Gedney, Oliver

From: Gedney, David
Sent: 15 February 2022 15:01
To: _planningadvice
Subject: FW: H07-0109-22 (D & R Property Services Ltd)
Attachments: UK21.5670 Phase I & II Geo-Environmental Assessment - Land at Millfield Nurseries, Gedney Hill (Issue 1).pdf

Please scan email and attachment – 6SUP (Phase I & Phase II Geo-Environmental Assessment)

Regards

David Gedney | Senior Planning Officer| **South Holland District Council**
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Please note that any informal officer opinion expressed by this email is without prejudice and is not binding on the Council during the consideration of any formal application.

From: G R MERCHANT LTD <grmerchant.arch.cons@gmail.com>
Sent: 15 February 2022 11:23
To: Gedney, David <DGedney@sholland.gov.uk>; _planningadvice <planningadvice@sholland.gov.uk>
Subject: H07-0109-22 (D & R Property Services Ltd)

This message originated from outside your organization

Dear David,

Please see attached report to be added to this application.

Regards
Hannah

G R Merchant Ltd
01406 490800
www.grmerchantltd.com

Phase I & II Geo-Environmental Assessment

Land at Millfield Nurseries
Mill Lane
Gedney Hill
PE12 0PW

Prepared for:

R K Wilson Builders Ltd
Sandpit Farm
Wisbech Road
Long Sutton
Lincolnshire
PE12 9AQ

EPS Project Reference:	UK21.5670
Date Issued:	15th February 2022
Report Status:	Issue 1

LAND AT MILLFIELD NURSERIES, GEDNEY HILL

NON-TECHNICAL CLIENT SUMMARY

This report presents the findings of a combined Phase I Desk Study and Phase II Intrusive Investigation undertaken to determine ground conditions and establish if there are any environmental risks associated with the site and its development. Pertinent findings and conclusions may be summarised as follows:

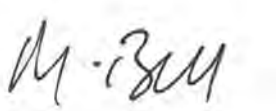
- The Phase I Desk Study identified that the site has historically been used as part of the adjacent Millfield Nurseries and a small infilled ditch is located in the east of the site.
- Geological mapping suggests the ground conditions are likely to comprise superficial Tidal Flat Deposits over bedrock of the Oxford Clay Formation, with the Tidal Flat Deposits classified as an Undifferentiated Secondary Aquifer. The nearest surface water feature located around 30m away, the site is considered to be of low environmental sensitivity.
- Ground investigation works involved the excavation of seven trial pits and drilling of four boreholes to a maximum depth of 4.0m. Ground conditions were mostly found to comprise a limited thickness of topsoil followed by silty sand and sandy silts representative of Tidal Flat Deposits. Made ground was encountered in the area identified as an infilled ditch up to 2.3m below ground level. Groundwater was encountered at around 2.5m in each of the boreholes.
- The infill materials in the ditch feature were forensically analysed to determine if they pose of risk from generating ground gases through the decay of organic materials, the risk was found to be very low.
- Laboratory testing of shallow soil samples obtained has shown no levels of contamination that pose a risk to future site users. Provided no unforeseen contamination is encountered, there should be no further need for any investigation or remediation associated with contaminated land through the planning process.

ENGINEERING SUMMARY

- The ground conditions are considered suitable for conventional spread foundations bearing on the underlying Tidal Flat Deposits Member, with allowable bearing capacities ranging from 75kN/m^2 to 125kN/m^2.
- For pavement design a design CBR value of 2% for silty soils and up to 10% for sandy soils is considered appropriate, however it is recommended that in-situ CBR testing should be undertaken in areas of new hardstanding to confirm this once final levels have been established.
- A Design Sulphate Class (DS) of DS-1, with an aggressive chemical environment for concrete (ACEC) of AC-1 is recommended for shallow buried concrete.

The above points represent a simplified summary of the findings of this assessment and **must not** form the basis for key decisions for the proposed development. A thorough review of the details is contained within the following report, or alternatively get in touch and we'll talk you through it.

Project Reference:	UK21.5670
Title:	Phase I & II Environmental Assessment Land at Millfield Nurseries, Mill Lane, Gedney Hill
Client:	R K Wilson Builders Ltd
Date:	15th February 2022
EPS Contact Details:	7B Caxton House Broad Street Cambourne Cambridge CB23 6JN T: 01954 710666 F: 01954 710677 E: info@epstrategies.co.uk W: www.epstrategies.co.uk
Status:	Issue 1

Author:	**Reviewed:**	**Authorised:**
		
Abbey High	Steve Bullock	Marcus Bell
Consultant	Director	Associate Director

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If third parties have been contracted / consulted during compilation of this report, the validity of any data they may have supplied, and which are included in the report, have been assessed as far as possible by EPS however, EPS cannot guarantee the validity of these data.

No part of this report, or references to it, may be included in published documents of any kind without approval from EPS. This report and its contents, together with any supporting correspondence or other documentation, remain the property of Environmental Protection Strategies Ltd until paid for in full.

The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

The National Planning Policy Framework requires a competent person to prepare site investigation information, which is defined as a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation. EPS considers that it fulfils these criteria and would welcome any request for staff CVs or case studies to demonstrate it.

As stated within DEFRA's Contaminated Land Statutory Guidance, with any complex risk assessment it is possible that different suitably qualified people may reach slightly different conclusions when interpreting the same information. EPS recognises this and considers the conclusions presented within this report to be robust and appropriate but input from the Local Authority and their judgement in line with this guidance would still be welcomed.

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Appendix K Generic Screening Criteria
Appendix L Method Statement for Unexpected Contamination

1 INTRODUCTION

In November 2021, Environmental Protection Strategies Ltd (EPS) was commissioned by G R Merchant Ltd on behalf of R K Wilson Builders Ltd (Mr R Spencely) to complete a Phase I & II Geo-Environmental Assessment at land at Mill Lane, Gedney Hill, PE12 0PW ('the site'); see Figure 1.

The work was commissioned in order to support planning proposed by addressing risks posed by contamination for a parcel of land included within South Holland District Council Planning Ref: H07-0927-21, for the development of nine dwellings. Contaminated land is covered by condition #12 on this consent. Inspection of the proposed development plan indicates plans to erect six of the dwellings within the boundaries of the land included as part of this report. The full area of Millfield Nurseries covered by this planning permission also includes a parcel of land further west of the site, which is not covered by this report.

This report presents the findings, conclusions, and recommendations of the Phase I Desk Study and subsequent Phase II Intrusive Investigation undertaken as instructed.

1.1 Objectives

The objectives of this investigation were as follows:

a) Compile a Phase I Desk Study and Conceptual Site Model (CSM) through a Preliminary Risk Assessment to evaluate the potential risks the site may pose to human and environmental receptors, both currently and in future.
b) Investigate potential contaminant linkages identified in the CSM by means of investigating shallow soils.
c) Determine the potential risks posed by the site and make recommendations for further work that may be required, to ensure safe development in accordance the Environment Agency's *Land Contamination: Risk Management* guidance (LC:RM, 2020) and the *National Planning Policy Framework*.
d) Collect information on ground conditions and strength in order to make appropriate recommendations for geotechnical design.

1.2 Scope of Work

To perform an exploratory assessment of the site in accordance with the principles and requirements of DEFRAs '*Contaminated Land Statutory Guidance*' (2012), BS10175 –'*Investigation of Potentially Contaminated Sites*', BS5930:2015 *'Code of practice for ground investigations'*, BS 8485:2015 *'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'* (Annex E – The 'RB17' Approach) and BS EN 1997 '*Geotechnical Design*', the following tasks were undertaken:

Desk Study:

- Collection of site records.
- Study of existing geological, hydrogeological and historic maps of the area.
- Consultation of environmental databases, including records held by the local authority (where available).
- Review of proposed development plans.
- Development of a Conceptual Site Model (CSM) through a Preliminary Risk Assessment.

Intrusive Investigation:

- Site walkover, inspection of any visual evidence of contamination at the site, obtaining photographic records.
- Health and safety briefing / site supervision.
- Drilling of four window sample boreholes to a maximum depth of 4.0m below ground level (bgl) using a track-mounted percussive rig and excavation of seven trial pits to a maximum depth of 2.2m bgl using a track-mounted excavator.
- Continual logging of ground conditions including inspection of samples for visual and olfactory contamination, and laboratory analysis of selected representative samples.
- Forensic analysis of samples of the fill material to determine the long-term potential for the generation of ground gases (RB17 forensic sorting and Total Organic Carbon testing).

Reporting:

- Data collection
- Interpretation of data including completion of Generic Quantitative Risk Assessment

The findings and conclusions of these investigations are presented in the following sections.

1.3 Project Limitations and Constraints

The purpose of this report is to present the findings of a soil sampling investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, Environmental Protection Strategies Ltd (EPS) makes the following statements:
No investigation method is capable of completely identifying all ground conditions that might be present in the soil or groundwater under a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes and / or trial pits to recover soil and / or groundwater samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface however, ground conditions are naturally variable and it may be possible that the conditions encountered may differ to those found during the investigation.

No visible evidence of Japanese Knotweed was identified during the site walkover. However, this plant can be difficult to identify in the early stages of growth and therefore it is not always possible to identify its' presence at certain times of the year. For this reason, EPS cannot confirm that Japanese Knotweed rhizomes do not exist and it is recommended that if it is suspected that this species, or other similarly invasive plants are present at the site, a specialist contractor should be commissioned to make a detailed assessment.

The investigation was carried out to assess the significance of contamination resulting from the use of the site as identified in this report. Unless EPS has otherwise indicated, no assessment of potential impact of any other previous uses has been made.

2 SITE CHARACTERISATION

The following section provides a summary of the information collected in relation to the site location and history.

2.1 Site Location and Description

Detail	Description
Location	The site lies north of the B1166/ Mill Lane, to the west of Gedney Hill, a village located approximately 8 miles west of Wisbech.
National Grid Reference	533580, 311580
Topographic Elevation	Levels appear to be mostly flat and lie at approximately 3m Above Ordnance Datum (AOD).
Site Description	A walkover was completed by EPS on the 24th November 2021 and the site was found to comprise two roughly equally sized parcels of land, which are associated with Millfield Nurseries which extends to the west/ northwest of the site. The western parcel of land is roughly square in shape, with the western half of the square occupied by a large commercial greenhouse. During the site visit the greenhouse was used to house potted plants and a diesel heater was located at one end, however this wasn't in use during the visit and there was no evidence of fuel identified on site. The eastern half of this parcel was open, with two areas of ground covered by a weed protective membrane and a small strip of grass running through the centre. The membrane covered area was used to store more potted plants. The eastern parcel of land is an open area of grass with a boundary of hedges to the north, east and west, with half of the western boundary delineated by stakes in the ground. During the site visit this area was not in use by the nursery. No obvious signs of potential sources of contamination such as fuel/chemical storage were noted during the inspection.
Surrounding Land Use	There is a residential property located between the two parcels of land as well as properties to the north along West Drove North and south and west along Mill Lane. To the west lies a number of greenhouses and glasshouses associated with the nursery as well as a barn and parking/ delivery area. During the site visit four historic above ground diesel tanks were observed approximately 100m from the site boundary, these are understood to be empty and not in use.

A plan showing the site location is provided as Figure 1, the current site layout is detailed on Figure 2 and an aerial photograph is included as Figure 3.

Selected Site Photographs are included as Appendix A. An indicative proposed development plan is included as Appendix B and relevant extracts of a Landmark Envirocheck report are included as Appendix C.

2.2 Geo-Environmental Setting

<table>
<tr><th>Detail</th><th colspan="2">Description</th></tr>
<tr><td>Geology</td><td colspan="2">Geological maps of the area suggest the ground conditions are likely to comprise superficial Tidal Flat Deposits (sand and silt), underlain by mudstone of the Oxford Clay Formation.

Information on the site's geological context is included as Appendix D.</td></tr>
<tr><td>British Geological Survey (BGS)</td><td colspan="2">An historic borehole log was acquired from the British Geological Survey (BGS) for a location within 500m of the site and reports a clayey silt and silty clay with peat fragments to 8.35m with a thin band of peat around 7.2m. Encountered beneath this was a clayey silty sand with occasional gravel to a total depth of 9.0m. Groundwater was not encountered. A copy of the historic borehole log is included within Appendix D.</td></tr>
<tr><td rowspan="8">Geological Hazards</td><td>Hazard</td><td>On Site Risk</td></tr>
<tr><td>Mining (non-coal)</td><td>No Hazard</td></tr>
<tr><td>Collapsible Ground</td><td>No Hazard</td></tr>
<tr><td>Compressible Ground</td><td>Moderate</td></tr>
<tr><td>Ground Dissolution</td><td>No Hazard</td></tr>
<tr><td>Running Sand</td><td>High</td></tr>
<tr><td>Landslide</td><td>Very Low</td></tr>
<tr><td>Shrinking / Swelling Clay</td><td>No Hazard (22m NE)</td></tr>
<tr><td>Radon</td><td colspan="2">The Envirocheck report indicates that the site lies in an area where less than 1% of homes are estimated to be at or below the radon action level. Therefore, the report also states that no protective measures are required in the construction of new buildings or extensions.</td></tr>
<tr><td>Hydrogeology</td><td colspan="2">Groundwater vulnerability maps for the area show that the superficial Tidal Flat Deposits are classified as an Undifferentiated Secondary Aquifer and the bedrock Oxford Clay Formation is classified as Unproductive Strata. The site does not lie within a Source Protection Zone (SPZ) for local groundwater abstraction.

The Envirocheck report does not list any groundwater abstractions within 1km of the site. Groundwater vulnerability maps are included as Appendix E.</td></tr>
<tr><td>Hydrology</td><td colspan="2">The nearest surface water feature is Fleet Drain located 35m north.

The Envirocheck report lists ten discharge consents within 250m of the site, the nearest of which is 87m northeast at Lincoln Avenue Sewage Works and concerns the discharge of treated sewage into a tributary of Fleet Drain.

The Envirocheck report does not list any surface water abstractions within 1km.</td></tr>
</table>

<table>
<tr><th>Detail</th><th>Description</th></tr>
<tr><td>Flood Risk</td><td>Review of the EA Flood Zone Map for the area indicated that the site is located within Flood Zone 1, which is defined as the area with a low potential risk from fluvial or tidal sources. It should be noted that the EA maps do not take into account the presence of flood defences when designating the flood zones although the areas benefitting from flood defences are shown. They also do not account for flooding from other sources such as poor drainage, or groundwater.
An indicative flood zone map is included as part of Appendix E.</td></tr>
<tr><td>Landfill & Waste</td><td>The Envirocheck report lists no licensed waste treatment or transfer sites within 1km, but does record seventeen instances of potentially infilled land (15 water and 2 non-water) within the same radius, with the closest being around 80m east and denoting an infilled pond, river or stream.

The Envirocheck report lists one historic landfill within 250m, located 40m northeast at West Drove North where household waste was deposited. The landfill was known as ‘Peacock House’.

Three areas of potentially infilled land (such as a pond/stream) are listed within 250m of the site, with the nearest located around 120m south.</td></tr>
<tr><td>Industrial Land Use</td><td>The Envirocheck report lists six industrial land uses within 1km, the most pertinent of which are summarised below.
<table>
<tr><th>Land Use</th><th>Distance (Direction)</th><th>Status</th></tr>
<tr><td>Trevor E Fisher (Road Haulage Services)</td><td>457m (SE)</td><td>Inactive</td></tr>
<tr><td>H Sly & Sons (Mechanical Engineers)</td><td>528m (NW)</td><td>Inactive</td></tr>
<tr><td>Central Garage (Garage Services)</td><td>599m (S)</td><td>Inactive</td></tr>
<tr><td>Gedney Hill Garage Services (Garage Services)</td><td>741m (S)</td><td>Active</td></tr>
</table></td></tr>
<tr><td>Pollution Incidents</td><td>There are two recorded pollution incidents to controlled waters within 250m, the closest of which relates to a release of an unknown pollutant into a freshwater stream, located around 30m west. This was classified as a Category 3 (Minor) incident.</td></tr>
<tr><td>Previous Investigation or Remediation</td><td>EPS are not aware of any previous ground investigations or remedial works undertaken at the site. There is an archaeological investigation available to view on South Holland’s planning portal which does contain some relevant information. The report (Archaeological Evaluation of Land at Millfield Nurseries, Archaeological Project Services ref 73/18, 2018), covered a slightly larger area than the current study area but includes some pertinent information for this geo-environmental assessment, summarised as follows:
Four trenches, measuring 16.5m, 13.7m, 12.5m and 10m long by 1.5m wide, were opened to the top of archaeological deposits or the surface of the underlying natural geology. Three of the trenches (Nos 2, 3 & 4) were positioned inside the current study area.
The field to the south east was used for growing peony’s at the time contained Trench 4.</td></tr>
</table>

Detail	Description
	• Below the natural topsoil's, alluvial silts and clays were encountered. • An agricultural feature or tributary typical of a fenland paleochannel was encountered in the trench just east of the green house on the site.
Sensitive Land Use	The Envirocheck does not list any areas of sensitive land use within 1km.

2.3 Site History

A summary of historical map data from 1888 to 2021 is summarised below. Key points are highlighted, and copies of relevant historic maps and any others examined during the investigation are included in this report as Appendix F.



- Earliest mapping shows the site as undeveloped agricultural land and a small area in the east is labelled "D" and has been interpreted as an infilled ditch. Some marshy ground is shown beyond the neighbouring Peacock House to the north.
- By the 1970s Millfield Nurseries has been developed to the west and historic mapping shows the site itself to remain undeveloped until the present day, however aerial photography from 1999 shows a large area of the site to be planted and presumed to be in use by the nursery.
- Other notable land uses within 250m of the site include Gedney Hill Corn Mill which is present from 1888 and shown as disused by the 1950s, Myrtle House Farm present from 1976-2021, and Sewage Works present from 1976-2021.
- Publicly available aerial imagery (Google Earth™, 2022) shows the site in use as fields for the nursery in the mid-1980s but it is not until some point between 2007-2014 that the green house on the western part of the site is visible. In the surrounding area, the former landfill recorded at 'Peacock House' positioned 40m to the north appears to have been occupied by farmland through these aerial records, and the crops do not appear uneven or distressed when compared to the wider fields as would typically be the case for a former landfill of this nature. There is no record on the historical mapping of this landfill either, it possibly was just a slight raising of the former marshy ground which was recorded in that area. The dwelling of Peacock House remains between the site and the former landfill throughout recorded history.

3 PRELIMINARY RISK ASSESSMENT & CONCEPTUAL SITE MODEL

In accordance with the Environment Agency's Land Contamination: Risk Management, there are three stages to managing contaminated land (Risk Assessment/Remedial Options Appraisal/ Remediation and Verification). This section outlines the first tier of Stage 1, the Preliminary Risk Assessment.

The following section provides a review of the contaminant linkages that may be active at the site, whereby EPS have examined the potential sources that may be present as a result of historic and / or current site activities and where potential interaction between these sources and the identified human / environmental receptors may occur.

3.1 Background

A Desk Study comprises the first stage of any geo-environmental assessment, the purpose of which is to determine what potentially contaminative activities may have occurred at the property or the surrounding area which may pose an environmental or geological risk to site users, the surrounding environment or proposed development, either at present or in the future.

The method used in this investigation to assess the environmental risk posed is based on the concept of 'contaminant linkage', which considers the following three factors:

Source	The location from which an environmentally hazardous / contaminative substance is, (or was,) derived.
Pathway	A route or mechanism via which a source could come into contact with a receptor to cause significant harm.
Receptor	An environmentally sensitive object or condition e.g. person, property, controlled water, or ecological system, which may be present now or in future.

If all three factors are identified, there is the potential for a 'contaminant linkage' to be active, which could result in significant harm being caused to the environment or human health.

3.2 Source Characterisation

The following potential contaminant sources have been identified at the site and in the surrounding area:

Potential Source	Source Description	Principal Contaminants of Concern
Current and Historical Site Use	Current and historic use of the site as a nursery. Including the possible use of lead arsenate pesticides particularly for flower-growing.	PAH, Metals, ACM, Pesticides & Herbicides
	Historically infilled ditch shown on historic mapping	Ground Gas (CH_4, CO_2)
Current and Historical	Historic landfill located 40m north of the site 'Peacock House'.	

Potential Source	Source Description	Principal Contaminants of Concern
Surrounding Land Use	Historic above ground diesel storage tanks.	TPH
	Current and historical farms/farmland in the surrounding area.	PAH, Metals, ACM, Pesticides & Herbicides

Notes: PAH Polycyclic Aromatic Hydrocarbons; ACM Asbestos Containing Material; TPH Total Petroleum Hydrocarbons; CO_2 Carbon Dioxide; CH_4 Methane

3.3 Potential Receptors

A framework for the assessment of risks arising from the presence of contamination in soils has been produced by the Environment Agency and the Department for the Environment, Food and Rural Affairs (DEFRA) and is presented with the report: '*Using Science to Create A Better Place: Updated Technical Background to the CLEA Model* – Science Report SC050021/SR3'. This guidance document defines a series of standard land-uses which have been further developed into six generic land-uses in the Category 4 Screening Levels project for Land Affected by Contamination (DEFRA/Contaminated Land: Applications in Real Environments (CL:AIRE) Project Report SP1010, 2014) which form a basis for the development of the Conceptual Site Model.

Risks posed to controlled waters have been considered in line with the Environment Agency's *approach to groundwater protection* (v1.2, 2018) and associated position statements.

The proposed development plan for the site includes the construction of six dwellings with associated gardens, therefore, the land use has been considered as:

- Residential (with home grown produce)

In view of the environmental setting, current and potential future land use of the site and surrounding sites, the potential receptors for any contaminant impact are discussed below:

Receptor	Site Specific Description
Human	Future site users and site workers involved in the site redevelopment have the potential to be at risk from exposure to potential contaminants of concern (CoCs).
Groundwater	The site is reported to be underlain by Tidal Flat Deposits which are defined by the EA as an undifferentiated secondary aquifer and the previous archaeological investigation encountered alluvial clays and silts, which are the typical low-permeability soils present in this unit. These soils are of negligible groundwater resource value so groundwater has been discounted as a receptor.
Surface Water	A number of surface watercourses are present within the surrounding area including Fleet Drain 35m north of the site. It is possible that site derived contaminants of concern may enter these watercourses by overland flow, migration through unsaturated soils or entering shallow surface drainage / historical land drainage which discharges to these drains, therefore surface waters must be considered as a sensitive receptor within the conceptual site model.
Flora and Fauna	The proposed development is likely to include the provision of domestic gardens and areas of soft landscaping. Some of the identified contaminants of concern are known to be phytotoxic and as such, the potential for this impact should be considered.
Buildings & Infrastructure	Subsurface structures are likely to be present at the site which may be adversely affected by the potential presence of the identified contaminants of concern. This could include concrete used in building foundations, buried potable water supply pipes and other service lines and pipes.
Adjacent Land	Adjacent land including private residential dwellings could also be at risk from potential contaminants found at the site.

3.4 Potential Pathways

Where contaminants may be present in soil, there are a number of potential pathways that enable human receptors to come into contact with or be exposed to them. The most direct pathways, considered under current UK legislation, can be summarised as follows:

- Direct ingestion of contaminated soil
- Ingestion of household dust
- Ingestion of contaminated vegetables
- Ingestion of soil attached to vegetables
- Dermal contact with contaminated soil
- Dermal contact with household dust
- Inhalation of fugitive soil dust
- Inhalation of fugitive household dust
- Inhalation of vapours outdoors
- Inhalation of vapours indoors

Clearly, not all of these potential pathways apply for every standard land-use. For example, ingestion of contaminated vegetables will not apply to land uses other than residential with plant uptake and allotments.

However, in addition to direct exposure pathways, a number of physical transport mechanisms / pathways may also exist at a site that allow remote or less accessible contaminants in soil or groundwater to reach human or environmental receptors both at a site and beyond the site boundary. These include the following:

- Downward and lateral movement of contaminants in soil either by gravity or through being 'leached' by percolating rainwater.
- Lateral migration of contaminants dissolved in groundwater.
- Direct seepage or leaching of contaminants from soil into subsurface drains or supply pipework.
- Volatilisation of contaminants from groundwater or unsaturated soils into buildings or outdoor air.

Through examination of the standard land use and environmental setting at each site, the presence of pathways and transport mechanisms described above must be considered when assessing whether a contaminant linkage may plausibly be active, and therefore be included in the conceptual site model.

3.5 Summary of Contaminant Linkages

Considering the site use and environmental setting, and the proposed land use; the following plausible contaminant linkages have been identified through this Phase I assessment and require further investigation.

Source	Pathway	Receptor
Contaminated soil (infilled ditch/residual diffuse contamination from nursery/made ground)	Direct contact and inadvertent ingestion by eating or smoking with dirty hands	Construction workers during redevelopment & site users
	Inhalation of fugitive dusts	
	Direct uptake and/or adherence of contaminated soil to vegetation and subsequent ingestion.	Site users
	Migration of ground gas to indoor air	

The following comments are made with respect to contaminant linkages which have been considered through development of the conceptual model, but have not been concluded as 'plausible' – i.e. through which a significant possibility of significant harm could occur to an identified receptor:

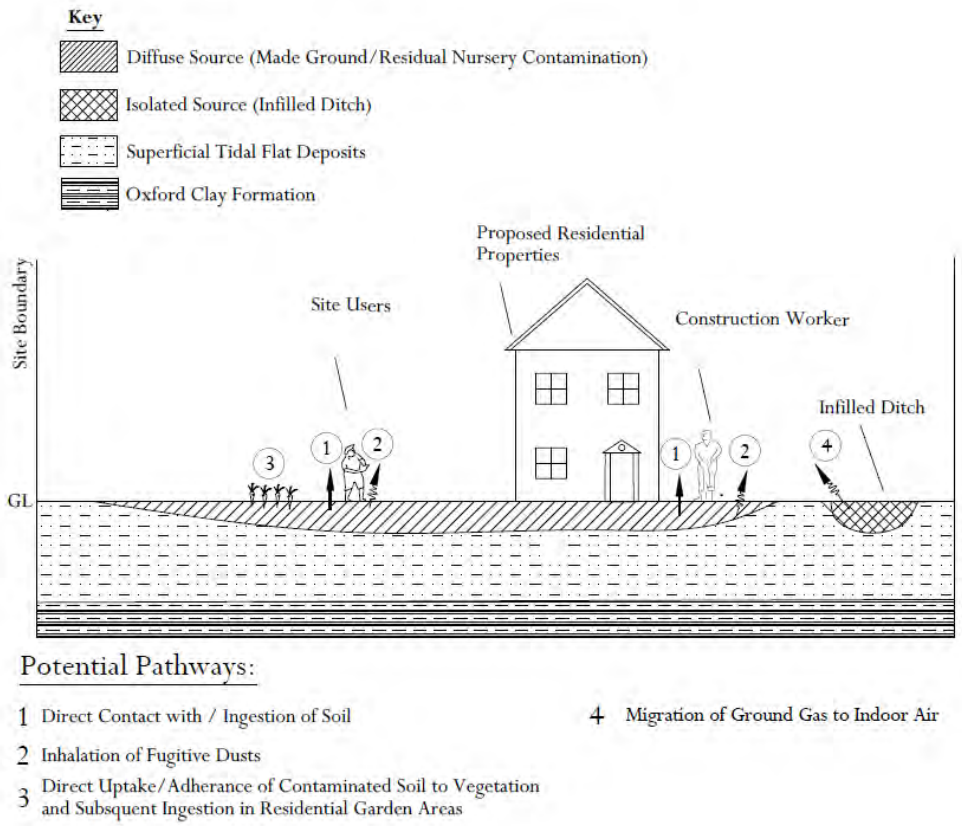
- Whilst the Envirocheck report identified a historic landfill 40m north of the site (Peacock House), it is not considered capable of posing an ongoing ground gas risk to site-based receptors introduced through the development. There does not appear to be any record of a former pit or depression into which the municipal waste would have been landfilled, the only indicative record is some marshy ground which may have been raised. The subsequent vegetation does not appear to be affected and there is an intervening house (Peacock House) which appears to pre-

date the landfill (and therefore will not have modern gas protection issues), but does not appear to have any issues with on-site gas migration. Given the size and age, (and therefore likely nature of fill material) of this feature from the site as well as the proven low-permeability of the ground, a plausible contaminant linkage is not recognised from the on-site migration of ground gas. Nevertheless, risks from migration of ground gas from the on-site infilled ditch have not been discounted at this stage.

- PAHs and metals (including lead arsenate pesticides) have been identified as contaminants of concern associated with the historic onsite infill, however these contaminants are considered to be relatively immobile in the environment by virtue of their very low solubility and volatility. On this basis, plausible pathways by which these potential contaminants could pose a significant risk to nearby surface watercourses are not considered to be active.
- Although above ground diesel storage tanks were identified off-site, they are no longer in use and also a considerable distance (<100m) from the site and there are no other significant sources of petroleum hydrocarbons identified on the site. Therefore, no contaminant linkages have been identified associated with potential contaminants sourced from the tanks, including risks to buried infrastructure and drinking water pipes.

The following diagram provides an illustration of the plausible contaminant linkages that may be active at the site and which may need further investigation or control to ensure safe development:

Mill Lane, Gedney Hill – Illustrative Conceptual Site Model



4 SUMMARY OF INTRUSIVE INVESTIGATIONS

Intrusive ground investigations were undertaken on the 24th November and the 22nd December 2021 in accordance with EPS standard operating procedures, copies of which will be made available on request. A summary of all site activities is presented in the following sections:

4.1 Exploratory Hole Locations

Exploratory hole locations were selected through consideration of the potential contaminant linkages identified through the Phase I Desk Study, the proposed development layout, the location of below ground utilities as well as operational and health & safety considerations.

Four window sample boreholes (WS01-WS04) were formed at the site to a maximum depth of 4.0m below ground level using a track-mounted percussive drilling rig and seven trial pits (TP01-TP07) were excavated using a tracked excavator to a maximum depth of 2.2m.

The overall objective in terms of exploratory hole locations was to provide an appropriate lateral and vertical coverage of the soils underlying the site in order to offer information relating to their quality and nature.

All positions were reinstated with soil arisings upon completion.

A borehole and trial pit location plan is presented as Figure 4.

4.2 In-Situ Testing & Soil Sampling

Each location was logged for ground conditions encountered and inspected for any physical evidence of contamination, such as soil staining, odour and the presence of separate phase liquids on a precautionary basis. Borehole and trial pit logs are presented in Appendix G.

Where potentially volatile organic compounds are suspected, EPS carries a Photoionisation Detector (PID), which can be used to measure the relative concentrations of vapour associated with soil samples collected from different depths and locations at the site. In these circumstances, soil samples will be placed into plastic bags, sealed, shaken and then allowed to rest for a few minutes to allow time for volatile vapour to accumulate in the air trapped within the bag. The PID probe will then be used to pierce the bag and sample the air above the soil to measure the concentration of volatile compounds that have accumulated. PID readings are only used to provide EPS with a basic means to quantify areas of volatile organic compound in the field to help guide the investigation. In this case, no physical evidence of volatile organic compounds was encountered in the field (such as soil staining or odour), therefore, the PID was not used.

Standard or cone penetration tests (SPT/CPT) were carried out within all window sample boreholes at 1m intervals using an automatic trip hammer. The number of blows required to advance a standard split spoon, (or solid 60° nose cone for the CPT test) over the final 300mm of a 450mm total drive was recorded and is shown on the borehole records at the penetration resistance ("N" value).

4.3 Forensic Ground Gas Analysis

In order to evaluate the long-term ground gas generation potential of the material used to infill the former ditch in the east of the site, forensic analysis was undertaken in accordance with the RB17 method (BS8485: 2015 *'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'*). To this end, a large bulk sample covering the full depth profile of the made ground materials was collected from the trial pit, taken off-site and later sorted to remove selected organic and inorganic fractions including vegetation, wood, and man-made items (brick, glass, metal, ceramic). The remaining material was then split into fines and coarse fractions by passing through a 10mm sieve. Each fraction was weighed and calculated as a weight percentage of the original sample. Finally, a subsample of the fine (<10mm) fraction was collected in laboratory containers and submitted for chemical analysis for Total Organic Carbon (TOC).

The type and nature of the source material, i.e. a low/medium risk source comprising a small sized infilled feature with a depth of infilled material unlikely to exceed around 3-5m, in which filling is understood to have occurred more than 30 years ago, suggests that the use of the RB17 Forensic Analysis approach to assessing risks from ground gas, as outlined within Annex E of BS8485:2015, may be more appropriate than conventional gas monitoring. There are technical benefits to using the RB17 approach, as it allows a comprehensive assessment of the source material as opposed to a gas monitoring program based on 'snapshots' of data. It also affords the benefit that the assessment can be completed relatively quickly, as opposed to a six-monthly or annual monitoring programme.

The rationale behind this approach is to recombine the laboratory TOC result for the fines with the coarse fractions to obtain a more representative value for the bulk material (as these fragments are often removed by the laboratory in any case but not accounted for in the results). This can then be used to model projected ground gas generation rates for the entire infill mass over the next years to decades; and if it can be determined that gas will not be generated at rates that are likely to pose a significant risk to the site and its users (as is considered likely to be the case for such an old and small- scale infilled ditch), then this can remove the need for a lengthy and expensive gas monitoring programme. The outputs of this analysis are presented and discussed in later sections of this report.

4.4 Laboratory Testing

Samples obtained for analysis of identified contaminants of concern were submitted to Element Materials Technology of Flintshire, who hold appropriate UKAS / MCERT accreditation for the required testing. Samples were transported in laboratory supplied containers and delivered to the laboratory by approved courier.

Geotechnical testing was undertaken by Soil Property Testing, Huntingdon, a UKAS accredited laboratory.

Copies of chain of custody documentation are held by EPS and will be made available on request. Environmental and geotechnical laboratory testing schedules are included as Table 1 and Table 2 respectively.

5 FINDINGS OF THE INVESTIGATION

This section of the report provides a summary of the findings of the various aspects of the ground investigation.

5.1 Ground Conditions

A total of four window sample boreholes and seven trial pits were formed at the site and the ground conditions encountered, from surface level, were found to comprise:

- Topsoil/ Made Ground
- Tidal Flat Deposits

Site specific borehole and trial pit logs are included as Appendix G and give descriptions and depths of strata encountered. A summary of the general strata encountered across the site is provided in the table below, with more detailed description given in the following sub sections.

Geological Strata	Maximum Depth to Base of Strata (m bgl)	Strata Thickness (m)
Topsoil/Made Ground	2.3	0.2 – 2.3
Tidal Flat Deposits	>4.0	Not proven

5.1.1 Topsoil/ Made Ground

All boreholes and trial pits were located in areas of grass or soft landscaping and topsoil was encountered from the surface in each location, consisting of a dark brown sandy, clayey, silty topsoil with roots and rootlets.

Made ground was encountered in TP05 and WS02, located in an area to the east of the site where there is a historic infilled ditch. The infill was found to consist of a brown slightly gravelly, clayey silt with pottery, brick, glass and metal fragments as well as whole glass bottles encountered in TP05. The made ground extended to a maximum depth of 2.3m in WS02.

5.1.2 Tidal Flat Deposits

Underlying the topsoil and made ground, material interpreted to represent Tidal Flat Deposits was encountered and this progressed to beyond the formation depth of each location (observed to a maximum depth of 4.0m in each borehole). Materials were generally recovered as a yellowish brown sandy, clayey silt or silty, clayey sand.

5.2 Groundwater

Groundwater was encountered in WS01-WS04 and struck at depths around 2.5m below ground level at each location.

5.3 Physical Evidence of Contamination

Aside from the made ground fragments including brick, metals, glass and pottery encountered in the location of the suspected infilled ditch (TP05 and WS02) no other palpable evidence of contamination was encountered at any of the exploratory locations formed during the ground investigation.

5.4 Forensic Analysis (Infilled Ditch)

The forensic analysis of the infilled material determines the limiting values of organic content, which takes into the account the age of the fill, the thickness of it and the TOC data from the laboratory combined with the organic content of the forensic sorting process. For example, if made ground contains 30% discrete material at 20% TOC, and the remaining 70% of the soil fraction has a TOC of 0.5%, the overall limiting value will be 6.4%. For this site, the results are as follows:

Location	Limiting Value of Organic Content (%)
WS2	2.82

The full results of the forensic sorting are presented in Table 2 and in Appendix D, while the results of the laboratory TOC analysis are included as Appendix E.

5.5 Laboratory Analysis – Soil

A laboratory analysis testing schedule is presented as Table 1 and all environmental sample results obtained from the laboratory are included as Appendix H. The key results of laboratory testing on environmental soil samples are summarised below.

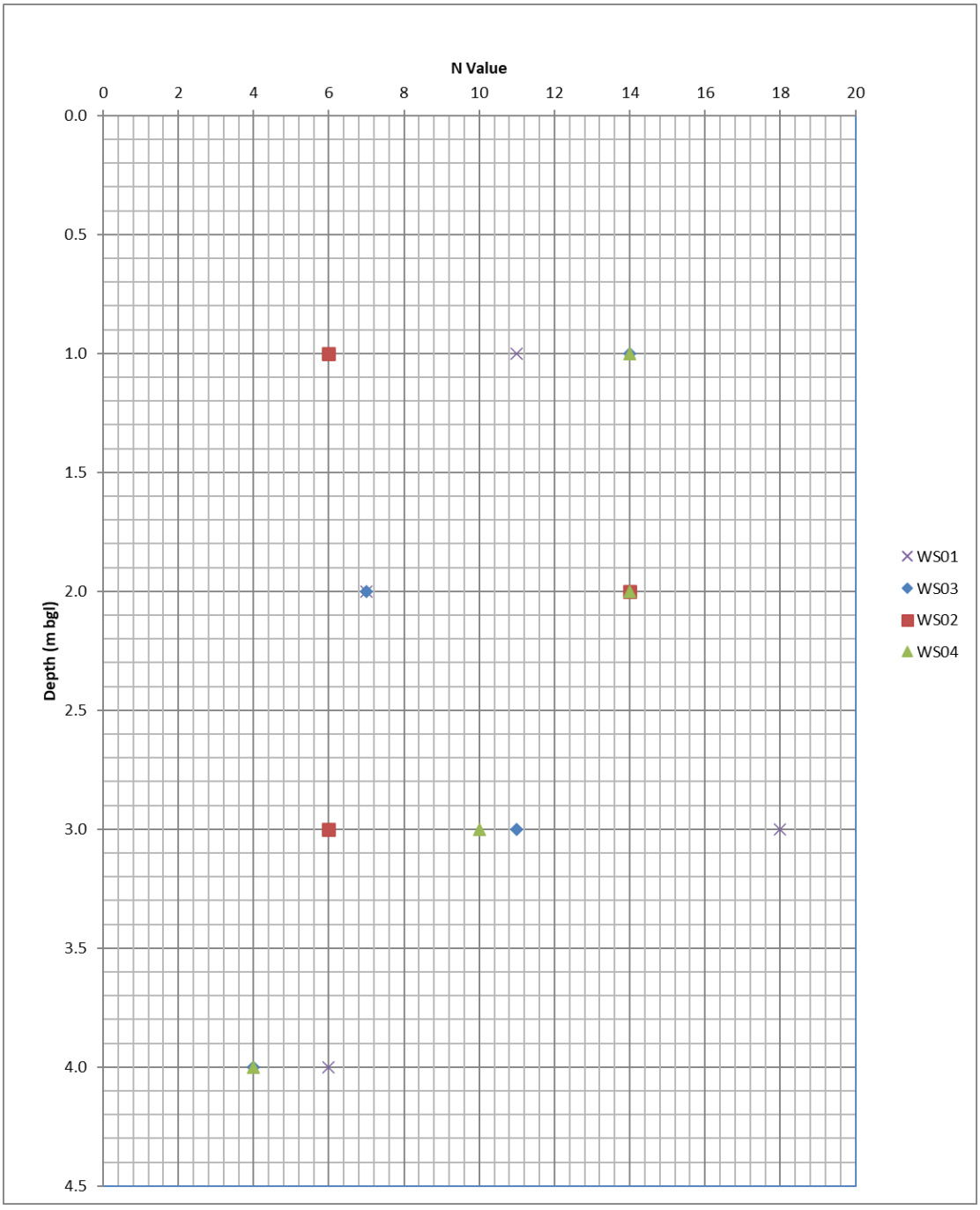
Contaminant	No. of Samples	No of Detections	Range of Detections (mg/kg)		Highest Location & Depth (m bgl)
			Min	Max	
Arsenic	6	6	9	13.3	TP05 (0.1-0.2)
Cadmium	6	1	0.3		TP05 (2.0-2.1)
Chromium	6	6	29.3	39.1	TP04 0.2-0.3
Copper	6	6	8	37	TP05 (2.0-2.1)
Lead	6	6	11	82	TP05 (2.0-2.1)
Mercury	6	1	0.8		TP05 (2.0-2.1)
Nickel	6	6	11.1	16.8	TP05 (0.1-0.2)
Selenium	6	0	-		-
Zinc	6	6	46	1128	TP05 (2.0-2.1)
Naphthalene	6	0	-		-
Benzo[a]pyrene	6	6	0.07	1.58	TP01 (0.4-0.5)
Dibenz(ah)anthracene	6	3	0.05	0.24	TP01 (0.4-0.5)
Total Aliphatics (C5-C35)	4	4	28	66	TP05 (0.1-0.2)
Total Aromatics (C3-C35)	4	4	44	213	TP01 (0.4-0.5)
p,p'-DDE	2	2	0.017	0.020	TP03 (0.3-0.4)
Asbestos (%)	6	0	-		-

Notes: - Contaminant not found above laboratory detection limits

5.6 Geotechnical Testing

5.6.1 In-Situ Geotechnical Testing

The results of the in-situ geotechnical testing are displayed on the graph below.



5.6.2 Laboratory Geotechnical Testing

The results of the geotechnical laboratory testing are summarised in the table below and all geotechnical sample results obtained from the laboratory are included as Appendix I.

Strata	**Range of Parameters**			
	Particle Size Distribution (%)			
	Clay	**Silt**	**Sand**	**Gravel**
Tidal Flat Deposits	2-11	11-44	45-87	0

Particle Size Distributions were undertaken on six samples of granular material in accordance with BS1377: Part 2: 1990: 9.2.

Sulphate contents and pH value determinations were carried out by the geotechnical laboratory, the results of which are included in Appendix I and summarised in Section 6.6. A geotechnical laboratory analysis testing schedule is presented as Table 2.

6 GEOTECHNICAL APPRAISAL

The ground conditions have been found to comprise topsoil overlying silts and sands representative of Tidal Flat Deposits, with a significant thickness of made ground identified in one area of the site. Groundwater has been recorded at around 2.5m below existing levels.

6.1 Geotechnical Category

Geotechnical Category (BS EN 1997-1:2004)	Definition
GC1	Geotechnical Category 1 (GC1) should only include small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations with negligible risk in terms of overall stability or ground movements and in ground conditions which are known.
GC2	Geotechnical Category 2 (GC2) should include conventional types of structure and foundation with no exceptional risk or difficult or loading conditions. Designs for structures in Geotechnical Category 2 should normally include quantitative geotechnical data and analysis.
GC3	Geotechnical Category 3 (GC3) should include structures or parts of structures, which fall outside the limits of Geotechnical Categories 1 and 2. This may include very large or unusual structures, structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions, or structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.

The proposed development is understood to comprise the construction of six new residential properties. Therefore, the below assessment has been undertaken in accordance with Geotechnical Category 2 (GC2), including conventional types of structure and foundation with no exceptional risk or difficult ground or loading conditions, as defined by BS EN 1997-1:2004.

6.2 Structural Foundations

6.2.1 Spread Foundations

As detailed above, the development is understood to comprise the construction of six new buildings, with foundations being vertically loaded. The foundation assessment has been undertaken in accordance with BS EN 1997-1:2004 to take in to account;

- Bearing Pressure (Ultimate Limit State)
- Settlement (Serviceability Limit State)

Ground conditions are considered suitable for the use of conventional spread foundations bearing on the underlying Tidal Flat Deposits.

Allowable bearing capacities have been calculated for depths of up to 2.0m for the underlying natural soils, and are provided in the table below:

Foundation Depth (m bgl)	Allowable Bearing Capacity* (kN/m^2)
1.0	75
1.5	100
2.0	125

*BS EN 1997 (EC7) Geo Load Combination 2

The allowable bearing capacity is the permissible increase in vertical stress at the level of the underside of the foundation, above existing overburden pressure, which may be calculated on the basis of a soil density of 19kN/m^3.

It should be noted that groundwater has been recorded at depths between 2.3m and 2.8m and if foundations are excavated below groundwater in the granular deposits, the allowable bearing pressures advised in the table above will need to be significantly reduced due to the loosening effect the excavation will have.

At the above allowable bearing capacities, total settlements are considered unlikely to exceed approximately 20mm. Settlements in the granular soils will take place rapidly as loadings increase.

A minimum foundation depth of 0.75m, below existing or proposed ground level is considered suitable for the site, subject to the following provisos:

- Foundations should fully penetrate any made/ disturbed ground and should extend a minimum of 150mm into undisturbed natural strata. The presence of an in-filled ditch has been noted to the east of the site, where made ground was recorded as 2.30m deep.

6.3 Ground Floor Construction

Given that the majority of sub- surface soils have been proven to be natural and not subject to volume change (non-plastic), the use of ground-bearing floor slabs are considered appropriate for new buildings. However, suspended ground floor slabs will be required in areas of made ground (particularly the eastern area of the site), incorporating a suitable sub-floor void.

6.4 Groundworks

Excavations in made ground or granular soils should not be relied upon in unsupported excavations.

Heavy plant and stockpiles of materials should not be permitted close to the edges of unsupported excavations. Further reference may be made to CIRIA Report No. 97 '*Trenching Practice*' 1992.

Given the findings of the investigation groundwater ingress may be encountered in excavations beyond around 2.3m deep. If excavations (for foundations, drainage or utilities for example) are required beyond this depth, there may be a requirement for temporary or permanent support measures as well as groundwater controls (dewatering) to be in place prior to the commencement of groundworks.

6.5 Pavement Design

Shallow soils at the site have been found to consist typically of silty fine sands with some apparently localised area of sandy silt. Laboratory CBR testing was undertaken on two bulk samples of shallow soil (silt sands) across the study area, and the results of this testing show CBR values ranging from 9.9% to 34.0%. The results of these tests are also included in Appendix E.

To offer further analysis, reference has also been made to the Department of Transport Design Manual for Roads and Bridges, Volume 7, Pavement Design and Maintenance document, which estimates CBR values based on plasticity and grading. During this investigation ground conditions from surface were encountered as a layer of topsoil overlying silts or sands representative of Tidal Flat Deposits. The guidance suggests that for predominantly silty soil a minimum design CBR value of 1% is likely to be appropriate and for sandy soil a minimum design CBR value of 20% is considered appropriate.

With all due consideration of the above lines of evidence, a design CBR value of 2% is considered appropriate for any areas of site where silt is encountered at formation depth (assuming this material does not saturate), and a CBR value of up to 10% is considered appropriate for areas of the site where silty sand is encountered at formation depth, for any new areas of hardstanding. It is recommended that in-situ CBR testing is undertaken in areas of new hardstanding to confirm the above once final levels have been established.

Once the formation level for the new pavement has been achieved, proof rolling should be carried out using a heavy roller, and any significant/ extensive soft areas revealed should be excavated and a greater depth of sub-base provided.

Exposed sub-grades will likely deteriorate rapidly on exposure to wet weather and should be shaped to shed water. Sub-base should be placed as soon as possible to minimise the exposure of the sub-grade to adverse weather conditions.

6.6 Concrete Grade

Sulphate contents and pH values determinations were carried out by the geotechnical laboratory, the results of which are also included within Appendix H. Results for concrete grade are summarised within the following table.

Strata	Water Soluble Sulphate (mg/l SO_4)		pH		Design Sulphate Class	Aggressive Chemical Environment for Concrete (ACEC)
	Min	Max	Min	Max		
Tidal Flat Deposits	<10	180	7.4	8.0	DS-1	AC-1

In accordance with Part 1 of the BRE Special Digest 1 '*Concrete in Aggressive Ground*' 2005, a design sulphate class of DS-1, with an ACEC of AC-1, is considered appropriate for shallow buried concrete in contact with the natural Tidal Flat Deposits.

7 ENVIRONMENTAL APPRAISAL

The following section outlines the approach applied to assessing the risks posed to human health, then identifies any sample results found by this investigation which warrant further consideration. In accordance with the Environment Agency's Land Contamination: Risk Management, this section represents the second tier of Stage 1, the Generic Quantitative Risk Assessment.

7.1 Human Health

7.1.1 Land Use Setting

It is understood that development proposals for the site includes six new residential dwellings with private gardens. In order to screen laboratory data for concentrations of contaminants in soil with potential to cause harm to human health in these soft landscaped areas, relevant generic screening values most applicable to this land use have been utilised. A land use setting of Residential with Homegrown Produce has been adopted as it is considered the most representative.

The technical framework used to derive DEFRA's Category 4 Screening Levels (Policy Companion Document '*SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination')* outlines the relevant factors for determining land use selection in the application of the screening levels.

7.1.2 Generic Screening

The technical framework used to derive the assessment criteria and the documents in which they are published are summarised as follows:

- *EA Science Reports* (SC050021/SR2, SC050021/SR3, and SC050021/SR7)
- *EA Soil Guideline Value Science Reports*
- *Suitable For Use Levels (S4ULs) for Human Health Risk Assessment* – LQM and CIEH (2015)
- *Soil Generic Assessment Criteria for Human Health Risk Assessment* - EIC/AGS/CL:AIRE (2010)

Category 4 Screening Levels (C4SLs) provide generic suitable for use screening values for common contaminants in a variety of land uses and are also utilised as appropriate generic screening criteria.

Where assessment of the risk to human health from asbestos in soil is concerned there is no nationally recognised suitable for use /generic screening value commonly referred to through the planning system. Due to this, it is necessary to take a more qualitative approach to the risks posed to future site users from asbestos on a site-specific basis.

For screening concentrations of the organochlorine pesticide DDT as well is its degradation products (DDE, DDD) there are currently no nationally recognised screening values within the UK. To screen the risks posed by these contaminants, reference has therefore been made to equivalent nationally recognised standards from other countries. Generally, these compounds are grouped into the sum of DDT metabolites/environmental degradation products including DDE and DDD, which is referred to in this report as DDT_{Tr}. The document *'Proceedings of the Annual International Conference*

on Soils, Sediments, Water and Energy - Comparison of International Risk-Based Screening Levels (June 2010)' highlights screening values based on a range of excess lifetime cancer risks which are used by other countries. Reference has been made to this document together with other publicly available national guidance documents which indicates that DDT_{Tr} screening values range from around 0.7-5mg/kg for soil (e.g. Finland 1mg/kg - Netherlands 4mg/kg).

It must be acknowledged that pesticides, by their nature, may pose greater risks to ecology than human health and it may be those receptors which drive the risk assessment.

A summary of the screening criteria and the methodology used to derive them is included in Appendix J.

7.1.3 Assessment of Results- Human Health

The results of the laboratory testing and the subsequent screening process show that screening criteria representative of minimal/ low risk to future site users were not exceeded for any contaminant in any sample.

7.2 Ground Gas Risk Assessment

7.2.1 Land Use Setting &Screening Criteria

The potential for ground gas beneath the site has been identified in one area associated with an infilled ditch (around TP05 &WS2). There is the possibility that the ground gases could migrate to indoor spaces thereby posing a significant risk to building safety and human health of future residents. As such, an assessment of the risks posed by ground gas generation has been undertaken in accordance with the following guidance.

- CIRIA Report C665 – *'Assessing Risks Posed by Hazardous Ground Gases to Buildings'*
- British Standard BS8485:2015 – *'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'*

7.2.2 Forensic Testing

Reference to Annex E of BS8485:2015 outlines the considerations relevant to determining a Characteristic Situation (from the Modified Wilson and Card Classification System) based on the calculated limited values of organic content in made ground material, on low to moderate risk gassing sites.

The infilled materials are considered as having the following details referring to Table D.1 of BS8485:2015; made ground in place for >20 years and a TOC ≤ 3%, with a maximum thickness of approximately 2.3m (<5m). From the bulk sample analysed, the Limiting Value of Organic Content value was 2.82% (see Table 2 for forensic breakdown. Taking account of Table D.1 in BS 6465:2015, a Limiting Value of <3% equates to Characteristic Situation 2. Obviously, it is important to note that this assessment makes no account for the pathway in the contaminant linkage. In reality some of the gas generated will vent to atmosphere, not all of it will migrate through the sub-surface into a dwelling. Overall this is a relatively low value, indeed the total organic carbon of

the overlying topsoil on this site was recorded at over 6% in TP4 (SOM of 10.4% converted to TOC).

Based on the guidance, the limiting value for the source lies in Characteristic Situation 2 but requires further gas generation modelling to reach a conclusion on the current level of risk

7.2.3 Gas Generation Modelling

To further inform the interpretation of the risks posed by the infilled material, site-specific gas generation modelling has been carried out by EPS in accordance with the Environment Agency's *Guidance on the Management of Landfill Gas - Landfill Technical Guidance Note 3* (2004). The workings are presented in Appendix H.

The modelling has shown that the average gas formation rate of the whole infilled material is 24.65m^3/yr. However, the gassing potential drops off markedly after around three years from deposition, and is now (>21 years from deposition) anticipated to be in the region of 1.2m^3/year, or 0.14l/hr (or less, since the modelling only forecasts 21 years from time of deposition).

Assuming the surface area of the infilled pit is 250m^2 and all gas generated by the infilled material is capable of emitting at surface (i.e. no surface emission factor is applied), this now equates to 0.00056l/m^2/hr. To provide some context on the gas generating potential of soils with organic content, Cresser et al. (1993), indicated that arable soils can typically generate 90 litres of methane/m^2/year which is 0.01l/m^2/hr.

In accordance with the Pecksen (1986) correction correlation between flow rate and surface emission (i.e. x10) this figure equates to an equivalent borehole flow rate of 0.0056l/hr, which can be broadly used to generate a conventional Gas Screening Value. This would comfortably put the site into Characteristic Situation 1 (Very Low Risk), in accordance with CIRIA C665.

It is important to note that the forensic analysis and gas generation modelling has only been undertaken on the potential source of ground gases associated with the infilled ditch only.

There are some inherent conservatisms to also be aware of when using the RB17 approach, aside from the waste being deposited more than 21 years ago. The gas generation equations were developed for municipal putrescible landfilled wastes, which are usually of much higher gas generating potential and less stable/more recent and are therefore known to be conservative when applied to more inert materials, as are present at this site. It is also assumed that all gas generated can reach the surface with no surface emission factor applied.

7.3 Summary of Findings

The Desk Study identified that although the site appeared low risk, a small number of contaminant linkages (risks) were identified associated with the former horticultural use of the site as well as the presence of an infilled ditch on sit. These risks could become active through the proposed residential redevelopment. The contaminant linkages that carry the greatest potential risks at the site were risks associated with future site users (including construction workers) coming into contact with

contaminated soils during and post completion of the redevelopment. Risks to controlled waters from site derived contamination were not identified.

During the intrusive ground investigation, ground conditions were encountered as a limited thickness of topsoil overlying Tidal Flat Deposits with made ground only encountered in one area of the site (identified in TP5 and WS2). The made ground found in the area correlates with historical records of an infilled ditch and was encountered to a maximum depth of 2.3m, however, there was no physical evidence of contamination such as soil staining, odours or the presence of any separate phase liquids. Risks of ground gas generation were forensically assessed from this feature and found to be very low.

Laboratory analysis of shallow soils sampled from across the site has not indicated any contamination that could pose a risk to human health. On this basis, the shallow soils currently in place across the site are considered to be suitable for the proposed residential end use, without any need for remediation.

7.4 Environmental Recommendations

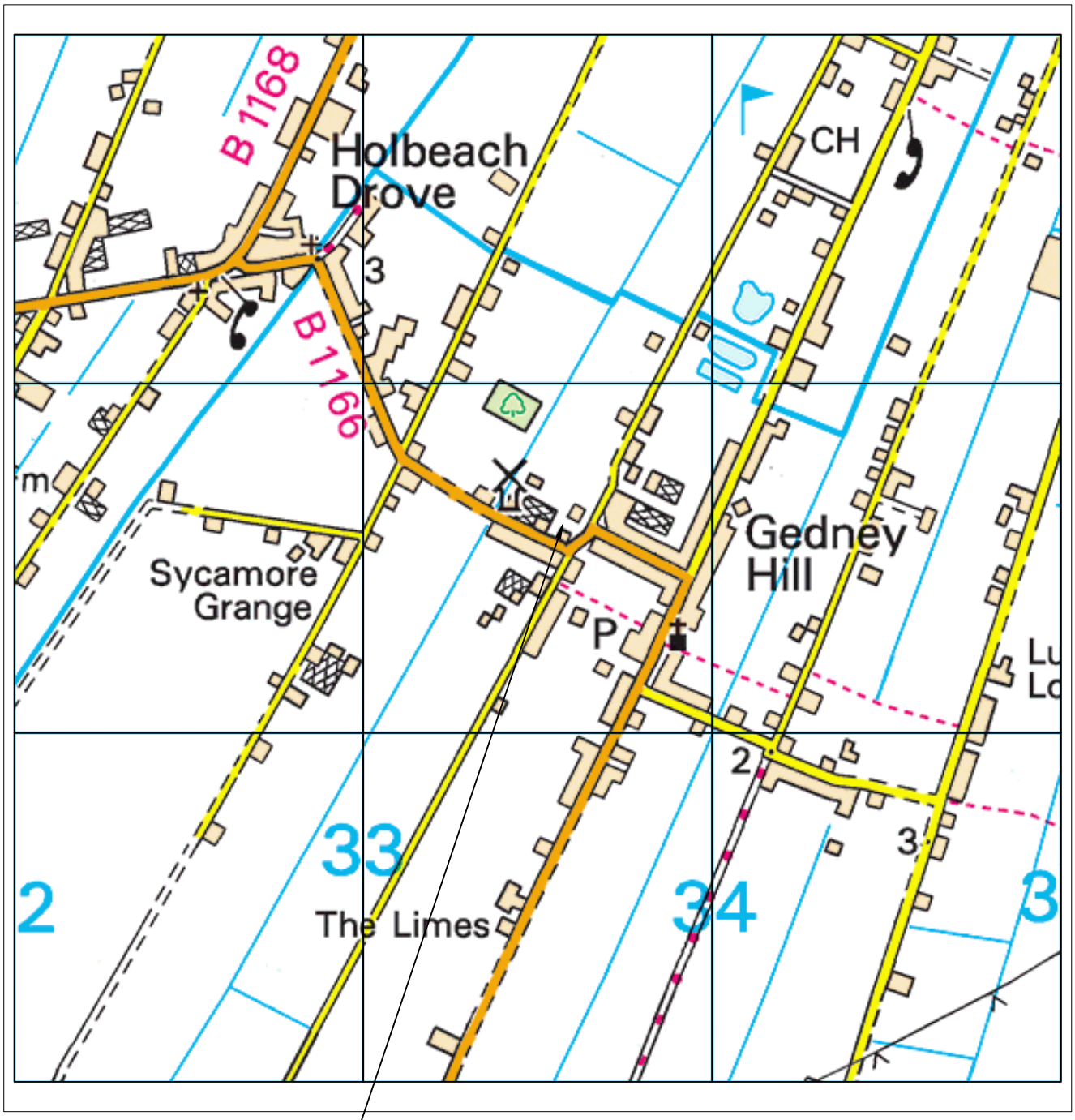
In the context of potentially unacceptable or acceptable risks as outlined within the Environment Agency's *Land Contamination: Risk Management* guidance (LC:RM, 2020), no risks have been identified that require further assessment.

Although contamination has not been identified through this work, the following precautionary recommendation is made to ensure safe redevelopment.

a) Should any palpable evidence of unexpected contamination be encountered during the redevelopment work, it should be reported to EPS so that an inspection can be made and appropriate sampling and assessment work carried out, a method statement for this is provided as Appendix L.

It is recommended that a copy of this report be provided to the Environmental Health Department of South Holland District Council so that the information may be incorporated into their land quality records and used to support the current planning application. Provided no unforeseen contamination is encountered, there should be no further need for any investigation or remediation associated with contaminated land through the planning process.

FIGURES



Approximate Site Location

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Licence Number: 100054115

Title: Site Location Plan

Project: Mill Lane, Gedney Hill, PE12 0PW

Fig No: 1

Scale: NTS

Drawn By:AH | Approved By:MB

Job No: UK21.5670

Dwg No: GedneyHill/0222/01

Date: February 2022



Approximate Site Boundary

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Title: Current Site Layout

Project: Mill Lane, Gedney Hill, PE12 0PW

Fig No: 2

Scale: NTS

Drawn By:AH | Approved By:MB

Job No: UK21.5670

Dwg No: GedneyHill/0222/02

Date: February 2022



Approximate Site Boundary

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Title: Aerial Photograph

Project: Mill Lane, Gedney Hill, PE12 0PW

Fig No: 3

Scale:	NTS
Drawn By:	AH
Approved By:	MB
Job No:	UK21.5670
Dwg No:	GedneyHill/0222/03
Date:	February 2022



Approximate Site Boundary

Borehole Location

Trial Pit Location

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Title: **Borehole & Trial Pit Location Plan**

Project: Mill Lane, Gedney Hill, PE12 0PW

Fig No: 4

Scale:	NTS
Drawn By: AH	Approved By: BV
Job No:	UK21.5670
Dwg No:	GedneyHill/0122/4
Date:	January2022

TABLES

Table 1 – Laboratory Testing Schedule (Environmental)

Sample ID	Sample Depth (m bgl)	EPS Mini Suite	EPS TPH Suite	Herbicides & Pesticides	RB17/Total Organic Carbon
TP1ES1	0.40-0.50	1	1	-	-
TP2ES1	0.10-0.20	-	-	-	-
TP2ES2	0.90-1.00	-	-	-	-
TP3ES1	0.30-0.40	1	-	1	-
TP4ES1	0.20-0.30	1	1	-	-
TP5ES1	0.10-0.20	1	1	-	-
TP5ES2	0.70-0.80	-	-	-	-
TP5ES3	2.00-2.10	1	1	-	-
TP6ES1	0.40-0.50	1	-	1	-
TP7ES1	0.10-0.20	-	-	-	-
TP5D1	1.5-1.7	-	-	-	1

Notes:

mbgl	meters below ground level
1	Sample Taken
-	Sample Not Analysed
EPS Mini Suite	Organic Matter, Cyanide, Metals, PAH's, Phenols, Asbestos

Table 2 – Laboratory Testing Schedule (Geotechnical)

Sample ID	Sample Depth (m bgl)	Particle Size Distribution	PH & Sulphates	CBR Compaction
WS1B1	0.5-1.5	-	-	1
WS1D1	1.7-1.8	1	-	-
WS1D2	3.7-3.8	1	1	-
WS2D1	2.6-2.7	-	1	-
WS2D2	3.1-3.2	1	-	-
WS3B1	0.3-1.3	-	-	1
WS3D1	1.4-1.5	1	1	-
WS3D2	2.3-2.4	1	-	-
WS4D1	0.8-0.9	1	1	-
WS4D2	2.5-2.6	-	1	-

Notes:

mbgl meters below ground level
1 Sample Taken
- Sample Not Analysed

Table 3 – RB17 Forensic Soil Analyses

	TP05	
Material	Mass (kg)	Rel. %
Fines	10.285	85.5
Coarse	0.769	6.4
Wood	0.147	1.2
Vegetation	0	0
Cloth	0	0
Metal, Glass, Ceramic etc.	1.076	8.9
Paper	0	0
Other	0	0
TOTAL:	12.03	102.05

TOC (%) Fines	3.3
Max TOC (%) Total (All organics)	**2.82**

APPENDICES

APPENDIX A

Selected Site Photographs



Approximate Site Boundary

Approximate Photo Location 4

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eps

Title: Photo Location Plan

Project: Mill Lane, Gedney Hill, PE12 0PW

Fig No: A

Scale:	NTS
Drawn By:	AH
Approved By:	MB
Job No:	UK21.5670
Dwg No:	GedneyHill/0222/A
Date:	February 2022

Photo 1: Photo of the greenhouses at the nursery	Photo 2: Location of TP5
	
Photo 3: Photo of the made ground encountered in TP5	Photo 4: Photo of the offsite historic fuel tanks
	
Photo 5: Photo of the drilling location of WS1	Photo 6: Photo of material recovered from WS1.
	

APPENDIX B

Proposed Development Plans

NOTES

THIS IS AN INDICATIVE LAYOUT ONLY

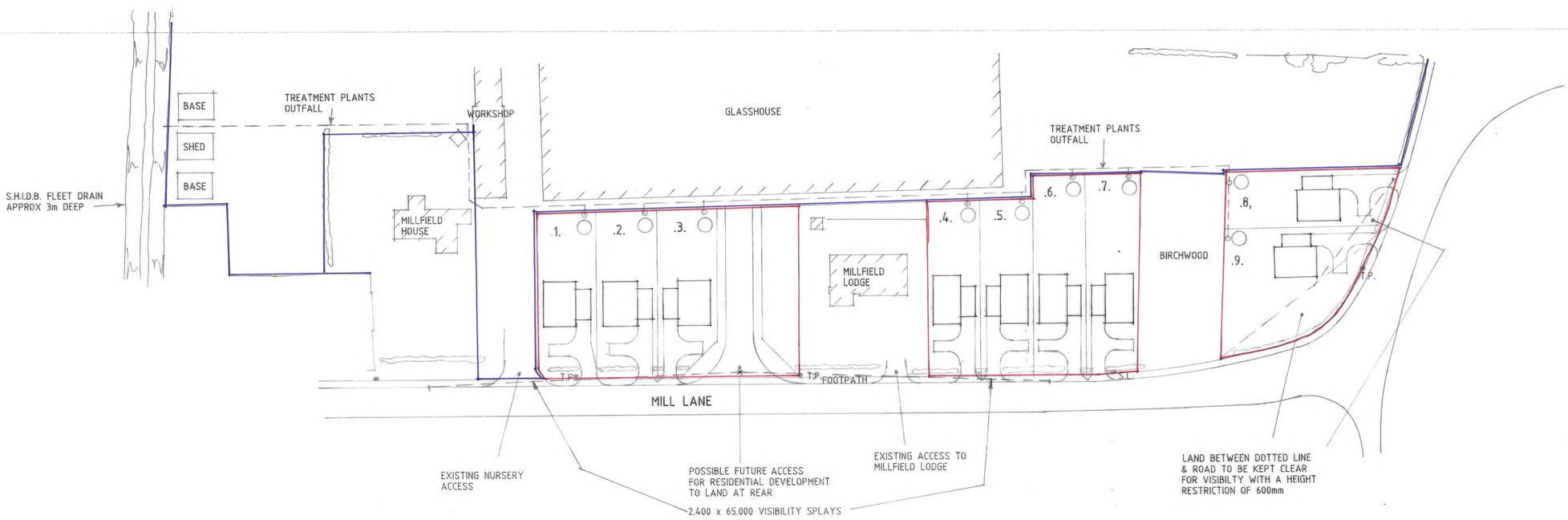
THE PROPOSED SITE TO CONSIST OF 9No DWELLINGS WITH A MAX. TOTAL DOMESTIC FLOOR SPACE OF 1000m²

EACH DWELLING TO HAVE A FOUL DRAINAGE TREATMENT PLANT WITH OUTFALL TO S.H.I.D.B. DRAIN

EXISTING SITE FRONTAGE HEDGE TO REMAIN WHERE POSSIBLE

EACH PROPERTY TO HAVE ITS OWN ACCESS ONTO MILL LANE AND TURNING BAYS ALL TO L.C.C. REQUIRMENTS

ENSURE VISIBILITY SPLAYS OF 2.400 x 65.000 FOR FUTURE ACCESS ROAD ARE MAINTAINED



SITE LAYOUT

General Notes

Do not scale from this drawing.

This drawing is copyright and may not be altered, traced, copied, photographed or used for any purpose other that that for which it is issued without written permission from Messrs Status Design.

The General Contractor is to check all dimensions on site and report discrepancies to the Architect.

All details shown on this drawing are based upon typical site conditions related to the area. No responsibility can be accepted for abnormal conditions unless reported to the Architects so that design amendments may be considered. Site soil surveys are recommended in respect of foundations to establish specific site conditions before foundation work is undertaken.

Please note this drawing is not a conveyance drawing.

Proposed on-site soakaways to be maintained by the owner for the life duration of the property.

This drawing is limited in the amount of information contained and does not purport to contain a full specification of the works. It is solely for the purpose of obtaining Planning and Building Regulations approvals. This drawing must not be used as a contract document alone. The works will not be supervised or inspected by Status Design unless specifically contracted to do so. It is the client or their agent's responsibility to control workmanship, substitution of materials, adherence to specification, variations to contract, etc.

All materials to be new unless stated otherwise and all components and materials, etc. to be used, fitted and installed, etc in strict accordance with manufacturers' instructions and relevant Code of Practice. Materials should conform to appropriate British Standard specification or BBA Certificate or European Code equivalent.

The Employer/Client shall ensure that the selected contractor is conversant with and adopts all measures necessary to achieve compliance with Health and Safety Legislation for Building Sites and Work Places. The Employer/Client is advised that should the works need to comply with the Construction Design and Management Regulations 1994 (CDM) and Health and Safety at Work, etc., Act 1974 (HSW Act) an independent Planning Supervisor will be required, whom should be supplied with a set of all relevant drawings, etc.

The works shall comprise of all that shown on the drawings and information, etc. Works that may not specifically be shown but may be reasonably inferred as necessary to carry out the works shall be deemed to be included.

These notes relate to this drawing and all associated drawings.

It is the property/landowner's responsibility to be aware of the Party Wall, etc. Act 1996 when building or carrying out alterations in close proximity to adjoining neighbour's boundaries.

A - ALTS - 1.12.17

Status DESIGN
CONSULTANTS IN ARCHITECTURE & PLANNING

PROPOSED RESIDENTIAL DEVELOPMENT FOR 9No. DWELLINGS AT MILLFIELD NURSERY, MILL LANE, GEDNEY HILL FOR

J. PELL & SON.

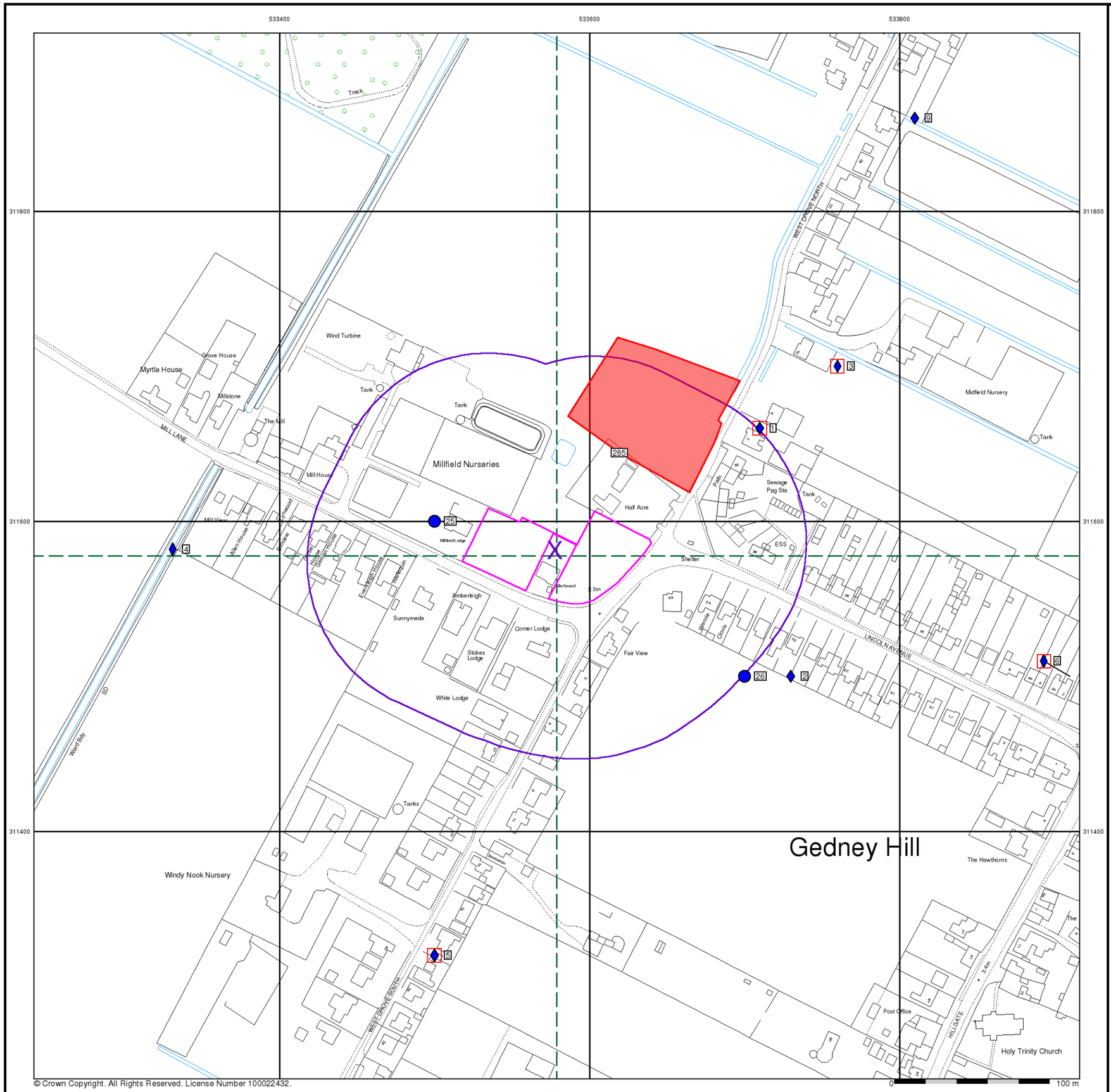
DRAFT
SITE LAYOUT

1:500	SD17-033/3
NOV-17	B.GILHAM.

2 Edinburgh Walk, Holbeach, Spalding, Lincs. PE12 7AP.
Tel: 01406 424343 Fax: 01406 490702

APPENDIX C

Surrounding Land Use



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

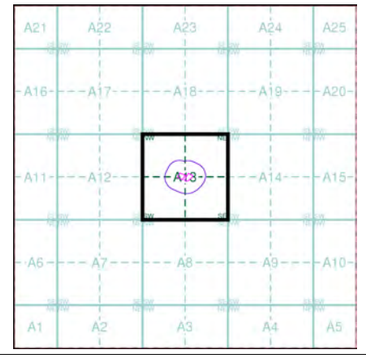
Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Segment A13



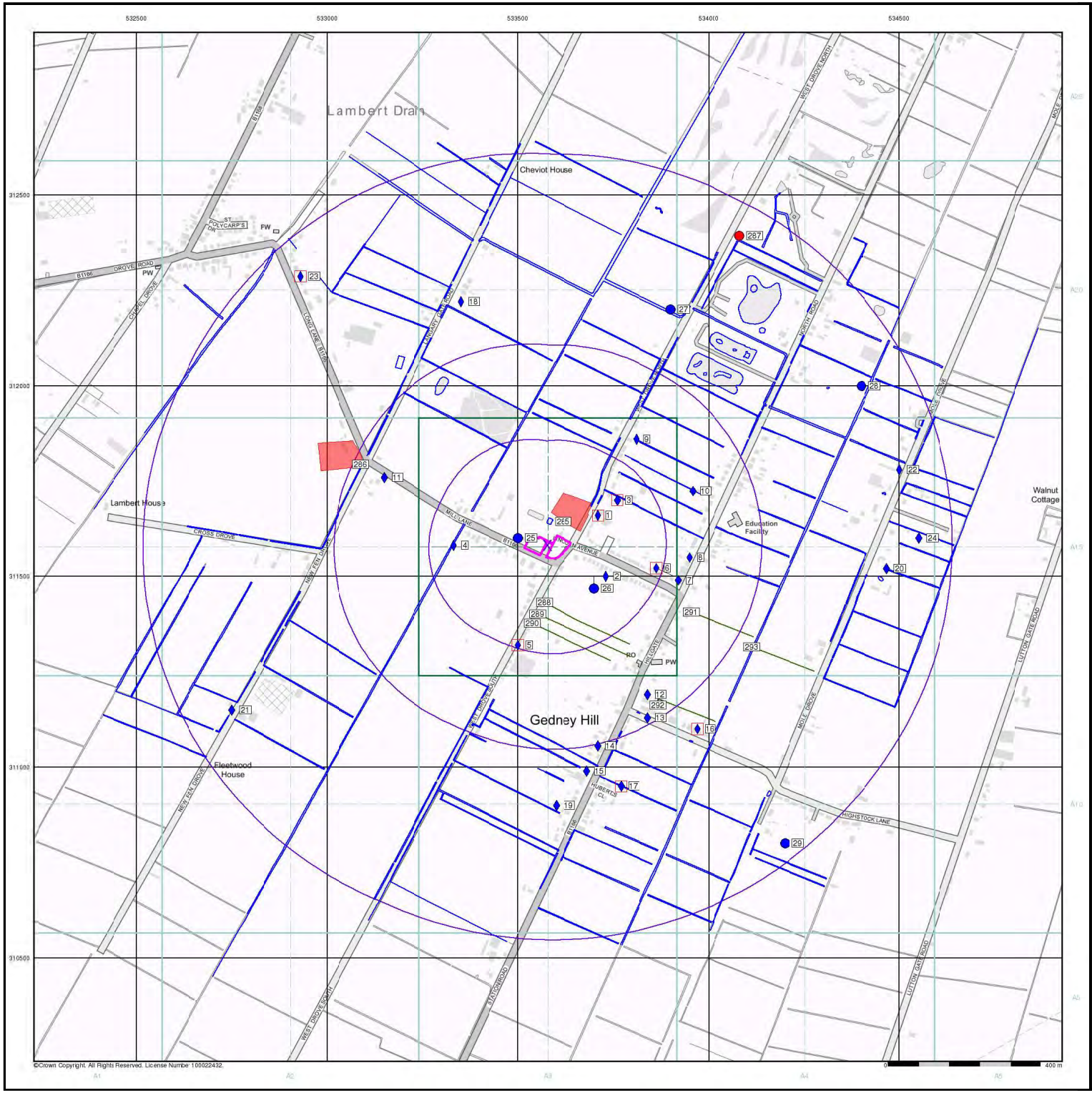
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Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Plot Buffer (m):	100

Site Details

Mill Lane, Gedney Hill, Spalding, PE12 0PW

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
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- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
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- Potentially Infilled Land (Non-water)
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- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

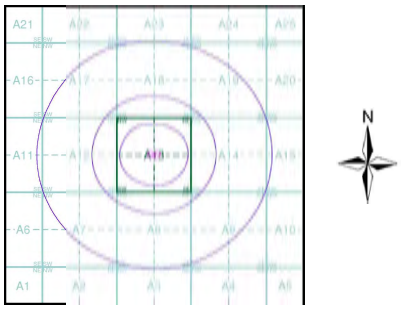
Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Geological

- BGS Recorded Mineral Site

Site Sensitivity Map - Slice A



Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details

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APPENDIX D

Geological Context

Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	TFD1	Tidal Flat Deposits, 1	Sand and Silt	Not Supplied - Quaternary
	TFD1	Tidal Flat Deposits, 1	Clay and Silt	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WWAC	West Walton Formation and Ampthill Clay Formation (Undifferentiated)	Mudstone	Not Supplied - Oxfordian
	OXC	Oxford Clay Formation	Mudstone	Not Supplied - Callovian

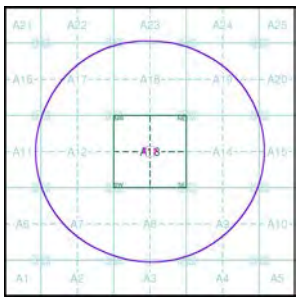
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID: 1
Map Sheet No: 158
Map Name: Peterborough
Map Date: 1984
Bedrock Geology: Available
Superficial Geology: Available
Artificial Geology: Available
Faults: Not Supplied
Landslip: Not Available
Rock Segments: Not Supplied

Geology 1:50,000 Maps - Slice A



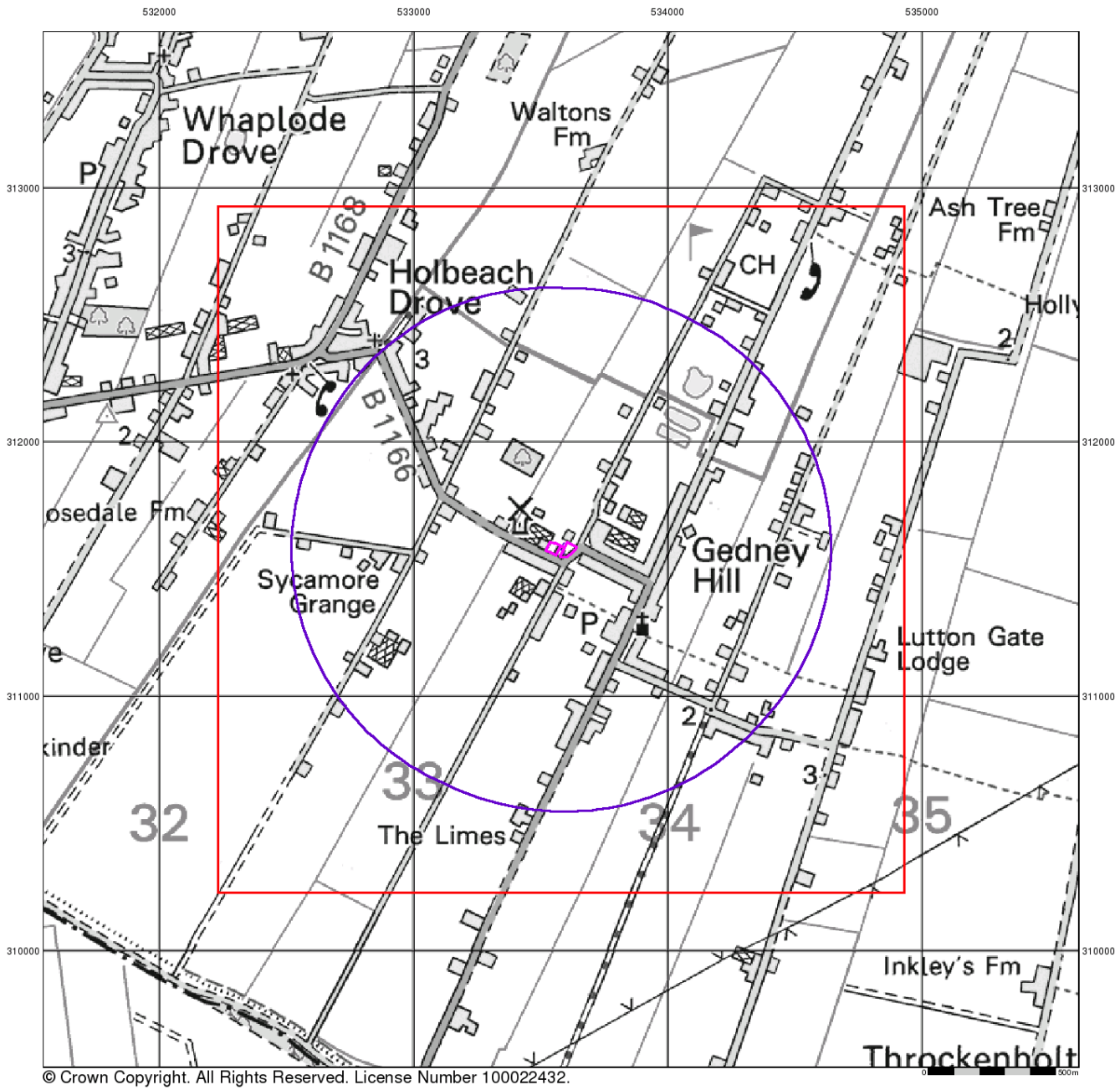
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National Grid Reference: 533580, 311580
Slice: A
Site Area (Ha): 0.39
Search Buffer (m): 1000

Site Details:

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Artificial Ground and Landslip

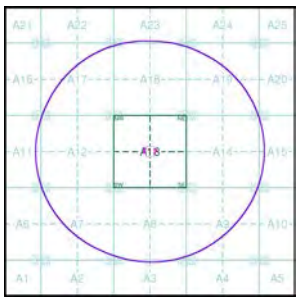
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



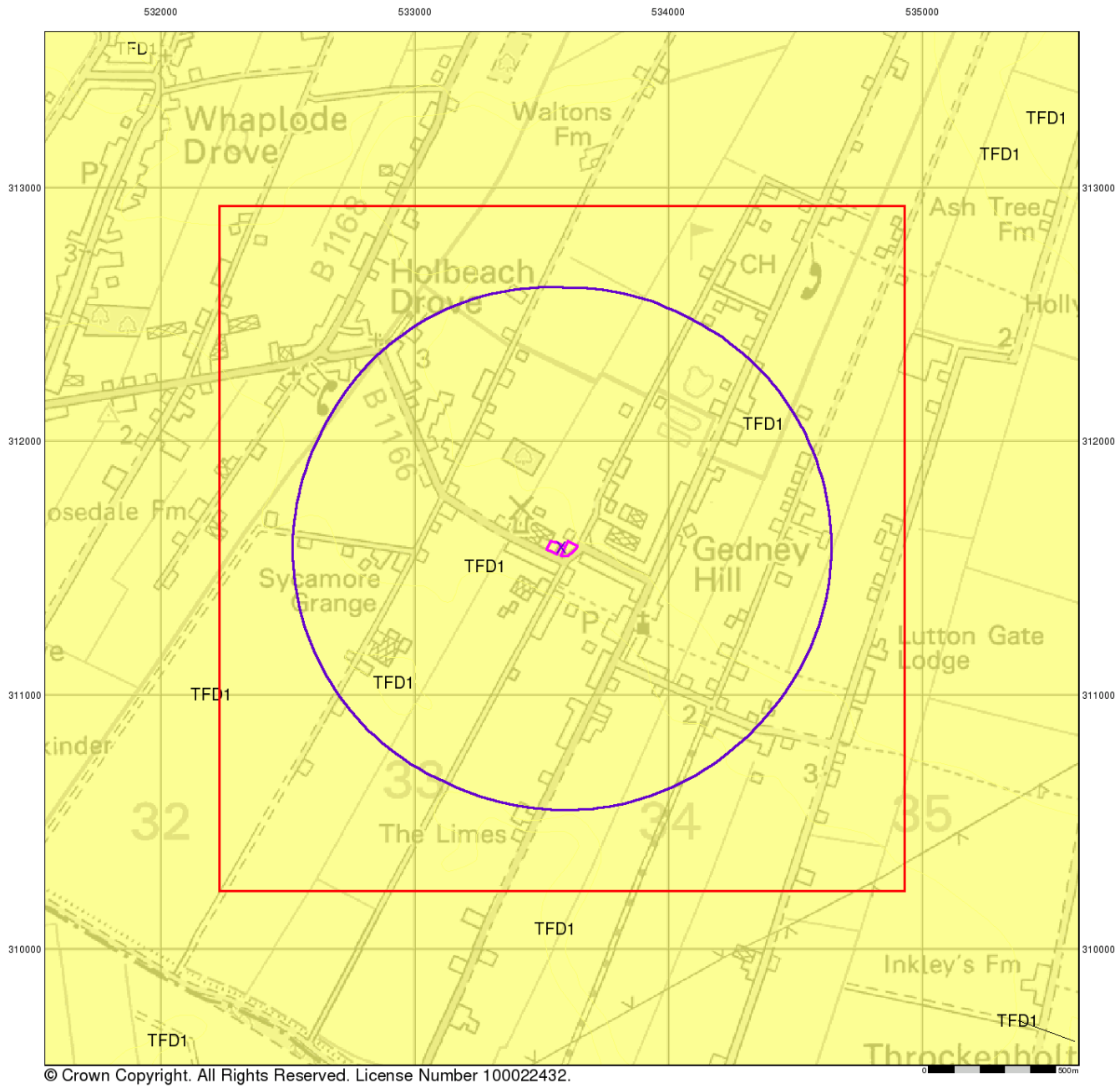
Order Details:

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Customer Reference:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details:

Mill Lane, Gedney Hill, Spalding, PE12 0PW

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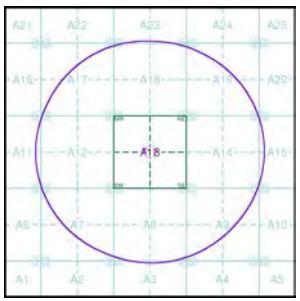
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



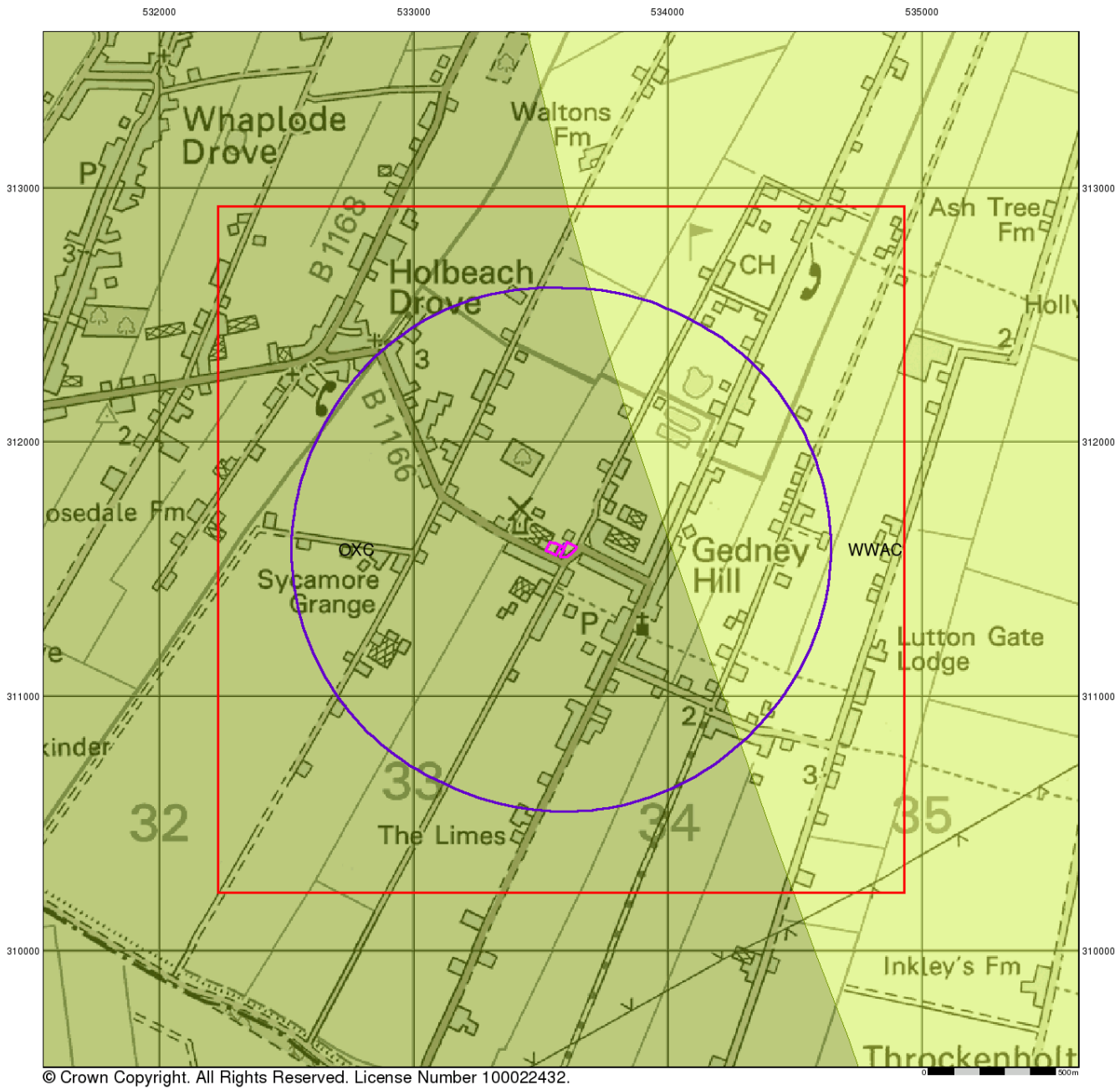
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Customer Reference:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details:

Mill Lane, Gedney Hill, Spalding, PE12 0PW

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Bedrock and Faults

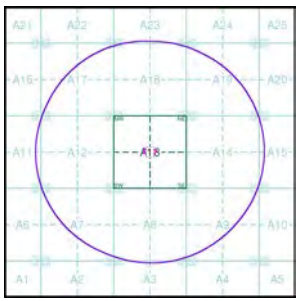
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



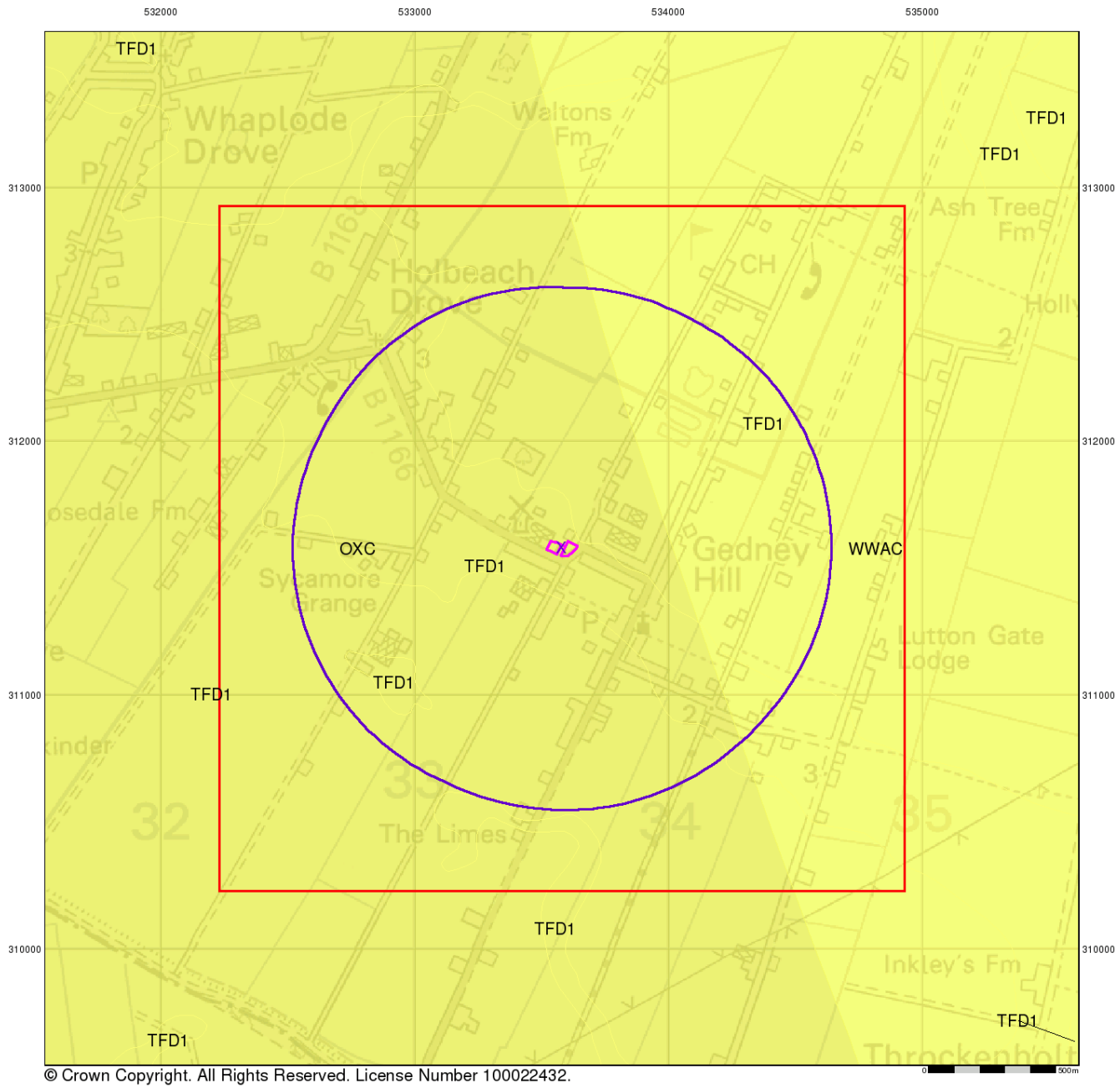
Order Details:

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Customer Reference:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details:

Mill Lane, Gedney Hill, Spalding, PE12 0PW

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Fax: 0844 844 9951
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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

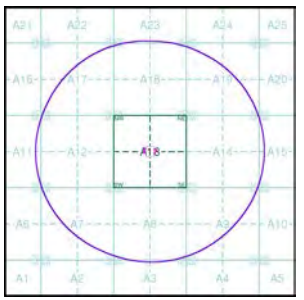
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number:	287848568_1_1
Customer Reference:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

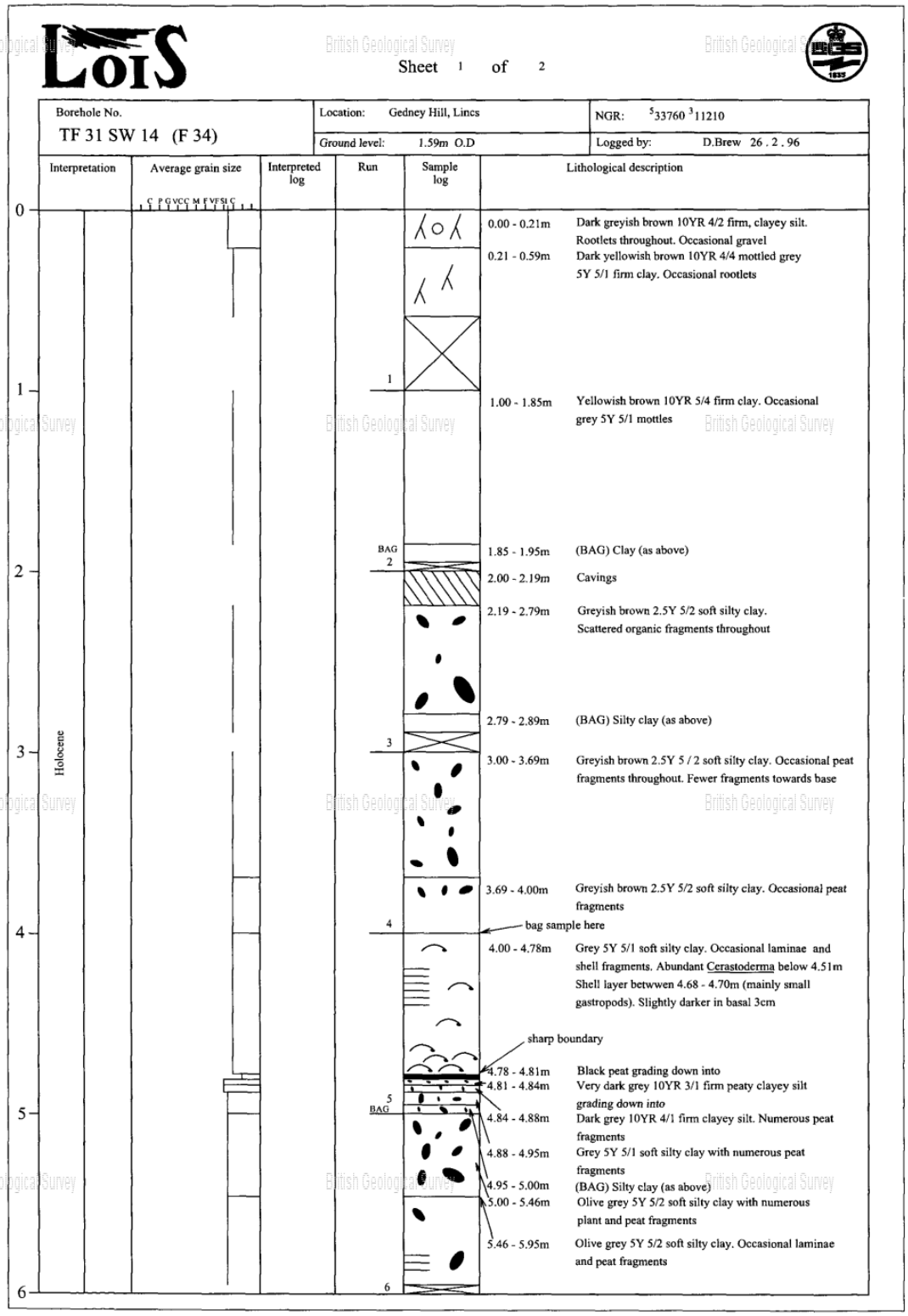
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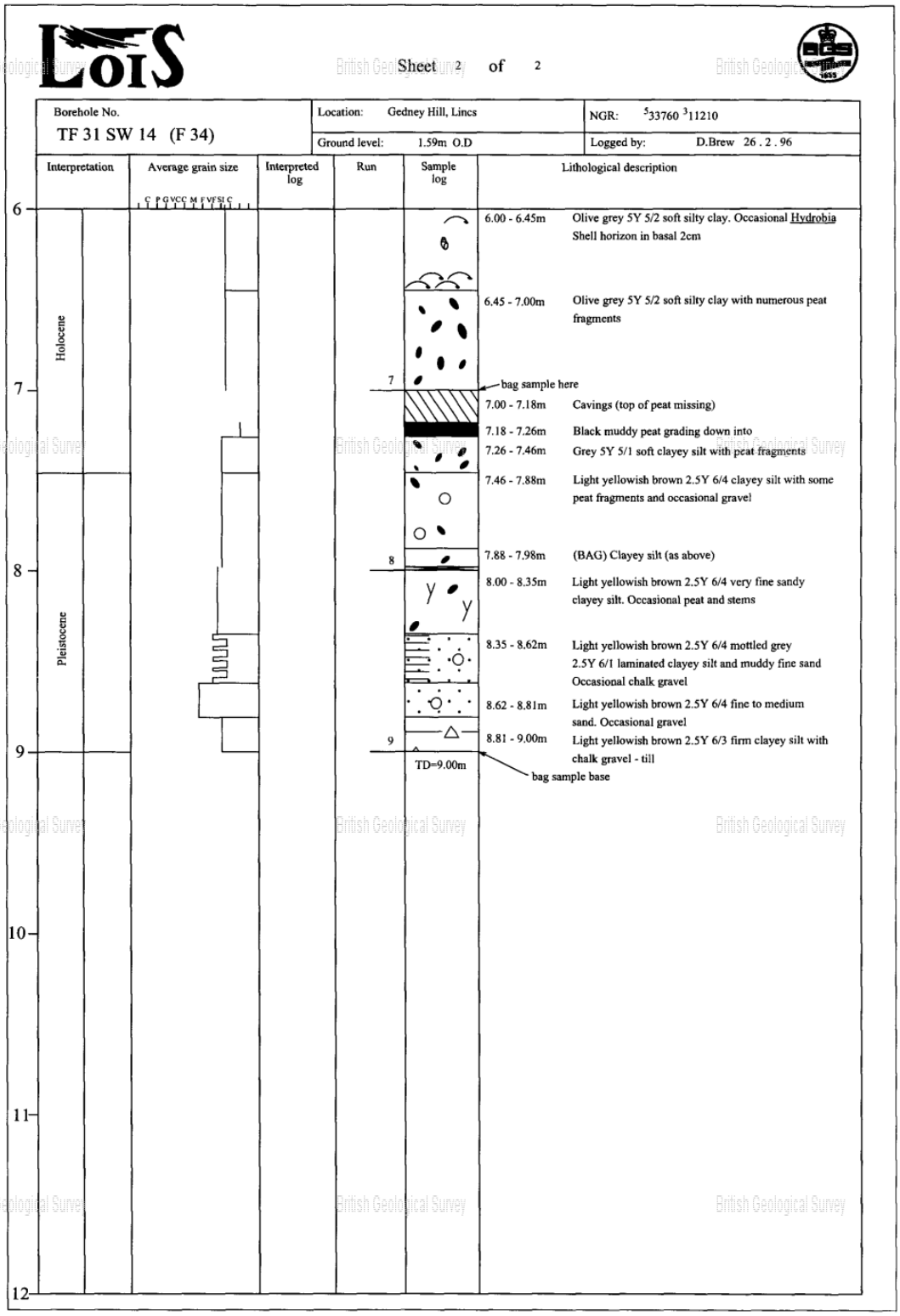
Mill Lane, Gedney Hill, Spalding, PE12 0PW

LOIS

Sheet 1 of 2

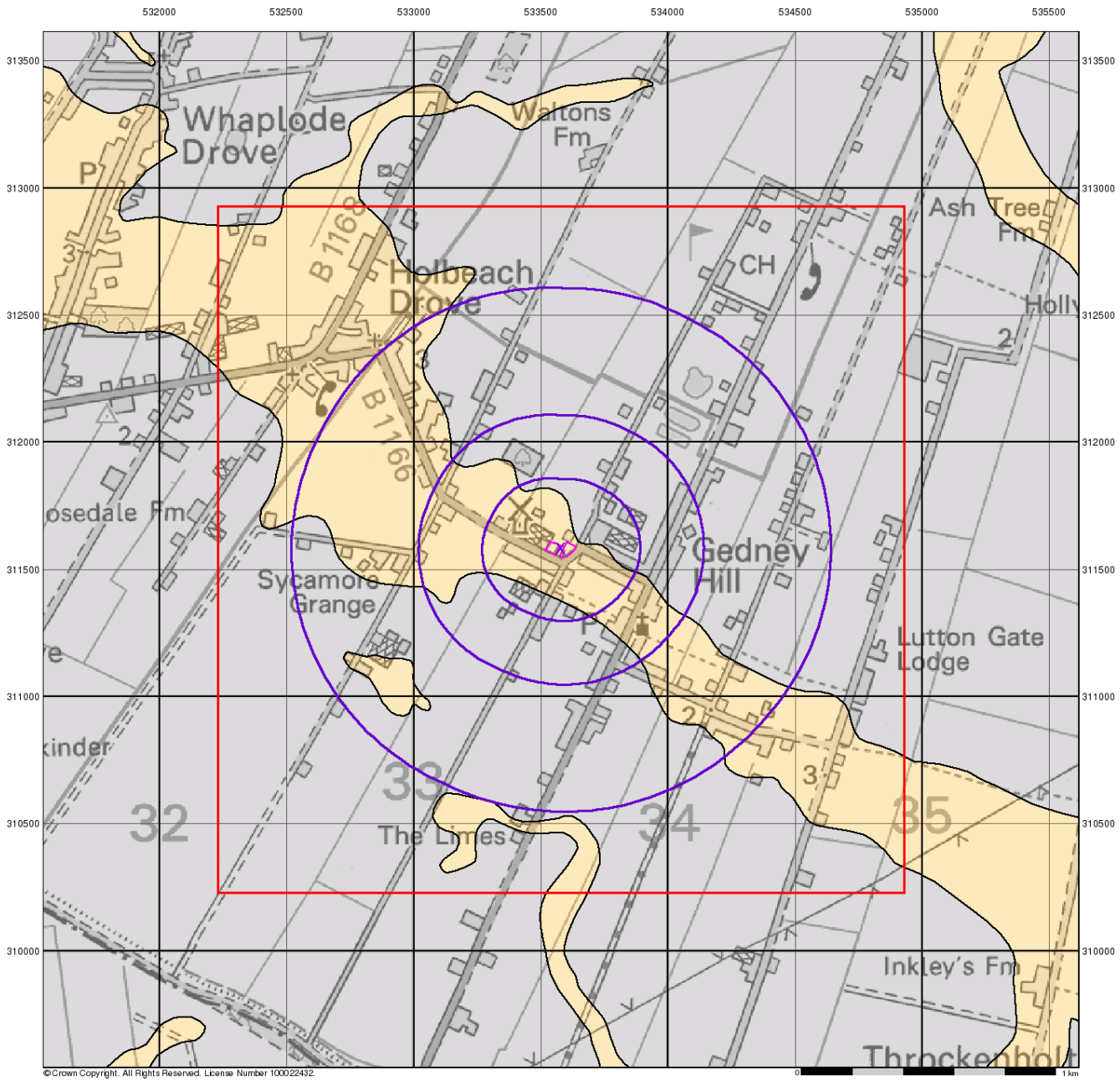
Borehole No.	Location:	NGR:
TF 31 SW 14 (F 34)	Gedney Hill, Lincs	$^{5}33760\ ^{3}11210$
	Ground level: 1.59m O.D	Logged by: D.Brew 26 . 2 . 96




LOIS
Sheet 2 of 2
Borehole No.
TF 31 SW 14 (F 34)
Location: Gedney Hill, Lincs
Ground level: 1.59m O.D
NGR: 533760 311210
Logged by: D.Brew 26 . 2 . 96
Interpretation
Average grain size
C P G VCC M F VFSI C
Interpreted log
Run
Sample log
Lithological description
Holocene
Pleistocene
6
7
8
9
10
11
12
6.00 - 6.45m Olive grey 5Y 5/2 soft silty clay. Occasional Hydrobia Shell horizon in basal 2cm
6.45 - 7.00m Olive grey 5Y 5/2 soft silty clay with numerous peat fragments
bag sample here
7.00 - 7.18m Cavings (top of peat missing)
7.18 - 7.26m Black muddy peat grading down into
7.26 - 7.46m Grey 5Y 5/1 soft clayey silt with peat fragments
7.46 - 7.88m Light yellowish brown 2.5Y 6/4 clayey silt with some peat fragments and occasional gravel
7.88 - 7.98m (BAG) Clayey silt (as above)
8.00 - 8.35m Light yellowish brown 2.5Y 6/4 very fine sandy clayey silt. Occasional peat and stems
8.35 - 8.62m Light yellowish brown 2.5Y 6/4 mottled grey 2.5Y 6/1 laminated clayey silt and muddy fine sand Occasional chalk gravel
8.62 - 8.81m Light yellowish brown 2.5Y 6/4 fine to medium sand. Occasional gravel
8.81 - 9.00m Light yellowish brown 2.5Y 6/3 firm clayey silt with chalk gravel - till
TD=9.00m
bag sample base

APPENDIX E

Groundwater Vulnerability and Flood Maps



Groundwater Vulnerability

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

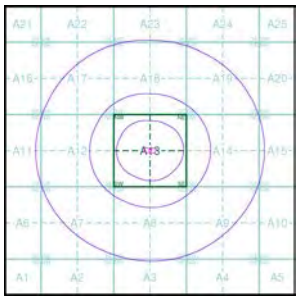
Agency and Hydrological

Bedrock Aquifers	Superficial Aquifers
High Vulnerability, Principal Aquifer	High Vulnerability, Principal Aquifer
High Vulnerability, Secondary Aquifer	High Vulnerability, Secondary Aquifer
Medium Vulnerability, Principal Aquifer	Medium Vulnerability, Principal Aquifer
Medium Vulnerability, Secondary Aquifer	Medium Vulnerability, Secondary Aquifer
Low Vulnerability, Principal Aquifer	Low Vulnerability, Principal Aquifer
Low Vulnerability, Secondary Aquifer	Low Vulnerability, Secondary Aquifer

Unproductive Aquifer

Soluble Rock

Site Sensitivity Context Map - Slice A



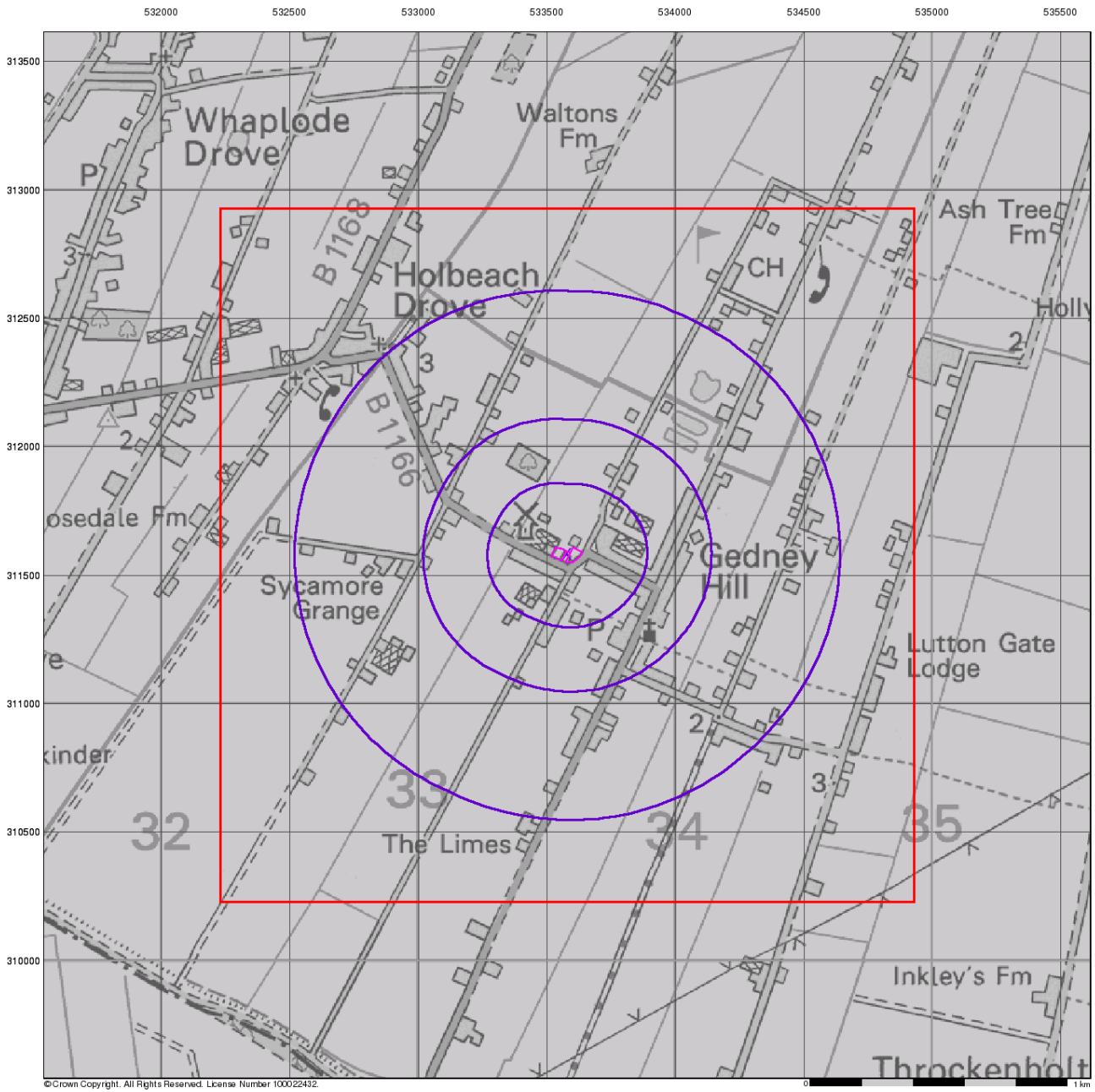
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details

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Bedrock Aquifer Designation

General

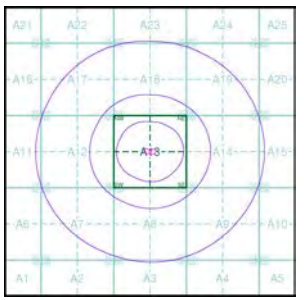
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



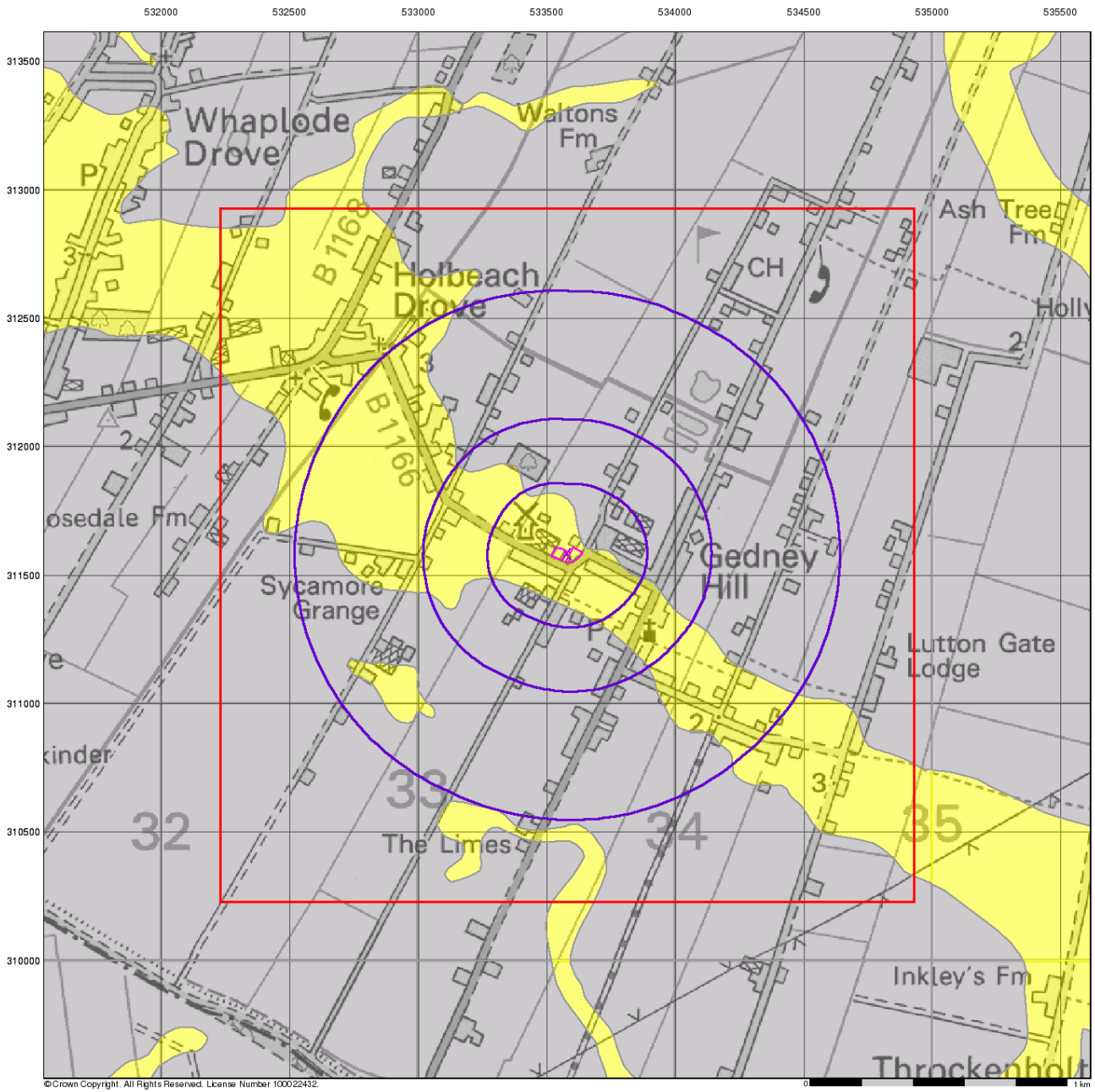
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details

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Superficial Aquifer Designation

General

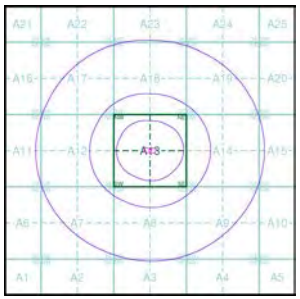
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



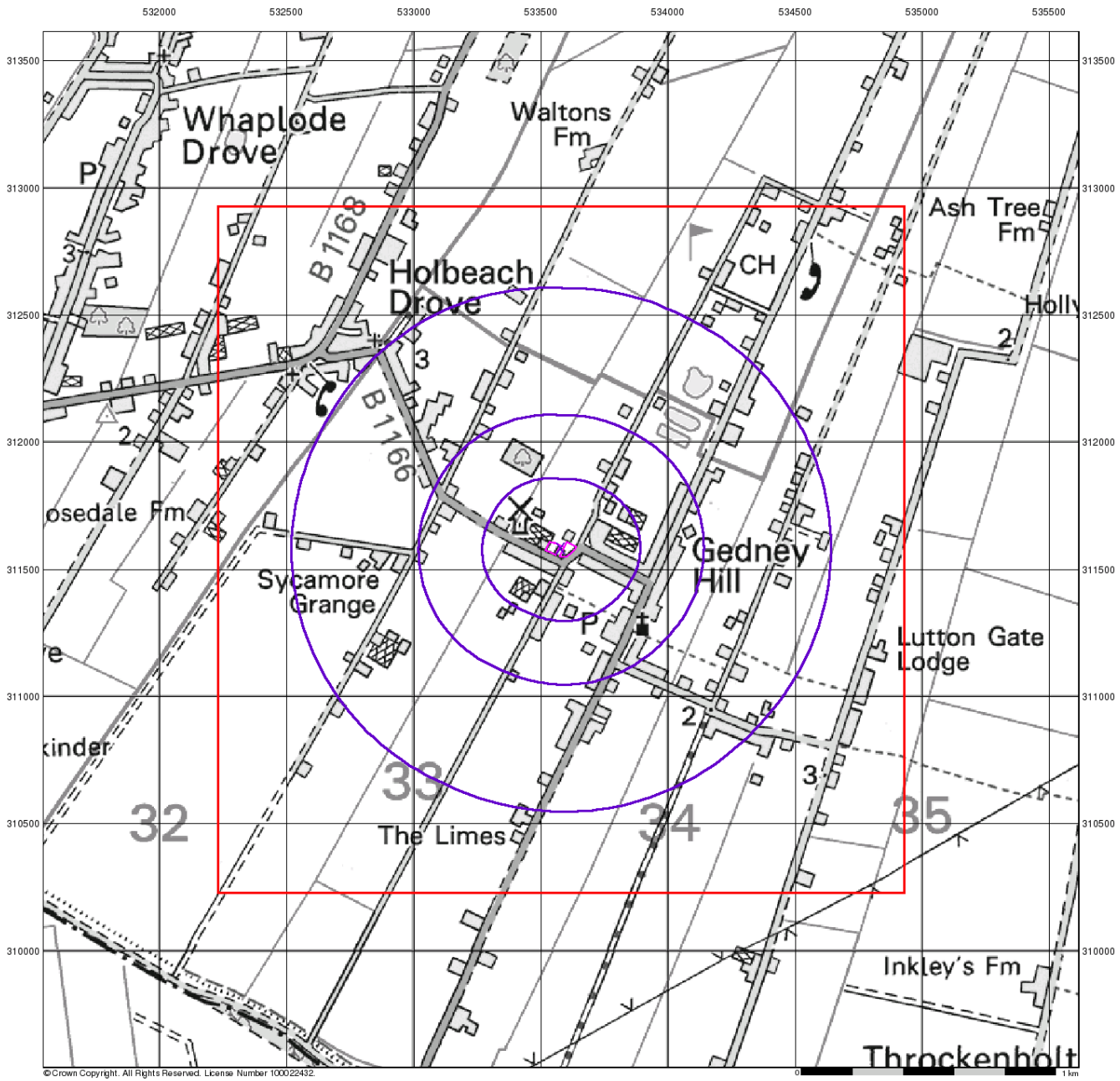
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details

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Source Protection Zones

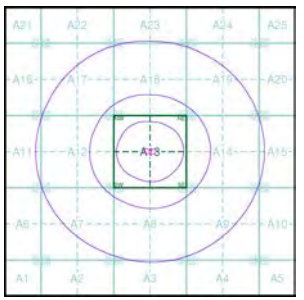
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



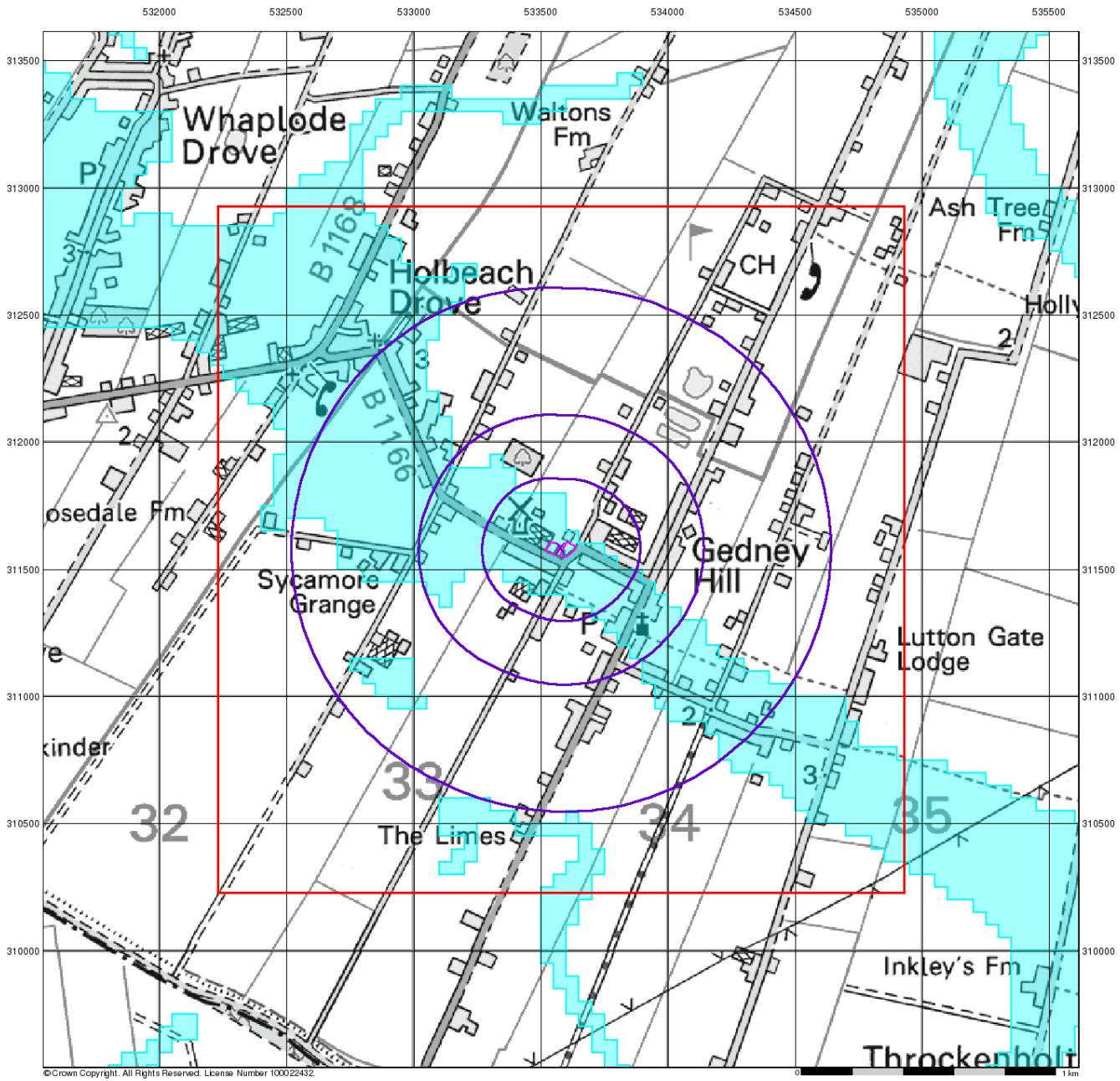
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details

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BGS Flood GFS Data

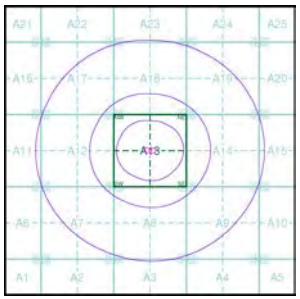
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



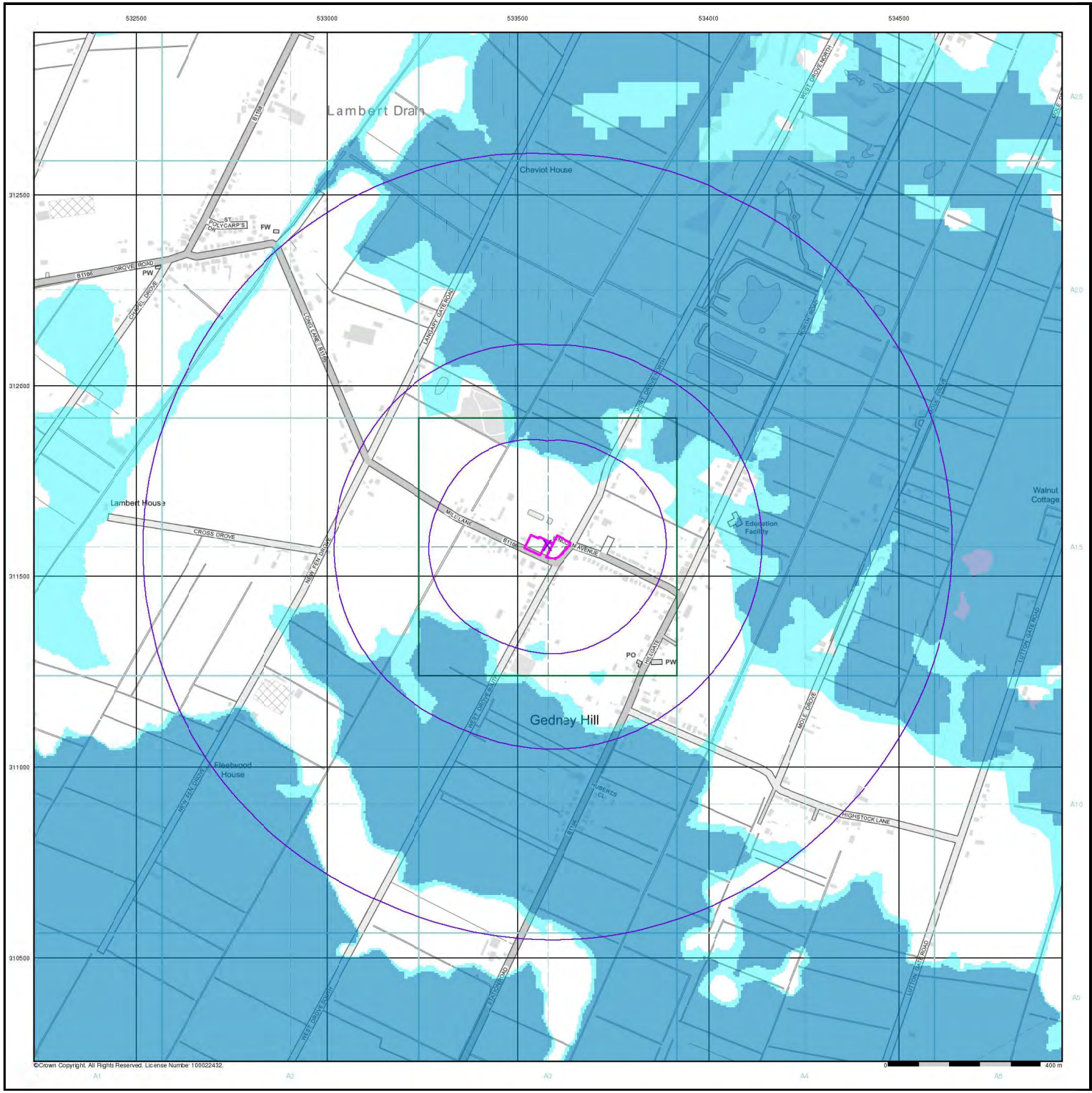
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

Site Details

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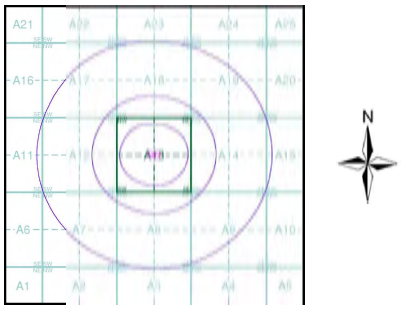
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	1000

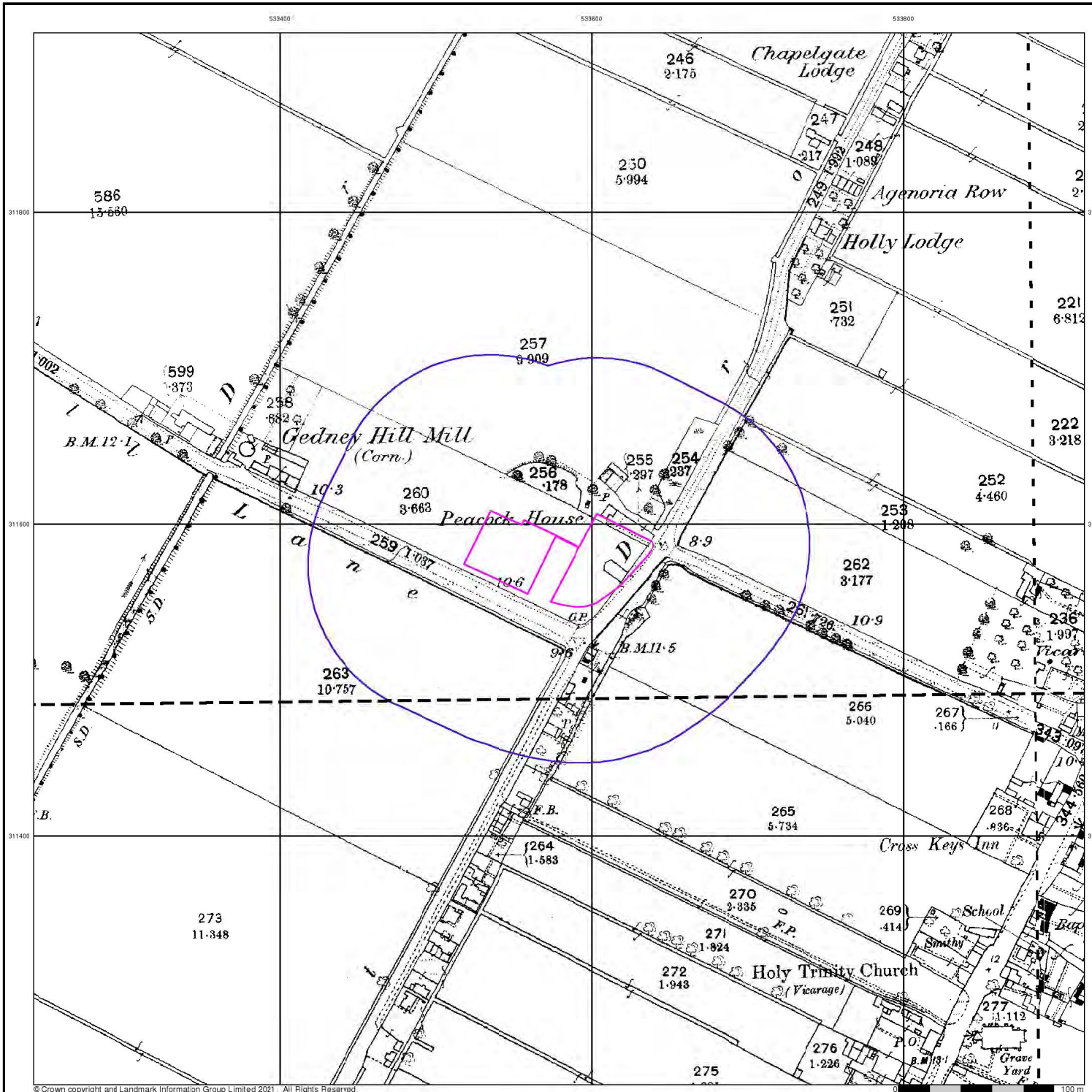
Site Details

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APPENDIX F

Selection of Historic Maps



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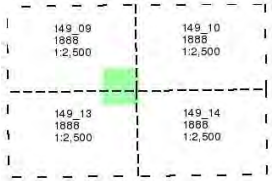
Lincolnshire

Published 1888

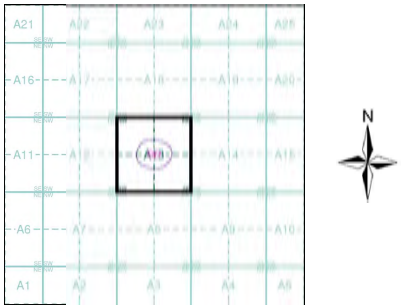
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



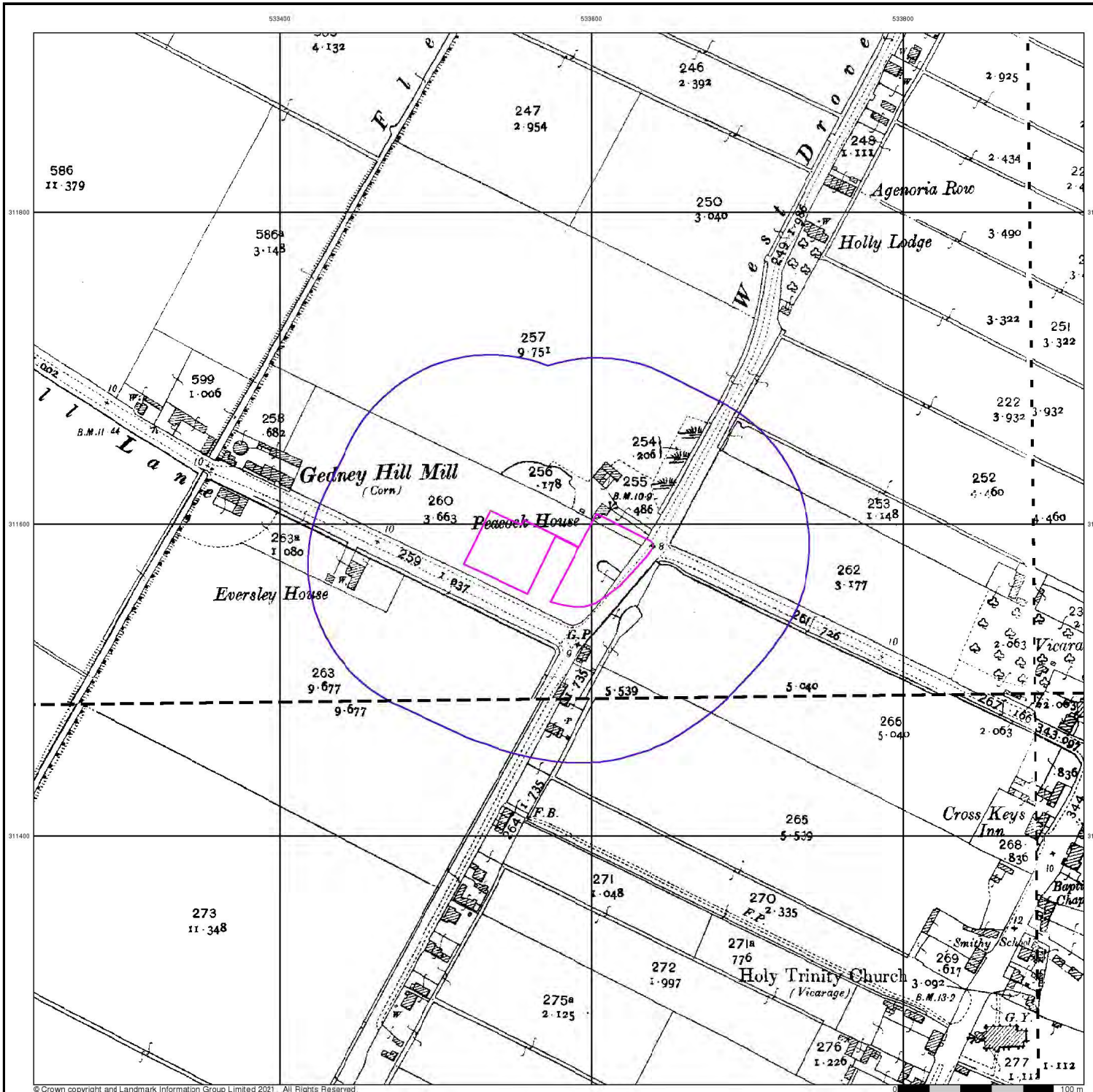
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	100

Site Details

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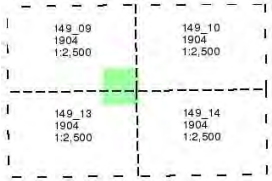
Lincolnshire

Published 1904

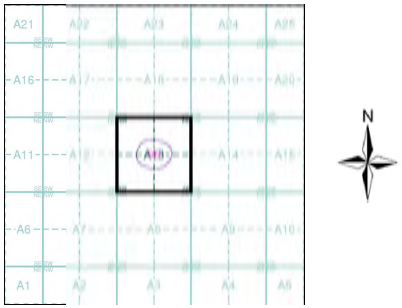
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



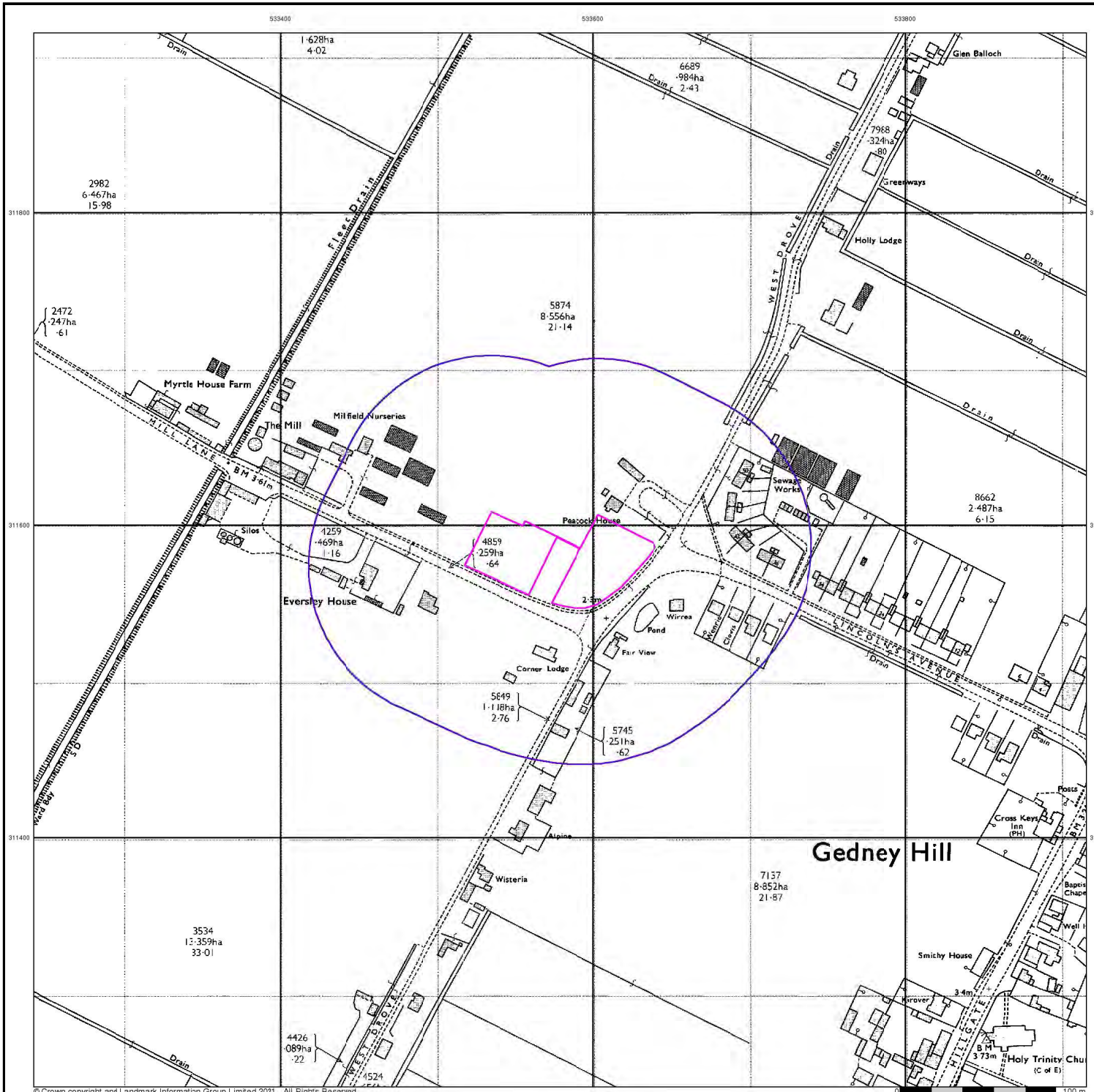
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	100

Site Details

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Ordnance Survey Plan

Published 1976

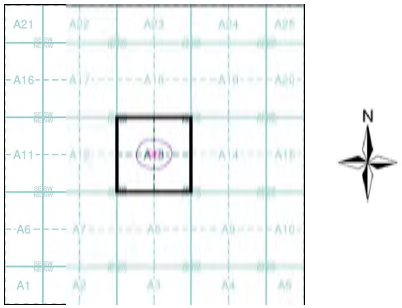
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



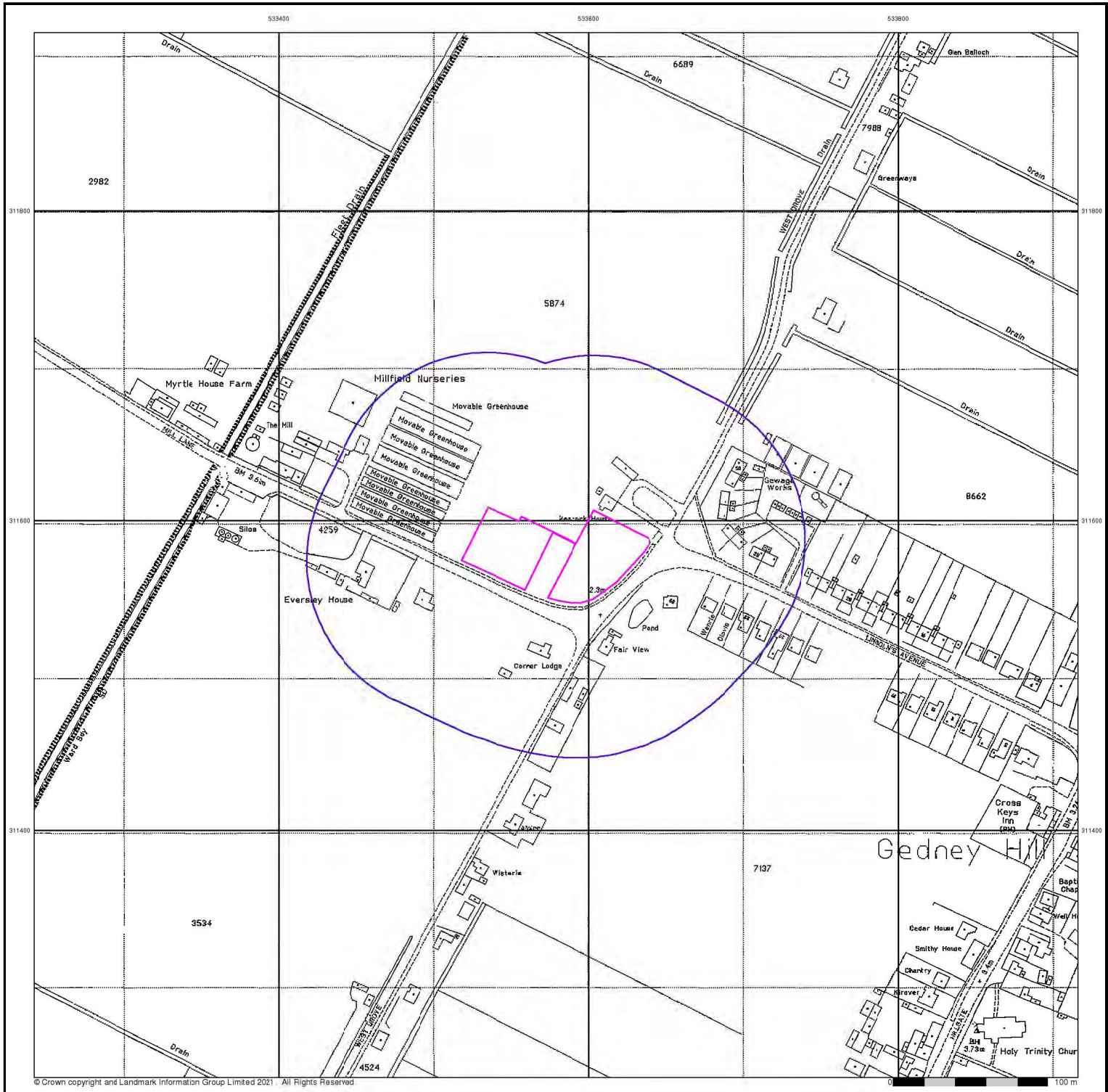
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	100

Site Details

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Large-Scale National Grid Data

Published 1994

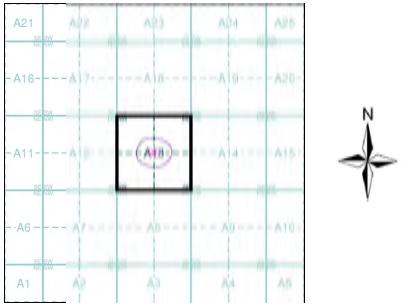
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



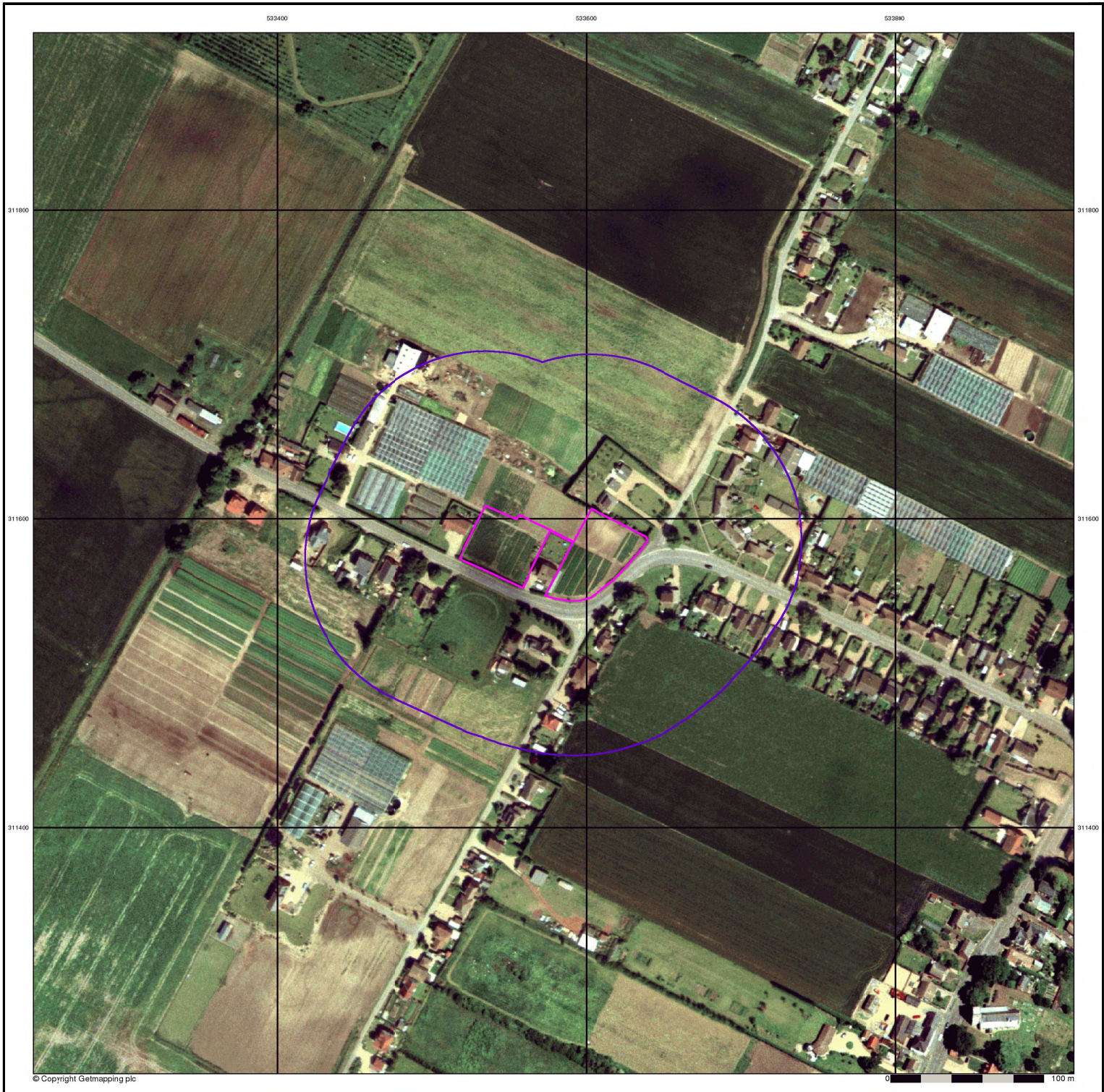
Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	100

Site Details

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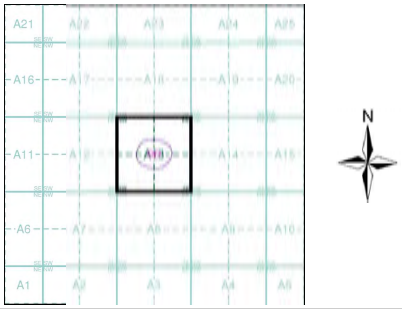


Historical Aerial Photography

Published 1999

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

Order Number:	287848568_1_1
Customer Ref:	UK21.5670
National Grid Reference:	533580, 311580
Slice:	A
Site Area (Ha):	0.39
Search Buffer (m):	100

Site Details

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APPENDIX G

Site Specific Trial Pit & Borehole Logs

Trial Pit Log

Trialpit No **TP01**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: - Level:	Date 24/11/2021
Location: PE12 0PW		Dimensions (m): Depth 1.00	Scale 1:20
Client: Mr R Spencely			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40 - 0.50	ES		0.25			Dark brown slightly sandy, slightly clayey, silty TOPSOIL with frequent active roots and rootlets.
				1.00			Brown slightly clayey, sandy SILT with occasional active roots. (TFD) End of pit at 1.00 m

Remarks: TFD= Tidal Flat Deposits
No Groundwater Encountered

Stability:

Trial Pit Log

Trialpit No **TP02**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: - Level:	Date 24/11/2021
Location: PE12 0PW		Dimensions (m): Depth 0.95	Scale 1:20
Client: Mr R Spencely			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.20	ES		0.20			Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
				0.60			Brown slightly clayey, slightly sandy SILT. (TFD)
	0.90 - 1.00	ES		0.95			Yellowish brown slightly clayey, sandy SILT. (TFD)
							End of pit at 0.95 m

Remarks: TFD= Tidal Flat Deposits
No Groundwater Encountered

Stability:

Trial Pit Log

Trialpit No **TP03**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: - Level:	Date 24/11/2021
Location: PE12 0PW		Dimensions (m): Depth 1.00	Scale 1:20
Client: Mr R Spencely			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.30 - 0.40	ES		0.22			Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
				0.34			Brown slightly clayey, slightly sandy SILT. (TFD)
							Yellowish brown slightly clayey, sandy SILT. (TFD)
				1.00			End of pit at 1.00 m

1 2 3 4

Remarks: TFD= Tidal Flat Deposits
No Groundwater Encountered

Stability:

AGS

Trial Pit Log

Trialpit No **TP04**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: - Level:	Date 24/11/2021
Location: PE12 0PW		Dimensions (m): Depth 1.00	Scale 1:20
Client: Mr R Spencely			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20 - 0.30	ES		0.23			Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
				0.46			Brown slightly sandy, clayey SILT. (TFD)
				1.00			Yellowish brown slightly clayey, sandy SILT. (TFD)
							End of pit at 1.00 m

Remarks: TFD= Tidal Flat Deposits
No Groundwater Encountered

Stability:

Trial Pit Log

Trialpit No **TP05**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: - Level:	Date 24/11/2021
Location: PE12 0PW		Dimensions (m): Depth 2.20	Scale 1:20
Client: Mr R Spencely			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.20	ES					Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
				0.30			MADE GROUND: Brown slightly gravelly, clayey SILT with rare brick fragments.
	0.70 - 0.80	ES					
				1.50			MADE GROUND: Dark grey and brown clayey SILT with fragments of pottery, brick, glass and metal as well as whole glass bottles.
	2.00 - 2.10	ES					
				2.20			End of pit at 2.20 m

1 2 3 4

Remarks: TFD= Tidal Flat Deposits
No Groundwater Encountered

Stability:

Trial Pit Log

Trialpit No **TP06**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: - Level:	Date 24/11/2021
Location: PE12 0PW		Dimensions (m): Depth 1.40	Scale 1:20
Client: Mr R Spencely			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40 - 0.50	ES		0.34			Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
							Yellowish brown sandy clayey SILT with occasional light orangish brown mottling.. (TFD)
				1.40			End of pit at 1.40 m

1 2 3 4

Remarks: TFD= Tidal Flat Deposits
No Groundwater Encountered

Stability:

Trial Pit Log

Trialpit No **TP07**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: - Level:	Date 24/11/2021
Location: PE12 0PW		Dimensions (m): Depth 1.20	Scale 1:20
Client: Mr R Spencely			Logged

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.20	ES					Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
				0.36			Yellowish brown sandy clayey SILT with occasional light orangish brown mottling.. (TFD)
				1.20			End of pit at 1.20 m

Remarks: TFD= Tidal Flat Deposits
No Groundwater Encountered

Stability:

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: -	Hole Type WS
Location: PE12 0PW		Level:	Scale 1:20
Client: Mr R Spencely		Dates: -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
		0.50 - 1.50	B		0.46			Loose to medium dense yellowish brown slightly clayey silty SAND. (TFD)
		1.00		N=11 (2,2/2,3,3,3)				
		1.70 - 1.80	D					
		2.00		N=7 (2,1/2,2,1,2)				
	▼							
		3.00		N=18 (2,3/4,4,5,5)				
		3.70 - 3.80	D					
		4.00		N=6 (2,1/1,1,2,2)	4.00			End of borehole at 4.00 m

Remarks
TFD= Tidal Flat Deposits
Groundwater strike was encountered at roughly 2.55m.

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: -	Hole Type WS
Location: PE12 0PW		Level:	Scale 1:20
Client: Mr R Spencely		Dates: -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		1.00		N=6 (2,2/1,3,1,1)				MADE GROUND: Brown slightly gravelly, clayey SILT with occasional brick, pottery and glass fragments.
		2.00		N=14 (3,3/4,4,3,3)				
					2.30			Loose to medium dense dark grey to brown organic slightly clayey silty fine SAND. (TFD)
	▼	2.60 - 2.70	D					
		3.00		N=6 (2,1/1,1,1,3)				
		3.10 - 3.20	D					
		4.00		N=8 (1,1/2,1,2,3)	4.00			End of borehole at 4.00 m

Remarks
TFD= Tidal Flat Deposits
Groundwater strike was encountered at roughly 2.8m.

AGS

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: -	Hole Type WS
Location: PE12 0PW		Level:	Scale 1:20
Client: Mr R Spencely		Dates: -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30 - 1.30	B		0.30			Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
		1.00		N=14 (2,3/3,3,4,4)				Medium dense yellowish brown sandy clayey SILT with occasional light orangish brown mottling.. (TFD)
		1.40 - 1.50	D		1.50			Loose to medium dense brown clayey silty fine SAND with occasional yellowish brown mottling and rare dark grey organic pockets. (TFD)
		2.00		N=7 (2,1/2,2,1,2)				
	▼	2.30 - 2.40	D					
		3.00		N=11 (2,2/3,3,2,3)				
		4.00		N=4 (2,1/1,1,1,1)	4.00			End of borehole at 4.00 m

1 2 3 4

Remarks
TFD= Tidal Flat Deposits
Groundwater strike was encountered at roughly 2.3m.

AGS

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: Mill Lane, Gedney Hill	Project No. UK21.5670	Co-ords: -	Hole Type WS
Location: PE12 0PW		Level:	Scale 1:20
Client: Mr R Spencely		Dates: -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Dark brown slightly sandy, slightly clayey, silty TOPSOIL with active rootlets.
					0.50			Medium dense yellowish brown sandy clayey SILT with occasional light orangish brown mottling. (TFD)
		0.80 - 0.90	D					
		1.00		N=14 (3,3/3,3,4,4)				
					1.30			Loose to medium dense yellowish brown silty fine SAND. (TFD)
		2.00		N=14 (4,4/4,3,3,4)				
	▼							
		2.50 - 2.60	D					
		3.00		N=10 (2,1/2,3,2,3)				
		4.00		N=4 (2,1/1,1,1,1)	4.00			End of borehole at 4.00 m

Remarks
TFD= Tidal Flat Deposits
Groundwater strike was encountered at roughly 2.3.

APPENDIX H

RB17 Forensic Analysis

RB17 Forensic Soil Analysis

UK21.5678							
Material	TP05						
	Mass (kg)	Rel. %	Max. TOC (kg)	Total TOC per kg (%)			
Total Fines (variable organic)	10.285	85.5	0.339				
Coarse (non-organic)	0.769	6.4					
Wood (100% organic)	0.147	1.2	0.147				
Veg. (100% organic)	0	0.0	0				
Cloth (100% organic)	0	0.0					
Metal, Glass, Ceramic (non-organic)	1.076	8.9					
Paper (100% organic)	0	0.0					
Other	0	0.0					
TOTAL:	12.03	102.0532		**2.82**			

TOC (%) Fines	3.3	
Max TOC (%) Total (all organics)	**2.82**	

A (tonnes)	875.00	
C_l (kg/tonne)	2.12	
k ($year^{-1}$)	0.10	
t (years)	21.00	
α^T (m^3 / year)	24.65	

Area of Site (m2)	250
Depth of Strata (m)	2.5
Volume of Strata (m3)	625

Estimated Landfill Size (tonnes)
875
Gas Generation Rate (Fast: 0.185; Med: 0.1; Slow: 0.03)
0.1

Average TOC (%) Total (all organics)	Average TOC (%) Fines
2.821	1.650

Average Gas Generation From Material (m^3 /year)
24.65

Compound Gas Generation

Year	TP05	
	Gas potential	Cum. Gas
1	182.16	182.16
2	82.41	264.57
3	49.71	314.28
4	33.74	348.02
5	24.42	372.44
6	18.41	390.85
7	14.28	405.14
8	11.31	416.44
9	9.09	425.54
10	7.41	432.94
11	6.09	439.04
12	5.05	444.09
13	4.22	448.31
14	3.55	451.86
15	2.99	454.85
16	2.54	457.39
17	2.16	459.55
18	1.85	461.40
19	1.58	462.99
20	1.36	464.35
21	1.17	465.52

APPENDIX I

Laboratory Results – Environmental

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
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EPS Ltd
7B Caxton House
Broad Street
Cambourne
Cambridgeshire
CB23 6JN

Attention :	Abbey High
Date :	8th December, 2021
Your reference :	UK21.5670
Our reference :	Test Report 21/18769 Batch 1
Location :	Mill Lane, Gedney Hill
Date samples received :	26th November, 2021
Status :	Final Report
Issue :	1

Ten samples were received for analysis on 26th November, 2021 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Hayley Prowse
Project Manager

Please include all sections of this report if it is reproduced

Client Name: EPS Ltd
Reference: UK21.5670
Location: Mill Lane, Gedney Hill
Contact: Abbey High
EMT Job No: 21/18769

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-2	7-8	9-10	11-12	15-16	17-18					LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP04	TP05	TP05	TP06							
Depth	0.40-0.50	0.30-0.40	0.20-0.30	0.10-0.20	2.00-2.10	0.40-0.50							
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J							
Sample Date	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021							
Sample Type	Clay	Clay	Clay	Clay	Clayey Silt	Clay							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021							
Arsenic #M	12.8	12.3	12.5	13.3	9.0	9.6					<0.5	mg/kg	TM30/PM15
Cadmium #M	<0.1	<0.1	<0.1	<0.1	0.3	<0.1					<0.1	mg/kg	TM30/PM15
Chromium #M	34.2	35.5	39.1	37.3	29.3	31.3					<0.5	mg/kg	TM30/PM15
Copper #M	12	11	14	17	37	8					<1	mg/kg	TM30/PM15
Lead #M	27	17	21	59	82	11					<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1	<0.1	0.8	<0.1					<0.1	mg/kg	TM30/PM15
Nickel #M	15.0	16.6	16.3	16.8	11.1	16.3					<0.7	mg/kg	TM30/PM15
Selenium #M	<1	<1	<1	<1	<1	<1					<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #M	521	529	621	575	774	377					<50	mg/kg	TM50/PM29
Zinc #M	57	58	60	92	1128	46					<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #M	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.21	<0.03	<0.03	<0.03	<0.03	0.05					<0.03	mg/kg	TM4/PM8
Acenaphthene #M	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					<0.05	mg/kg	TM4/PM8
Fluorene #M	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Phenanthrene #M	1.03	0.04	0.07	0.15	0.10	0.39					<0.03	mg/kg	TM4/PM8
Anthracene #	0.41	<0.04	<0.04	0.06	<0.04	0.14					<0.04	mg/kg	TM4/PM8
Fluoranthene #M	3.23	0.13	0.24	0.55	0.35	1.50					<0.03	mg/kg	TM4/PM8
Pyrene #	2.75	0.12	0.22	0.47	0.31	1.30					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	1.49	0.09	0.16	0.31	0.22	0.73					<0.06	mg/kg	TM4/PM8
Chrysene #M	1.77	0.09	0.14	0.33	0.19	0.79					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	3.00	0.15	0.24	0.60	0.31	1.37					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	1.58	0.07	0.12	0.31	0.17	0.73					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	1.36	0.07	0.12	0.28	0.14	0.60					<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.24	<0.04	<0.04	0.05	<0.04	0.11					<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1.16	0.06	0.08	0.23	0.10	0.50					<0.04	mg/kg	TM4/PM8
PAH 16 Total	18.2	0.8	1.4	3.3	1.9	8.2					<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	2.16	0.11	0.17	0.43	0.22	0.99					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.84	0.04	0.07	0.17	0.09	0.38					<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	88	88	94	93	94					<0	%	TM4/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5670
Location: Mill Lane, Gedney Hill
Contact: Abbey High
EMT Job No: 21/18769

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-2	7-8	9-10	11-12	15-16	17-18					LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP04	TP05	TP05	TP06							
Depth	0.40-0.50	0.30-0.40	0.20-0.30	0.10-0.20	2.00-2.10	0.40-0.50							
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J							
Sample Date	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021							
Sample Type	Clay	Clay	Clay	Clay	Clayey Silt	Clay							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021							
Pesticides													
Organochlorine Pesticides													
Aldrin	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Alpha-HCH (BHC)	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Beta-HCH (BHC)	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Delta-HCH (BHC)	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Dieldrin	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Endosulphan I	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Endosulphan II	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Endosulphan sulphate	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Endrin	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Gamma-HCH (BHC)	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Heptachlor	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Heptachlor Epoxide	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
p,p'-DDE	-	20	-	-	-	17					<10	ug/kg	TM42/PM8
p,p'-DDT	-	<10	-	-	-	25					<10	ug/kg	TM42/PM8
p,p'-TDE	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Total Methoxychlor	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Organophosphorus Pesticides													
Azinphos methyl	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Diazinon	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Dichlorvos	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Disulfoton	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Ethion	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Ethyl Parathion (Parathion)	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Fenitrothion	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Malathion	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Methyl Parathion	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8
Mevinphos	-	<10	-	-	-	<10					<10	ug/kg	TM42/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: EPS Ltd
Reference: UK21.5670
Location: Mill Lane, Gedney Hill
Contact: Abbey High
EMT Job No: 21/18769

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-2	7-8	9-10	11-12	15-16	17-18					LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP04	TP05	TP05	TP06							
Depth	0.40-0.50	0.30-0.40	0.20-0.30	0.10-0.20	2.00-2.10	0.40-0.50							
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J							
Sample Date	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021							
Sample Type	Clay	Clay	Clay	Clay	Clayey Silt	Clay							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021							
Acid Herbicides													
2,3,6 - TBA	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
2,4 - D	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
2,4 - DB	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
2,4,5 - T	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
4 - CPA	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Benazolin	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Bentazone	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Bromoxynil	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Clopyralid	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Dicamba	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Dichloroprop	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Diclofop	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Fenoprop	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Flamprop	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Flamprop – isopropyl	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Ioxynil	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
MCPA	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
MCPB	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Mecoprop	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Pentachlorophenol	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Picloram	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
Triclopyr	-	<0.1	-	-	-	<0.1					<0.1	mg/kg	TM42/PM8
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #M	<0.1	-	<0.1 SV	<0.1 SV	<0.1	-					<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #M	<0.1	-	<0.1 SV	<0.1 SV	<0.1	-					<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	-	<0.1 SV	<0.1 SV	<0.1	-					<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #M	<0.2	-	<0.2	2.0	<0.2	-					<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #M	<4	-	<4	13	<4	-					<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #M	<7	-	<7	18	<7	-					<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #M	<7	-	28	33	<7	-					<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH+HS_CU_1D_AL)	<19	-	28	66	<19	-					<19	mg/kg	TM5/TM36/PM8/PM12/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: EPS Ltd
Reference: UK21.5670
Location: Mill Lane, Gedney Hill
Contact: Abbey High
EMT Job No: 21/18769

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-2	7-8	9-10	11-12	15-16	17-18	LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP04	TP05	TP05	TP06			
Depth	0.40-0.50	0.30-0.40	0.20-0.30	0.10-0.20	2.00-2.10	0.40-0.50			
COC No / misc									
Containers	V J	V J	V J	V J	V J	V J			
Sample Date	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021	24/11/2021			
Sample Type	Clay	Clay	Clay	Clay	Clayey Silt	Clay			
Batch Number	1	1	1	1	1	1			
Date of Receipt	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021			
TPH CWG									
Aromatics									
>C5-EC7 (HS_1D_AR) #	<0.1	-	<0.1 SV	<0.1 SV	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	-	<0.1 SV	<0.1 SV	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #M	<0.1	-	<0.1 SV	<0.1 SV	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	-	<0.2	<0.2	<0.2	-	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	-	<4	<4	<4	-	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	45	-	<7	<7	<7	-	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	168	-	58	59	44	-	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH+HS_CU_1D_AR) #	213	-	58	59	44	-	<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-35) (EH+HS_CU_1D_Total)	213	-	86	125	44	-	<38	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE #	<5	-	<5 SV	<5 SV	<5	-	<5	ug/kg	TM36/PM12
Benzene #	<5	-	<5 SV	<5 SV	<5	-	<5	ug/kg	TM36/PM12
Toluene #	<5	-	<5 SV	<5 SV	<5	-	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	-	<5 SV	<5 SV	<5	-	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	-	<5 SV	<5 SV	<5	-	<5	ug/kg	TM36/PM12
o-Xylene #	<5	-	<5 SV	<5 SV	<5	-	<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	24.4	22.3	35.2	27.8	29.8	17.9	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	<0.0015	0.0374	0.0057	<0.0015	0.1598	<0.0015	<0.0015	g/l	TM38/PM20
Chromium III	34.2	35.5	39.1	37.3	29.3	31.3	<0.5	mg/kg	NONE/NONE
Total Cyanide #M	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	TM89/PM45
Organic Matter	1.9	2.6	10.4	5.6	1.3	1.5	<0.2	%	TM21/PM24
pH #M	8.26	8.42	7.93	8.00	7.94	8.48	<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay	Clay	Clayey Silt	Clay		None	PM13/PM0
Sample Colour	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown		None	PM13/PM0
Other Items	stones	stones	stones, vegetation, loam	stones	stones	stones		None	PM13/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: EPS Ltd

Reference: UK21.5670

Location: Mill Lane, Gedney Hill

Contact: Abbey High

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
21/18769	1	TP01	0.40-0.50	1-2	PAH's
21/18769	1	TP04	0.20-0.30	9-10	Naturally occurring compounds
21/18769	1	TP05	0.10-0.20	11-12	Unknown aliphatic hydrocarbons, Possible PAH's & Naturally occurring compounds
21/18769	1	TP05	2.00-2.10	15-16	Trace of possible PAH's

Client Name: EPS Ltd
Reference: UK21.5670
Location: Mill Lane, Gedney Hill
Contact: Abbey High

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/18769	1	TP01	0.40-0.50	2	02/12/2021	**General Description (Bulk Analysis)**	soil
					02/12/2021	**Asbestos Fibres**	NAD
					02/12/2021	**Asbestos ACM**	NAD
					02/12/2021	**Asbestos Type**	NAD
					02/12/2021	**Asbestos Level Screen**	NAD
21/18769	1	TP03	0.30-0.40	8	02/12/2021	**General Description (Bulk Analysis)**	soil
					02/12/2021	**Asbestos Fibres**	NAD
					02/12/2021	**Asbestos ACM**	NAD
					02/12/2021	**Asbestos Type**	NAD
					02/12/2021	**Asbestos Level Screen**	NAD
21/18769	1	TP04	0.20-0.30	10	02/12/2021	**General Description (Bulk Analysis)**	soil
					02/12/2021	**Asbestos Fibres**	NAD
					02/12/2021	**Asbestos ACM**	NAD
					02/12/2021	**Asbestos Type**	NAD
					02/12/2021	**Asbestos Level Screen**	NAD
21/18769	1	TP05	0.10-0.20	12	02/12/2021	**General Description (Bulk Analysis)**	soil
					02/12/2021	**Asbestos Fibres**	NAD
					02/12/2021	**Asbestos ACM**	NAD
					02/12/2021	**Asbestos Type**	NAD
					02/12/2021	**Asbestos Level Screen**	NAD
21/18769	1	TP05	2.00-2.10	16	01/12/2021	**General Description (Bulk Analysis)**	Soil/Stones
					01/12/2021	**Asbestos Fibres**	NAD
					01/12/2021	**Asbestos ACM**	NAD
					01/12/2021	**Asbestos Type**	NAD
					01/12/2021	**Asbestos Level Screen**	NAD
21/18769	1	TP06	0.40-0.50	18	01/12/2021	**General Description (Bulk Analysis)**	Soil/Stones
					01/12/2021	**Asbestos Fibres**	NAD
					01/12/2021	**Asbestos ACM**	NAD
					01/12/2021	**Asbestos Type**	NAD
					01/12/2021	**Asbestos Level Screen**	NAD

Client Name: EPS Ltd
Reference: UK21.5670
Location: Mill Lane, Gedney Hill
Contact: Abbey High

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/18769						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

EPS Ltd
7B Caxton House
Broad Street
Cambourne
Cambridgeshire
CB23 6JN

Attention :	Abbey High
Date :	29th December, 2021
Your reference :	UK21.5670
Our reference :	Test Report 21/20648 Batch 1
Location :	Station Rd, Gedney Hill
Date samples received :	24th December, 2021
Status :	Final Report
Issue :	1

One sample was received for analysis on 24th December, 2021 and was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: EPS Ltd
Reference: UK21.5670
Location: Station Rd, Gedney Hill
Contact: Abbey High
EMT Job No: 21/20648

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1										LOD/LOR	Units	Method No.
Sample ID	TP05												
Depth	1.5-1.7												
COC No / misc													
Containers	J												
Sample Date	16/12/2021												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	24/12/2021												
Total Organic Carbon #	3.30										<0.02	%	TM21/PM24

Please see attached notes for all abbreviations and acronyms

Client Name: EPS Ltd
Reference: UK21.5670
Location: Station Rd, Gedney Hill
Contact: Abbey High

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/20648						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/20648

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/20648

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

APPENDIX J

Laboratory Results - Geotechnical

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

0998

Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

Client:

Environmental Protection Strategies Ltd
Unit 7
Caxton House
Broad Street
Great Cambourne
Cambridge
CB23 6JN

Soil Property Testing Ltd

15, 16, 18 Halcyon Court, St Margaret's Way, Stukeley Meadows, Huntingdon, Cambridgeshire, PE29 6DG

Tel: 01480 455579
Email: enquiries@soilpropertytesting.com
Website: www.soilpropertytesting.com

Samples Submitted By:

Environmental Protection Strategies Ltd

Samples Labelled:

UK21.5670 - Station Road, Gedney Hill

Approved Signatories:

☑ **J.C. Garner B.Eng (Hons) FGS**
Technical Director & Quality Manager

☐ **W. Johnstone**
Materials Lab Manager

Date Received: 24/12/2021

Samples Tested Between: 24/12/2021 **and** 24/01/2022

Remarks:

For the attention of Abbey High
Your Reference No: UK21.5670
Your Order No: 28080

Notes:

1. All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
2. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
3. Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
4. This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.
5. The results within this report only relate to the items tested or sampled.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

0998

Contract	**UK21.5670 - Station Road, Gedney Hill**		
Serial No.	**39972_1**	**Target Date**	24/01/2022
Scheduled By	Environmental Protection Strategies Ltd		
Schedule Remarks			

Bore Hole No.	Type	Sample Ref.	Top Depth	California Bearing Ratio Test	Particle Size Distribution (BS1377)	Sulphate Content/pH Value																Sample Remarks
WS01	B	1	0.50	1																		
WS01	D	1	1.70		1																	
WS01	D	2	3.70		1	1																
WS02	D	1	2.60			1																
WS02	D	2	3.10		1																	
WS03	B	1	0.30	1																		
WS03	D	1	1.40		1	1																
WS03	D	2	2.30		1																	
WS04	D	1	0.80		1	1																
WS04	D	2	2.50			1																
Totals				**2**	**6**	**5**																**End of Schedule**

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

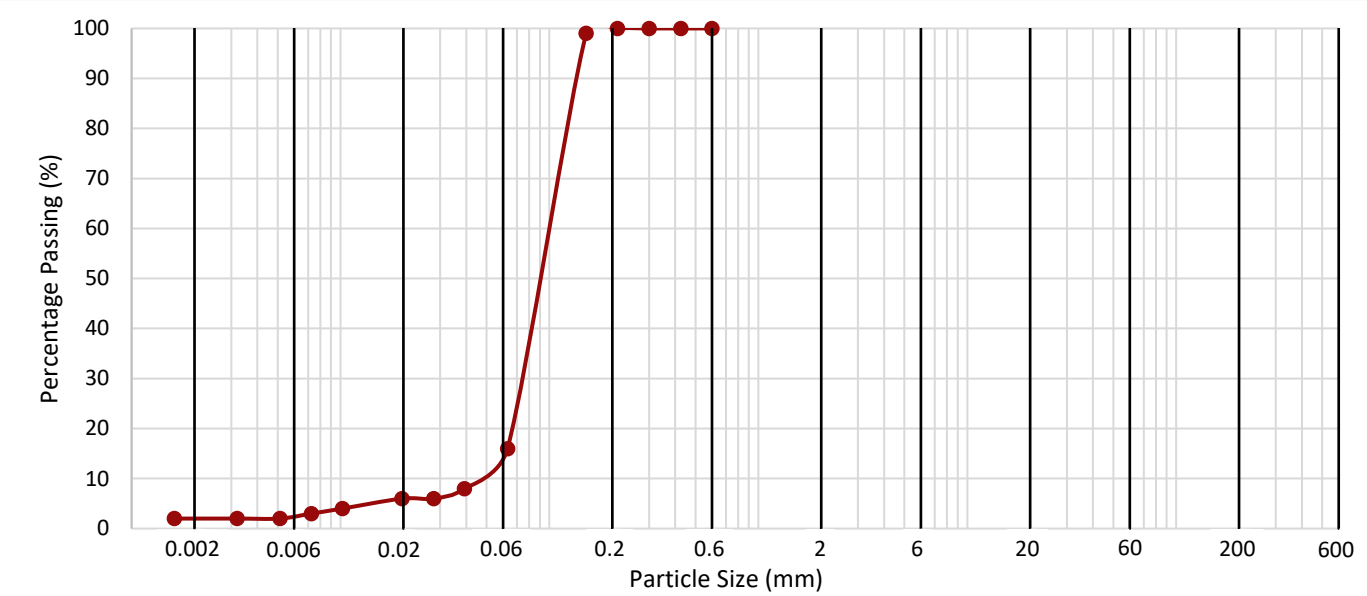
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Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS01	1.70 - 1.80	D	1	Yellowish brown slightly clayey silty SAND	

Method of Test:	Hydrometer + Pre-sieve	Method of Pretreatment:	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer

Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
0.0392	8	14
0.0279	6	
0.0197	6	
0.0102	4	Clay by Dry Mass (%)
0.0073	3	
0.0051	2	
0.0032	2	2
0.0016	2	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00		84
1.18		
0.600	100	
0.425	100	
0.300	100	
0.212	100	
0.150	99	
0.063	16	

Fines By Dry Mass (%)	
<0.063mm	16

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		0
125		
90		
63		
50		
37.5		
28		
20		
14		
10		
6.3		
5		

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2,9.5
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

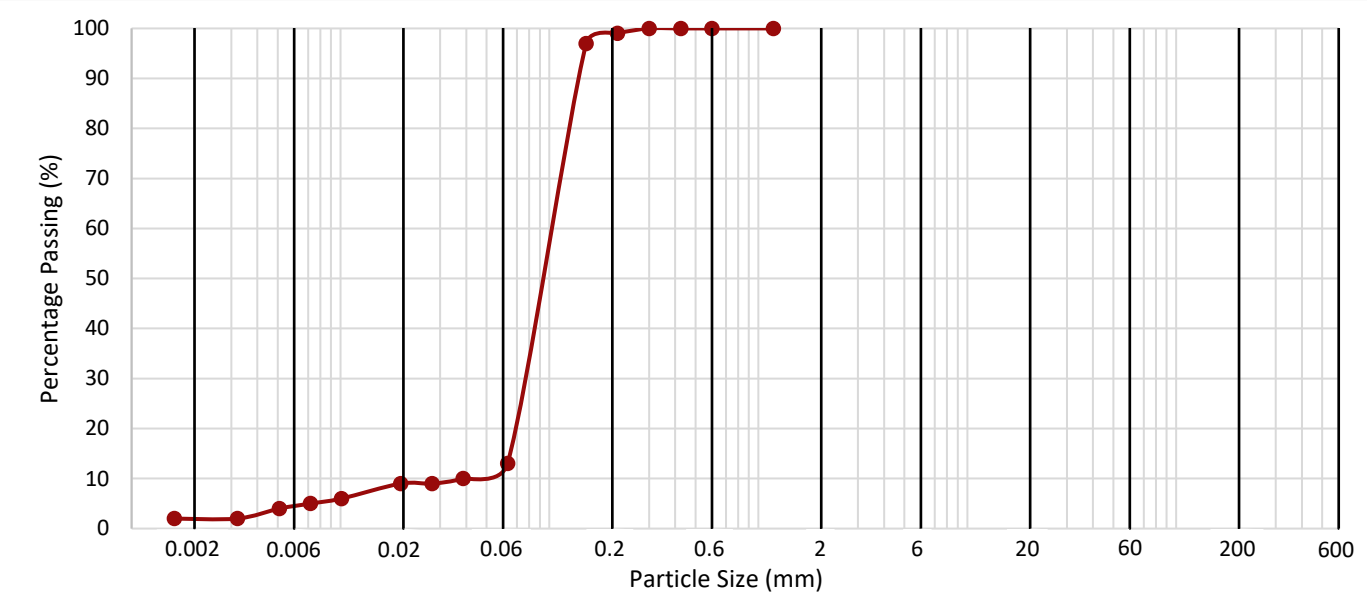
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Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS01	3.70 - 3.80	D	2	Brown slightly clayey silty SAND	

Method of Test:	Hydrometer + Pre-sieve	Method of Pretreatment:	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
	0.0386	10	11
	0.0274	9	
	0.0194	9	
	0.0101	6	Clay by Dry Mass (%)
	0.0072	5	
	0.0051	4	
	0.0032	2	2
	0.0016	2	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00		87
1.18	100	
0.600	100	
0.425	100	
0.300	100	
0.212	99	
0.150	97	
0.063	13	

Fines By Dry Mass (%)	
<0.063mm	13

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		0
125		
90		
63		
50		
37.5		
28		
20		
14		
10		
6.3		
5		

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2,9.5
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

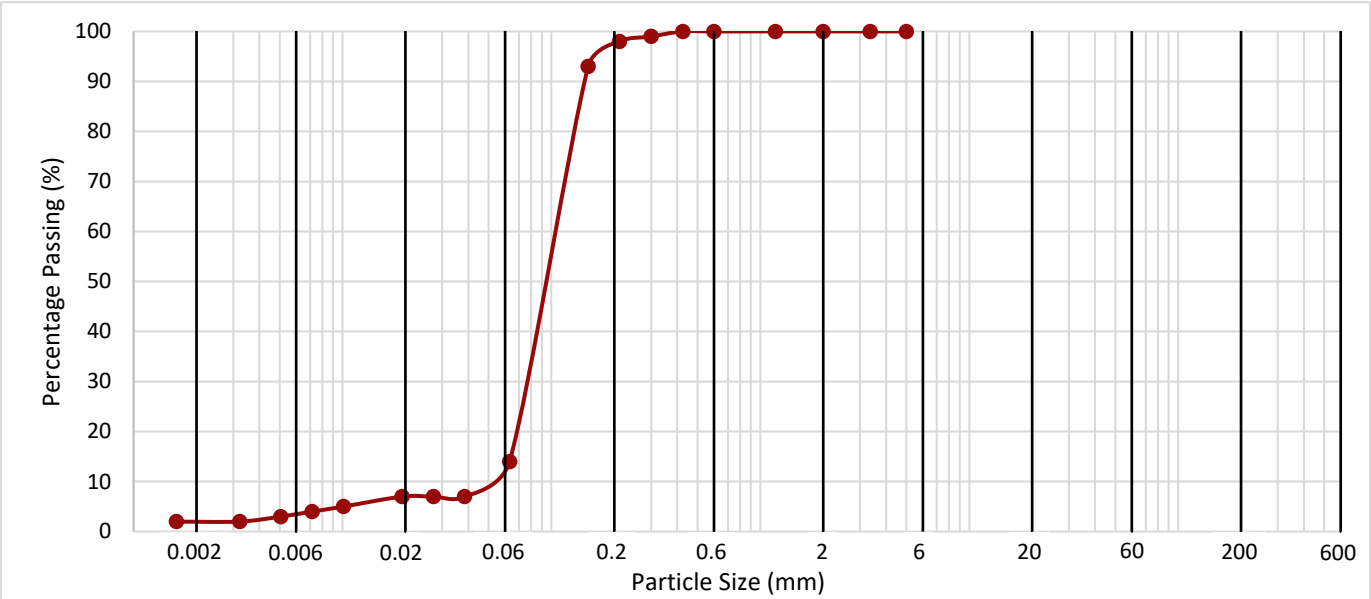
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Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS02	3.10 - 3.20	D	2	Dark grey organic slightly clayey silty fine SAND locally oxidised to brown	

Method of Test:	Hydrometer + Pre-sieve	Method of Pretreatment:	Tested from natural - pretreatment for organics not carried out



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
	0.0383	7	12
	0.0272	7	
	0.0193	7	
	0.0101	5	Clay by Dry Mass (%)
	0.0072	4	
	0.0051	3	
	0.0032	2	2
	0.0016	2	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	100	86
1.18	100	
0.600	100	
0.425	100	
0.300	99	
0.212	98	
0.150	93	
0.063	14	

Fines By Dry Mass (%)	
<0.063mm	14

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		0
125		
90		
63		
50		
37.5		
28		
20		
14		
10		
6.3		
5	100	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2,9.5
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

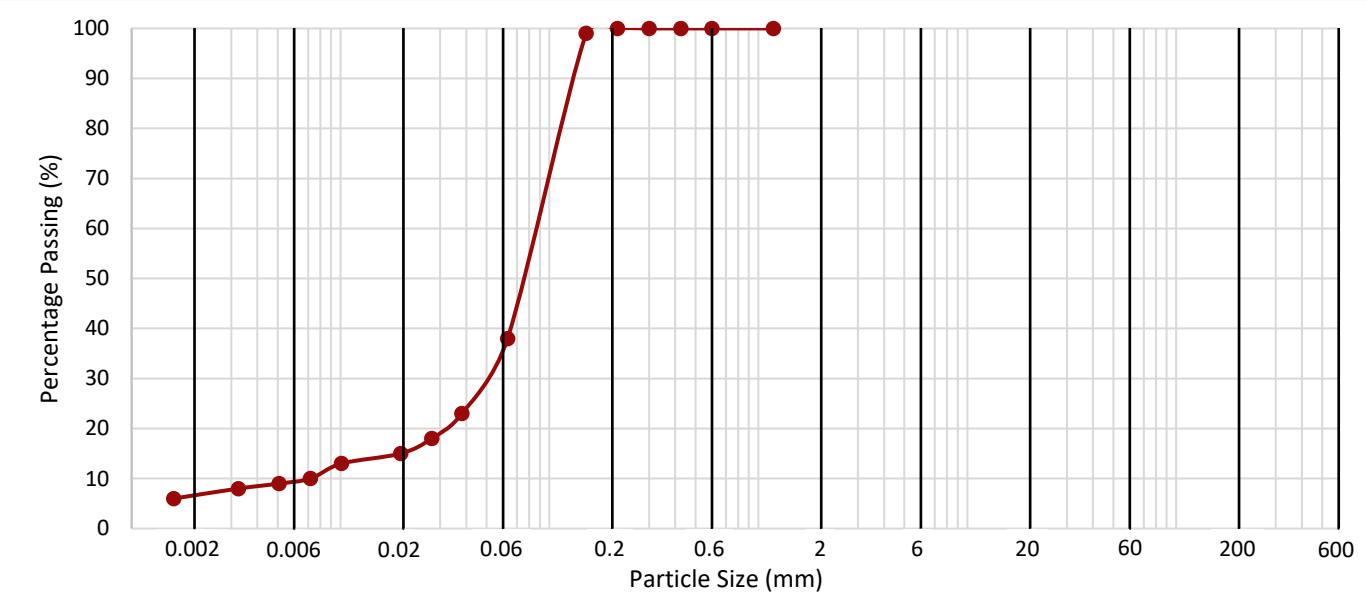
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Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS03	1.40 - 1.50	D	1	Yellowish brown sandy clayey SILT with occasional light orangish brown mottling	

Method of Test:	Hydrometer + Pre-sieve	Method of Pretreatment:	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
	0.0381	23	31
	0.0273	18	
	0.0194	15	
	0.0101	13	Clay by Dry Mass (%)
	0.0072	10	
	0.0051	9	
	0.0032	8	7
	0.0016	6	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00		62
1.18	100	
0.600	100	
0.425	100	
0.300	100	
0.212	100	
0.150	99	
0.063	38	

Fines By Dry Mass (%)	
<0.063mm	38

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		0
125		
90		
63		
50		
37.5		
28		
20		
14		
10		
6.3		
5		

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2,9.5
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

TEST REPORT

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DATE ISSUED: 24/01/2022

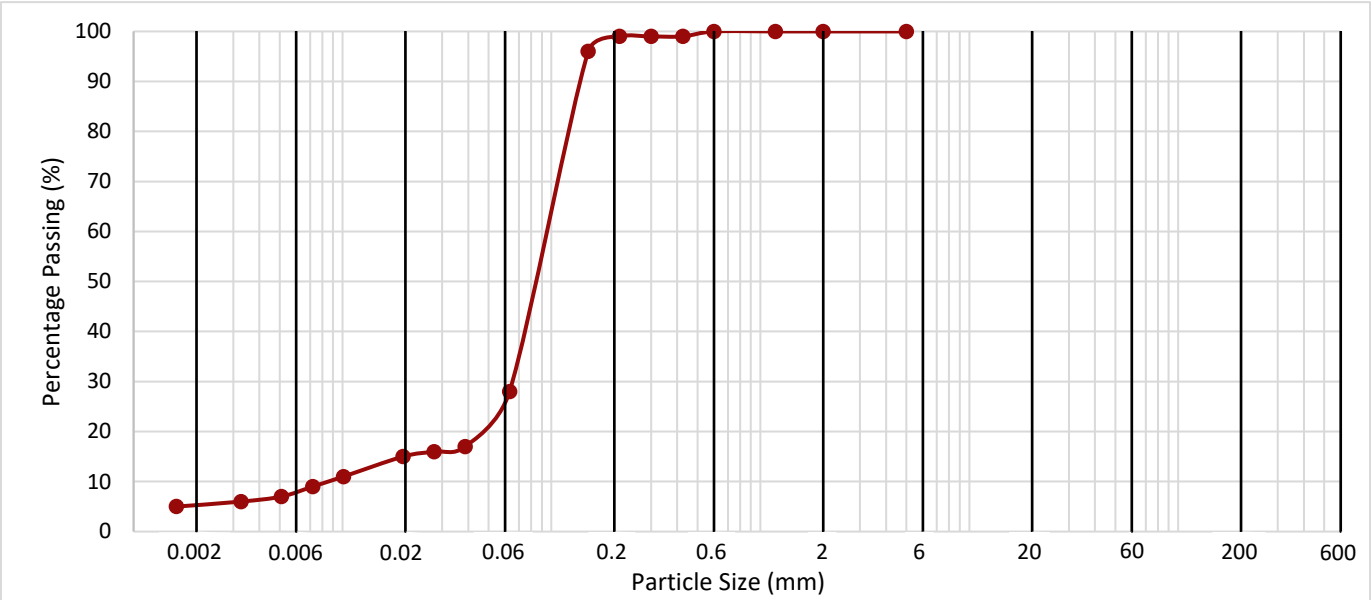
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Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS03	2.30 - 2.40	D	2	Brown clayey silty fine SAND with occasional yellowish brown mottling and rare dark grey organic pockets	

Method of Test:	Hydrometer + Pre-sieve	Method of Pretreatment:	Tested from natural - pretreatment for organics not carried out



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
	0.0386	17	23
	0.0274	16	
	0.0195	15	
	0.0101	11	Clay by Dry Mass (%)
	0.0072	9	
	0.0051	7	
	0.0033	6	5
	0.0016	5	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	100	72
1.18	100	
0.600	100	
0.425	99	
0.300	99	
0.212	99	
0.150	96	
0.063	28	

Fines By Dry Mass (%)	
<0.063mm	28

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		0
125		
90		
63		
50		
37.5		
28		
20		
14		
10		
6.3		
5	100	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2,9.5
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

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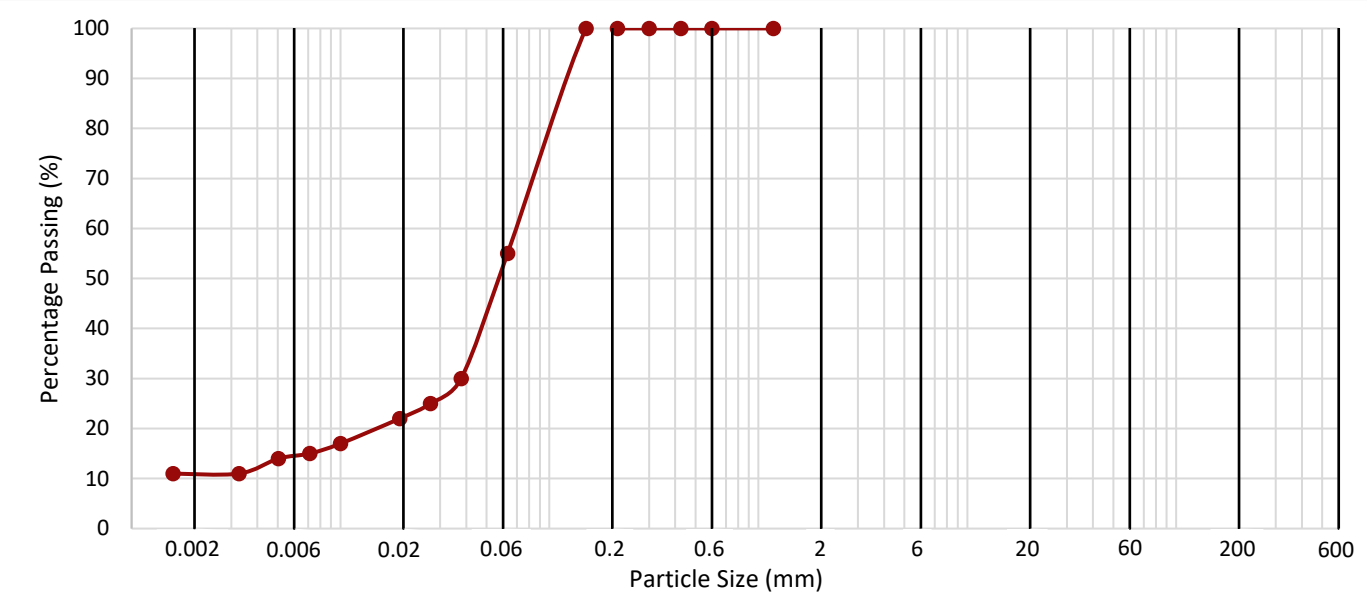
0998

Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS04	0.80 - 0.90	D	1	Yellowish brown sandy clayey SILT with occasional light orangish brown mottling	

Method of Test:	Hydrometer + Pre-sieve	Method of Pretreatment:	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer

Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
0.0378	30	44
0.0270	25	
0.0192	22	
0.0100	17	Clay by Dry Mass (%)
0.0071	15	
0.0050	14	
0.0033	11	11
0.0016	11	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00		45
1.18	100	
0.600	100	
0.425	100	
0.300	100	
0.212	100	
0.150	100	
0.063	55	

Fines By Dry Mass (%)	
<0.063mm	55

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		0
125		
90		
63		
50		
37.5		
28		
20		
14		
10		
6.3		
5		

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2,9.5
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

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Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

CALIFORNIA BEARING RATIO TEST

Borehole /Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS01	0.50 - 1.50	B	1	Dark yellowish brown clayey silty fine SAND	

Specimen Preparation

Condition	Remoulded
Details	Recompacted with specified standard effort using 2.5kg rammer

Material Retained on 20mm Sieve Removed		0.0	%
Initial Specimen Details:	Bulk Density	1.95	Mg/m³
	Dry Density	1.63	Mg/m³

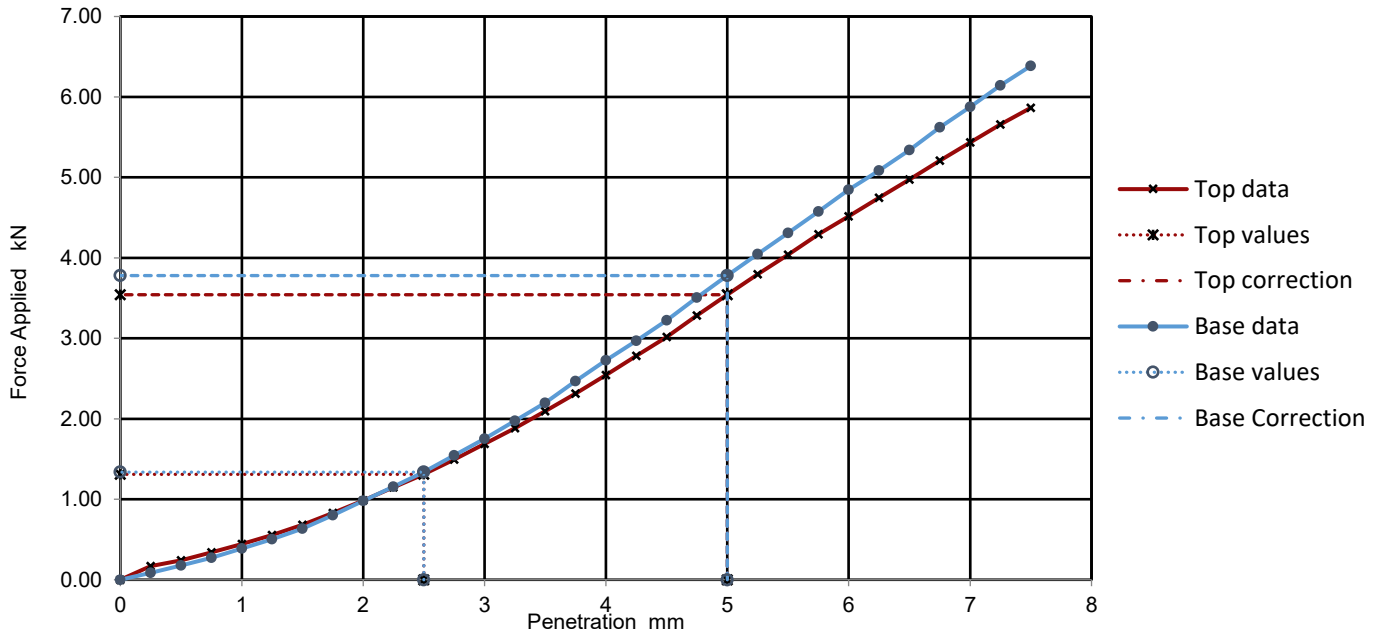
Soaking Details	Not Soaked	
Period of Soaking		days
Time to Surface		days
Amount of Swell Recorded		mm
Initial Water Content		%

Surcharge Applied	15	kg

Test Results

	Curve Correction	CBR Values (%) 2.5mm	5.0mm	Highest	Mean*	Water Content (%)
TOP	No	9.9	18	18	19	19.6
BASE	No	10	19	19		19.8

Force v Penetration Plots



Method of Preparation: BS1377: Part1: 2016 & BS1377: Part 4: 1990: 7.2.4.4

Method of Test: BS 1377: Part 4: 1990: 7

Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT= Split Spoon Sample, C = Core Cutter

Comments: *Only reported if the results from each end of the sample are within ±10% of the mean value.
Note:- CBR Results are water content dependent - an increase in water content will result in a decrease of CBR value.

Remarks to Include: Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

0998

Contract	**UK21.5670 - Station Road, Gedney Hill**
Serial No.	**39972_1**

CALIFORNIA BEARING RATIO TEST

Borehole /Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
WS03	0.30 - 1.30	B	1	Dark yellowish brown clayey silty fine SAND with occasional dark brown mottling	

Specimen Preparation

Condition	Remoulded
Details	Recompacted with specified standard effort using 2.5kg rammer

Material Retained on 20mm Sieve Removed		0.0	%
Initial Specimen Details:	Bulk Density	1.95	Mg/m³
	Dry Density	1.64	Mg/m³

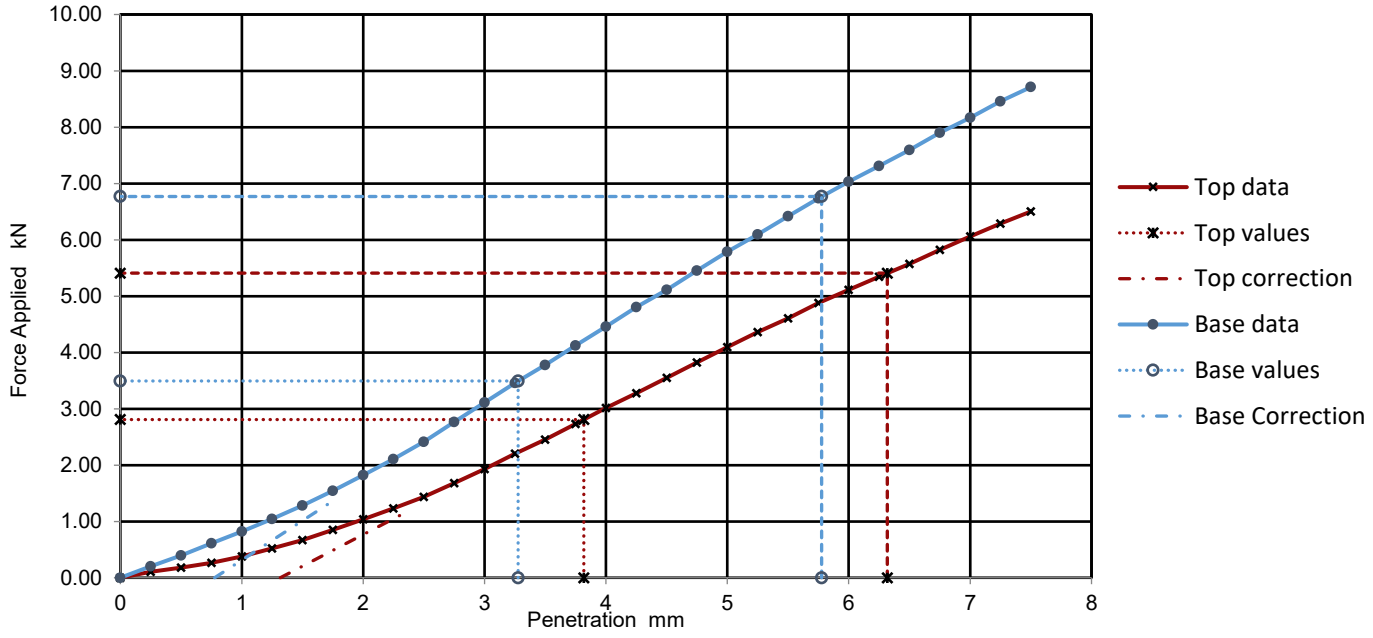
Soaking Details	Not Soaked	
Period of Soaking		days
Time to Surface		days
Amount of Swell Recorded		mm
Initial Water Content		%

Surcharge Applied	15	kg

Test Results

	Curve Correction	CBR Values (%) 2.5mm	5.0mm	Highest	Mean*	Water Content (%)
TOP	Yes	21	27	27		19.4
BASE	Yes	26	34	34		19.1

Force v Penetration Plots



Method of Preparation:	BS1377: Part1: 2016 & BS1377: Part 4: 1990: 7.2.4.4
Method of Test:	BS 1377: Part 4: 1990: 7
Type of Sample Key	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT= Split Spoon Sample, C = Core Cutter
Comments:	*Only reported if the results from each end of the sample are within ±10% of the mean value. Note:- CBR Results are water content dependent - an increase in water content will result in a decrease of CBR value.
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 24/01/2022

Contract:	**UK21.5670 - Station Road, Gedney Hill**
Serial No:	**39972_1**

DETERMINATION OF THE SULPHATE CONTENT AND pH OF SOIL AND GROUNDWATER

Borehole / Pit No.	Depth (m)	Sample		Conc. of Soluble SO3		Calc'd Conc. Of SO4 (g/L)	pH Value	% Sample Passing 2mm Sieve	Description	Remarks
		Type	Ref.	Water Soluble 2:1 (g/L)	Ground Water (g/L)					
WS01	3.70 - 3.80	D	2	0.04		0.05	7.9	100	Brown slightly clayey silty SAND	
WS02	2.60 - 2.70	D	1	0.18		0.21	7.4	100	Very dark grey locally oxidised to brown organic silty fine SAND	
WS03	1.40 - 1.50	D	1	0.03		0.04	7.8	100	Yellowish brown sandy clayey SILT with occasional light orangish brown mottling	
WS04	0.80 - 0.90	D	1	<0.01		<0.01	7.8	100	Yellowish brown sandy clayey SILT with occasional light orangish brown mottling	
WS04	2.50 - 2.60	D	2	0.02		0.03	8.0	100	Yellowish brown silty fine SAND	

Method of Preparation:	BS1377: Part 1: 2016: 8.5, BS1377: Part 3: 1990: 5.3 Soil/Water Extract, 5.4 Groundwater
Method of Test:	BS1377: Part 3: 1990: 5.5
Type of Sample Key:	U= Undisturbed, B= Bulk, D= Disturbed, J= Jar, W= Water, SPT= Split Spoon Sample, C= Core Cutter
Comments:	**Test not UKAS accredited**
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location, and origin of test specimen within original sample. Oven drying temperature if not 105-110C.

APPENDIX K

Generic Screening Criteria

EPS Generic Quantitative Risk Assessment

Generic Screening Criteria (C4SLs) - All Land Uses

Contaminant	Soil Targets					
	Residential		Allotments	Commercial	Public Open Spaces	
	With Home Grown Produce	Without Home Grown Produce			Residential	Parks
Unit	mg/kg					
Arsenic	37	40	49	640	79	168
Benzene	0.87	3.3	0.18	98	140	230
Benzo(a)pyrene	5	5.3	5.7	76	10	21
Cadmium	26	149	4.9	410	220	880
Chromium (VI)	21	21	170	49	23	250
Lead	200	310	80	2330	630	1300
Chloroethene (Vinyl Chloride)	0.017	0.029	0.0058	2.2	7.8	19
Trichloroethene (TCE)	0.043	0.045	0.16	3.4	79	69
Tetrachloroethene (PCE)	1.6	1.6	11	130	3400	2500

Notes:

Targets for Human Health have been taken from the publicly available Category 4 Screening Levels (C4SLs) for assessment of land affected by contamination issued by DEFRA/CL:AIRE in December 2013 and May 2021.

Within the modelling for C4SLs, a Soil Organic Matter content of 6% has been used. Reference to site-specific data should be made where possible.

The C4SLs for the contaminant benzene along with the three chlorinated solvents are the most susceptable to changes in SOM.

Jan-22

EPS Generic Quantitative Risk Assessment - Residential Land Use

Contaminant	Soil Targets			Groundwater Targets		
	Human Health	Controlled Waters		Human Health	Controlled Waters	
		Surface Water	Groundwater		Surface Water	Groundwater
Unit	mg/kg			µg/l		
Arsenic	See C4SL	n/c	n/c	n/c	50	10
Cadmium	See C4SL	n/c	n/c	n/c	0.5 (0.25)	5
Chromium III	910	n/c	n/c	n/c	4.7	50
Chromium VI	See C4SL	n/c	n/c	n/c	3.4	
Copper	2400	n/c	n/c	n/c	1	2000
Mercury (elemental)	1.2	0.085	1.22	1.1	1 (0.07)	1
Nickel	180	n/c	n/c	n/c	4	20
Lead	See C4SL	n/c	n/c	n/c	5 (1.2)	10
Selenium	250	n/c	n/c	n/c	10	10
Zinc	3700	n/c	n/c	n/c	10.9	3000
Benzene	See C4SL	0.064	0.0064	210	10	1
Toluene	130	1.33	12.6	230,000	74	700
Ethylbenzene	47	0.77	11.5	10,000	20	300
Xylene (para)	56	1.18	19.6	9,900	30	500
MTBE#	49	4.41	0.026	83,000	2600	15
Benzo(a)Pyrene	See C4SL	n/c	n/c	n/c	0.005 (0.00017)	0.01
Naphthalene	2.3	0.11	0.11	220	2	2
Aliphatic C5-C6	42	4.06	0.81	1,900	50	10
Aliphatic C6-C8	100	17.8	3.57	1,500	50	10
Aliphatic C8-C10	27	n/c	n/c	57	50	10
Aliphatic C10-C12	130(48)*	n/c	n/c	37	50	10
Aliphatic C12-C16	1100(8.48)**	n/c	n/c	n/c	50	10
Aliphatic C16-C35	65000 (8.48)**	n/c	n/c	n/c	50	10
Aromatic C8-C10	34	6.71	1.34	1,900	50	10
Aromatic C10-C12	74	10.6	2.13	6,800	50	10
Aromatic C12-C16	140	21.2	4.23	39,000	50	10
Aromatic C16-C21	260	n/c	n/c	n/c	50	10
Aromatic C21-C35	1100	n/c	n/c	n/c	50	10
Tetrachloroethene	See C4SL	0.24	0.24	34	10	10
Trichloroethene	See C4SL	0.13	0.13	5.7	10	10
cis-1,2 Dichloroethene		0.21	0.21	130	50	50
Vinyl Chloride	See C4SL	0.0012	0.0012	0.62	0.5	0.5

Notes:
f = Oral, dermal and inhalation exposure compared with oral HCV N/C = Not Calculated
* = S4UL exceeds vapour saturation limit (in brackets) ** = S4UL exceeds solubility saturation limit (in brackets)
n/c = not calculated. Under normal conditions contaminant exhibits low solubility /volatility, therefore risks from leaching and or vapour pathways are considered low. Where compliance criteria was found below laboratory MDL, the latter was adopted as GAC with compliance criteria stated in brackets.

Soil Targets

Targets for Human Health have been taken from *S4ULs 'Suitable For Use Levels for Human Health Risk Assessment' – LQM and CIEH (2014)* derived using standard sandy loam soil with 1% SOM, except (#) = *EIC/AGS/CL:AIRE GAC 'Soil Generic Assessment Criteria' (2010)* . For sites where ground conditions differ significantly from sandy loam or site-specific SOM and pH are available, the generic human health targets may be revised.

Targets for Controlled waters have been derived using EA Remedial Targets Worksheet (v3.1) - using standard Sandy Loam ground conditions as described in Science Report SC050021/SR3, assuming no degradation for a 10m compliance distance with criteria of EQS or UKDWS for Surface Water and Groundwater respectively (see notes for GW targets).

Groundwater Targets
For Surface Water, targets have been taken as Freshwater EQS where available. For MTBE Predicted No Effect Concentration (European Risk Assessment Report, 2002) was used. For individual TPH fractions, in absence of UK EQS, a 5 times multiplier of UKDWS has been taken.

For Groundwater, targets have been taken as UKDWS where available. In the absence of UK targets internationally recognised criteria were adopted. For MTBE, WHO taste threshold has been adopted.

Targets for Human Health have been taken from *Society of Brownfield Risk Assessment (SoBRA) 'Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater' - Version 1.0, February 2017,* derived using sandy soil and 1%SOM. GAC were set up assuming source at 50cm below typical ground bearing slab of 15cm thickness. GAC were derived for vapour pathways only. For sites where ground conditions, or differ significantly from described above, the generic human health targets may be revised.

APPENDIX L

Method Statement for Encountering Unexpected Contamination

METHOD STATEMENT

ACTIONS TO BE TAKEN IN THE EVENT OF DISCOVERING UNEXPECTED CONTAMINATION DURING INTRUSIVE GROUNDWORKS

If at any point during intrusive groundworks at a site, evidence of unforeseen contamination is encountered in the form of significant noxious odours, discolouration, or instability within soils or sheen/ discolouration in groundwater, the following actions will be taken:

- Intrusive works in the immediate area of the impacted ground will be suspended and the continuation of work in other areas of the site will be considered within the context of the site specific health & safety plan.
- Environmental Protection Strategies Ltd (EPS) will be contacted and appraised of the situation so that arrangements can be made to characterise the impact and determine what action may be necessary in addition to the scheduled site works. Where possible / health & safety plan permits, digital photographs of the impacted ground will be taken and emailed to EPS at the address below to assist in the initial assessment
- It may well be necessary for EPS to attend site to undertake visual inspection and obtain samples for field and/or laboratory analysis, although the actions taken will be dependent on the nature of what is encountered
- In cases where EPS consider the unforeseen contamination likely to pose a significant risk of significant harm to adjacent site users or local environmental receptors, the local authority and the Environment Agency will be informed of the situation and the actions being taken
- Once appropriate action has been agreed and undertaken, a written summary will be produced by EPS for submission to the Local Authority, (and where relevant, the Environment Agency) in accordance with planning requirements. The submission will include details of work undertaken, analytical results of investigative and validation samples obtained and conclusions and recommendations for any further actions considered necessary
- Where regulatory bodies have been involved, site works should only recommence following their agreement and in all cases should only recommence when the site manager considers it safe to do so within the context of the site specific health & safety plan.

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