

**Site Investigation
and** Residential Development
Generic Quantitative Risk Assessment



Report prepared at

Land at Pound Farm
Ickelford
SG5 3RS

On behalf of

Bugler Homes Limited

Report reference

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Version 2

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Aviron Associates Limited

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Contents

1.0	PROJECT AND SITE INFORMATION	1
2.0	DESK STUDY REVIEW	4
3.0	PRELIMINARY RISK ASSESSMENT	10
4.0	SITE INVESTIGATION WORK	16
5.0	LABORATORY ANALYSIS	21
6.0	ENVIRONMENTAL INTERPRETATIVE GUIDANCE	23
7.0	ASSESSMENT OF GEOCHEMICAL SOIL RESULTS	25
8.0	HAZARDOUS GROUND GAS MONITORING	27
9.0	REVISED RISK ASSESSMENT	30
10.0	GEOTECHNICAL ASSESSMENT	34
11.0	CONCLUSIONS AND RECOMMENDATIONS	47
12.0	PROJECT INSTRUCTION AND LIMITATIONS	50
13.0	REFERENCES AND OTHER SOURCES OF INFORMATION	53

Figures

1	Site Location Plan
2	Existing Site Layout Plan – Aerial View
3	Existing Site Layout Plan – Topographical
4	Site Photographs
5	Proposed Development Plan
6	Exploratory Hole Location Plan - Existing Layout
7	Exploratory Hole Location Plan - Proposed Development

Appendices

- | | |
|-----|--|
| I | Exploratory Hole Logs and Photographs |
| II | Field Monitoring Results |
| III | Soil Contamination Results and Assessment Criteria |
| IV | Soil Geotechnical Results |
| V | Soil Infiltration Test Results |

1.0 PROJECT AND SITE INFORMATION

1.1 APPOINTMENT

Aviron Associates Limited (Aviron) was retained by Bugler Homes Limited (the “Client”) to prepare a Site Investigation (SI) leading towards a tier 2 Generic Quantitative Risk Assessment (GQRA) of the following premises:

Land at Pound Farm, Ickleford, SG5 3RS (hereafter referred to as the “site”).

The site investigation follows on from a previous desk study report completed by Aviron in October 2025/February 2026 (Preliminary Risk Assessment, version 2, reference 25-267.01) which formed a tier 1 assessment by completing a preliminary risk assessment (PRA) with site walkover to identify potential areas of contaminative concern associated with the proposed development of the site. The PRA formed a preliminary Conceptual Site Model (CSM) with recommendations for any further investigation or risk assessment.

The SI will investigate the pollutant linkages established within the PRA in order to produce suitable data for the preparation of a tier 2 GQRA to refine the CSM and as necessary provide recommendations for any further investigation or tier 3 Detailed Quantitative Risk Assessment (DQRA). Alternatively, it may be possible to make remediation recommendations immediately following the GQRA.

In addition, geotechnical issues shall be investigated to provide recommendations for new foundations, drainage and pavement design.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

1.2 THE SITE

Table 1.2 provides a summary of site details and surrounding area.

Table 1.2: Site Details	
Site Location	The site is located on Bedford Road in the north-west of the village of Ickleford, 2.7 kilometres (km) north of Hitchin and 10km north-east of Luton. Figure 1 is presented as the Site Location Plan.
National Grid Ref.	Centred at approximately 517460, 231420.
Current Land Use	The site currently comprises arable agricultural land with a track bisecting the site in a west-east orientation. Figures 2 and 3 are presented as the Existing Site Layout Plans, using an aerial view and

Table 1.2: Site Details

	topographical survey, showing the positions of the walkover photographs. Figure 4 is presented as the Site Photographs.
Surrounding Land Use	The site is almost entirely surrounded by agricultural land or pasture with the village of Ickleford to the south-east and east. Bedford Road forms the eastern boundary of the site.
Proposed Land Use	Hybrid application for a mixed-use development to provide a total of up to 230 dwellings, a residential care home (Use Class C2), an Independent Special School (ISS) and new sports pitch, with access from Bedford Road, landscaping, parking and SuDS comprising: Phase 1 – Application for full planning permission for the erection of 100 dwellings, an ISS, new sports pitch and associated parking, landscaping, open space and SuDS; Phase 2 – An outline application on the remaining part of the site for the erection of up to 130 dwellings, a residential care home (Use Class C2) and associated works with access from Bedford Road (all matters reserved apart from access). Figure 5 is presented as the Proposed Development Plan.

1.3 SITE WALKOVER SURVEY

A site walkover survey was undertaken on 14 October 2025 and included an inspection of the site and surrounding area, where safe and accessible. The purpose of the survey is to identify any potential on-site or nearby contaminative activities or potential sources of land contamination.

Additionally, as part of the survey any features which may affect site re-development in terms of physical site and ground conditions were noted.

Table 1.3 provides a description of site features observed during the walkover survey and also current Ordnance Survey maps made available at the time of report writing.

Table 1.3: Summary of Site Walkover Survey

Physical Site Characteristics	
Existing Structures	No buildings on-site. There are overhead cables running along the track that crosses the centre of the site in a west-east direction. There is a locked gate at the site access point on the eastern boundary.
Basements	None observed.
Visual Topography and Site Surfacing	The site comprises ploughed fields that have recently been planted with crops.
Retaining Structures and Slopes	The site slopes gently downwards generally in a northerly direction, locally to the north-east and north-west.
Drainage Issues	Shallow drainage ditch observed along the north-western site boundary.
Surface Waters	Softened ground surface following prolonged rain.

Table 1.3: Summary of Site Walkover Survey

Trees and Hedges	Numerous young, semi-mature and mature trees, shrubs and hedges line the site boundary with the road and to the west.
Made and Infilled Ground	No significant made ground or infilled ground is anticipated. Made ground may however be encountered locally as unmade surfacing at the site entry points.
Contaminative Characteristics	
Above or Underground Storage Tanks (ASTs/USTs) and Drums	None observed.
Fuel Interceptors	None observed.
Waste Storage and Disposal	None observed.
Hazardous Material Storage and Use	None observed.
Asbestos Containing Materials (ACMs)	None observed.
Boiler Houses	None observed.
Sub-stations	None observed.
Surface Staining	None observed.
Potentially Contaminative Activities	No significant evidence of potentially contaminative activities observed at the site.

1.3.1 Summary of Physical Site Characteristics

Consideration should be made towards the make-up and competency of the underlying strata and the influence of trees on any proposed buildings.

1.3.2 Summary of Contaminative Site Characteristics

No significant evidence of potentially contaminative activities observed at the site.

2.0 DESK STUDY REVIEW

Historical Ordnance Survey (OS) maps were obtained as part of a Envirocheck database search reported within the aforementioned PRA. Database information within the PRA also included reference to the hydrogeology, hydrology and ground gas hazards in the site area and this information is also summarised in the following sections.

2.1 HISTORICAL REVIEW

Historical Ordnance Survey (OS) maps were reviewed, and the historical development of the site and the surrounding land is summarised in the following table.

Table 2.1: History of the Site and Surrounding Land		
Date	Site History	Surrounding Land History
1881, 1882 (1:2,500) 1884 (1:10,560) 1887 (1:10,560) 1899 (1:10,560) 1901(1:10,560) 1901 (1:2,500) 1898-1901 (1:2,500)	The site is shown to have comprised undeveloped agricultural land or pasture.	The site is surrounded by fields, roads, or tracks in all directions. Roads bound the site along the eastern boundary and at the south-west corner (Hambridge Way). To the south-east, the site was bordered by fields, with the Icknield Way (Roman Road) located approximately 200m SE. The village of Ickleford was around 500m E. Several corn mills associated with the River Oughton were located approximately 500m SW and between 500m and 800m SE. A railway line was present about 700m E, an old gravel pit approximately 500m NW, and Ickleford Roller Mills about 500m SW. These off-site features represent the nearest historical industrial or extractive land uses; however, given their distance and orientation, they are not considered likely to have impacted the site. An apparent land drain running along the north-western boundary and extending off the most northerly point of the site, flows in a north-easterly direction.
1922 (1:2,500) 1925(1:10,560) 1925 (1:2,500) 1938-47(1:10,560) 1939 (1:2,500) 1948-50(1:10,560) 1950 (1:10,560)	No notable changes identified at the site.	A gravel pit is shown approximately 600m to the SE. No other notable changes were identified in the surrounding area until the 1950 edition, when residential development appeared beyond the SE site boundary. Further residential development is shown around 1km to the SE.
1960 (1:10,000)	No notable changes identified at the site.	No notable changes identified in the surrounding area.

Table 2.1: History of the Site and Surrounding Land

Date	Site History	Surrounding Land History
1966-80 (1:2,500) 1966-69 (1:10,000) 1969 (1:10,560) 1978-80 (1:2,500)		
1980 (1:2,500) 1983 (1:10,000) 1982-83(1:10,560)	No notable changes identified at the site.	No notable changes identified in the surrounding area.
1993 (1:2,500) 1999 (1:10,000) 2006 (1:10,000) 1999 (aerial photograph)	No notable changes identified at the site.	No notable changes identified in the surrounding area.
2025 (1:10,000) 2025 walkover	No notable changes identified at the site. The site is a field without any on-site structures aside from overhead cables. An unsurfaced track runs through the centre of the site.	No notable changes identified in the surrounding area.
Note: All distances are approximate.		

2.1.1 Anecdotal Evidence

No anecdotal evidence available at the time of reporting.

2.1.2 Summary of Historical Landuses

The site has remained undeveloped throughout the available mapping history.

No significant industrial or commercial landuses shown in the surrounding area.

2.2 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

2.2.1 Anticipated Geology

Relevant geological information has been sourced using the British Geological Survey (BGS) extract sheet 221 of Hitchin and is summarised in table 2.1.1 below.

Table 2.2.1: Anticipated Geology

Stratum	Age	Possible Thickness (m)	Typical Description	Aquifer Status
Artificial/Made Ground None indicated on site	N/A	N/A	N/A	N/A
Superficial Lowestoft Formation (northern third)	Anglian	Extremely variable Up to 60m	Diamicton (north)	Secondary Aquifer - Undifferentiated
Superficial Glaciofluvial Deposits, Mid Pleistocene (southern two-thirds)	Cromerian	Not recorded	Sand and Gravel (south)	Secondary Aquifer - A
Solid Gault Formation	Albian	Up to 60m in Bedfordshire	Mudstone	Unproductive strata

The BGS website indicates that there are no references to artificial ground, mass movement, linear features or faults recorded on site or within 500m of the site.

2.2.2 Ground Conditions – BGS Borehole and Trial Pit Records

The nearest BGS borehole log(s) for drilling or excavation works undertaken within circa 500m of the site, and a summary of the ground conditions encountered to approximate depths in metres (m) below ground level (bgl), are presented in table 2.2.2.

Table 2.2.2: Summary of Local BGS Borehole Logs

Unit	Description	From (bgl)	To (bgl)
TL13SE15 – POUND FARM ICKLEFORD– On site			
Topsoil	No details of the geology		24m
Superficial/Solid			
Groundwater (bgl)	6.1m (fairly stable)		
GL = Ground Level			
TL13SE6 - THE RECTORY ICKLEFORD -525m NE			
Topsoil	Soil or mould	0.0	0.6m

Superficial	Clay and stones	0.6m	5.9m
	Sand and gravel	5.9m	8.8m
	Sand and thick veins of clay	8.8m	11.9m
	Sandy Clay	11.9m	15.2m
	Boulder clay with pieces of chalk, flints, etc. A thin layer of flints at 22.7m, with water	15.2m	35.4m
	Boulder clay with gravels of chalk	35.4m	44.5m
Groundwater (bgl)	3.35m and 22.7m		

2.2.3 Hydrogeology

The hydrogeology of the site has been determined by the superficial geology of the Lowestoft Formation and the Glaciofluvial Deposits, which are classified by the Environment Agency as Secondary Aquifers – ‘undifferentiated’ and ‘A’ respectively.

Secondary (undifferentiated) aquifers have been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type. Secondary A aquifers are described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

Both the Envirocheck report and the Environment Agency website (December 2025) indicate that the site is not located within an Environment Agency source protection zone (SPZ).

The Envirocheck report indicates that there are two references to groundwater abstraction licences for premises within 1000m of the site. One abstraction is located 164m NW for ‘General Farming and Domestic’ and the other is located 810m NE for ‘General Agriculture Purposes’.

Areas of BGS Groundwater Flooding Susceptibility include ‘Potential for Groundwater Flooding to Occur at Surface’, along the north-western site boundary, at the location of the drainage ditch, and ‘Potential for Groundwater Flooding of Property Situated Below Ground Level’ for the southern two-thirds of the site.

2.2.4 Hydrology

The Ordnance Survey Water Network Lines indicates that the nearest inland river (and surface water feature) is a drainage ditch located on the north-western boundary.

The nearest named watercourse is the River Oughton located 500m to the south.

There are several records of surface water abstractions within 1000m. The nearest record is 658m to the SW for impounding purposes. At distances of approximately 853m there are numerous records relating to 'General Agriculture: Spray Irrigation' and 'General Farming and Domestic' purposes. Additional surface water abstractions for 'Spray Irrigation' purposes are recorded 880m (W) and 939m and 952m (both SW).

The Envirocheck report indicates that there is one reference to 'Discharge Consents' for premises within 500m of the site. The record relates to a consent 485m SE for 'Sewage Discharges - Final/Treated Effluent'.

The Envirocheck report indicates that the nearest record of a 'Pollution Incident to Controlled Waters' is at a location 465m to the south-east, where 'unknown pollutant' is noted to have entered the River Oughton, however the incident is shown to have been 'minor'.

There are no 'Local Authority Pollution Prevention and Controls' for premises within 250m of the site.

The Envirocheck report indicates that the site is not located within an area that is at risk of 'extreme flooding' or 'flooding' from rivers or sea without defences. The site is not located in an area that benefits from flood defences. The site is not located in a flood water storage area.

Areas of the eastern and north-western boundary, as well as small areas discreetly within the site fall within areas of 1 in 30, 1 in 100 and 1 in 1000 year flood extents.

2.3 LANDFILLS AND BIO-GROUND GAS

2.3.1 Landfills, Waste Management Facilities and Infilled Ground

The Envirocheck report indicates that there no historical landfill sites, Local Authority recorded landfill sites, registered landfill sites, or waste facilities within 250m of the site.

There are also no references to potentially infilled land (non-water or water) within 250m of the site.

2.3.2 Preliminary Risk Assessment (PRA) – Bio-Ground Gas

Table 2.3.2 summarises the gas risk for the site, based on the above information gained through the desk-based research. In accordance with current guidance (CIRIA C665), the gas generation potential for each source has been individually assessed, with references to potential gassing risk made according to the following definitions: Negligible, Very Low, Low, Moderate, High and Very High. The definitions are explained in Section 10.0 of the guidance.

The objective of this exercise is to determine if potentially unacceptable bio-ground gas risks exist, and whether further investigation and assessment is necessary.

Table 2.3.2: Preliminary Risk Assessment (PRA) – Bio-Ground Gas

Potential Source	Risk	Risk Rating	Rationale
Made Ground (CO ₂ + CH ₄)	Human health Explosion	Very Low	The site has remained undeveloped with the exception of an access track. Although Made Ground may be encountered locally at site entrance points. Significant organic biodegradable material is not expected.
Alluvial Strata (CO ₂ + CH ₄)	Human health Explosion	Negligible	No alluvial deposits noted within 250m of the site.
Landfills (CO ₂ + CH ₄)	Human health Explosion	Negligible	No landfill sites noted within 250m of the site.
Infilled Ground + Burial Sites (CO ₂ + CH ₄)	Human health Explosion	Negligible	No potentially infilled ground locally within 250m of the site.
Coal and Mining (CO ₂ + CH ₄)	Human health Explosion	Negligible	The site is not located in a 'non-coal mining area(s) of Great Britain'.
Soil Vapours	Human health Explosion	Very Low	No evidence of fuel storage.
COMBINED RISK RATING = VERY LOW			

A combined Very Low risk from ground gas ingress and explosion is considered and ground gas monitoring is not required. Precautionary gas monitoring would be prudent as a matter of course during future ground investigation and subsequent routine groundwater monitoring, to confirm the very low risk determined.

2.4 RADON GAS

Information from the Envirocheck report (using data supplied by the BGS) indicates that 'The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level)' and that no radon protection measures are required.

Notwithstanding the above, a Radon report is recommended immediately prior to the re-development as radon guidance periodically changes and the above advice may be outdated by the time of any re-development.

The HSA website (ukradon.org) can be used to purchase radon reports, where an address-specific radon report may be obtained. It should however be noted that for redevelopment sites, a GeoReport provided by the British Geological Survey may be more appropriate.

3.0 PRELIMINARY RISK ASSESSMENT

3.1 METHODOLOGY

A tier 1 PRA and CSM have been prepared in accordance with the technical approach on Land Contamination Risk Management (LCRM), which replaced 'CLR11'. Possible hazards identified by a potential source of contamination and sensitive receptors have been assessed via a source-pathway-receptor (SPR) model in accordance with current UK protocols. A risk may only exist where a plausible SPR linkage is viable and where the quantity or concentration of a contaminant (source) is sufficient to cause harm. Under the statutory definition "Contamination" may only exist where contaminants pose a risk of harm to a receptor. Risk may be defined as a function of the likelihood and severity of any adverse effects resulting from a contamination event in accordance with CIRIA C552. A summary of how risk is derived, and the associated definition, is presented in tables 3.1.1 and 3.1.2.

Table 3.1.1: Risk Ratings Matrix				
	Consequence			
Probability	Severe	Medium	Mild	Minor
High Likelihood	Very high risk	High risk	Moderate Risk	Moderate/low risk
Likely	High risk	Moderate Risk	Moderate/low risk	Low risk
Low Likelihood	Moderate Risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table 3.1.2: Risk Ratings Definition	
Risk Rationale	Definition
Very high risk	A high probability that severe harm could occur to determined receptor from identified contaminant - OR - evidence exists that severe harm to receptor is currently occurring. Urgent investigation and remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
High risk	Harm is likely to occur to determined receptor from identified contaminant. Urgent investigation and short-term risk minimisation remediation followed by longer term fit for purpose remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
Moderate Risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is relatively unlikely that any harm would be severe or should harm occur it is likely to be relatively mild.
Moderate/low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that any harm would be severe or should harm occur it is probable to be relatively mild.
Low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that such harm, if indeed present, would at worst be mild.
Very low risk	There is a low possibility that harm could occur to a receptor. In such event the harm would not be severe.

3.2 POTENTIAL SOURCES OF CONTAMINATION

Based on the desk-study and walkover survey completed, table 3.2 presents a summary of the potential sources identified.

Table 3.2: Potential Sources			
Source	Key Contaminants of Concern	Description	Plausible?
1. Site-wide soil contamination	Metals, hydrocarbons (TPH/PAH), asbestos.	Limited risk of soil contamination within the site associated likely limited presence of Made Ground	Yes
2. Local soil contamination	Metals, hydrocarbons (TPH/PAH), asbestos.	Limited risk of soil contamination. No on-site structures noted on the historical mapping, but an unidentified activity may have taken place, or temporary agricultural building may have been located on-site.	Yes
3. Asbestos	Asbestos	Limited risk of Asbestos Containing Soils (ACS) and Asbestos Containing Materials (ACMs). No buildings.	No
4. Groundwater	Groundwater may be located at shallow depth beneath the site.	Site is underlain by Secondary Aquifers – 'undifferentiated' and 'A'. Not located in an SPZ.	Yes
5. Surface Water	Inland river along north-western site boundary.	Drainage ditch flowing in a northerly direction along the north-western site boundary.	Yes
6. Ground gases/vapours	Hazardous bio-ground gas. Complete routine bio-ground gas monitoring.	Significant hazardous ground gas sources are not anticipated on-site.	No

3.3 PATHWAYS

A pathway is one or more routes or means that a receptor can be exposed to, or affected by, a contaminant.

Table 3.3: Plausible Pathways
On-Site and Locally
Direct contact; to humans and infrastructure
Underlying geology/hydrogeology; <i>Diamicton (north) and Glaciofluvial Deposits (south) comprising Secondary Aquifers – 'undifferentiated' and 'A'</i>
Inhalation and ingestion
Surface run-off/drainage

3.4 RECEPTORS

A receptor is either a living organism, a group of organisms, an ecological system, controlled waters or property that could be harmed or polluted by a contaminant. Table 3.4 examines the potential receptors.

Table 3.4: Potential Receptors			
Receptor	Description	Comments	Plausible
Construction workers	Groundworkers and general construction works.	Construction works proposed within the site.	Yes
End users	Occupants of the proposed development.	Landscaped areas proposed around the site.	Yes
Adjacent land users	Occupants of surrounding residencies.	Adjacent residential dwellings which could be affected by run-off or migration.	Yes
Soft landscaping	Areas of new planting including lawns.	Landscaped areas proposed around the site.	Yes
Water supply pipes	Plastic pipework for potable water supply may be affected if laid in contaminated soils.	New supply required for redevelopment.	Yes
Buildings & infrastructure	Buried concrete for new foundations may be in contact with aggressive ground (sulphur attack).	New building works proposed.	Yes
Groundwater	Controlled waters (aquifers) beneath the site.	Site underlain by Secondary Aquifers. No public water supply boreholes within 1000m of the site. The site is not located in an SPZ.	Yes
Surface waters	Controlled water such as lakes, streams, rivers or coastal waters.	Inland river along north-western site boundary.	Yes
Ecological receptors	Sensitive areas of ecological significance defined under Part 2A of EPA 1990.	In an area of Adopted Green Belt and Nitrate Vulnerable Zone. A Local Nature Reserve is located 417m SE.	Yes

3.5 SUMMARY OF POLLUTANT LINKAGES FOR PROPOSED LAND USE - PRELIMINARY CSM

The preliminary CSM is based upon the proposed site end use and the information currently consulted relating to various risk sources and plausible pollutant linkages and is presented within table 3.5.

Table 3.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
Sources 1 and 2 Site-wide and local soil contamination	Construction workers	Direct contact	Unlikely	Mild	Very Low <i>Note 1.</i> Site in use as agricultural land or pasture. It is not occupied with buildings. Very limited potential for made ground and contaminants that may normally be associated with any buildings locally.	1
	End users	Direct contact	Low Likelihood	Mild	Low <i>See Note 1.</i>	2
	Adjacent land users	Direct contact via run-off	Unlikely	Mild	Very Low <i>Note 2.</i> Secondary aquifers beneath the site, overlying unproductive strata. Site predominantly soft surfaced.	3
	Soft landscaping	Root uptake	Low Likelihood	Mild	Low <i>Note 3.</i> No evidence of made ground following walkover and desk based study. Vegetation is well established with no signs of die-back.	4
	Water supply pipes	Direct contact	Low Likelihood	Mild	Low <i>Note 1.</i>	5
	Buildings & infrastructure	Direct contact	Low Likelihood	Mild	Low <i>Note 1.</i>	6
	Groundwater	Vertical migration through hydrogeology	Unlikely	Mild	Very Low <i>Note 4.</i> Secondary aquifers beneath the site, unproductive strata. The site is not located in an SPZ. No evidence of significant potential contamination sources following walkover and desk based study	7
	Surface water	Run-off	Unlikely	Mild	Very Low <i>See Note 4.</i>	8

Table 3.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
	Ecology	Direct contact via run-off	Unlikely	Mild	Very Low <i>See Note 4.</i>	9
Source 3 Asbestos	Construction workers	Inhalation	Low likelihood	Minor	Very Low <i>Note 5. No potential for ACMs due to absence of existing buildings.</i>	10
	End users	Inhalation	Low likelihood	Minor	Low <i>See Note 5.</i>	11
	Adjacent land users	Inhalation	Unlikely	Mild	Very Low <i>See Note 5.</i>	12
Sources 4 and 5 Groundwater	Construction workers	Direct contact	Unlikely	Mild	Very Low <i>Note 6. Secondary A aquifer beneath the site, overlying a unproductive strata.</i> Groundwater and surface water contamination from site unlikely as risk of soil contamination is low.	13
	End users					
	Adjacent land users					
	Water supply pipes					
Sources 4 and 5 Groundwater	Soft landscaping	Root uptake	Unlikely	Mild	Very Low <i>See Note 6.</i>	14
	Groundwater	Lateral migration through hydrogeology	Unlikely	Mild	Very Low <i>See Note 6.</i>	15
	Surface water					
Source 6 Ground gases and Soil vapours (on/off site source)	Ecology					
	Construction workers	Inhalation of vapours/gas	Low likelihood	Minor	Very Low <i>Note 7. No potential sources of ground gas risk identified.</i>	16
	End users	Inhalation of vapours/gas	Low likelihood	Minor	Very Low <i>See Note 7.</i>	17

The overall environmental risk classification for the site is considered to be generally **VERY LOW**.

3.6 CONSIDERATIONS FOR SITE INVESTIGATION

Due to the sensitivity of the proposed land use and site investigation and suitable risk assessment should be completed, to include:

1. Complete precautionary site-wide soil contamination testing of overlying soils to determine the presence or absence of contaminants. Additionally, pH, sulphate and sulphur testing should be completed to enable design of buried concrete.
2. Complete precautionary ground gas monitoring to provide quantification to the qualitative risk assessment.

To assess the risk, the following analysis should be completed:

🌱 Aviron's "ES-1" of laboratory analysis shall be applied to future site investigations which includes; arsenic, barium, cadmium, total chromium, copper, nickel, zinc, lead, mercury, selenium, water soluble boron, total cyanide, total sulphate, water soluble sulphide, speciated Polycyclic Aromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and Methyl Tert-Butyl Ether (MTBE), organic matter, total phenols, pH and asbestos. **Provides broad analysis of common soil contaminants.**

🌱 Waste Acceptance Criteria (WAC) testing to determine waste soil classification.

The listed suite of analysis is considered suitable and will provide a screening for the majority of commonly found soil contaminants.

4.0 SITE INVESTIGATION WORK

4.1 METHOD STATEMENT AND SITE INVESTIGATION APPROACH

A method statement detailing how the site investigation was to be conducted was produced in accordance with current statutory guidance, best practices and the Client's instructions.

A health and safety plan was completed before site work commenced. Site investigation staff were briefed on the potential contaminants likely to be encountered, and the appropriate personal protective equipment (PPE) to be adopted for this type of investigation.

The site investigation was conducted in accordance with British Standards; BS5930:2015+A1 'Code of Practice for Ground Investigation', BS1377-1:2016 'Methods of test for soils for Civil Engineering Purposes' and/or BS EN ISO 17892 Parts 1-12, 'Geotechnical investigation and testing. Laboratory testing of soil', and BS10175:2011+A2:2017 'Investigation of Potentially Contaminated sites'.

4.2 SITE INVESTIGATION METHODS

Section 3.5 prepared an initial CSM where pollutant linkages with a greater risk than low would require suitable investigation. Table 4.2 presents what it considered to be a suitable method and rationale of investigation which was completed between 6 and 7 November 2025.

Exploratory Hole Location Plans are enclosed as **Figures 6 and 7**.

Exploratory holes were positioned where agreement was made between the Client and on-site representatives.

Table 4.2: Rationale of the Site Investigation Positions		
Locations	Rationale	Monitoring Wells
Window Sample (WS) Boreholes		
	WS1 to WS15 were spatially positioned around the site to target the proposed development buildings, for shallow soil sampling and laboratory testing. The monitoring installation in WS1 was constructed in an area proposed for sustainable drainage in the north of the site to determine the periodic groundwater level.	Monitoring wells were installed into WS1, WS3, WS9, WS11 and WS14
Machine Trial Pits (SP, TP)		
	SP1, SP2 and SP3 were spatially located in areas proposed for open space and sustainable drainage, to facilitate soil infiltration testing. TP1 and TP2 were completed in the area of the proposed sports pitches in the north of the site.	Not Installed

All intrusive locations were pre-cleared prior to the ground investigation works using a Cable Avoidance Tool (CAT) and tracing of manhole covers, which was completed to endeavour service avoidance during this exercise.

4.2.1 Window Sample Drilling

Window sample boreholes WS1 to WS15 were drilled to depths of up to 4.0m bgl using an Archway Dart drilling rig.

The purpose of the window sampling was to evaluate ground conditions at shallow depths, collect soil samples for geochemical and geotechnical laboratory analysis and to determine soil strength by means of SPTs.

The action of window sampling also enables the installation of monitoring wells to determine standing groundwater levels and ground gas testing.

Standard Penetration Tests were undertaken at 1m intervals to depths of 5.0m bgl within the boreholes in accordance with BS EN SO 22476-3 "Standard Penetration Test 2005". Drilling refusal (SPT N > 50) occurred routinely between depths of 1.0m and 4.0m bgl, where the boreholes were terminated to prevent jamming and damage to the drilling rig and tooling. The desired depth of 5.0m bgl initially proposed was therefore not achieved.

Disturbed soil samples were also collected from bored arisings for geochemical and geotechnical laboratory tests which are further discussed within section 5.0.

4.2.2 Trial Pits

Trial Pits SP1 to SP3 and TP1 and TP2 were excavated to depths of up to 1.5m bgl using a 2.7T tracked machine excavator.

The purpose of the trial pits was to determine ground conditions, enable soil infiltration testing in accordance with BRE 365 Soakaway Design 2016 to determine parameters for shallow soakaways, and soil sample collection for laboratory geochemical and geotechnical testing.

4.2.3 Dynamic Cone Penetrometer (DCP/TRL)

Eight Dynamic Cone Penetrometer (DCP) tests (DCP1-DCP8) were undertaken to determine design parameters (California Bearing Ratio, or CBR) for road pavement construction in accordance with the Transport Research Laboratory (TRL), commencing at ground level, to a depth of 0.9 m bgl.

The tests were undertaken at the locations included in **Figures 6 and 7**.

4.3 GROUND CONDITIONS

The exploratory hole logs and photographs are presented within **Appendix I**.

Table 4.3: Summary of Ground Conditions			
Unit	Description	From (m bgl)	To (m bgl)
Topsoil	Silty sandy gravelly CLAY, with roots.	GL	0.3
Lowestoft Formation	Diamicton: Firm to stiff, stiff and very stiff silty sandy gravelly CLAY, locally in the north of the site in WS1, WS2, WS3, WS4 and WS15.	0.3 – 3.4	3.0 – 4.0+
Glaciofluvial Deposits	Firm to stiff, locally soft, becoming stiff and very stiff slightly silty sandy and very sandy gravelly and very gravelly CLAY, with frequent gravel partings and local horizon of SAND.	0.3	2.8 – 4.0+

4.3.1 Field Observations

The following visual and olfactory observations were made:

-  Soft low strength soils noted locally in WS13 in the south-east of the site at 2.0m to 2.5m bgl.
-  No significant roots or rootlets recorded during the site investigation works.
-  No discernible stains, or visual and olfactory evidence of contamination noted during the site investigation works.

4.4 GROUNDWATER LEVELS

4.4.1 Groundwater Levels: During Site Investigation Works

Groundwater was encountered during the site investigation works completed between 6 and 7 November 2025 at the depths detailed in table 4.4.1.

Table 4.4.1: Groundwater During Investigation		
Location	Depth – bgl (during GI)	Comments
WS1-WS2, WS6-WS11	Dry to depths of up to 4.0m	The water encountered is expected to represent water locally within the coarse partings of the Glaciofluvial Deposits.
WS3	2.1m and 2.9m, standing at 2.9m	
WS4	1.9m, standing at 1.9m	

Table 4.4.1: Groundwater During Investigation

Location	Depth – bgl (during GI)	Comments
WS5	1.8m, standing at 1.7m	
WS12	1.8m, standing at 2.1m	
WS13	1.6m, standing at 1.6m	
WS14	1.8m and 3.5m, standing at 2.7m	
WS15	1.2m, standing at 1.9m	
SP1-SP3, TP1-TP2	Dry to depths of up to 1.4m	

4.4.2 Groundwater and Gas Monitoring Wells

Selected boreholes were converted to monitoring wells to enable standing groundwater level monitoring and ground gas monitoring. Wells were installed into 101mm diameter window sample boreholes using 63mm external diameter and 50mm internal diameter HDPE standpipe. Table 4.4.2 describes the construction of the wells.

Table 4.4.2: Monitoring Well Construction

Location	Depth of plain pipe and bentonite seal (m)	Response zone; depth of slotted pipe with gravel screen (m)	Depth of install (m)
WS1	Ground level (GL)-1.0	1.0-3.0	3.0
WS3	GL-1.0	1.0-4.0	4.0
WS9	GL-1.0	1.0-2.0	2.0
WS11	GL-1.0	1.0-3.0	3.0
WS14	GL-1.0	1.0-4.0	4.0

4.4.3 Groundwater and Gas Post-Investigation Monitoring

In all instances and prior to completing groundwater monitoring and field measurements bulk ground gases and soil vapours were monitored using a GFM 435 Gas Analyser and miniRAE Photon-Ionisation Detector (PID) on the dates shown in table 4.4.3, which provides standing level groundwater ‘dips’ during post-investigation monitoring.

Table 4.4.3: Groundwater Monitoring Depths

Location / Date	Depth – bgl WS1	Depth – bgl WS3	Depth – bgl WS9	Depth – bgl WS11	Depth – bgl WS14
24 November 2025	0.0m	1.05m	1.29m	1.70m	0.0m
17 December 2025	0.0m	0.97m	0.75m	1.14m	0.05m
22 January 2026	0.0m	0.56m	0.61m	1.04m	0.02m

Further to comments made regarding the groundwater within table 4.4.1, the groundwater encountered is expected represent the secondary (A) aquifer of the Glaciofluvial Deposits, thought potentially perching within cohesive deposits following high winter rainfall of 2025-2026.

Ground gas monitoring is discussed in section 8.0 of this report.

Field monitoring sheets are enclosed in **Appendix II**.

5.0 LABORATORY ANALYSIS

5.1 SOIL GEOCHEMICAL TESTING

Table 5.1 details the soil samples which were collected and submitted for geochemical analysis.

Table 5.1: Soil Geochemical Testing			
Location	Strata Sampled	Objective	Analysis
TP1 (0.1m)	Topsoil	To provide baseline concentrations of Shallow Topsoil (<0.5m deep). <i>Material at shallow depths is the greatest risk to human health via the dermal contact, ingestion and inhalation pathways and thus is the most intensely assessed stratum.</i>	ES-1
TP2 (0.2m)	Topsoil		ES-1
SP2 (0.1m)	Topsoil		ES-1
SP3 (0.2m)	Topsoil		ES-1
WS10 (0.2m)	Topsoil		ES-1
WS13 (0.1m)	Topsoil		ES-1
SP3 (0.5m)	Natural Clay	To provide baseline concentrations of natural soils (~1m deep) where root growth will occur.	ES-1
WS3 (0.5m)	Natural Clay		ES-1
COMP1 (0.1-0.3m)	Topsoil	Composite Topsoil sample to enable characterisation of overlying soils for off-site disposal purposes.	WAC

Chemical sampling and testing targeted the overlying units of Topsoil and natural strata whereby virtue of surface deposition historical contaminants are most likely to be recorded. The purpose of sampling slightly deeper natural strata is to generate a baseline understanding of natural soil chemistry where root growth may occur.

The analytical suites were chosen to provide a suitable screening in accordance with the potential contaminants identified within the site conceptualisation presented within section 3.5.

Soil samples for environmental quality analysis were sent to Eurofins Chemtest Limited.

5.2 SOIL GEOTECHNICAL TESTING

A programme of geotechnical laboratory testing was undertaken at GEO Site and Testing Services Limited and Eurofins Chemtest Limited. Testing was completed on the fine soils encountered beneath the site. The test procedures used were generally in accordance with the methods described in BS1377-1:2016 and/or BS EN ISO 17892. Details of testing used are provided in table 5.3.

Table 5.2: Soil Geotechnical Testing

Test	Standard	Number of Samples
Atterberg Limits (and Moisture Content) <i>The objective of Atterberg limits and moisture content testing is to determine plasticity and volume change potential of fine (clay and silt) soils and the potential for desiccation to have occurred</i>	BS1377: 1990: Part 2: Clause 3.2, 4.5, 5.0	17 (17)
Particle Size Distribution (PSD) <i>The objective of PSD testing is to determine grading of coarse (sand and gravel) soils</i>	BS EN ISO 17892 Part 4: 2016	1
Aviron LC Suite - pH, water soluble sulphate, total sulphate & total sulphur <i>To enable concrete classification to be specified</i>	UKAS accredited	12 (including 8 within the ES-1 analysis)

5.3 SOIL SAMPLING PROTOCOL

All soil samples were collected from bored or excavated arisings using a trowel and following Aviron's standard protocols for soil sampling. To avoid cross contamination, the sampling equipment was cleaned using de-ionised water after each sample was retrieved. Clean latex gloves were used each time a soil sample was collected, and all samples were placed into clean sterilised jars for submission to the UKAS/MCERTS accredited laboratory.

All sample containers were labelled on-site immediately prior to filling. These samples were identified by a label placed on the body of each container and the following information was recorded; site name, date collected, unique sample number, soil sample depth.

Samples for geochemical analysis were then placed into a cool box containing ice packs to maintain refrigerated conditions following collection and transport to the laboratory.

6.0 ENVIRONMENTAL INTERPRETATIVE GUIDANCE

6.1 GENERIC QUANTITATIVE RISK ASSESSMENT

The purpose of a tier 2 GQRA is to determine the suitability of the site for proposed development and end use.

The site investigation shall collect soil samples whereby determinant chemistry measured in the soil through laboratory analysis have been compared with guidance values which are appropriate to the receptor under consideration. The guidance values or screening criteria applied shall be industry adopted generic values which following a screening of the laboratory analysis shall determine whether or not a site is contaminated, as defined under Part IIA of the EPA 1990 and specification in regard of the proposed development and identified receptors.

Where exceedances of guidance values or recorded a GQRA can be used to appraise risk and make recommendations in regard of further investigation, remediation and/or tier 3 Detailed Quantitative Risk Assessment (DQRA).

6.2 GUIDANCE USED FOR ASSESSING SOIL CONTAMINATION

Aviron has followed the technical approach on Land Contamination Risk Management (LCRM), accessed on gov.uk website and other available guidance to assess contaminant concentrations.

Details of the methodology and Aviron's position on the adoption of guidance values is outlined below.

The available chemical data, from soil samples tested, is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial GQRA is completed using the relevant and industry available screening criteria and where appropriate, statistical modelling. Risks to human health shall be initially assessed by comparing soil chemical data against various published screening criteria. These have been sourced from the following and in order of preference:

-  Category 4 Screening Levels (C4SLs) prepared by the Department of Environmental Food and Rural Affairs (DEFRA) and published March 2014.
-  Phase 2 C4SLs prepared by CL:AIRE and published May 2021.
-  Suitable 4 Use Levels (S4ULs) prepared by Land Quality Management/Chartered Institute of Environmental Health (LQM/CEIH) and published December 2014. LQM acknowledgement for use of S4ULs. *"Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3275. All rights reserved".*

-  Soil Guidance Values (SGVs) prepared by the Environment Agency (EA)/DEFRA and published 2009.
-  Soil Generic Assessment Criteria (GAC) prepared by Environment Industries Commission (EIC)/Association of Geotechnical and Geoenvironmental Specialists (AGS)/Contaminated Land: Application In Real Environments (CL:AIRE) and published 2010.

Aviron have adopted the above hierarchy in response to LCRM recommendations.

6.3 GUIDANCE USED FOR THE ASSESSMENT OF HAZARDOUS GROUND GAS

The principle influence for causing the migration of landgas in the ground is changes to barometric pressure. The most onerous landgas emission conditions on a site are usually observed following days of low or rapidly falling barometric pressure below 1000 millibars (mb).

Monitoring is usually performed over a period of several weeks or months in order to increase the chances of visiting the site on days when the conditions for monitoring worst-case results are correct. Gas monitoring results collected solely during high pressure conditions (>1000mb) may not provide a true value for worst case emission rates from the site.

Methane is produced by a number of processes, which can be biological or chemical in nature. The principal process is from the biogenic decay of organic material and is commonly found associated with landfill and organic marsh deposits or river silts. Methane can also be found associated with coal workings. It is explosive at concentrations of between 5 and 15%, with 5% being termed the lower explosive limit (LEL).

In assessing the risks from hazardous ground gas, reference has been made to the guidance from BS 8485:2015 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings' 2007 which adopts a risk characterisation strategy based on the maximum flow (L/hour) and maximum steady stated concentration (% v/v) of methane and carbon dioxide from a site to derive gas screening values (GSV) in litres/hour which are comparable with the Modified Wilson and Card classification (shown in Table 8.5 of C665) for any site which isn't intended to be developed as low-rise housing with vented underfloor void.

It is noted bio-ground gas monitoring is precautionary.

7.0 ASSESSMENT OF GEOCHEMICAL SOIL RESULTS

The development proposed shall involve new homes with private gardens and therefore the homegrown produce with plant uptake end use values from the guidance listed in section 6.2 shall be selected.

In order to select the appropriate Soil Organic Matter (SOM) value for appraisal of PAH and TPH the mean average SOM value was determined from the laboratory dataset and accordingly the 2.5% SOM value was selected.

Laboratory certificates of chemical analysis are presented in **Appendix III** along with the chemical assessment criteria.

7.1 ASSESSMENT OF SOIL GEOCHEMICAL RESULTS

Table 7.1 provides a summary of the results for each determinand analysed when compared to the relevant assessment criteria.

Table 7.1: Summary of Geochemical Results				
Location	Strata	Determinant	Measured Conc. (mg/kg)	Guidance Conc. (mg/kg)
TP1 (0.1m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
TP2 (0.2m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
SP2 (0.1m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
SP3 (0.2m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
WS10 (0.2m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
WS13 (0.1m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
SP3 (0.5m)	Natural Clay	All determinants recorded at acceptable concentrations	n/a	n/a
WS3 (0.5m)	Natural Clay	All determinants recorded at acceptable concentrations	n/a	n/a
Notes: Barium EIC Generic Acceptance Criteria (EIC GAC) is 1300mg /kg (Residential) Chromium is assumed to be chromium III (not chromium IV).				

7.2 DISCUSSION OF SOIL GEOCHEMICAL RESULTS

7.2.1 Human Health Risk

All determinants have been recorded at acceptable concentrations and are considered to be found in 'low' (based on professional judgement) concentrations.

No abnormal conditions were identified within the samples submitted for testing from across the site.

It is unlikely current and historical land uses have chemically impacted the site.

It is recommended a discovery strategy is enacted and as necessary in the event of contaminative discoveries, suitable remediation (and subsequent verification) is undertaken to the requirement and approval of the local planning authority.

7.2.2 Waste Management and Disposal

The results of the WAC test and chemical testing suggest soils would be on an inert waste criteria, which should be confirmed by the waste management contractor, who upon presentation of the laboratory results shall be able to classify waste soil.

8.0 HAZARDOUS GROUND GAS MONITORING

8.1 STRATEGY

As previously presented within table 4.4.2 monitoring well installations were constructed in order to enable precautionary ground gas monitoring following the outcome of the preliminary ground gas assessment, which determined a very low risk. Monitoring was completed in order to quantify the qualitative assessment.

The installation of the monitoring wells have suitable response zones to enable the capture of ground gases which may possibly migrate through granular and fractured units beneath proposed homes. Each monitoring well was completed with a 1m thick bentonite seal from ground level to prevent atmospheric influence.

8.2 MONITORING

The presence of soil vapours was determined prior to bulk ground gas monitoring using a MiniRAE Photon Ionisation Detector (PID) from RAEs Systems. The presence of hazardous bio-gases including methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) was determined using a GFM Infra-Red Gas Analyser from Ribble Enviro Limited. The flow rate and atmospheric pressure, in millibars (mb), was also measured during the monitoring process. Depth to groundwater was measured using an electronic dip meter.

Monitoring work was completed on the dates specified within table 8.2 which also summarises weather conditions and atmosphere pressure. To determine rising or falling pressures local 'online' weather trends from the Met Office and/or the monitoring apparatus were consulted.

Table 8.2: Background Gas Monitoring Data				
Date	Atmospheric Pressure	Rising/Falling Pressure?	Worst Case Conditions?	Groundwater above response zone?
24 November 2025	984-981mB	Falling	Yes	Yes – WS1 and WS14
17 December 2025	1012mB	Falling	No	Yes – WS1, WS3, WS9 and WS14
22 January 2026	982mB	Falling	Yes	Yes – WS1, WS3, WS9 and WS14

Note 2 of C665 indicates 'worst case' conditions occur during falling and sub-1000mB atmospheric pressures. Section 5.5.1 of C665 indicates 'worst case' conditions are likely to occur during weather conditions such as rainfall, frost or dry weather.

8.3 MONITORING

Table 8.3 summaries the results obtained which are enclosed in **Appendix II**.

Table 8.3: Summary of Monitoring Results			
Gas	Measured Conc. Range (% v/v)		Comments
	Low	High	
CH ₄	0.0 (<0.1)	0.0 (<0.1)	Methane was not detected (<0.1%) and thus is below the guidance value of 1% at which point the characteristic situation is advised to increase to CS2.
CO ₂	0.2	2.9	Carbon dioxide has been detected at concentrations below the guidance value of 5% at which point the characteristic situation is advised to increase to CS2.
O ₂	17.4	20.1	Oxygen has been recorded at ambient concentrations, above 16%, being the point where it is considered there is potential for asphyxiation.
Vapour*	0.0 (<0.1)	0.0 (<0.1)	Very low (PID) concentrations have been recorded. This concurs with the ground conditions and geochemical laboratory results suggesting the absence of soil vapour risk to new units.

*vapour concentration in parts per million (ppm)

Monitoring positions remained constant and intact. No replacement monitoring positions were installed during the period of this project. No damage was observed to the monitoring wells during works.

It is considered the integrity of the monitoring wells has not been compromised as there is no evidence of surface damage which may affect the underlying installations. There is a bentonite seal within the bored annulus preventing escape of ground gases and entry of atmospheric gases. The gas valve remained closed prior to all monitoring occasions so passive venting of ground gas is unlikely to have occurred as site visits were unannounced.

8.4 INTERPRETATION OF DATA

Under normal use of the site (i.e. above ground), the risk presented by methane and carbon dioxide is dependent on both the concentrations and the rate of flow. In accordance with Wilson and Card methodology specified in the CIRIA C655 document, Gas Screening Values (GSV) were determined using the formula below.

GSV =	(Maximum steady concentration / 100) x Flow rate
GSV measured in litres per hour (l/hr)	Maximum steady concentration measured in percent (%) Flow rate measured in l/hr.

Based on the maximum concentrations and flows recorded, the **GSV** for **methane** was **0.0 L/hr** and the **GSV** for **carbon dioxide** was **0.0l/hr**.

Based on the outcome of the PRA, the results of the monitoring during worst-case condition and GSV for carbon dioxide which is between below 0.07l/h the site is likely to conform the Characteristic Situation 1 (CS1).

Bio-ground gas protection is not considered to be necessary based on the results of the three precautionary rounds of monitoring.

9.0 REVISED RISK ASSESSMENT

9.1 REVISED SOURCES OF CONTAMINATION

Table 9.1 summarises the sources of contamination are considered to exist, following completion of the site investigation and interpretation of test results.

Table 9.1: Revised Sources		
Source	Description	Key Contaminants of Concern/Comments
Revised Potential Sources		
1. Undiscovered contamination	Potential for undiscovered soil contamination in the event of agricultural site disposals/burying of waste.	Enact discovery strategy
No Longer Considered to be Potential Sources		
Site-wide and local soil contamination	Based on the site history, the ground conditions beneath the site and the laboratory results it is unlikely site-wide soil contamination exists at the site.	Enact discovery strategy for any potentially undiscovered soil contamination.
Local soil contamination	Based on the site history, the ground conditions beneath the site and the laboratory results it is unlikely local soil contamination exists at the site.	Enact discovery strategy for any potentially undiscovered soil contamination.
Asbestos	Based on the site history, the ground conditions beneath the site and the laboratory results it is unlikely asbestos soil contamination exists at the site.	Enact discovery strategy for any potentially undiscovered soil contamination.
Groundwater and Surface Water	Groundwater and Surface contamination is not considered to exist beneath or adjacent to the site	n/a
Bio-ground gases/vapours	Ground gas concentrations are considered to represent CS1 and gas protection is not considered to be necessary.	n/a
Radon	Radon protection not required (as of the date of reporting)	Procure radon report immediately prior to construction in the event guidance has changed.

9.2 REVISED CONCEPTUAL SITE MODEL

Following interpretation of the laboratory results, site dynamics and the revision of potential soil contaminants within table 9.1 a revised conceptual model has been prepared and is presented in table 9.2.

Table 9.2: Refined Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
1. Undiscovered contamination	Construction workers	Direct contact	Unlikely	Mild	Very Low <i>Note 8.</i> No evidence of soil contamination following investigation. However, there remains potential, albeit limited, for discovery of possible (buried) soil contamination. Action. Enact Discovery Strategy and any subsequent (and as necessary) remediation and verification.	18
	End users	Direct contact	Unlikely	Mild	Very Low <i>See Note 8.</i>	19
	Adjacent land users	Direct contact via run-off	Unlikely	Mild	Very Low <i>See Note 8.</i>	20
	Soft landscaping	Root uptake	Unlikely	Mild	Very Low <i>See Note 98</i>	21
	Water supply pipes	Direct contact	Unlikely	Mild	Very Low <i>See Note 8.</i>	22
	Buildings & infrastructure	Direct contact	Unlikely	Mild	Very Low <i>Note 9.</i> Non-aggressive ground conditions encountered. See section 10.7.	23
	Groundwater	Vertical migration through hydrogeology	Unlikely	Mild	Very Low <i>Note 10.</i> No evidence of soil contamination following investigation.	24
	Surface waters	Vertical and lateral migration through hydrogeology	Unlikely	Mild	Very Low <i>See Note 10.</i>	25
	Ecology	Direct contact via run-off	Unlikely	Mild	Very Low <i>See Note 10.</i>	26

9.3 RISK COMMENTARY

9.3.1 Contamination Risk from Soil to Human Health – Construction Workers

Concentrations of soil determinants are unlikely to present a short-term exposure risk to adult construction workers, specifically from the dermal contact, ingestion and inhalation pathways. Nonetheless construction workers should ensure suitable PPE is worn which would include:

-  Gloves to prevent dermal contact with contaminated soils. It is advised that disposable latex gloves are worn beneath the outer 'work' gloves. This shall prevent skin contact with any contaminated soils which may come into contact with the outer 'work' gloves.
-  To prevent ingestion of contaminated soils construction workers should avoid putting hands or objects in their mouth whilst on-site.
-  To prevent ingestion of contaminated soils prior to eating or drinking construction workers should ensure their hands are properly washed, rinsed and dried. The use of latex gloves shall restrict any contamination from soils from coming into contact with the skin.
-  To prevent inhalation of contamination soils construction workers should wear dust masks on dry and windy days. On damp or wet still days the risk of dust inhalation is low.

Notwithstanding there always remains risk (albeit very low) for undiscovered contamination and thus a Discovery Strategy should be enacted.

9.3.2 Contamination Risk from Soil to Human Health – End Users

No visual or olfactory evidence of soil contamination was observed during the ground investigation. A soil sampling and geochemical testing scheme of the in-situ Topsoil and natural strata was completed as part of this assessment which recorded concentrations of a wide variety of determinants to below the relevant end use criteria. It is considered that neither current nor previous site uses have impacted the site and remedial work is unlikely to be necessary.

9.3.3 Contamination Risk from Soil to Human Health – Domestic Water Supply

Special design for domestic water supply are unlikely. However, to be certain, it is advised that the report should be provided to the local water authority to ensure the correct materials are chosen for water supply pipes. Following the formal withdrawal of WRAS Guidance Note No. 9-04-03 (October 2002), it is recommended that the following reference should be consulted:

Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites” (Ref 10/WM/03/21 by the UK Water Industry Research Ltd (UKWIR); ISBN: 1 84057 5697

Generally, all services should be placed within dedicated runs, and then backfilled with clean imported material.

9.3.4 Contamination Risk from Soils to Controlled Waters

It is not considered that soils present a risk to groundwater/controlled waters given the absence of contaminative site history, no evidence of abnormal ground conditions and also the absence of soil contamination.

9.3.5 Contamination Risk from Groundwater

It is not considered contaminated groundwater exists beneath the site.

9.3.6 Risk from Bio-Ground Gas

Following completion of the PRA a Very Low combined risk from ground gas ingress and explosion is considered. No significant risk sources such as made ground, landfills or soils contained abundant organic matter were identified.

To further evaluate ground gas risk one round of ‘worst-case’ precautionary monitoring has been completed which recorded acceptable GSV and maximum concentrations within in site. The concentrations recorded suggest Characteristic Situation 1 (CS1).

Bio-ground gas protection is not considered to be necessary.

10.0 GEOTECHNICAL ASSESSMENT

This section provides a geotechnical assessment in connection with the proposed development as described above and considers the GEO Limit State: failure or excessive deformation of the ground, in accordance with EN 1997 Eurocode 7: Geotechnical Design (and the UK National Annex to Eurocode 7) where applicable.

It is assumed for the purposes of this assessment that the finished ground floor levels of the proposed development buildings are the same as the ground level at each of the exploratory hole locations.

The assessment of the stability of any slopes or retaining structures across or adjacent the site, the requirement for additional retaining structures and the requirements for cut and fill that may be required to facilitate construction is outside the scope of this report.

Where applicable the following assessment includes bearing resistance assuming conventional construction only and no allowances have been made for interaction between existing adjacent foundations and proposed foundations or loads.

Eurocode 7 Section 2.1 Basis for Geotechnical Design indicates that for each geotechnical design situation it shall be verified that no limit state is exceeded. Geotechnical design requirements have been established by three Geotechnical Categories, 1, 2 and 3. For the purpose of this assessment the development is Geotechnical Category 2: which 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 to ensure that the fundamental requirements are satisfied. Routine procedures for field and laboratory testing and for design and execution may be used for Geotechnical Category 2 designs.

10.1 GROUND MODEL

Table 10.1 overleaf, provides the ground model for the site as determined from ground conditions encountered during the site investigation works.

Table 10.1: Ground Model

Stratum	Description	Top of Stratum (m bgl)	Bottom of Stratum (m bgl)	Average Thickness (m)
Topsoil	Silty sandy gravelly CLAY, with roots.	GL	0.3	0.3
Lowestoft Formation	Diamicton: Firm to stiff, stiff and very stiff silty sandy gravelly CLAY, locally in the north of the site in WS1, WS2, WS3, WS4 and WS15.	0.3 – 3.4	3.0 – 4.0+	-
Glaciofluvial Deposits	Firm to stiff, locally soft, becoming stiff and very stiff slightly silty sandy and very sandy gravelly and very gravelly CLAY, with frequent gravel partings and local horizon of SAND.	0.3	2.8 – 4.0+	-
Notes				
Soft low strength soils noted locally to depths of up to 2.5m bgl in WS13.				
Groundwater				
Groundwater at depths of between 'ground level' in WS1 and WS14, and 1.7m bgl in WS11, during the return monitoring (November 2025 to January 2026).				

10.2 FOUNDATION DESIGN CONCEPT

The ground model and the following considerations will need to be taken in account in determining the foundation solution for the proposed development buildings:

-  Adequate bearing resistance to support the proposed development buildings.
-  Soft low strength soils noted locally to depths of up to 2.5m bgl in WS13 in the south-east corner of the site.
-  Deeper foundations or possibly piled foundations therefore expected to be required in the south-east of the site.
-  Medium volume change potential CLAY soils and the influence of trees.
-  Requirements of temporary works in locally coarse soils and elevated groundwater.

The clay soils present at shallow depth beneath the site are of predominantly low and intermediate plasticity and low and medium volume change potential.

Assumed maximum 'characteristic action' (or line load) of up to 150kN/m run on conventional shallow foundations 1.0m wide on firm to stiff CLAY, at the anticipated foundation formation level of 1.0-2.5m bgl may be acceptable for the proposed buildings subject to the above considerations. It is assumed that the 'characteristic actions' comprises a vertical permanent action.

Frequent gravel partings were observed within the Glaciofluvial Deposits across most of the development area of the site, as well as a local horizon of SAND. During groundworks, should predominantly coarse soils (SAND or GRAVEL) be encountered at the foundation formation level, AND groundwater is shown to rise above 0.5m bgl, the characteristic action should be reduced to 125kN/m run on conventional shallow foundations 1.0m wide.

Due to low strength soils, deeper foundations or possibly piled foundations are expected to be required in the south-east of the site (WS13), pending further ground investigation work in this area.

Further information regarding the permanent actions and variable actions (making up the 'characteristic actions') applied to the foundations may be required along with confirmation of the foundation type and foundation dimensions.

10.2 EXCAVATION CONDITIONS

Excavation of the materials encountered during the ground investigation should be achieved using conventional hydraulic excavation techniques.

10.2.1 Temporary Works

From the ground investigation undertaken, excavations in the natural fine soils may remain stable in the short term. However, due to the requirement for excavations to facilitate the construction, as well as frequent coarse partings and a local horizon of SAND, in elevated groundwater, care should be taken to ensure that instability of excavations does not affect existing structures and services (e.g. foundations, roads, boundary walls or buildings) both on and off-site, and temporary support is expected to be required in order to achieve this. Further advice should therefore be sought from the appointed structural engineer and specialist contractor regarding temporary works.

General guidance can be found within CIRIA Report 97: Trenching Practice, dated 2001.

Care should be taken to ensure that falls from excavation faces do not adversely affect the integrity of foundation concrete.

All excavations on site should be in accordance with HSE guidelines and stability should be practically maintained at all times.

10.2.2 Dewatering

Groundwater was recorded at depths of between 'ground level' in WS1 and WS14, and 1.04m bgl (WS11), during the return monitoring (November 2025 to January 2026). On the basis of the data obtained; dewatering is expected to be required in shallow excavations beneath the site.

Well-point dewatering may be required to prevent 'boiling' should predominantly fine SAND soils be encountered at the foundation formation level during groundworks.

Groundwater is expected to rise in wetter winter months, and ongoing groundwater monitoring is recommended to determine the seasonal groundwater level below the site.

Consideration should be given to a summer build programme when groundwater is expected to be lower.

10.3 EXISTING SERVICES/SUBSTRUCTURES

Due to the historical development of the site environs, existing services or sub-structures should be anticipated.

Where foundations or obstructions are encountered during excavations for the proposed foundations, all new foundations should be extended downwards to fully penetrate all redundant former construction.

10.4 BEARING STRATA

Bearing resistance for the firm to stiff CLAY at the anticipated foundation formation level of 1.0m to 2.5m bgl is provided below pending confirmation of the required foundation actions, foundation widths, foundation depths and tolerable settlement.

10.4.1 Atterberg Limits and Material Properties

Atterberg limits tests conducted on the fine soils at depths of between 1.0m and 3.0m bgl indicate that the strata comprise inorganic CLAY of predominantly low and intermediate plasticity (CL/CI). The modified plasticity index was determined to be between 13% and 28% indicating soils of low and medium-volume change potential.

The result of particle size distribution analysis indicates that locally in SP3 at 1.0m bgl the coarse soils comprise clayey very silty very gravelly fine to coarse SAND of negligible volume change potential.

For the purposes of this assessment and in accordance with NHBC Standards Chapter 4.2, Building Near Trees, the fine soils beneath the site are classified as being of medium-volume change potential, and the coarse soils locally are of negligible volume change potential.

10.4.2 Desiccation

Using the ratio of the moisture content (MC) to the liquid limit (LL) (an empirical indicator of desiccation, after Driscoll, 1983), the test results indicate that the CLAY strata beneath the site are potentially desiccated (MC:LL ratio 0.24-0.45). However, the natural soils are known to be overconsolidated, where a MC:LL ratio of <0.5 is typical, an assessment in accordance with BRE Digest 412 Desiccation in Clay Soils, 1996, including a number of material properties and shear strength profiles indicates that desiccation is not expected to have occurred.

Mitigation measures to prevent heave in clay soils within the influence of trees should be incorporated into the below ground construction.

The soil sampling and testing undertaken provides for a preliminary assessment only based on limited sampling and testing locations. To enable a comprehensive desiccation assessment, consideration should be given to additional soil sampling, in-situ testing and profiling and laboratory analysis including soil suction tests.

10.4.2 Design Parameters

Characteristic values for design parameters for the strata encountered beneath the site are included in table 10.4.2.

In the absence of laboratory triaxial test data an estimated critical state angle of shearing resistance (ϕ'_{crit}) of 25° and 34° is assumed for the CLAY and SAND soils beneath the site, using Table 2 of BS8002:1994 September 2001. The undrained cohesion of the fine soils is assumed to be zero. The coarse soils are assumed to be medium dense, well graded and rounded.

Table 10.4.2: Design Parameters			
Strata	Volume Change Potential	Unit Weight (kN/m ³)	Critical State Angle of Shearing Resistance (ϕ'_{crit})
CLAY	Medium	17-19	25
SAND, locally	Negligible	19	34

For assessment purposes a characteristic value of undrained shear strength ($C_{u,k}$) of 75kN/m² has been assumed for the firm to stiff CLAY strata at the anticipated foundation level of 1.0-2.5m bgl. A characteristic value of the angle of shearing resistance (ϕ) of 34° has been assumed, should medium dense SAND or GRAVEL strata be encountered at the foundation formation level.

The characteristic value of undrained shear strength was derived using the results of the empirical relationships between C_u and the SPT N_{60} value (GEO 005, $E_r=69\%$, $N_{60}=15$), plasticity index after Stroud M.A and the results of laboratory testing. (The Standard Penetration Test in Insensitive Clays and Soft Rocks, Proceedings of the European Symposium on Penetration Testing, 2, 367-376 (1975). The characteristic value of the angle of shearing resistance was derived using the relationship between ϕ and the average SPT N-value (GEO 005, $E_r=69\%$, mean $N_{60}=20$) after Peck, Hanson and Thornburn (Foundation Engineering, 1967). Bearing capacity factors determined by Vesic (Analysis of Ultimate Loads of Shallow Foundations, 1973) have been applied. It is assumed that groundwater will not rise above the base of foundations.

Please note that when using this data for design purposes, the effects of eccentric loading are taken into account, and that the bearing pressure is limited to account for maximum tolerable settlement beneath the structures and adjacent properties.

Geotechnical laboratory material property test results are presented within **Appendix IV**.

10.5 TREE INFLUENCE ON FOUNDATIONS

When considering the influence of trees on foundations, the material properties of the strata beneath the site and the distance and species of the trees to the foundations are the determining factors.

For the purposes of this assessment the natural overlying and predominantly fine soils at shallow depth beneath the site are classified as being of medium volume change potential. An adjustment to foundation depths in accordance with NHBC Standards Chapter 4.2, Building Near Trees, 2025 is therefore required.

Mitigation measures to prevent heave in clay soils within the influence of trees should be incorporated into the below ground construction. Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.

Should roots or desiccated soils be encountered during the groundworks, and/or previously unidentified trees or tree stumps encountered during the site preparation works, foundations should be extended beneath the roots/desiccated soils and/or the depth adjusted to accommodate the species of tree/tree stump encountered. A record of the findings associated with roots, desiccated soils and trees/tree stumps should be kept during the groundworks phase.

Mitigation measures to protect existing adjacent tree species during the construction process may need to be considered.

10.6 FOUNDATION TYPE, DEPTH AND ALLOWABLE BEARING PRESSURE

10.6.1 Trench Fill/Strip Foundations

Should the depths of foundations, the adjustments in accordance with NHBC Standards and the requirements of temporary works be overcome, conventional shallow foundations in firm to stiff CLAY at the anticipated foundation formation depths of 1.0-2.5m bgl may be suitable for the proposed buildings.

Using an assumed maximum vertical characteristic action of 150kN/m run (1.0-2.5 bgl) and Design Approach 1 of Eurocode 7 (checking for a limit state of rupture or excessive deformation), Combination 1 and Combination 2 are both satisfied where the vertical design actions (V_d) are less than the design value of the vertical bearing resistances (R_d) in each case. The GEO limit state requirement is therefore satisfied.

It is assumed that the action is vertical, and it is also assumed that the base of the foundations and the ground surface are horizontal. The vertical design actions include the trench fill foundations, assumed to be a maximum thickness of 2.5m, and also accounts for overburden.

The assumed maximum vertical characteristic action of **150kN/m run** corresponds to the bearing resistance in Table 10.6.1 of **150kN/m²** when applied to trench fill foundations 1.0m wide constructed on firm to stiff **CLAY** at depths of 1.0-2.5m bgl, beneath the development buildings. The serviceability state is satisfied with the total settlement being restricted to **25mm**.

During groundworks, should predominantly coarse soils (SAND or GRAVEL) be encountered at the foundation formation level, AND groundwater is shown to rise above 0.5m bgl, the characteristic action should be reduced to 125kN/m run on conventional shallow foundations 1.0m wide.

Table 10.6.1: Bearing Resistance				
Borehole Location / Plot / Strata Type	Depth BGL (m)	Footing Width (m)	Bearing Resistance (kN/m ²)	Comment
WS1-WS12, WS14-WS15	1.0	1.0	150	Extend foundations beneath softened low strength soils locally in WS13 to 2.5m. Consider medium volume change potential (VCP) soils and further adjustments to foundation depths in accordance with NHBC Chapter 4.2.
WS13	2.5	1.0	150	
Firm to stiff CLAY				
Additional Notes				

SAND/GRAVEL soils	Where predominantly coarse soils (SAND or GRAVEL) are encountered at the foundation formation level, an allowable bearing resistance of 150kN/m ² would apply to foundations 1.0m wide. However, where groundwater is shown to rise above 0.5m bgl, the bearing resistance should be reduced to 125kN/m ² on conventional shallow foundations 1.0m wide.
Piled Foundations	Piled foundations may be required in the area of WS13, in the south-east of the site, due to softened low strength soils noted to a depth of 2.5m bgl. Further ground investigation work should be considered in the area of WS13 to determine the ground conditions for the development buildings in this corner of the site. Notwithstanding, temporary works and control of groundwater may influence the feasibility of a shallow foundation solution throughout the site.
Consider temporary works due to coarse soils and elevated groundwater. The total settlement for trench fill foundations 1.0m wide is anticipated to be less than 25mm for the bearing resistance provided and the soils encountered. Please note that increasing foundation widths to accommodate increased line loads will result in an increase in the total settlement anticipated. Include mitigation measures to accommodate differential movement between foundations spanning CLAY and SAND/GRAVEL locally.	

Notwithstanding the above it is recommended that the formation beneath each section of the proposed re-development works is inspected to assess the competency of the bearing strata prior to pouring of foundation concrete. The formation should not be allowed to soften or loosen due to surface water, rainwater or groundwater ingress prior to pouring of foundation concrete.

It should be noted that the design actions and design layout/dimensions of the proposed works have not been supplied and the above bearing resistance accounts for conventional construction only.

The moments resulting in eccentricity of loadings, and the settlement, sliding and overturning and the requirements for propping would need to be considered in the design of any retaining structures.

It should also be noted that the above recommendations have been made using data in window sample boreholes completed.

10.6.2 Piled Foundations

Should the issues of reduced bearing resistance, particularly in the area of WS13, temporary works, the control of groundwater and foundation depths due to trees be deemed uneconomical for conventional construction, a piled foundation solution may be required.

The advice of a piling specialist should be sought to determine the working loads of their proprietary piling technique when considering the ground and groundwater conditions encountered beneath the site, and the health and safety implications of working within the confines of the site and adjacent neighbouring properties.

Consideration should be given to undertaking additional ground investigation work such as cable and percussion drilling to a depth suitable to enable piled foundation design.

10.6.3 Floor Slabs and Heave

It is assumed at this stage that the ground floor slabs beneath the proposed buildings will be suspended on ground beams.

Mitigation measures to prevent heave in the overlying clay soils within the influence of trees should be incorporated into the below ground construction.

Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.

10.7 CONCRETE CLASSIFICATION

In accordance with Building Research Establishment (BRE) Special Digest 1: 2005 - Concrete in Aggressive Ground, the following laboratory test data has been used to derive classifications for buried concrete (Table C1, natural ground locations) beneath the site:

 Soluble Sulphate (2:1 extract)	– 0.012 to 0.023g/l
 pH	– 7.3 to 8.7
 Total Sulphate SO ₄	– 0.01 – 0.074%
 Total Sulphur	– 0.016 – 0.032%
 Total Potential Sulphate	– 0.048 – 0.096%
 Oxidisable Sulphide	< 0.3%

“BRE guidance suggests that ‘if significant number of determination of oxidisable sulphides is above 0.3%, then use the results of total potential sulphate to determine the concrete class’.

Oxidisable sulphides have not been calculated above 0.3% SO₄ in the samples tested which do not exceed the threshold where the concrete classification is based on oxidisable sulphide and total potential sulphate.

Based on the results obtained for soluble sulphate, the Design Sulphate (DS) Class for shallow buried concrete beneath the site is DS-1. Assuming mobile groundwater (secondary (A) aquifer), the Aggressive Chemical Environment for Concrete (ACEC) Class is AC-1.

It should be noted that additional considerations for the determination of concrete class and appropriate aggregate use are set out in BRE Special Digest 1. These are considerations specific to the soil type, the proposed development and the type of concrete foundations to be used at the site.

Laboratory results for the pH, sulphate and sulphur testing are included within **Appendix III**.

10.8 PAVEMENT DESIGN

The results of DCP/TRL testing indicate CBR values bottoming out at 4-6% for the overlying horizons at the locations tested across the site, considered typical of sandy CLAY.

Following scarifying and proof rolling, consideration should be given to an estimated design CBR value of 4% and 5% for thin and thick construction respectively for a 'sandy clay' (PI ~20% at 1.0m bgl) in accordance with Design Guidance for Road Pavement Foundations IAN 73 06 HD25[rev1] 2009.

Consideration should also be given to completing 'soaked' CBR testing on samples collected at the road foundation formation level once known.

The results of DCP testing are enclosed in **Appendix IV**.

10.9 SOAKAWAY DRAINAGE

10.9.1 Investigation Design

In order to complete a 'compliant' infiltration test in accordance with Building Research Establishment (BRE) Digest D365, February 2016, Soakaway Design trial pits should be excavated and then filled and drained with three-cycles of water. The time taken for the water to drain to 25% full within the trial pit is the determining factor in order to complete a successful and compliant infiltration test.

Prior to undertaking the infiltration testing it is near impossible to determine a time-period in which to resource the testing, in terms of attendance of site operatives, technicians and plant machinery. As such a best estimate has to be that a balance is struck between technical and commercial viability.

Following review of the ground conditions it was considered unlikely the full three-cycles of testing would be achieved within the day and thus, in such a situation a default position as described below is taken in order to maximise the value of time over the duration of the plant allocated for the investigation:

-  **Day 1.** Excavate pits and secure with panels to prevent falls. Commence first cycle of filling/draining.
-  **End of Day 1 into evening/night of Day 1 to Day 2.** Commence second cycle of filling/draining on the presumption the first cycle concludes during the first day. The second cycle of draining is likely to

occur during the night-time and will not be fully monitored. However, experience tells us that the third cycle of draining more often than not yields the slowest infiltration rate as a result of the test pit being fully saturated/drained on two previous cycles. Therefore, conducting this test in a secured pit, over-night, makes best endeavours to utilise 'time' in an efficient manner and seeks to complete a third cycle of testing within a pit which has been previously saturated on two occasions.

-  **Day 2.** Where applicable, complete monitoring of the second cycle. Commence third cycle of filling/draining and backfill pits.

10.9.2 Investigation Completion

Soil infiltration tests were undertaken within trial pits SP1 to SP3 in general accordance with Building Research Establishment (BRE) Digest D365, February 2016, Soakaway Design in the manner designed within section 10.9.1.

The trial pits were excavated to depths of between 1.0m and 1.5m bgl and tested to determine the suitability for conventional soakaways in the overlying soils encountered at these locations.

Excavation of the trial pits was completed at a steady rate and the trial pits were rapidly filled with a tankered water supply. The subsequent fall in water level was observed over the time period specified within the table of results.

Water filling was completed within each trial pit in the manner described within table 10.9.2 along with infiltration rates and comments.

Table 10.9.2: Soil Infiltration Rates				
Location (Test no.)	Testing depths (bgl)	Strata Tested	Infiltration Rate (m/s)	Comments
SP1 (T1)	0.47m – 1.5m	CLAY/SAND/CLAY	*1.01 x 10 ⁻⁶	Testing commenced on the morning of day 1. By the end of the shift on day-1 (300mins/5hrs) the water level had dropped just past 75% full. It was decided to leave the water in the pit to continue draining overnight whereby after 1294 minutes (21.5 hrs) the water level had dropped to just beyond 50% full. The test was continued during day-2 until the end of the shift. However, following 1751 minutes of testing (29hrs) the fall in water level did not achieve 25% full. By extrapolation (*) of the curve an infiltration rate can be determined.

Table 10.9.2: Soil Infiltration Rates

Location (Test no.)	Testing depths (bgl)	Strata Tested	Infiltration Rate (m/s)	Comments
				Given the time left on the second and final day of testing and based on the first cycle of testing an attempt at a second cycle of testing was aborted. It is estimated cycle-2 of testing would take >35 hours. It is considered soakaway drainage at this location is unsuitable.
SP2 (T1)	0.35m – 1.0m	CLAY	9.01×10^{-7}	Testing commenced on the morning of day-1. By the end of the shift on day-1 (180mins/3hrs) the water level had dropped past 75% full and was approaching 50% full. It was decided to leave the water in the pit to continue draining overnight whereby after 1228 minutes (20.5 hrs) the water level had dropped close to 25% full. The test was continued during day-2 until the end of the shift. Following 1689 minutes of testing (28hrs) the fall in water level had reached 25% full. Given the time left on the second and final day of testing and based on the first cycle of testing an attempt at a second cycle of testing was aborted. It is estimated cycle-2 of testing would take >30 hours. It is considered soakaway drainage at this location is unsuitable.
SP3 (T1)	0.46m – 1.0m	CLAY	2.09×10^{-6}	Testing commenced on the morning of day-1. By the end of the shift on day-1 (180mins/3hrs) the water level had dropped past 75% full and was approaching 50% full. It was decided to leave the water in the pit to continue draining overnight whereby after 1215 minutes (20hrs) the water level had dropped beyond 25% full leaving ~0.02m of water in the pit.
SP3 (T2)	0.46m – 1.0m	CLAY		The pit was re-filled on day-2, though it was not expected the test would reach the necessary 25% full level. The test was undertaken for 240 minutes (4hrs) where water levels passed 75% full and were approaching 50% full. The test pit was backfilled prior to the end of the day-2 shift.

Table 10.9.2: Soil Infiltration Rates				
Location (Test no.)	Testing depths (bgl)	Strata Tested	Infiltration Rate (m/s)	Comments
				It is estimated the test would take >20hrs to conclude and would yield a slower infiltration rate than cycle/test-1. It is considered soakaway drainage at this location is unsuitable.

Shallow soakage drainage in the soils overlying the site is not considered suitable for the proposed re-development.

Soil infiltration test results are included within **Appendix VI**.

11.0 CONCLUSIONS AND RECOMMENDATIONS

This tier 1 PRA desk study and Site Investigation including tier 2 GQRA has provided an assessment of the site's history, geo-environmental setting and an evaluation of ground conditions.

11.1 ENVIRONMENTAL

Table 11.1 summarises the pertinent environmental risks providing advice on further works and assessment.

Table 11.1: Environment Risk Summary			
Medium	Risk Item	Risk Description	Comments/Recommendations
Soils	1	Potential for undiscovered soil contamination, albeit low.	Enact Discovery Strategy/Watching Brief.
	2	Any imported Topsoil should it be required, should be chemically suitable for use in private gardens.	Import suitable Topsoil (BS3882) to sustain planting.
	3	Ensure material encountered is suitable for desired water main.	Consult local water authority prior to water main installation.
	No abnormal ground conditions encountered and all concentrations of analytical determinands acceptable. In-situ soils are not considered to be contaminated.		
Bio-Ground Gas	Preliminary risk assessment has determined very low risk from ground gas. Two rounds of 'worst-case' monitoring and a third of ambient conditions monitoring have determined acceptable gaseous concentrations suggestive of CS1. Ground gas protection is not considered to be necessary.		
Radon	Information from the Envirocheck report (using data supplied by the BGS) indicates that 'The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level)' and that no radon protection measures are required. Notwithstanding the above, a Radon report is recommended immediately prior to the re-development as radon guidance periodically changes and the above advice may be outdated by the time of any re-development. The HSA website (ukradon.org) can be used to purchase radon reports, where an address-specific radon report may be obtained. It should however be noted that for redevelopment sites, a GeoReport provided by the British Geological Survey may be more appropriate.		
Groundwater	Ground conditions are not considered to present a notable risk to groundwater or controlled waters.		

Once the above risks have been evaluated/implemented the environmental risk assessment can be considered complete and the development suitable to proceed.

11.2 GROUND HAZARDS SUMMARY

This report and the Clients preferred foundation solution should be presented to the Local Authority or appropriate build warranty provider for approval prior to construction. Table 11.2 summarises the pertinent Ground Hazards Summary.

Table 11.2: Ground Hazards Summary		
Construction Issue	Ground Hazard	Recommendation
Below Ground Obstructions	Foundations and made ground are not anticipated; however, unknown former temporary or agricultural buildings may have been constructed locally.	Any isolated shallow obstructions likely to be removed with conventional excavation plant and hydraulic breaking equipment.
Foundations	Locally softened soils noted in WS13 to a depth of 2.5m bgl. Conventional shallow foundations at 1.0-2.5m bgl in firm to stiff CLAY are subject to adequate bearing resistance, further increased adjustments to foundation depths due to the influence of trees in accordance with NHBC Chapter 4.2, and the requirements of temporary works. Piled foundations may be required locally due to softened soils in the south-east of the site. Shallow excavations in fine soils during dry conditions may be stable in the short term, however instability in gravel partings and coarse soils expected to occur, and in wetter weather, or below the groundwater level. Water encountered during return monitoring between 'ground level' and 1.7m bgl in November 2025.	Piled foundations may be required in the area of WS13 in the south-east of the site. Extend foundations beneath softened soils locally, possibly on piled foundations. Bearing resistance of 150N/m² may be acceptable for trench fill foundations at depths of 1.0-2.5m bgl in firm to stiff CLAY, subject to adequate bearing resistance and design requirements. Bearing resistance for foundations in SAND/GRAVEL locally, subject to further reduction due to groundwater above 0.5m bgl, with bearing resistance of 125kN/m². Dewatering expected to be required in shallow excavations beneath the site. Consider well-point dewatering. Temporary excavations may be stable in CLAY soils, when not supported. However, shoring of excavations expected to be required in coarse partings and coarse soils, in wetter winter weather or below the groundwater level. CLAY soils determined as medium volume change potential (NHBC Chapter 4.2, Building Near Trees). SAND locally of negligible volume change potential.
Floor Slab and Heave	Suspended.	Heave protection required in clay soils within the influence of trees. Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.
Buried Concrete	Non-aggressive ground conditions encountered.	Concrete classification determined as DS-1, AC-1.

Table 11.2: Ground Hazards Summary

Construction Issue	Ground Hazard	Recommendation
Pavements	Estimated CBR value of 4% and 5% for thin and thick construction respectively for 'sandy clay' (IAN 73 06 HD25[rev1] 2009).	Complete soaked CBR testing once road pavement foundation formation depth known.
Drainage	Shallow soakaways are unlikely to be suitable for the proposed development.	Consider alternative to shallow soakaways.
Abnormals	A piled foundation solution may be required due to insufficient bearing resistance locally in the south-east of the site, groundwater control, the requirements of temporary works and the influence of trees on foundation depths.	Consideration should be given to additional ground investigation such as cable and percussion drilling to enable piled foundation design.

12.0 PROJECT INSTRUCTION AND LIMITATIONS

12.1 SCOPE OF WORKS

The following scope of work was undertaken to an agreed brief set out in Aviron's proposal and involves the following:

- 🚧 Three days of window sample drilling to enable boreholes to depths of up to 5.0m bgl, including SPTs at 1m intervals.
- 🚧 Install five of the boreholes with monitoring pipe to enable return gas and groundwater readings.
- 🚧 Machine trial pitting to enable soil infiltration testing and for shallow soil sampling and laboratory testing.
- 🚧 CBR DCP/TRL tests to determine road pavement parameters at a number of locations.
- 🚧 Log the strata within each exploratory hole noting any water strikes.
- 🚧 Collect disturbed soil samples from exploratory holes and submit for geochemical laboratory tests to determine the presence or absence of soil contaminants, and geotechnical material property tests to enable foundation recommendations and allow roadway and drainage design.
- 🚧 All soil samples shall be collected in accordance with the instruction and ground conditions and submitted to UKAS/MCERTS accredited laboratories for testing.
- 🚧 Prepare an interpretative GERA report to interpret ground conditions with respect to potential environmental risks and provide recommendations for foundation design and engineering parameters.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

12.2 PUBLISHED GUIDANCE

This report follows the technical approach presented on Land contamination risk management (LCRM), accessed on gov.uk website. The guidance replaced the Contaminated Land Report 11 (CLR11) "Model Procedures for the Management of Land Contamination" prepared by the Environment Agency in 2004. CLR11, which was withdrawn in 2020, provided guidance on the application of management processes when assessing potentially contaminated land.

This project and report have been designed to fulfil the information requirements set out in LCRM.

This report is additionally prepared in accordance with current guidance notes, standards and practices as set out by the Environment Agency and statutory organisations in order to establish potential and significant contaminant linkages as defined in Part IIA of the Environmental Protection Act 1990.

12.3 LIMITATIONS

Aviron's scope of work has been designed to meet the timeframe and as such it may follow that further work would be prudent upon evaluation of the ground conditions. The scope of work provided shall provide a view of site conditions and understanding of potential geo-environmental risks and possible mitigation procedures.

The information used in this report has been derived from the site investigation, which in turn were based on known current and historical land uses identified at the site and surrounding area, available to Aviron at the time of the investigation.

Intrusive points chosen relate to the data collected and the risk assessment and recommendations will rely on these points only. It therefore follows that some areas of the site will not be examined. It is always possible that some areas not investigated may contain conditions which would be impossible to determine due to lack of evidence or time and budget restrictions.

This report provides recommendations for foundation design based upon the ground conditions encountered and where possible makes predictions for possible variations in ground conditions. However, it is always possible that not all variations in ground conditions can be accounted for and shall also be dependent upon design loadings and foundation construction techniques used. It should be acknowledged that ground conditions may vary from intrusive point to intrusive point and without undertaking continuous investigation it is impossible to entirely understand variations in ground conditions. Our recommendations should therefore not supersede the project's Consulting Structural and Civil Engineers design.

This report comprises a Ground Investigation Report in accordance with BS EN 1997-2, unless otherwise stated. This report does not constitute a Geotechnical Design Report (BS EN 1997-2) and geotechnical recommendations in this report are for guidance only.

In accordance with the BS EN 1998-1:2004+A1:2013 'Eurocode 8: Design of Structures for Earthquake Resistance – Part 1', the UK is located in an area of very low seismicity, and seismic loading need not be considered.

Unless otherwise stated, a preliminary or detailed risk assessment of unexploded ordnance (UXO) is outside the scope of this report.

Also, unless otherwise stated, an assessment of invasive species such as Japanese Knotweed and Himalayan Balsam is outside the scope of this report.

Should changes in legislation, statutory requirements or industry practices occurred following issue of this report, this report should be viewed in light of these changes.

Should a notable time period elapse between the date issue of this report and the date of application of this report changes to site dynamics may occur and in particular the site inspection notes may no longer be applicable should any change of use occur to the site in the interim.

13.0 REFERENCES AND OTHER SOURCES OF INFORMATION

Previous Reports

Aviron, Preliminary Risk Assessment, reference 25-267.01, dated October 2025

References

British Geological Survey Website. www.bgs.ac.uk

BRE Special Digest 1:2005. Concrete in Aggressive Ground

BRE D412. Desiccation in Clay Soils. 1996

BS1377-1:2016 Methods of test for soils for civil engineering purposes - General requirements and sample preparation

BS5930:2015+A1:2020. British Standards Institute. Code of Practice for Ground Investigations

BS8004:2015+A1:2020. British Standards Institute. Code of Practice for Foundations

BS10175:2011+A2:2017. British Standards Institute. Investigation of Potentially Contaminated Land - Code of Practice

BS EN ISO 14688-1:2018 Geotechnical investigation and testing – Identification and Classification of Soil – Identification and Description

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BS EN ISO 17892 – Parts 1-12 Geotechnical investigation and testing. Laboratory testing of soil

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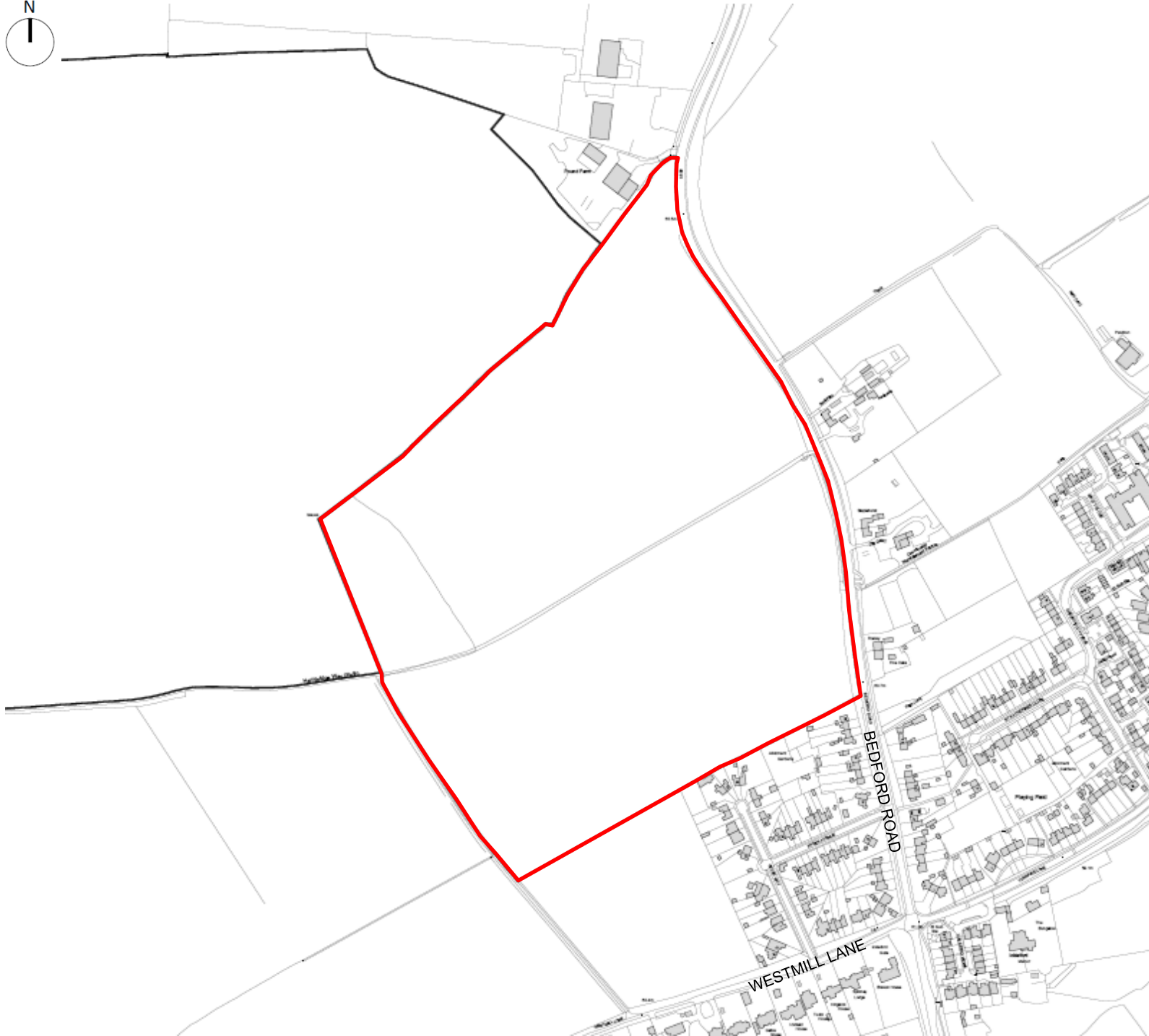
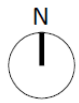
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Figures

- | | |
|---|---|
| 1 | Site Location Plan |
| 2 | Existing Site Layout Plan – Aerial View |
| 3 | Existing Site Layout Plan – Topographical |
| 4 | Site Photographs |
| 5 | Proposed Development Plan |
| 6 | Exploratory Hole Location Plan - Existing Layout |
| 7 | Exploratory Hole Location Plan - Proposed Development |



Legend

 Approximate Site Boundary

Notes

Drawing supplied by Client

Figure 1

Drawing Title

Site Location Plan

Project Number 25-267.01

Project Title

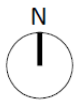
Land at Pound Farm, Bedford Road,
Ickleford, Hitchin, SG5 3RS

Drawn by DN

Checked by JB

Scale NTS





Legend

— Approximate Site Boundary

Notes

Figure 2

Drawing Title

Existing Site Layout Plan - Aerial View

Project Number 25-267.01

Project Title

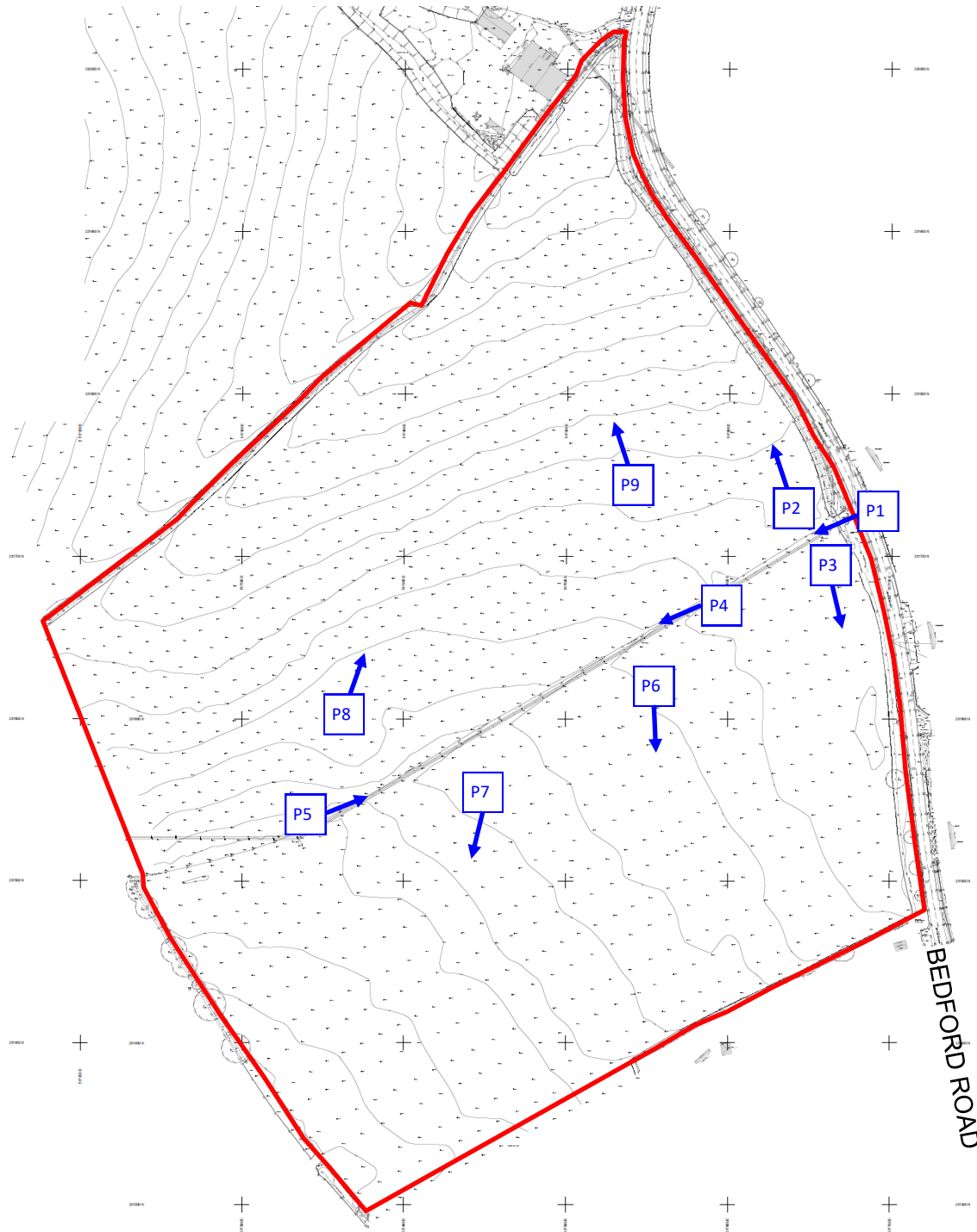
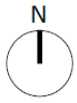
Land at Pound Farm, Bedford Road,
Ickleford, Hitchin, SG5 3RS

Drawn by DN

Checked by JB

Scale NTS





Legend

-  Approximate Site Boundary
-  Photo Direction

Notes

Drawing supplied by Client

Figure 3

Drawing Title

Existing Site Layout Plan - Topographical

Project Number 25-267.01

Project Title

Land at Pound Farm, Bedford Road,
Ickleford, Hitchin, SG5 3RS

Drawn by DN

Checked by JB

Scale NTS





Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9

Legend

Notes

Figure 4

Drawing Title

Site Photographs

Project Number 25-267.01

Project Title

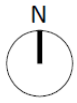
Land at Pound Farm, Bedford Road,
Ickleford, Hitchin, SG5 3RS

Drawn by DN

Checked by JB

Scale NTS





Legend

— Site Boundary

Notes

Drawing supplied by Client

Figure 5

Drawing Title

Proposed Development Plan

Project Number 25-267.01

Project Title

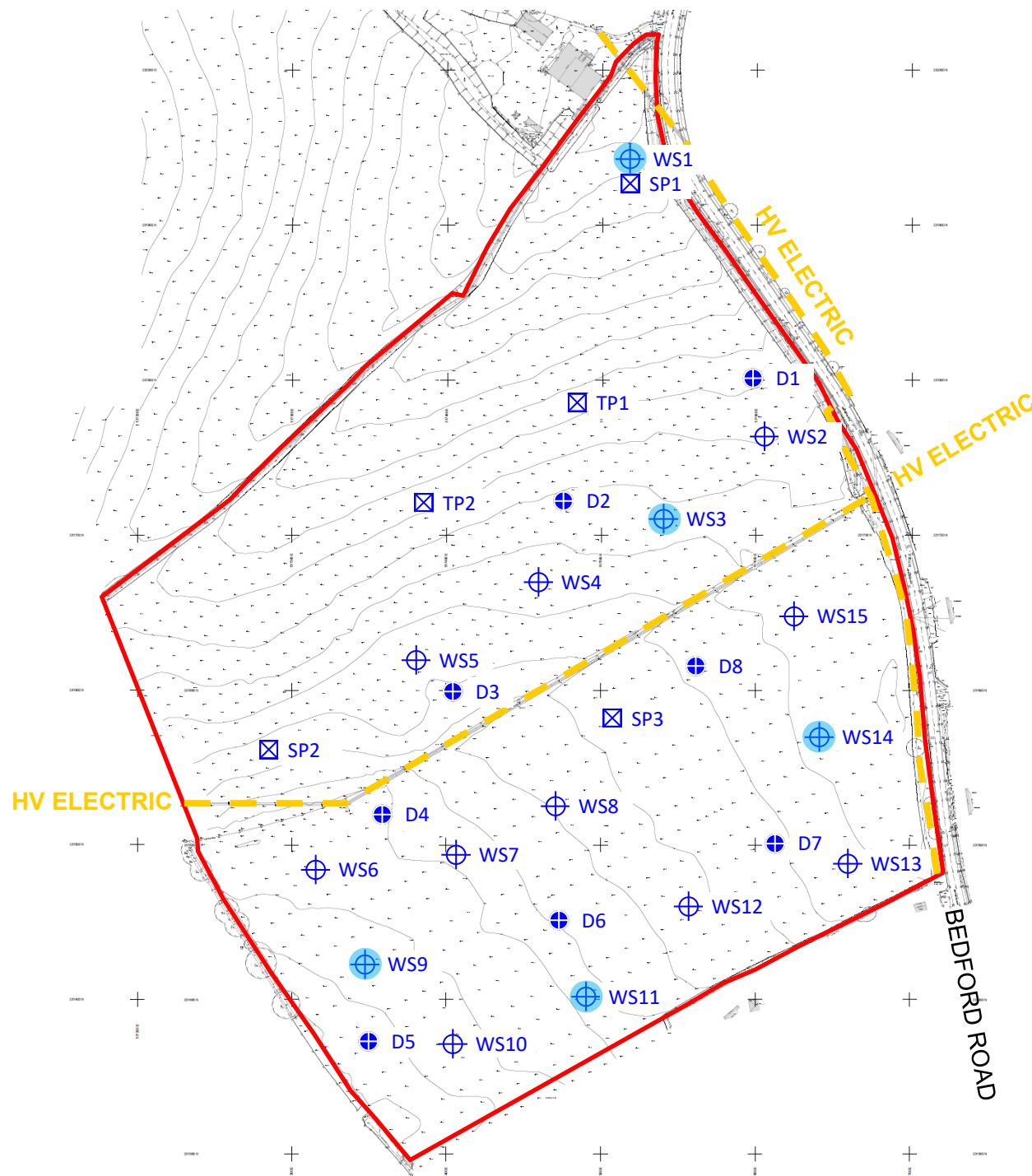
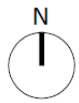
Land at Pound Farm, Bedford Road,
Ickleford, Hitchin, SG5 3RS

Drawn by DN

Checked by JB

Scale NTS





Legend

-  Window Sample Borehole
-  Monitoring Well
-  Mechanical Trial Pit
-  DCP/CBR

Notes

Figure 6

Drawing Title

Exploratory Hole Location Plan -
Existing Layout

Project Number 25-267.01

Project Title

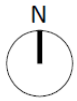
Land at Pound Farm, Bedford Road,
Ickleford, Hitchin, SG5 3RS

Drawn by DN

Checked by JB

Scale NTS





Legend

-  Window Sample Borehole
-  Monitoring Well
-  Mechanical Trial Pit
-  DCP/CBR

Notes

Figure 7

Drawing Title

Exploratory Hole Location Plan -
Proposed Development

Project Number 25-267.01

Project Title

Land at Pound Farm, Bedford Road,
Ickleford, Hitchin, SG5 3RS

Drawn by DN

Checked by JB

Scale NTS



Appendices

- I Exploratory Hole Logs and Photographs
- II Field Monitoring Results
- III Soil Contamination Results and Assessment Criteria
- IV Soil Geotechnical Results
- V Soil Infiltration Test Results

Appendix

I Exploratory Hole Logs and Photographs



WINDOW SAMPLE LOG

Site: Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				Project No. 25-267.02	Borehole: WS1
Client: Bugler Homes Limited			Start: 06/11/2025	End: 06/11/2025	Sheet: 1 of 1
Method/Plant Used: Archway Dart (DO)		Co-ordinates: NT		Ground Level: NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Constr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		(0.3) 0.3		1.0	1	SPT/D	4	4	5	6	6	5	22	
Firm to stiff orange brown silty very sandy gravelly CLAY. Gravel is fine sub-rounded of flint. (LOWESTOFT FORMATION)		(0.9) 1.2												
Stiff orange brown with grey mottling silty sandy very gravelly CLAY. Gravel is fine to coarse sub-angular to rounded of flint. (LOWESTOFT FORMATION)		(0.8) 2.0												
Stiff to very stiff dark grey silty sandy gravelly CLAY. Gravel is white fine sub-rounded of chalk. (LOWESTOFT FORMATION)		(1.0) 3.0												
				3.0	3	SPT/D	8	9	11	12	13	14	50	for 295 mm
				3.45		SPT	15	15	15	16	16	16	63	

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
06/11/2025	100	1.00				06/11/2025	-	-	-	Dry	
Remarks									By		
Roots present to 0.3m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Gas and groundwater monitoring well installed to 3.0m bgl.									Logged	OC	
SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample									Checked	OB	Scale 01:25



WINDOW SAMPLE LOG

Site: Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				Project No. 25-267.02	Borehole: WS2
Client: Bugler Homes Limited			Start: 06/11/2025	End: 06/11/2025	Sheet: 1 of 1
Method/Plant Used: Archway Dart (DO)		Co-ordinates: NT		Ground Level: NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	N Value	
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		(0.3)											
		0.3											
Firm orange brown silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint. Gravel partings. (GLACIOFLUVIAL DEPOSITS)		(0.7)											
		1.0		1.0	1	SPT/D	5	5	5	4	3	3	15
Firm to stiff orange brown with grey mottling silty sandy very gravelly CLAY. Gravel is fine to coarse sub-angular to rounded of flint and fine white sub-rounded of chalk. Gravel partings. (GLACIOFLUVIAL DEPOSITS)		(0.5)											
		1.5		1.5	2	LC							
Stiff orange brown with grey mottling silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. (GLACIOFLUVIAL DEPOSITS)		(0.5)											
		2.0		2.0	3	SPT/D	3	3	5	5	6	6	22
Stiff becoming very stiff brown and grey mottled occasionally silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. (LOWESTOFT FORMATION)		(2.0)											
		4.0											
				3.0	4	SPT/D	3	4	6	7	8	9	30
				4.0		SPT	10	10	12	13	13	12	50 for 295mm

Casing record			Chiselling records			Water level observations (depths in metres below gl)						
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
06/11/2025	100	1.00				06/11/2025	-	-	-	Dry		
Remarks									By			
Roots present to 0.3m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.									Logged	OC		
									Checked	OB		Scale 01:25
									SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample			



WINDOW SAMPLE LOG

Site: Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				Project No. 25-267.02	Borehole: WS3
Client: Bugler Homes Limited			Start: 06/11/2025	End: 06/11/2025	Sheet: 1 of 1
Method/Plant Used: Archway Dart (DO)		Co-ordinates: NT		Ground Level: NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	N' Value	
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		(0.3)		0.5	1	ES							
Firm to stiff orange brown silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint. (GLACIOFLUVIAL DEPOSITS)		(0.7)											
		1.0		1.0		SPT	6	6	6	10	12	12	
Very stiff orange brown with grey mottling silty sandy very gravelly CLAY. Gravel is fine to coarse sub-angular to rounded of flint and fine white sub-rounded of chalk. Gravel partings. (GLACIOFLUVIAL DEPOSITS)		(0.8)											
		1.8											
Firm to stiff orange silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and occasional chalk. (GLACIOFLUVIAL DEPOSITS)		(0.2)		2.0		SPT	3	4	4	6	9	10	
		2.0											
Stiff brown and grey mottled occasionally silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. (GLACIOFLUVIAL DEPOSITS)		(1.4)											
		3.4		3.0		SPT	2	2	4	6	6	6	
		4.0											
Very stiff dark brown grey silty sandy gravelly CLAY. Gravel is white fine sub-rounded of chalk. (LOWESTOFT FORMATION)		(0.6)		4.0		SPT	7	10	12	13	13	12	50 for 285mm
		4.0											
				4.45		SPT	15	15	16	16	17	17	66

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
06/11/2025	100	1.00				06/11/2025	2.10	-	-	-	
						06/11/2025	2.90	-	-	2.90	
Remarks									By		
Roots present to 0.3m. Groundwater encountered at 2.1m and 2.9m, standing at 2.9m at end of borehole. No visual or olfactory evidence of contamination. Gas and groundwater monitoring well installed to 4.0m bgl.									Logged	OC	
SPT: Standard Penetration Test. HP: Hand Penetrometer. B: Bulk Sample. D: Disturbed Sample									Checked	OB	Scale 01:25



WINDOW SAMPLE LOG

Site:				Project No.		Borehole:	
Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				25-267.02		WS4	
Client:				Start:		End:	
Bugler Homes Limited				06/11/2025		06/11/2025	
Method/Plant Used:				Co-ordinates:		Ground Level:	
Archway Dart (DO)				NT		NT	
						Sheet:	
						1 of 1	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	N Value	
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		(0.3) 0.3		1.0		SPT	6	7	7	7	6	6	26
Firm to stiff orange brown silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint. Gravel partings. (GLACIOFLUVIAL DEPOSITS)		(0.9) 1.2											
Stiff becoming very stiff brown and grey mottled occasionally silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. Gravel partings to 1.5m. (GLACIOFLUVIAL DEPOSITS)		(1.8) 3.0											
Poor recovery between 2.0m and 2.8m													
Possible LOWESTOFT FORMATION 2.8-3.0m				3.0		SPT	8	9	10	11	13	14	48
				3.45		SPT	14	14	15	15	16	16	62

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
06/11/2025	100	1.00				06/11/2025	1.90	-	-	1.90	
Remarks									By		
Roots present to 0.3m. Groundwater encountered at 1.9m, standing at 1.9m at end of borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.									Logged	OC	
SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample									Checked	OB	Scale 01:25



WINDOW SAMPLE LOG

Site: Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				Project No. 25-267.02	Borehole: WS5
Client: Bugler Homes Limited			Start: 06/11/2025	End: 06/11/2025	Sheet: 1 of 1
Method/Plant Used: Archway Dart (DO)		Co-ordinates: NT		Ground Level: NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	N' Value	
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		(0.3)											
Firm orange brown silty very sandy gravelly CLAY. Gravel is fine to coarse sub-rounded to angular of flint and fine to medium sub-rounded of chalk. (GLACIOFLUVIAL DEPOSITS)		0.3 (0.7)											
		1.0		1.0	1	SPT/D	4	4	4	6	7	8	25
Stiff orange brown silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to angular of flint and occasional chalk. Gravel partings. (GLACIOFLUVIAL DEPOSITS)		(1.0)											
		2.0		2.0	2	SPT/D/LC	3	3	4	4	5	5	18
Stiff becoming very stiff brown and grey mottled occasionally silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. Occasional gravel partings. (GLACIOFLUVIAL DEPOSITS)		(2.0)											
		4.0		3.0	3	SPT/D	4	4	6	8	9	10	33
				4.0		SPT	9	9	11	12	13	14	50
				4.45		SPT	15	15	15	16	16	17	64

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
06/11/2025	100	1.00				06/11/2025	1.80	-	-	1.70	
Remarks									By		
Roots present to 0.3m. Groundwater encountered at 1.8m, standing at 1.7m at end of borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.									Logged	OC	
SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample									Checked	OB	Scale 01:25



WINDOW SAMPLE LOG

Site: Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				Project No. 25-267.02		Borehole: WS6					
Client: Bugler Homes Limited				Start: 06/11/2025		End: 06/11/2025		Sheet: 1 of 1			
Method/Plant Used: Archway Dart (DO)				Co-ordinates: NT				Ground Level: NT			

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	N Value	
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		(0.3) 0.3		1.0	1	SPT/D	14	11	15	15	16	4	for 245mm
Firm to stiff orange brown silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint. (GLACIOFLUVIAL DEPOSITS)		(0.5) 0.8											
Very stiff brown and grey mottled occasionally silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. (GLACIOFLUVIAL DEPOSITS)		(0.2) 1.0											
				1.45		SPT	17	17	17	18	18	19	72

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
06/11/2025	100	1.00				06/11/2025	-	-	-	Dry	
Remarks									By		
Roots present to 0.3m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.									Logged	OC	
SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample									Checked	OB	Scale 01:25



WINDOW SAMPLE LOG

Site: Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				Project No. 25-267.02	Borehole: WS7
Client: Bugler Homes Limited			Start: 06/11/2025	End: 06/11/2025	Sheet: 1 of 1
Method/Plant Used: Archway Dart (DO)		Co-ordinates: NT		Ground Level: NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Constr.	Samples/Tests			SPT Results						Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	N' Value	
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		(0.3) 0.3		1.0		SPT	9	10	10	12	13	15	50 for 295mm
Firm to stiff orange brown silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint. (Possibly DIAMICTON)		(0.2) 0.5											
Stiff to very stiff brown and grey mottled occasionally silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. (GLACIOFLUVIAL DEPOSITS)		(0.5) 1.0											
				1.45		SPT	14	14	15	15	16	16	62

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
06/11/2025	100	1.00				06/11/2025	-	-	-	Dry	
Remarks Roots present to 0.3m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.									By		
									Logged	OC	
									Checked	OB	Scale 01:25

SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample



WINDOW SAMPLE LOG

Site: Land at Pound Farm, Bedford Road, Ickleford, Hitchin, SG5 3RS				Project No. 25-267.02	Borehole: WS8
Client: Bugler Homes Limited			Start: 06/11/2025	End: 06/11/2025	Sheet: 1 of 1
Method/Plant Used: Archway Dart (DO)		Co-ordinates: NT		Ground Level: NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	N' Value	
Soft dark grey brown silty sandy gravelly CLAY. Roots to 0.3m. (TOPSOIL)		0.3 (0.3)											
Firm to stiff becoming stiff and very stiff brown and grey mottled occasionally silty very sandy gravelly CLAY. Gravel is fine to medium sub-rounded to sub-angular of flint and white fine sub-rounded of chalk. Gravel partings from 0.8m. (GLACIOFLUVIAL DEPOSITS)		2.0 (1.7)		1.0	1	SPT/D	5	5	5	7	8	8	
				2.0	2	SPT/D	5	8	12	13	13	12	50 for 295mm

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
06/11/2025	100	1.00				06/11/2025	-	-	-	Dry	
Remarks Roots present to 0.3m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.									By		
									Logged	OC	
									Checked	OB	Scale 01:25

SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample