590	390	< 10	< 10	130
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	19000	2500	610	160	1500

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



Analytical Report Number : 21-13224
Project / Site name: Bishops Stortford

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.



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Analytical Report Number : 21-30698

Replaces Analytical Report Number: 21-30698, issue no. 1
Client references/information amended.

Project / Site name:	Bishops Stortford	Samples received on:	22/12/2021
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	22/12/2021
Your order number:		Analysis completed by:	07/01/2022
Report Issue Number:	2	Report issued on:	07/01/2022
Samples Analysed:	10 water samples		

Signed: _____

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

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

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

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

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

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



Analytical Report Number: 21-30698
Project / Site name: Bishops Stortford

Lab Sample Number	2125719			2125720			2125721			2125722			2125723		
Sample Reference	HBH4			HBH5			HBH3			DS05			HBH1		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	20/12/2021			20/12/2021			20/12/2021			20/12/2021			20/12/2021		
Time Taken	0900			0900			1600			1600			1600		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	Units	Limit of detection	Accreditation Status	2125719	2125720	2125721	2125722	2125723
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	52.1	35.5	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	3.71	< 0.01	< 0.01	0.36	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	4.73	0.43	2.86	0.82	2.25
Fluorene	µg/l	0.01	ISO 17025	12.0	0.75	7.87	1.88	6.71
Phenanthrene	µg/l	0.01	ISO 17025	15.6	< 0.01	7.34	< 0.01	2.40
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	1.95	< 0.01	0.94	< 0.01	0.26
Pyrene	µg/l	0.01	ISO 17025	4.63	< 0.01	1.76	< 0.01	0.61
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Parameter	Units	Limit of detection	Accreditation Status	2125719	2125720	2125721	2125722	2125723
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	42.7	1.18	72.8	38.6	12.2

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	2125719	2125720	2125721	2125722	2125723
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	55.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	118	31.5

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	2125719	2125720	2125721	2125722	2125723
TPH-CWG - Aliphatic >C5 - C6 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	50	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	30	< 1.0	90	< 1.0
TPH-CWG - Aliphatic >C10 - C12 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	16000	< 10	1600	1500	13000
TPH-CWG - Aliphatic >C12 - C16 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	34000	160	13000	1700	26000
TPH-CWG - Aliphatic >C16 - C21 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	22000	210	5100	< 10	5000
TPH-CWG - Aliphatic >C21 - C35 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	5500	39	2000	< 10	470
TPH-CWG - Aliphatic (C5 - C35) HS+EH_1D_AL_#1_#2_MS	µg/l	10	NONE	78000	440	21000	3400	45000

Parameter	Units	Limit of detection	Accreditation Status	2125719	2125720	2125721	2125722	2125723
TPH-CWG - Aromatic >C5 - C7 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	55	< 1.0
TPH-CWG - Aromatic >C7 - C8 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	88	< 1.0
TPH-CWG - Aromatic >C10 - C12 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	6900	290	960	1500	5000
TPH-CWG - Aromatic >C12 - C16 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	7300	640	4100	1400	7400
TPH-CWG - Aromatic >C16 - C21 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	4200	85	830	< 10	650
TPH-CWG - Aromatic >C21 - C35 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	520	< 10	470	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) HS+EH_1D_AR_#1_#2_MS	µg/l	10	NONE	19000	1000	6400	3000	13000

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



Analytical Report Number: 21-30698
Project / Site name: Bishops Stortford

Lab Sample Number	2125724			2125725			2125726			2125727			2125728		
Sample Reference	DS04			DS03			DS01			DS02			HBH2		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	20/12/2021			21/12/2021			21/12/2021			21/12/2021			21/12/2021		
Time Taken	1600			0900			0900			0900			0900		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	Units	Limit of detection	Accreditation Status	2125724	2125725	2125726	2125727	2125728
Naphthalene	µg/l	0.01	ISO 17025	64.5	< 0.01	9.48	102	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	2.60	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	0.75	1.19	1.91	3.39	0.26
Fluorene	µg/l	0.01	ISO 17025	2.22	2.88	7.93	8.80	0.40
Phenanthrene	µg/l	0.01	ISO 17025	0.60	1.52	6.53	4.26	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.81	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.14	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.95	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.04	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.87	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.97	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.75	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.62	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.68	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.68	< 0.01	< 0.01

Total PAH

Parameter	Units	Limit of detection	Accreditation Status	2125724	2125725	2125726	2125727	2125728
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	68.1	5.59	37.0	119	0.66

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	2125724	2125725	2125726	2125727	2125728
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	26.4	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	163	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	28.3	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	2125724	2125725	2125726	2125727	2125728
TPH-CWG - Aliphatic >C5 - C6 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_1D_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	1800	590	8400	17000	150
TPH-CWG - Aliphatic >C12 - C16 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	7000	1300	30000	36000	120
TPH-CWG - Aliphatic >C16 - C21 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	810	480	8000	7200	30
TPH-CWG - Aliphatic >C21 - C35 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10	160	1700	790	< 10
TPH-CWG - Aliphatic (C5 - C35) HS+EH_1D_AL_#1_#2_MS	µg/l	10	NONE	9500	2500	49000	61000	300

Parameter	Units	Limit of detection	Accreditation Status	2125724	2125725	2125726	2125727	2125728
TPH-CWG - Aromatic >C5 - C7 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 HS_1D_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 HS_1D_AR	µg/l	1	ISO 17025	590	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	890	640	3700	7300	580
TPH-CWG - Aromatic >C12 - C16 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	3100	1300	7300	11000	740
TPH-CWG - Aromatic >C16 - C21 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	350	340	1400	1200	68
TPH-CWG - Aromatic >C21 - C35 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) HS+EH_1D_AR_#1_#2_MS	µg/l	10	NONE	4900	2200	12000	19000	1400

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



Analytical Report Number : 21-30698
Project / Site name: Bishops Stortford

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 21-30698
Project / Site name: Bishops Stortford

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
DS05	None Supplied	W	2125722	b	BTEX and MTBE in water (Monoaromatics)	L073B-PL	b



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Analytical Report Number : 21-84167

Replaces Analytical Report Number: 21-84167, issue no. 1
Additional analysis undertaken.

Project / Site name:	Bishops Stortford	Samples received on:	29/06/2021
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	30/06/2021
Your order number:	POR034918	Analysis completed by:	19/07/2021
Report Issue Number:	2	Report issued on:	19/07/2021
Samples Analysed:	10 water samples		

Signed: _____

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

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

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

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

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

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



Analytical Report Number: 21-84167
Project / Site name: Bishops Stortford

Your Order No: POR034918

Lab Sample Number	1922064			1922065			1922066			1922067			1922068		
Sample Reference	DS01			DS02			DS03			DS04			DS05		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	29/06/2021			29/06/2021			28/06/2021			28/06/2021			28/06/2021		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	94.4	< 0.01	111	107
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	5.77	4.40	3.78	4.90	5.96
Fluorene	µg/l	0.01	ISO 17025	21.2	9.67	11.0	12.2	14.2
Phenanthrene	µg/l	0.01	ISO 17025	18.5	4.86	10.6	4.40	8.81
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.78	0.21	0.43	0.18	0.56
Pyrene	µg/l	0.01	ISO 17025	2.06	0.41	1.16	0.46	1.25
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Parameter	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	48.3	114	26.9	133	137

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	90.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	2.1	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	6.3	60.7	< 1.0	262	32.2
o-xylene	µg/l	1	ISO 17025	< 1.0	10.5	< 1.0	38.8	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	95.9

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	31000	24000	6500	53000	31000
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	51000	41000	19000	48000	48000
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	19000	3100	6300	2400	6100
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	100000	68000	32000	100000	85000

Parameter	µg/l	Limit of detection	Accreditation Status	1922064	1922065	1922066	1922067	1922068
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	92
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	110	180	< 1.0	770	580
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	2600	6400	2700	16000	12000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	11000	2800	4300	21000	7700
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	2200	< 10	830	< 10	910
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	16000	9400	7800	38000	21000

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



Analytical Report Number: 21-84167
Project / Site name: Bishops Stortford

Your Order No: POR034918

Lab Sample Number	1922069			1922070			1922071			1922072			1922073		
Sample Reference	HBH1			HBH2			HBH3			HBH4			HBH5		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Date Sampled	28/06/2021			28/06/2021			28/06/2021			28/06/2021			28/06/2021		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status												

Speciated PAHs

Compound	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	19.8	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	3.82	0.29	1.44	59.5	2.14
Fluorene	µg/l	0.01	ISO 17025	8.98	0.67	3.71	157	3.99
Phenanthrene	µg/l	0.01	ISO 17025	3.25	0.20	2.44	187	0.80
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.24	< 0.01	0.21	23.5	0.34
Pyrene	µg/l	0.01	ISO 17025	0.51	< 0.01	0.49	55.9	0.60
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Parameter	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	16.8	1.16	28.1	483	7.87

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	54.3	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	5.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	8.1	< 1.0	14.2	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	38.7	< 1.0	23.1	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	740	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	16000	380	2300	91000	600
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	32000	940	4800	230000	1700
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3100	130	1100	100000	920
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	50000	1500	8200	430000	3200

Parameter	µg/l	Limit of detection	Accreditation Status	1922069	1922070	1922071	1922072	1922073
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	53	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	110	< 1.0	170	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	5600	150	1100	7200	1400
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	4000	270	2400	32000	820
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	340	29	290	10000	140
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	10000	450	4000	50000	2400

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



Analytical Report Number : 21-84167
Project / Site name: Bishops Stortford

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
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

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.



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Analytical Report Number : 22-68249

Project / Site name:	Bishops Stortford	Samples received on:	29/06/2022
Your job number:	NTG2113	Samples instructed on/ Analysis started on:	29/06/2022
Your order number:	1952	Analysis completed by:	07/07/2022
Report Issue Number:	1	Report issued on:	08/07/2022
Samples Analysed:	10 water samples		

Signed: _____

Joanna Wawrzeczek
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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: 22-68249
Project / Site name: Bishops Stortford

Your Order No: 1952

Lab Sample Number	2332408	2332409	2332410	2332411	2332412
Sample Reference	DS01	DS02	DS03	DS04	DS05
Sample Number	EW1	EW1	EW1	EW1	EW1
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	28/06/2022	27/06/2022	28/06/2022	27/06/2022	28/06/2022
Time Taken	0900	1700	0900	1700	0900
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

Speciated PAHs

Compound	µg/l	Limit of detection	ISO 17025	2332408	2332409	2332410	2332411	2332412
Naphthalene	µg/l	0.01	ISO 17025	8210	847	< 0.01	U/S*	2420**
Acenaphthylene	µg/l	0.01	ISO 17025	504	36.4	0.61	U/S*	137
Acenaphthene	µg/l	0.01	ISO 17025	472	35.3	1.04	U/S*	111
Fluorene	µg/l	0.01	ISO 17025	1330	79.5	2.71	U/S*	323
Phenanthrene	µg/l	0.01	ISO 17025	861	45.2	1.99	U/S*	212
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	40.5	3.02	< 0.01	U/S*	13.3
Pyrene	µg/l	0.01	ISO 17025	99.8	5.44	< 0.01	U/S*	30.9
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	U/S*	< 0.01

Total PAH

Parameter	µg/l	Limit of detection	ISO 17025	2332408	2332409	2332410	2332411	2332412
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	11500	1050	6.35	U/S*	3240

Monoaromatics & Oxygenates

Compound	µg/l	Limit of detection	ISO 17025	2332408	2332409	2332410	2332411	2332412
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	58.1	22.4	< 1.0	< 1.0	1850
p & m-xylene	µg/l	1	ISO 17025	235	386	< 1.0	1680	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

Parameter	µg/l	Limit of detection	ISO 17025	2332408	2332409	2332410	2332411	2332412
TPH-CWG - Aliphatic >C5 - C6 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	940	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_ID_AL	µg/l	1	ISO 17025	9300	28000	110	72000	120000
TPH-CWG - Aliphatic >C10 - C12 EH_ID_AL_#1_#2_MS	µg/l	10	NONE	5800000	380000	1600	U/S*	1200000
TPH-CWG - Aliphatic >C12 - C16 EH_ID_AL_#1_#2_MS	µg/l	10	NONE	5400000	560000	3400	U/S*	1500000**
TPH-CWG - Aliphatic >C16 - C21 EH_ID_AL_#1_#2_MS	µg/l	10	NONE	1000000	78000	1200	U/S*	260000
TPH-CWG - Aliphatic >C21 - C35 EH_ID_AL_#1_#2_MS	µg/l	10	NONE	180000	17000	410	U/S*	50000
TPH-CWG - Aliphatic (C5 - C35) HS+EH_ID_AL_#1_#2_MS	µg/l	10	NONE	12000000	1100000	6700	U/S*	3100000

Parameter	µg/l	Limit of detection	ISO 17025	2332408	2332409	2332410	2332411	2332412
TPH-CWG - Aromatic >C5 - C7 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 HS_ID_AR	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 HS_ID_AR	µg/l	1	ISO 17025	1500	< 1.0	< 1.0	8800	28000
TPH-CWG - Aromatic >C10 - C12 EH_ID_AR_#1_#2_MS	µg/l	10	NONE	2800000	160000	1300	U/S*	730000
TPH-CWG - Aromatic >C12 - C16 EH_ID_AR_#1_#2_MS	µg/l	10	NONE	2400000	320000	1900	U/S*	850000
TPH-CWG - Aromatic >C16 - C21 EH_ID_AR_#1_#2_MS	µg/l	10	NONE	350000	26000	320	U/S*	100000
TPH-CWG - Aromatic >C21 - C35 EH_ID_AR_#1_#2_MS	µg/l	10	NONE	40000	4600	< 10	U/S*	20000
TPH-CWG - Aromatic (C5 - C35) HS+EH_ID_AR_#1_#2_MS	µg/l	10	NONE	5600000	510000	3500	U/S*	1700000

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

*Sample was highly contaminated.

**Over range data, sample was diluted and results are estimated from an extrapolated calibration. Results should be interpreted with care.



Analytical Report Number: 22-68249
Project / Site name: Bishops Stortford

Your Order No: 1952

Lab Sample Number	2332413	2332414	2332415	2332416	2332417
Sample Reference	HBH1	HBH2	HBH3	HBH4	HBH5
Sample Number	EW1	EW1	EW1	EW1	EW1
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	28/06/2022	28/06/2022	28/06/2022	27/06/2022	27/06/2022
Time Taken	0900	0900	0900	1700	0900
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

Speciated PAHs

Compound	µg/l	0.01	ISO 17025	2332413	2332414	2332415	2332416	2332417
Naphthalene	µg/l	0.01	ISO 17025	42.5	346	283	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	1.83	20.8	29	3.3	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	1.71	16.5	31.6	4.22	0.48
Fluorene	µg/l	0.01	ISO 17025	4.63	39.1	90.4	9.7	0.93
Phenanthrene	µg/l	0.01	ISO 17025	1.63	< 0.01	78.9	9.07	0.33
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	7.71	0.97	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	4.06	16.7	1.9	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 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	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	2332413	2332414	2332415	2332416	2332417
				52.3	426	538	29.2	1.74

Monoaromatics & Oxygenates

Compound	µg/l	1	ISO 17025	2332413	2332414	2332415	2332416	2332417
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	67.4	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	52.5	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	39.1	< 1.0	45.1	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	2332413	2332414	2332415	2332416	2332417
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 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	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	53	< 1.0	57	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	22000	190000	84000	15000	180
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	24000	180000	160000	24000	460
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	2900	37000	54000	9800	160
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	460	8900	16000	2900	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	49000	420000	320000	52000	800

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	2332413	2332414	2332415	2332416	2332417
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	67	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	400	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	9600	88000	52000	7100	600
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	18000	98000	100000	7900	800
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	1700	18000	17000	4000	90
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	100	< 10	< 10	400	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	29000	200000	170000	19000	1500

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

*Sample was highly contaminated.

**Over range data, sample was diluted and results are estimated from an extrapolated calibration. Results should be interpreted with care.



Analytical Report Number : 22-68249
Project / Site name: Bishops Stortford

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
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

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Appendix 10: Leachate Screening Sheets

*EQS Standard: Phenol and Benzene annual average of 300µg/l; Toluene 500µg/l for Freshwater, 400µg/l for Saltwater; 1,1,1-TCA 1,000µg/l.

Project Name:	Farnham Rd, Bisjop's Startford
Project Number:	NTG2113
Assessment for:	Soil Leachate Assessment
Laboratory:	i2
Receptor:	Freshwater
Receptor Water Hardness:	>200



	Contaminant	Units	Detection Limit	Guideline Concentration	Source	Number of Samples	Min	Max	No of Exceedences	DS06	
										0.50	0.80
Heavy Metals	Arsenic	µg/l	1.1	50	EQS Freshwater	1	4.80	4.80	0	< 1.1	4.80
	Barium	mg/l	0.05	700	UK DWS	2	0.08	0.12	0	0.08	0.12
	Beryllium	µg/l	0.2	None Available		0	0.00	0.00	0	< 0.2	< 0.2
	Cadmium	µg/l	0.08	0.25	EQS Freshwater	0	0.00	0.00	0	< 0.08	< 0.08
	Chromium III	µg/l	0.4	4.7	EQS Freshwater	0	0.00	0.00	0	< 0.4	< 0.4
	Chromium VI	µg/l		3.4	EQS Freshwater	0	0.00	0.00	0		
	Copper	µg/l	0.7	1	EQS Freshwater	2	5.90	6.80	2	5.90	6.80
	Lead	µg/l	1	1.2	EQS Freshwater	2	2.90	6.00	2	6.00	2.90
	Mercury	µg/l	0.5	0.07	EQS Freshwater	0	0.00	0.00	0	< 0.5	< 0.5
	Nickel	µg/l	0.3	4	EQS Freshwater	2	1.50	5.00	1	1.50	5.00
	Selenium	µg/l	4	10	UK DWS	0	0.00	0.00	0	< 4.0	< 4.0
	Vanadium	µg/l	1.7	None Available		0	0.00	0.00	0	< 1.7	< 1.7
	Zinc	µg/l	0.4	10.9	EQS Freshwater	2	19.00	56.00	2	19.00	56.00
	Sulphate	mg/l	0.1	400	EQS Freshwater	2	93.40	102.00	0	102.00	93.40
Boron	mg/l	10	2000	EQS Freshwater	2	0.08	0.22	0	0.08	0.22	
pH					2	7.60	7.80	0	7.80	7.60	
Inorganics	Cyanide (total)	µg/l	10	1	EQS Freshwater	0	0.00	0.00	0	< 10	< 10
	Phenol*	µg/l		7.7	EQS Freshwater	0	0.00	0.00	0		

Appendix 11: Groundwater Screening Sheets

*EQS Standard: Phenol and Benzene annual average of 300µg/l; Toluene 500µg/l for Freshwater, 400µg/l for Saltwater; 1,1,1-TCA 1,000µg/l.

Project Name:	Farnham Road, Bishop's Stortford
Project Number:	NTG2113 - Round 2
Assessment for:	Water Assessment
Laboratory:	i2
Receptor:	Drinking Water
Receptor Water Hardness:	>200



100 = Assessment Criteria Exceedance)
 50 = M-BAT Bioavailability Assessment Required

Contaminant	Units	Detection Limit	Guideline Concentration	Source	Number of Samples	Min	Max	No of Exceedences	HBH1	HBH2	HBH3	HBH4	HBH5	DS01	DS02	DS03	DS04	DS05	
									< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
BTEX	Benzene*	µg/l	1	10	EQS Freshwater	2	70.70	927.00	2	< 1.0	< 1.0	70.70	< 1.0	< 1.0	< 1.0	< 1.0	927.00	< 1.0	
	Ethylbenzene	µg/l	1	300	UK DWS	5	99.80	24000.00	3	< 1.0	< 1.0	187.00	< 1.0	< 1.0	387.00	2600.00	< 1.0	24000.00	99.80
	Toluene*	µg/l	1	700	EQS Freshwater	1	2220.00	2220.00	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2220.00	< 1.0
	Xylene	µg/l	0	500	UK DWS	0	0.00	0.00	0										
Total Petroleum Hydrocarbons	Aliphatic C5-C6	µg/l	1	10	UK DWS	0	0.00	0.00	0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	Aliphatic C6-C8	µg/l	1	10	UK DWS	1	95000.00	95000.00	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	95000.00	< 1.0
	Aliphatic C8-C10	µg/l	1	10	UK DWS	8	1500.00	300000.00	8	2700.00	< 1.0	50000.00	26000.00	2700.00	140000*	180000.00	1500.00	300000.00	31000.00
	Aliphatic C10-C12	µg/l	10	10	UK DWS	10	2200.00	38000000.00	10	2200.00	3000.00	25000.00	3900.00	28000.00	17000.00	26000.00	58000.00	38000000.00	220000.00
	Aliphatic C12-C16	µg/l	10	10	UK DWS	10	6600.00	56000000.00	10	9200.00	17000.00	83000.00	6600.00	39000.00	33000.00	51000.00	78000.00	56000000.00	480000.00
	Aliphatic C16-C21	µg/l	10	10	UK DWS	10	2700.00	4300000.00	10	2700.00	2700.00	25000.00	4000.00	14000.00	11000.00	8400.00	43000.00	4300000.00	100000.00
	Aliphatic C21-C35	µg/l	10	10	UK DWS	10	160.00	450000.00	10	160.00	420.00	5900.00	11000.00	4800.00	3000.00	830.00	9800.00	450000.00	21000.00
	Aromatic EC5-EC7	µg/l	1	10	EQS Freshwater	2	71.00	930.00	2	< 1.0	< 1.0	71.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	930.00	< 1.0
	Aromatic EC7-EC8	µg/l	1	700	UK DWS	1	2200.00	2200.00	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2200.00	< 1.0
	Aromatic EC8-EC10	µg/l	1	10	UK DWS	6	170.00	160000.00	6	< 1.0	< 1.0	9700.00	< 1.0	< 1.0	35000.00	52000.00	170.00	160000.00	4200.00
	Aromatic EC10-EC12	µg/l	10	10	UK DWS	10	2100.00	9400000.00	10	3100.00	2100.00	45000.00	4700.00	8700.00	19000.00	23000.00	17000.00	9400000.00	160000.00
	Aromatic EC12-EC16	µg/l	10	10	UK DWS	10	3400.00	23000000.00	10	4700.00	8700.00	36000.00	3400.00	18000.00	19000.00	22000.00	56000.00	23000000.00	200000.00
	Aromatic EC16-EC21	µg/l	10	10	UK DWS	10	560.00	1800000.00	10	560.00	1400.00	8900.00	3600.00	6200.00	4900.00	5400.00	23000.00	1800000.00	56000.00
	Aromatic EC21-EC35	µg/l	10	10	UK DWS	2	5100.00	7300.00	2	< 10	< 10	< 10	< 10	5100.00	< 10	< 10	7300.00	< 10	< 10
Total TPH (EC5-EC35)	µg/l	0	10	EQS Freshwater	0	0.00	0.00	0											
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/l	0.01	None Available		6	1.18	10100.00	0	1.21	< 0.01	80.20	1.18	< 0.01	43.20	4.43	< 0.01	10100.00	159*
	Acenaphthylene	µg/l	0.01	None Available		8	0.86	6570.00	0	1.50	< 0.01	72.50	0.86	19.00	48.10	6.32	191.00	6570.00	187*
	Anthracene	µg/l	0.01	0.1	EQS Freshwater	2	14.70	21.50	2	< 0.01	< 0.01	< 0.01	< 0.01	21.50	14.70	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(a)anthracene	µg/l	0.01	None Available		1	5.33	5.33	0	< 0.01	< 0.01	< 0.01	< 0.01	5.33	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(a)pyrene	µg/l	0.01	0.7	UK DWS	3	1.57	17.30	3	< 0.01	< 0.01	< 0.01	< 0.01	1.57	< 0.01	< 0.01	2.16	17.30	< 0.01
	Benzo(b)fluoranthene	µg/l	0.01	None Available		2	2.46	3.94	0	< 0.01	< 0.01	< 0.01	< 0.01	2.46	< 0.01	< 0.01	3.94	< 0.01	< 0.01
	Benzo(k)fluoranthene	µg/l	0.01	None Available		1	0.70	0.70	0	< 0.01	< 0.01	< 0.01	< 0.01	0.70	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(g,h,i)perylene	µg/l	0.01	None Available		2	0.84	1.61	0	< 0.01	< 0.01	< 0.01	< 0.01	0.84	< 0.01	< 0.01	1.61	< 0.01	< 0.01
	Chrysene	µg/l	0.01	None Available		1	5.52	5.52	0	< 0.01	< 0.01	< 0.01	< 0.01	5.52	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Dibenzo(a,h)anthracene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluoranthene	µg/l	0.01	0.0063	EQS Freshwater	7	0.20	174.00	7	< 0.01	0.38	15.30	< 0.01	15.00	9.12	0.20	47.50	174.00	19.1*
	Fluorene	µg/l	0.01	None Available		8	3.10	14100.00	0	4.38	< 0.01	242.00	3.10	131.00	109.00	15.50	743.00	14100.00	621*
	Indeno(1,2,3-c,d)pyrene	µg/l	0.01	None Available		1	0.56	0.56	0	< 0.01	< 0.01	< 0.01	< 0.01	0.56	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Naphthalene	µg/l	0.01	2	EQS Freshwater	6	27.00	177000.00	6	35.30	< 0.01	2520.00	27.00	< 0.01	708.00	212.00	< 0.01	177000.00	5330*
	Phenanthrene	µg/l	0.01	None Available		9	1.93	6650.00	0	1.93	8.45	231.00	3.84	212.00	133.00	10.30	1190.00	6650.00	434*
Pyrene	µg/l	0.01	None Available		7	0.73	599.00	0	< 0.01	1.39	53.30	< 0.01	40.40	16.60	0.73	147.00	599.00	61.0*	
Total PAH	µg/l	0.16	0.1	WHO (Health)	10	10.20	215000.00	10	44.30	10.20	3210.00	36.00	456.00	1080.00	250.00	2320.00	215000.00	6810.00	

Appendix 12: CLEA Screening Sheets

STATISTICAL APPROACH FOR ASSESSING RISK TO HUMAN HEALTH FROM CONTAMINATED LAND 2008

CIEH/CLAIRE Guidance on Comparing Soil Contamination Data with a Critical Concentration May 2008

STAGE 1
QA CHECK

Are data of acceptable quality
Lab sampling errors / erroneous results
Are data sufficient to characterise area of interest

No

Review CSM, update sampling and analytical strategy

yes

STAGE 2
DATA SCREENING

Compare all data against GSAC
Do any values exceed GSAC?

No

True mean is less than critical concentration
No action required

Yes

STAGE 3
ZONING AND
OUTLIER CHECK

Plot data on bubble chart
Plot histogram
Identify and deal with non detects

Outliers

Assess Outliers directly against GSAC

Non detects to DL or DL/2
Remove outliers

STAGE 4
UPPER CONFIDENCE
LIMIT

With outliers removed
do any values exceed GSAC ?

No

True mean is less than critical concentration
No action required

Yes

With outliers removed are data normally Distributed
Histogram
Shapiro Wilkes test, q-q plot

Normal

Non-normal

Normal Distributed data
UCL from Students t-test

Non-normal Distributed data
UCL from Chebychev theorem

Compare UCL to GSAC
Does UCL exceed GSAC?

No

True mean is less than critical concentration
No action required

Yes

true mean is greater than critical concentration
Further action required

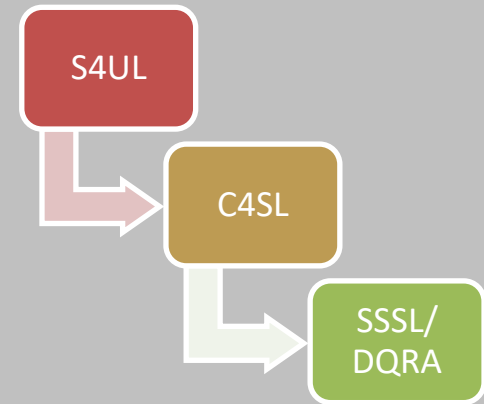
Human Health Generic QRA Worksheet

Farnham Road, Bishop's Stortford	NTG2113
All Data	

Define CSM – Is site represented by a standard land use?
 Residential with / without homegrown produce
 Commercial / Industrial
 Public Open Space - Residential (S4UL/C4SL only)
 Public Open Space - Park (S4UL/C4SL only)

GSAC Type (BWB, LQM S4UL, C4SL, Bespoke)	LQM_CIEH_S4UL
Key Receptor/CSM (Residential/Commercial/POS)	S4UL Commercial
Organic Matter % (If unknown use 1%)	1

GSAC Hierarchy



Generic Assessment Criteria



CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Farnham Road, Bishop's Stortford
NTG2113

S4UL Commercial
mg/kg

Source

	S4UL Commercial mg/kg	Source
Arsenic	6.40E+02	LQM_CIEH_S4UL
Barium	2.21E+04	LQM_CIEH_S4UL
Beryllium	1.20E+01	LQM_CIEH_S4UL
Boron	2.40E+05	LQM_CIEH_S4UL
Cadmium	1.90E+02	LQM_CIEH_S4UL
Chromium VI	3.30E+01	LQM_CIEH_S4UL
Chromium III	8.60E+03	LQM_CIEH_S4UL
Copper	6.80E+04	LQM_CIEH_S4UL
Lead*	2.33E+03	DEFRA_C4SL
Inorganic Mercury	1.10E+03	LQM_CIEH_S4UL
Nickel	9.80E+02	LQM_CIEH_S4UL
Selenium	1.20E+04	LQM_CIEH_S4UL
Vanadium	9.00E+03	LQM_CIEH_S4UL
Zinc	7.30E+05	LQM_CIEH_S4UL
Cyanide (Free)	4.30E+01	BWB
Cyanide (Complex)	2.13E+02	BWB
Phenols (Total)	4.40E+02	LQM_CIEH_S4UL
Benzene	2.70E+01	LQM_CIEH_S4UL
Toluene	5.60E+04	LQM_CIEH_S4UL
Ethyl benzene	5.70E+03	LQM_CIEH_S4UL
Total Xylene	5.90E+03	LQM_CIEH_S4UL
TPH (EC5-6) aliphatic	3.20E+03	LQM_CIEH_S4UL
TPH (>EC6-8) aliphatic	7.80E+03	LQM_CIEH_S4UL
TPH (>EC8-10) aliphatic	2.00E+03	LQM_CIEH_S4UL
TPH (>EC10-12) aliphatic	9.70E+03	LQM_CIEH_S4UL
TPH (>EC12-16) aliphatic	5.90E+04	LQM_CIEH_S4UL
TPH (>EC16-21) aliphatic	1.60E+06	LQM_CIEH_S4UL
TPH (>EC21-35) aliphatic	1.60E+06	LQM_CIEH_S4UL
TPH (>EC35-44) aliphatic	1.60E+06	LQM_CIEH_S4UL
TPH (>EC6-7) aromatic (benzene)	2.60E+04	LQM_CIEH_S4UL
TPH (>EC7-8) aromatic (toluene)	5.60E+04	LQM_CIEH_S4UL
TPH (>EC8-10) aromatic	3.50E+03	LQM_CIEH_S4UL
TPH (>EC10-12) aromatic	1.60E+04	LQM_CIEH_S4UL
TPH (>EC12-16) aromatic	3.60E+04	LQM_CIEH_S4UL
TPH (>EC16-21) aromatic	2.80E+04	LQM_CIEH_S4UL
TPH (>EC21-35) aromatic	2.80E+04	LQM_CIEH_S4UL
TPH (>EC35-44) aromatic	2.80E+04	LQM_CIEH_S4UL
Total TPH	5.00E+02	LQM_CIEH_S4UL
Naphthalene	1.90E+02	LQM_CIEH_S4UL
Acenaphthylene	8.30E+04	LQM_CIEH_S4UL
Acenaphthene	8.40E+04	LQM_CIEH_S4UL
Fluorene	6.30E+04	LQM_CIEH_S4UL
Phenanthrene	2.20E+04	LQM_CIEH_S4UL
Anthracene	5.20E+05	LQM_CIEH_S4UL
Fluoranthene	2.30E+04	LQM_CIEH_S4UL
Pyrene	5.40E+04	LQM_CIEH_S4UL
Benzo(a)anthracene	1.70E+02	LQM_CIEH_S4UL
Chrysene	3.50E+02	LQM_CIEH_S4UL

Generic Assessment Criteria



CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Farnham Road, Bishop's Stortford
NTG2113

S4UL Commercial
mg/kg

Source

	S4UL Commercial mg/kg	Source
Benzo(b)fluoranthene	4.40E+01	LQM_CIEH_S4UL
Benzo(k)fluoranthene	1.20E+03	LQM_CIEH_S4UL
Benzo(a)pyrene	3.50E+01	LQM_CIEH_S4UL
Indeno(1,2,3-c,d)pyrene	5.00E+02	LQM_CIEH_S4UL
Dibenzo(a,h)anthracene	3.50E+00	LQM_CIEH_S4UL
Benzo(g,hi)perylene	3.90E+03	LQM_CIEH_S4UL
Coal Tar (B(a)P as surrogate marker	1.50E+01	LQM_CIEH_S4UL
Tetrachloroethene (PCE)	1.90E+01	LQM_CIEH_S4UL
Trichloroethene (TCE)	1.20E+00	LQM_CIEH_S4UL
cis -1,2-Dichloroethene	1.40E+01	LQM_CIEH_S4UL
Vinyl Chloride (VC)	5.90E-02	LQM_CIEH_S4UL
1,1,2,2-Tetrachloroethane (PCA)	2.70E+02	LQM_CIEH_S4UL
1,1,1-Trichloroethane (TCA)	6.60E+02	LQM_CIEH_S4UL
1,2-Dichloroethane	6.70E-01	LQM_CIEH_S4UL
Carbon Tetrachloride	2.90E+00	LQM_CIEH_S4UL
Carbon disulphide	1.10E+01	LQM_CIEH_S4UL

Location	Sample depth	Easting	Northing	Strata Type	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium VI	Chromium III	Copper	Lead	Inorganic Mercury	Nickel	Selenium	Vanadium	Zinc	Cyanide (Free)	Cyanide (Complex)	Phenols (Total)	
Detection Limit				1	1	0.06	0.2	0.2	4	1	1	1	0.3	1	1	1	1	1	1	1	1	0.001
GSAC					6.40E+02	2.21E+04	1.20E+01	2.40E+05	1.90E+02	3.30E+01	8.60E+03	6.80E+04	2.33E+03	1.10E+03	9.80E+02	1.20E+04	9.00E+03	7.30E+05	4.30E+01	2.13E+02	4.40E+02	
DS02	0.40			MG	14	450	0.62	3.5	0.3	4	23	96	890	0.7	27	1	28	620	1	3	1	
DS02	3.70			Head																		
DS02	5.90			Chalk																		
DS03	0.20			MG	15	43	0.58	1.6	1.3	4	19	30	34	0.3	20	1	29	190	1	1	1	
DS03	3.50			Head																		
DS03	4.50			Chalk																		
DS01	0.30			MG	16	180	0.93	0.6	0.5	4	27	52	120	0.3	25	1	39	270	1	1	1	
DS01	3.90			Head																		
DS01	4.90			Chalk	1	9.9	0.06	0.2	0.2	4	1.8	3.1	1	0.3	2.1	1	3.1	9.4	1	1	1	
DS06	0.50			MG	16	190	0.75	1.3	2.9	4	36	94	190	0.3	24	1	34	260	1	1	1	
DS06	0.80			MG	25	340	0.54	2.6	22	4	89	870	420	0.5	59	1	29	1900	1	2	1	
DS04	1.50			Head	11	72	1.1	1.4	0.2	4	29	13	15	0.3	25	1	46	61	1	1	1	
DS04	3.50			Head																		
DS04	4.30-4.40			Head																		
DS05	0.25			MG	19	230	0.89	0.8	0.3	4	21	85	410	0.9	16	1	33	180	1	1	1	
DS05	2.50			Head	6.5	38	0.63	0.3	0.2	4	22	8.1	9.6	0.3	18	1	29	45	1	1	1	
DS05	4.20			Head	16	36	0.92	0.3	0.2	4	31	12	13	0.3	29	1	50	83	1	1	1	

Location	Sample depth	Benzene	Toluene	Ethyl benzene	Total Xylene	TPH (EC5-6) aliphatic	TPH (>EC6-8) aliphatic	TPH (>EC8-10) aliphatic	TPH (>EC10-12) aliphatic	TPH (>EC12-16) aliphatic	TPH (>EC16-21) aliphatic	TPH (>EC21-35) aliphatic	TPH (>EC6-7) aromatic (benzene)	TPH (>EC7-8) aromatic (toluene)	TPH (>EC8-10) aromatic	TPH (>EC10-12) aromatic	TPH (>EC12-16) aromatic	TPH (>EC16-21) aromatic	TPH (>EC21-35) aromatic
Detection Limit		0.001	0.001	0.001	0.001	0.001	0.001	1	2	8	8	8	0.001	0.001	1	2	10	10	
GSAC		2.70E+01	5.60E+04	5.70E+03	5.90E+03	3.20E+03	7.80E+03	2.00E+03	9.70E+03	5.90E+04	1.60E+06	1.60E+06	2.60E+04	5.60E+04	3.50E+03	1.60E+04	3.60E+04	2.80E+04	2.80E+04
DS02	0.40																		
DS02	3.70	0.001	0.001	0.001	0.002	0.001	1.2	15	39	170	86	8.7	0.001	0.001	7.7	18	86	56	10
DS02	5.90	0.001	0.001	0.016	0.075	0.001	0.001	0.36	1	2	8	8	0.001	0.001	0.18	1	2	10	10
DS03	0.20																		
DS03	3.50	0.001	0.001	0.001	0.002	0.001	0.001	15	100	230	100	9.5	0.001	0.001	4.2	78	200	130	34
DS03	4.50	0.001	0.001	0.001	0.002	0.001	0.001	11	2.3	14	8	8	0.001	0.001	0.72	3.4	27	30	22
DS01	0.30																		
DS01	3.90	0.001	0.001	0.001	0.002	0.001	0.001	0.78	54	230	110	38	0.001	0.001	0.19	50	220	130	53
DS01	4.90	0.001	0.001	0.001	0.002	0.001	0.001	2.5	1	2	8	8	0.001	0.001	0.81	1	2	10	10
DS06	0.50																		
DS06	0.80																		
DS04	1.50																		
DS04	3.50	0.001	0.001	0.001	0.002	0.001	0.001	0.001	1	2	8	28	0.001	0.001	0.001	1	2	10	10
DS04	4.30-4.40	0.001	0.001	0.001	0.002	0.001	0.001	0.001	3.1	45	40	50	0.001	0.001	0.001	1.8	33	36	12
DS05	0.25																		
DS05	2.50	0.001	0.001	0.001	0.002	0.001	0.001	11	20	130	52	100	0.001	0.001	0.001	9	85	27	18
DS05	4.20	0.001	0.001	0.001	0.002	0.001	0.001	18	44	390	110	45	0.001	0.001	2	12	120	58	10

Location	Sample depth	TPH (>EC35-44) aromatic	Total TPH	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene
Detection Limit		10	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
GSAC		2.80E+04	5.00E+02	1.90E+02	8.30E+04	8.40E+04	6.30E+04	2.20E+04	5.20E+05	2.30E+04	5.40E+04	1.70E+02	3.50E+02	4.40E+01	1.20E+03	3.50E+01	5.00E+02	3.50E+00	3.90E+03
DS02	0.40		190	0.05	0.05	0.05	0.05	4.6	3.5	20	19	13	7.5	12	4.9	9.9	5.5	0.05	5.8
DS02	3.70																		
DS02	5.90																		
DS03	0.20		490	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
DS03	3.50																		
DS03	4.50																		
DS01	0.30		110	0.05	0.05	0.05	0.05	1.2	0.37	3.5	3.7	2	1.6	3.2	1.1	2.6	1.9	0.63	2.4
DS01	3.90																		
DS01	4.90		10	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
DS06	0.50		490	0.05	0.05	0.05	0.05	1.8	0.37	3.8	3.9	1.2	1.7	1.9	0.98	1.3	0.83	0.05	1.1
DS06	0.80		1200	0.05	0.05	0.05	0.05	2.1	0.05	5.5	6.2	2	2.3	2.7	1.2	1.9	1.6	0.05	1.9
DS04	1.50		10	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
DS04	3.50																		
DS04	4.30-4.40																		
DS05	0.25		410	0.05	0.05	0.05	3	1.7	1.4	6.7	5.4	2.3	2	1.5	1.1	1.1	0.57	0.05	0.77
DS05	2.50		460	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
DS05	4.20		700	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05



BETTER SOLUTIONS, INTELLIGENTLY ENGINEERED





APPENDIX C
Oil Salvage Limited Environmental Risk
Assessment Bishop's Stortford; Ref - EA04

Environmental Risk Assessment



Scope of Assessment	Reference Number	EA04
This Assessment is to assess the potential environmental impact of the Bishops Stortford Site		

Assessed By	Signature	Date
Neil Redmond		19 th October 2021
Approved By	Signature	Date
Mitch Vernon		19 th October 2021



Potential Environmental Hazards <i>(Please tick)</i>					
Odour	✓	Noise & Vibration	✓	Emissions to water & land	✓
Emission to Air	✓	Mud & Litter	✓	Pest, Vermin Insects	✓
Leaks & Spills	✓	Process generated Waste	✓	Dust & Particulate	
Other Hazards Identified <i>(please state below)</i>					
Arson and acts of vandalism. Accidental fire. Flood					

Ref	Title	Written By	Approved By	Version	Date
EA04	Environmental Risk Assessment Bishops Stortford			1.0	19 th October 2021



What do you do that can harm and what could be harmed			Managing the risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm	What is at risk what do I wish to protect	How can the hazard get to the receptor	What measures will you take to reduce the risk – who is responsible	How likely is this contact	What is the harm that can be caused	What is the risk that remains? The balance of probability and consequence
Odour associated with the storage and transfer of liquids	Farmland around the site, public footpaths, and highway A120 within 200m of plant, small residential area (6 houses).	Air	Waste types accepted are not considered odourless in nature. Strict waste acceptance procedures in place audited to ISO standards. Only permitted waste accepted on site. Liquids stored within enclosed tanks liquids pumped between vehicles and tanks. Drivers are instructed to report any unusual or strong odours when attending site. A sniff test will be completed on a quarterly basis.	Low	Odour Nuisance	Not significant due to the type of waste accepted on site
Noise and Vibration from plant operation and vehicular movements	Farmland around the site, public footpaths and highway A120 within 200m of plant, small residential area (6 houses).	Air	Little increase in traffic expected above current traffic movements. Vehicles undergo regular maintenance and inspections. Regular maintenance of transfer pumps to reduce noise and vibration. Pumps changed at end of working life. Speed limits implemented on site.	Low	Noise Disturbance	Not Significant due to the location and mitigation methods implemented on site.

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What do you do that can harm and what could be harmed			Managing the risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm	What is at risk what do I wish to protect	How can the hazard get to the receptor	What measures will you take to reduce the risk – who is responsible	How likely is this contact	What is the harm that can be caused	What is the risk that remains? The balance of probability and consequence
Contaminated site run off	Surface Water. Ground Water. Waterfowl. Aquatic life. A small brook runs along the west of the site.	Runoff and percolation	Site is concreted to prevent percolation to ground water. Surface water is direct towards an interceptor. All liquids stored in tanks. All tankers and ancillary equipment undergo regular maintenance and inspection. All tanks undergo regular inspection and maintenance. Discharge valve to the brook isolated, surface water captured by the interceptor and rainwater collected in the bund will be removed by tanker and taken to Lyster Road for treatment. All storage tanks are contained within regularly inspected and maintained bund walls capable of holding 110% of content.	Low	Ground water and surface water contamination	Not Significant due to mitigation methods implemented on site

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What do you do that can harm and what could be harmed			Managing the risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm	What is at risk what do I wish to protect	How can the hazard get to the receptor	What measures will you take to reduce the risk – who is responsible	How likely is this contact	What is the harm that can be caused	What is the risk that remains? The balance of probability and consequence
Emissions to Air	Farmland around the site, public footpaths, and highway A120 within 200m of plant, small residential area (6 houses).	Air	Site is not situated within air protection zone. The site is not permanently occupied and access to the site will be limited. Fleet being upgraded to Euro 6 vehicles. Vehicles will spend a short amount of time on site to load / unload. Emissions from tanks and tanker manways occur during oil transfer only, as the result of displacement.	Low	Air pollution and Nuisance from VOC contamination	Not Significant due to mitigation methods implemented on site.
Leakage of fuel and oils from Tanks	Surface Water. Ground Water. Waterfowl. Aquatic life. A small brook runs along the west of the site. Local land quality.	Overland Surface Water	See contaminated site run off section. Site is not situated in wildlife protection zones. Visual and electronic overfill detection on all storage tanks. Tanks sit within bunds. Flexi pipes are inspected on a regular basis. Site employees trained to deal with spills. Site is operated by drivers who are all ADR trained and carry the necessary equipment and PPE needed for the control and clean-up of small to medium spillages. Company operates a Spillage and Accidental Release Standard Operating Procedure	Low	Ground water and surface water contamination Land contamination	Not Significant due to mitigation methods implemented on site.

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What do you do that can harm and what could be harmed			Managing the risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm	What is at risk what do I wish to protect	How can the hazard get to the receptor	What measures will you take to reduce the risk – who is responsible	How likely is this contact	What is the harm that can be caused	What is the risk that remains? The balance of probability and consequence
Pests, vermin, and Insects	Farmland around the site, public footpaths, and highway A120 within 200m of plant, small residential area (6 houses).	Through the air and over land	Liquids stored do not attract pests and vermin. Drivers instructed to not dispose of any rubbish at the site. Regular inspections of site if any indication of pest, vermin activity arrangements will be made with a pest control company to manage the situation. Records will be kept monitoring the effectiveness of control measures. Site is regularly maintained to prevent vegetation overgrowth.	Low	Ground water and surface water contamination Damage to plant and equipment Hazard to human health	Not Significant due to mitigation methods implemented on site
Arson and vandalism causing the	Farmland around the site, public footpaths, and highway A120	Air Spillages and contaminated	Site is located a significant distance from any built-up area or residential properties. Mischievous	Medium	Air pollution Ground water and surface	Not Significant due to mitigation

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release of polluting materials to air, water, or land.	within 200m of plant, small residential area (6 houses).	fire water run off	attempts at unauthorised access are unlikely to occur. Site is surrounded by a robust security fence topped with barbed wire. Intruder alarm with perimeter sensors in place the system is linked to company directors' phones. Security gates locked outside of times of occupation. Tanks sit within bunds built with fire retardant sealant, rope, and joint filler. Fire water run off would be collected within an interceptor that would then be pumped into a tank and transferred off site for proper disposal.		water contamination Damage to plant and equipment	methods implemented on site
What do you do that can harm and what could be harmed			Managing the risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk
What has the potential to cause harm	What is at risk what do I wish to protect	How can the hazard get to the receptor	What measures will you take to reduce the risk – who is responsible	How likely is this contact	What is the harm that can be caused	What is the risk that remains? The balance of probability and consequence
Accidental Fire Explosion	Farmland around the site, public footpaths and highway A120 within 200m of plant, small residential area (6 houses).	Air Spillages and contaminated fire water run off	Tanks sit within bunds which are built with fire retardant sealant, rope, and joint filler. All plant, equipment and electrical installations will be kept maintained and in good working condition and subject to routine inspection and maintenance. No smoking is permitted on the site. Strict waste acceptance procedures in place audited to ISO standards. Only permitted waste accepted on site.	Low	Air pollution Ground water and surface water contamination Damage to plant and equipment	Not Significant due to mitigation methods implemented on site

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			Only a small amount of potential flammable liquids is stored on site. Drivers ADR trained.			
Flood	Surface Water. Ground Water. Waterfowl. Aquatic life. A small brook runs along the south of the site. Local land quality.	Overland Surface Water Runoff and percolation	OSL has signed up to weather watch, flood notifications. In the event of a flood all tanks will be emptied, all unsecured plant will be stowed safely or removed from site.	Low	Ground water and surface water contamination	Not Significant due to mitigation methods implemented on site.

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