



Intrusive Geoenvironmental and Geotechnical Site Assessment

Starwood House
Avenue One
Letchworth Garden City
Hertfordshire
SG6 2TT

September 2025

680199.0000.0001

Prepared For:

Letchworth Investment LLP
38 Seymour Street
London
W1H 4BP

Prepared By:

TRC Companies Limited
20 Red Lion Street
London
WC1R 4PS

Quality Control

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Executive Summary

TRC Companies Limited (TRC) was commissioned by Letchworth Investment LLP (the 'Client') to undertake a Tier 2 Geoenvironmental and Geotechnical Site Assessment at Starwood House, Avenue One, Letchworth Garden City, Hertfordshire, SG6 2TT (hereafter referred to as the 'Site').

This Executive Summary is part of the complete report; and findings, opinions or conclusions in this Executive Summary are made in context with the complete report. TRC recommends that the user reads the entire report for all supporting information related to findings opinions and conclusions.

Executive Summary	
Site Details	
Client	Letchworth Investment LLP
Site Address & Grid Reference	Starwood House, Avenue One, Letchworth Garden City, Hertfordshire, SG6 2TT Easting 523280, Northing 232950
Site Area	2.59 ha
Proposed Development	The proposed development plan indicates a commercial / industrial end use consisting of two buildings comprising three units with surrounding hardstanding and soft landscaping.
Site Setting	
Current Site Use	At the time of writing this assessment, demolition contractors had recently completed the decommissioning and removal of equipment and interior walls of the building on site. The Site comprises car parking in the north-eastern portion of the Site. Soft landscaping is present around the perimeter of the Site.
Site History	From earliest available mapping (1880), the Site comprised agricultural fields. In the 1930s the Site is part of larger sports fields. By the 1960s, infrastructure associated with the adjacent "Metal Works" and tank overlaps within the site boundary. By the early 1980s, the Site was redeveloped to contain two new buildings and associated tanks. By the late 1980s and early 1990s, the Site was redeveloped again to a data centre with offices and an associated car park, reflecting its current land use.
Expected Geology (based on desk study Information)	Made Ground is expected at the Site due to past developments. Superficial deposits – Not anticipated. Bedrock geology – Holywell Nodular Chalk Formation and New Pit Chalk Formation.
Expected Hydrogeology (based on desk study Information)	Bedrock geology – Unconfined Principal Aquifer The Site lies within a groundwater Source Protection Zone 1. Groundwater flow direction is anticipated to the northwest. Groundwater is therefore considered to be sensitive to contamination.
Expected Hydrology (based on desk study Information)	The nearest surface water feature is a small pond (Western Lake) located 38m northwest of the Site. Western lake is higher in elevation than the Site, and groundwater is anticipated at 19m bgl. Therefore, Western Lake is unlikely to be in hydraulic continuity with groundwater beneath the Site. Surface water is therefore not considered sensitive to contamination.

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	The Site is located within Flood Zone 1, which has a low probability of flooding. However, the annual risk of flooding from surface water is high.
Investigation Findings	
Ground Conditions	Made Ground was encountered from ground level to 0.80m bgl, overlying reworked Natural strata to a maximum recorded depth of 3.20m bgl, overlying Glaciofluvial Deposits locally present to 2.30m bgl, overlying the Holywell Nodular and New Pit Chalk Formation to a maximum proven depth of 17.00m bgl.
Groundwater Conditions	Groundwater was not encountered. According to a previous ground investigation, groundwater is anticipated within the Holywell Nodular Chalk and New Pit Chalk Formation, at depths generally greater than 18-19m bgl. The local presence of perched groundwater within the Made Ground, although not encountered during the ground investigation cannot be ruled out.
Geotechnical Assessment	
Geotechnical Hazards	The previous reports and current ground investigation have identified a number of geotechnical hazards at the Site which relate to the proposed development. These are Made Ground and Reworked Natural strata locally recorded to depths of at least 3.20m bgl; buried obstructions, such as old foundations and slabs, cobbles and boulders in Made Ground and the Reworked Natural, and flints in chalk; low CIRIA grade Dm chalk recorded to depths of at least 5.45m bgl, and potential unrecorded chalk dissolution features in areas inaccessible during the investigation, albeit the risk appears to be low to negligible based on available ground investigation data. These geotechnical hazards are discussed in detail along with mitigation measures in section 6 of this report.
Foundations	Shallow foundations will not be viable for the proposed structures due to the variable thickness of non-engineered Made Ground and Reworked Natural strata and the presence of less competent Holywell Nodular Chalk and New Pit Chalk Formation recorded during the ground investigation. Ground improvement is considered to be a cost-effective solution for this site. Vibrostone columns (VSC) could be considered to be constructed within the competent strata of the Holywell Nodular Chalk and New Pit Chalk Formation at depth. Upon treatment it should be possible to construct shallow foundations on top of the VSCs, subject to confirmation by a specialist contractor. Based on the presence of low density Chalk, the closest part of any shallow soakaway should not be within 10m from any foundation. Details of the foundation options including allowable bearing pressures are discussed in sections 6.3 and 6.4.
Floor Slabs	Subject to confirmation by a specialist subcontractor, dynamic compaction methods such as the Rapid Impact Compaction (RIC) or High Energy Impact Compaction (HEIC) or the Rolling Dynamic Compaction (RDC) are considered likely to be appropriate cost-effective ground improvement techniques below floor slabs given the presence of the predominantly granular soils of Made Ground and Reworked Natural. Details are provided in section 6.5 of this report.
Excavations	Excavations for any shallow foundations, floor slabs, and laying services should be readily achievable using standard excavation plant. However, hard surfacing, old

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	foundations, relict basement construction and the like, will require the use of breaking apparatus. Generally dry ground conditions are anticipated during shallow excavations for conventional foundations and services. The contractor should consider the impact of weather and potential for rainwater and surface run-off to accumulate within excavations. Details for anticipated excavations are provided in section 6.6.
Pavements	Assuming excavation formation soils will comprise Made Ground, an equilibrium CBR value of 3% is recommended for preliminary design purposes, based on a qualitative assessment and the findings of the ground investigation. Confirmatory in-situ CBR testing at final formation level is recommended just prior to pavement construction. Chalk is a frost-susceptible material, so a minimum pavement construction thickness of 0.45m (including sub-base) must be adopted for any pavement laid onto it. Details for proposed pavements are provided in section 6.7 of this report.
Buried Concrete	With reference to the BRE Digest SD1 (2005), and considering the results of soil samples, DS-1 and ACEC AC-1s are appropriate for any buried concrete within Made Ground, Reworked Natural, and Holywell Nodular Chalk and New Pit Chalk Formation up to a maximum depth of 18m.
Soakaways	Soakaway testing did not form part of the scope of works, however, given the presence of deep groundwater at 18-19m bgl within the Holywell Nodular and Newpit Chalk Formation, shallow soakaways may be viable for future developments. BRE365 testing would be required should shallow soakaways be proposed, to confirm ground soakage rates. In addition, as the Chalk is a Principal Aquifer, the Environment Agency (EA) and local authority must be consulted when planning soakaway installations where chalk lies below the Site, even where it is mantled with superficial deposits.
Contaminated Land Assessment	
Human Health	There were no exceedances of the GAC in soils for the proposed commercial end use. Asbestos fibres were identified within two samples of Made Ground (WS103 and WS104). The asbestos identified in the samples is considered to pose a moderate risk to future site users and future construction workers unless mitigation measures are included in the design and during construction works.
Controlled Waters	Groundwater was not encountered during the investigation. Soil leachate analysis identified exceedances of the EQS for copper and mercury and exceedances of the DWS for naphthalene and phenanthrene. The Site is located within a Source Protection Zone 1. The Site is underlain by sensitive aquifers (Principal Aquifer). Considering that leachate exceedances were recorded in only one sample of three tested, that only a thin layer of Made Ground was present across the Site, that groundwater is greater than 18-19m bgl, and that infiltration will be limited by the

Executive Summary	
	presence of buildings and hardstanding across the majority of the Site, the risk from soil leachates to the groundwater is considered to be low. No sensitive surface water receptors have been identified.
Ground Gas and Organic Vapour	Gas monitoring indicates that the Site would be classified as Characteristic Situation 1 (very low risk). There is not considered to be a risk from organic vapour. Based on the results, it is considered that ground gas protection may not be required at the proposed development.
Remediation	Based on the results of this assessment the following remediation/mitigation measures are considered to be required: • Construction of a clean cover layer across soft landscaped areas comprising a 300mm layer of clean materials with a geotextile membrane at the base. • Any works which have the potential to disturb asbestos must be undertaken in accordance with CAR 2012 and a Plan of Work will be required. An asbestos in soils management plan should be prepared to further assess risks associated with the asbestos in soils identified.
Recommendations	
<u>Geoenvironmental</u> The selection of appropriate water supply pipework should be confirmed by the local water supply company. A remediation strategy and verification plan is likely to be required by the local planning authority. <u>Geotechnical</u> Further work may be required to further quantify the risks and allow detailed design. Confirmation of ground infiltration rates in chalk via in-situ testing in accordance with BRE 365 should be considered if shallow soakaways be proposed. Early consultation with a specialist ground improvement contractor is recommended to confirm the feasibility of ground improvement techniques discussed in this report. The ground investigation results and assessment presented in this report should be made available for an informed decision. A foundation works risk assessment will be required for any construction works proposed in chalk, as it is a Principal Aquifer.	

1.0 Introduction

1.1 Appointment and Purpose

TRC Companies Limited (TRC) was commissioned by Letchworth Investment LLP (the 'Client') to undertake a Tier 2 Geoenvironmental and Geotechnical Site Assessment at Starwood House, Avenue One, Letchworth Garden City, Hertfordshire, SG6 2TT (hereafter referred to as the 'Site').

A site location plan is presented as Figure 1 in Annex A.

This report has been prepared in accordance with TRC's proposal dated 20/12/2024 and 19/06/2025 and the respective terms and conditions contained therein.

This Tier 2 report uses intrusive investigation methodologies to aid site characterisation and to inform the Client of potential environmental and geotechnical liabilities, identify risk, assist due diligence and inform cost estimates.

This report will support the Client with a future planning application for development of the Site for a proposed commercial end use, as discussed in detail in the following section.

1.2 Proposed Development

The proposed development will comprise the demolition of the existing structures and the construction of two buildings comprising three units with associated service yards and car parking, as well as some limited soft landscaping near the Site boundaries.

Based on the above and the anticipated site-specific ground conditions presented in this report, the proposed development is considered to fall into geotechnical category 2 with respect to BS EN 1997 (Eurocode 7).

The end user sensitivity is considered to be "low" for the proposed commercial/industrial end use.

A proposed development plan and proposed earthworks plan is presented as Figure 2 and Figure 4 respectively in Annex A.

1.3 Available Information & Standards

This report is based on the following information:

- Historical uses of the Site and surroundings;
- Current use and condition of the Site;
- Environmental setting in terms of geology, hydrogeology, hydrology and surrounding land uses;
- Relevant publicly available environmental records;
- Previous reports for the Site as listed in Section 2.6; and,
- Intrusive investigation including geoenvironmental and geotechnical sampling and testing.

This report was conducted with due regard to the following guidance and standards:

- The National Planning Policy Framework;
- BS5930:2015 (+A1:2020) Code of Practice for Ground Investigations;
- BS EN 1997 Eurocode 7;
- BS8485:2015 (+A1:2019) Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings;
- BS8576:2013 Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds (VOCs);
- BS10175:2011 (+A2:2017) Investigation of Potentially Contaminated Sites – Code of Practice; and,

- Land Contamination: Risk Management (LCRM) 2020 (2023 update).

The geotechnical appraisal has been carried out in accordance with Eurocode 7. Sections 1 to 5, together with Annexes A to E, comprise the Ground Investigation Report.

Preliminary geotechnical recommendations are presented in Section 6 and these may need to be verified in a Geotechnical Design Report once structural details of the proposed development are confirmed.

1.4 Significant Assumptions

This report presents TRC's observations, findings, and conclusions as they existed on the date that this report was issued. This report is subject to modification if TRC becomes aware of additional information after the date of issue of this report that is material to its findings and conclusions.

The reliability of information provided by others to TRC cannot be guaranteed to be accurate or complete. Performance of this Tier 2 Geoenvironmental and Geotechnical Site Assessment is intended to reduce, but not eliminate, uncertainty of geoenvironmental and geotechnical conditions associated with the Site; therefore, the findings and conclusions made in this report should not be construed to warrant or guarantee the Site, or express or imply, including without limitation, warranties as to its marketability for a particular use. TRC found no reason to question the validity of information received unless explicitly noted elsewhere in this report.

1.5 User Reliance

This report was prepared for Letchworth Investment LLP. Reliance on this report by any other third party is subject to requesting and fully executing a reliance letter between TRC and the third party that acknowledges the TRC Standard Terms and Conditions with the Client, to the same extent as if they were the Client thereunder.

TRC has been provided with information from third parties for information purposes only and without representation or warranty, express or implied as to its accuracy or completeness and without any liability on such third parties part to revise or update the information. Where reliance has been provided by third parties to potential purchasers this is noted in our report.

2.0 The Site

2.1 Location

The Site comprises an approximate 2.59ha plot of land located at Starwood House, Avenue One, Letchworth Garden City, Hertfordshire, SG6 2TT, centred on National Grid Reference Easting 523280, Northing 232950, situated approximately 1.5km east from Letchworth Garden City railway station.

A site location plan is presented as Figure 1 in Annex A.

2.2 Site Description

The Site is located within an area of predominantly commercial land use.

At the time of writing this assessment, the Site comprised a large, vacant single-storey data centre, with several extensions, located to the east of Avenue One. Demolition Contractors had recently completed the decommissioning and removal of the interior walls and equipment within the building. There was a car park in the north-eastern portion of the Site and soft landscaping around the perimeter of the Site and in the south-eastern portion of the Site. An electricity substation was identified in the northern portion of the Site.

The Site has an average elevation of approximately 81m above Ordnance Datum (aOD). The Site is generally flat, with gentle slopes upward around the perimeter of the Site. The soft landscaping in the south-eastern portion of the Site appeared slightly higher in elevation by approximately 0.30m and was slightly uneven.

2.3 Surrounding Area

Land uses in the immediate vicinity include the following principal features:

Table 2.1: Summary of Surrounding Land Use

Direction	Land Use
North	The Site is bound to the north by adjacent large warehouses and associated car park with hardstanding.
East	The Site is bound to the east by Third Avenue and a Sainsbury's superstore with associated petrol filling station, car park and hardstanding.
South	The Site is bound to the south by Second Avenue and beyond this are various industrial/commercial properties.
West	The Site is bound to the west by Avenue One and by large industrial/commercial warehouses with associated hardstanding to the southwest. To the northwest, a builder's merchants yard is present.

2.4 Site Environmental Setting

2.4.1 Geology

Based on previous reports for the Site (as detailed in section 2.6) and publicly available information, the Site is underlain by variable thickness of Made Ground over the Holywell Chalk Formation and New Pit Chalk Formation.

2.4.2 Hydrogeology

The British Geological Survey (BGS) geological mapping and hydrogeological mapping presented by DEFRA (MAGIC website) indicate the following hydrogeological information for the Site:

Table 2.2: Summary of Hydrogeology

Geology	Geological Description	Aquifer Status	Aquifer Description
Bedrock: Holywell Nodular Chalk Formation and New Pit Chalk Formation	Chalk	Principal Aquifer	Geological strata that exhibit high intergranular and/or fracture permeability. They usually provide a high level of water storage and can support water supply and/or base flow to rivers, lakes and wetlands on a strategic scale.

The Site lies within a groundwater Source Protection Zone 1.

2.4.3 Hydrology

The nearest surface water feature is a small pond (Western Lake) located 38m northwest of the Site. Western Lake sits above the level of the Site, and considering that groundwater is at circa 19m below ground level (bgl), Western Lake is unlikely to be in hydraulic continuity with groundwater beneath the Site.

2.5 Summary of Site History

From earliest available mapping (1880), the Site comprised agricultural fields. In the 1930s the Site is part of larger sports fields. By the 1960s, infrastructure associated with the adjacent “Metal Works” and tank overlaps within the site boundary. By the early 1980s, the Site was redeveloped to contain two new buildings and associated tanks. By the late 1980s and early 1990s, the Site was redeveloped again to a data centre with offices and an associated car park, reflecting its current land use.

2.6 Previous Investigations, Reports or Remediation

The following site specific assessments have been provided by the Client for review and are referred to in this report. Also, TRC issued previously a desk based geoenvironmental and geotechnical assessment which is briefly summarised in the table below.

Table 2.3: Summary of Previous Site Assessments

Report Details	Summary of Geoenvironmental and Geotechnical Findings
“Tesco Starwood House, Letchworth – Phase 1 Environmental Site Assessment”, Version 1, January 8th 2024, Arcadis	The overall aim of the environmental assessment was to provide a baseline assessment of geo-environmental conditions including the subsurface beneath the Site. The key objectives from the report were: • To examine whether there had been potentially contaminative uses on the Site or nearby land and identify Potential Areas of Concern through a desk top study; • To carry out a site walkover to provide additional information to support the development of a conceptual site model (CSM); and, • To prepare a Preliminary Risk Assessment report to identify potentially active contaminant linkages. The report concluded that there has been limited notable potentially contaminative development across most of the Site from earliest available mapping. There were previous industrial buildings relating to the steel and metal works as well as the traveling crane located on Site. The report noted two underground storage tanks, which were decommissioned in 2017, but were understood to contain diesel fuel. One of the decommissioned tanks was removed from Site, but the other remained onsite. The report concluded that several off-site land uses represent potential sources of contamination, including industrial and commercial land uses around the vicinity of the Site. Minimal environmental testing was undertaken on the Site previously. Arcadis undertook soil sampling on the Site in 2017 during the tank decommissioning process; however, this was limited to testing of stockpiles and excavation of the underground storage tank from the north of the Site. The data results concluded that there were no elevated concentrations of hydrocarbons above the Arcadis’ general assessment criteria protective of Human Health and Controlled Waters. No other known historical environmental investigations have been undertaken at the Site. The report stated that the Site is located within Source Protection Zone (SPZ) 1. The report concludes that groundwater within the bedrock geology of Holywell Nodular Formation and New Pit Chalk Formation are classified as a Principal Aquifer. The report also noted a potable water abstraction located 261m south of the Site. A geotechnical assessment did not comprise part of this report.

“Geo-environmental Ground Investigation Report”, Version 1, April 2024, Arcadis	The overall aim of the report was to undertake an initial assessment of the presence, composition, and extent of potential contamination beneath the surface of the Site, and to collect geotechnical information regarding subsurface conditions to support future leaseholders with planning redevelopment works. The scope of works for this geo-environmental ground investigation included: • A Detailed UXO Risk Assessment for the Site; • Risk assessments including the preparation of a Health and Safety Plan for Site works; • Commission and supervision of full topographic and utility survey undertaken by an Arcadis-approved specialist contractor before intrusive works. The scope of works for the intrusive investigation included: • Concrete coring of all proposed drilling locations; • Hand pitting to 1.20m below ground level prior to drilling; • Drilling of 3 no. dynamic sampling/rotary drilling boreholes up to 30m below ground level (bgl) with in-situ geotechnical testing; • Collection of soil samples at regular intervals for environmental and geotechnical laboratory testing; • Soil waste disposal; • Development of newly installed monitoring wells; • Waste water disposal; • Groundwater monitoring and sampling of all newly installed monitoring locations; and • Submission of groundwater samples for environmental laboratory testing. All three deep boreholes (BH101, BH102, BH103) reached a target depth of 30m bgl. Six more exploratory hole locations were abandoned at shallow depths while excavating the starter/inspection pits between 0.31m bgl and 1.04m bgl due to refusal on concrete obstructions. Groundwater monitoring wells were installed in each of the three successfully drilled boreholes. The geology encountered during the site investigation was Made Ground to a maximum depth of 1.45m bgl, which was underlain by very weak, light Chalk. The Holywell Nodular Chalk Formation and New Pit Chalk Formation (Undifferentiated) was encountered to a maximum depth of 30.00m bgl. Groundwater strikes were observed at 18.90m bgl in BH101. Groundwater was measured resting between 24.80m bgl (BH102) to 19.07m bgl (BH103) during the groundwater monitoring and sampling works. Groundwater monitoring found resting levels at depths from 19.07m bgl to 24.23m bgl. Soil samples were analysed for Total Petroleum Hydrocarbons (TPH) using the Criteria Working Group (CWG) method, fuel additives, pollutants regulated by the United States Environmental Protection Agency (US EPA), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), Contaminated Land Exposure Assessment (CLEA) metals, Hexavalent Chromium (Cr(VI)), Sulfate (SO₄²⁻), a comprehensive Waste Acceptance Criteria (WAC) analysis, an asbestos screen, and pH levels.
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Report Details	Summary of Geoenvironmental and Geotechnical Findings
	Groundwater samples were tested for TPH (CWG), PAHs, Volatile Organic Compounds (VOCs), CLEA metals, Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), Methyl Tertiary-Butyl Ether (MTBE), Tertiary Amyl Methyl Ether (TAME), Diisopropyl Ether (DIPE), Tert-Butyl Alcohol (TBA), and Ethanol. Geotechnical samples were tested for natural moisture content, intact dry density, saturation moisture content, and porosity. The results of the Arcadis ground investigation recorded no evidence of organic contamination in the boreholes. No asbestos was detected in the samples taken; however, the report noted that asbestos may be present on site in shallow soil. No visual or olfactory evidence of contamination was observed in soil and groundwater samples collected from BH101, BH102, and BH103. No measurable thickness of LNAPL was observed in any of the groundwater samples collected. PID readings in all three boreholes were <1 ppmV. Asbestos Containing Material (ACM) was not detected in any of the Made Ground soil samples. A UXO Desk Study & Risk Assessment report, dated 21st December 2023 prepared by Zetica for Arcadis, indicated 'low' UXO risk for the Site. No geotechnical assessment was included in the report.

Report Details	Summary of Geoenvironmental and Geotechnical Findings
“Desk Based Geoenvironmental and Geotechnical Site Assessment”, Version 2, March 2025, TRC Companies Ltd	The report can be summarised as follows: • The Site currently comprises a data centre with offices and an associated car park, with soft landscaping surrounding the Site. • Earliest available mapping (1880) shows the Site comprised agricultural fields until the 1960s, when infrastructure associated with the adjacent Metal Works and a tank encroached onto the Site. By the early 1980s, the Site was redeveloped to contain two new buildings and associated tanks. By the early 1990s, the Site was redeveloped into a data centre reflecting its current land use. • Made Ground is expected at the Site due to past developments. Superficial deposits are not expected. Bedrock geology is anticipated to consist of Holywell Nodular Chalk Formation and New Pit Chalk Formation. • The bedrock geology is classified as a Principal Aquifer and is unconfined. • The Site lies within a groundwater SPZ 1. • Groundwater is therefore considered to be sensitive to contamination. • The nearest surface water feature is a small pond (Western Lake) located 38m northwest of the Site. Western Lake is situated higher in elevation than the Site; thus, Western Lake is unlikely to be in hydraulic continuity with groundwater beneath the Site. • Surface water is therefore not considered to be sensitive to contamination. • The Site is located within Flood Zone 1, which has a low probability of flooding. • Made Ground, tanks, and previous operations at the Site could be a source of asbestos fibres in soil, heavy metals, polycyclic aromatic hydrocarbons, total petroleum hydrocarbons, polychlorinated biphenyls, ground gases, and organic vapours. • Potentially complete contaminant linkages have been identified and are considered to pose a potential risk to the identified receptors. • The following potential geotechnical hazards have been identified: ○ Made Ground is locally expected to depths of at least 4.80m below ground level (bgl); ○ Buried obstructions, such as old foundations, cobbles in Made Ground, flints in chalk; ○ Ground conditions aggressive to buried concrete; and, ○ Potential dissolution features in Chalk. A foundation risk assessment and consultation with the Environment Agency is likely to be required for any construction works in chalk. A ground investigation and assessment is recommended to be undertaken for the Site. The investigation should target the identified potential contaminant linkages and ensure that the geotechnical hazards identified are assessed with focus on the proposed development. An arborist survey and assessment is recommended to support the foundation design for a future development.

3.0 Ground Investigation

3.1 Scheduled Scope of Works

The scheduled TRC Tier 2 investigation was carried out over two phases. The scope of works for Phase 1 comprised the following:

- Three cable percussive boreholes (CP101, CP102, CP103) advanced to a maximum depth of 25m bgl;
- Two days of windowless sampler (WS) borehole drilling at approximately 8-10 locations to a maximum of 5m bgl or refusal, whichever is shallower;
- In-situ logging, ground sampling and testing;
- Construction of six gas and groundwater monitoring wells;
- Field monitoring of bulk ground gases, vapour and groundwater levels on four occasions; and,
- Collection of groundwater samples for laboratory testing on one occasion.

The scope of works for Phase 2 comprised the following:

- Two days of WS borehole drilling at 8 locations to a maximum of 5m bgl or refusal, whichever is shallower; and,
- In-situ logging, ground sampling and testing.

3.2 Investigation Rationale

The ground investigation was designed by TRC on behalf of the Client to gather information on the geoenvironmental and geotechnical ground, groundwater and ground-borne gas conditions at the Site.

Table 3.1: Summary of proposed Exploratory Hole Locations

Exploratory Hole	Location
Phase 1	
CP101	Located in the central portion of the Site, underlying the proposed buildings
CP102	Located in the central-northern portion of the Site, underlying the proposed buildings
CP103	Located in the north-eastern portion of the Site, underlying the proposed buildings
WS101	Located in the south-western portion of the Site, for general Site coverage
WS102	Located in the south-eastern portion of the Site, within the soft landscaping
WS103	Located in the north-western portion of the Site, near the aboveground storage tank in the site building
WS104	Located in the northern portion of the Site, near where Arcadis encountered a refusal
WS105	Located in the south-eastern portion of the Site, within the soft landscaping
WS106	Located in the central-eastern portion of the Site, underlying the proposed buildings
WS107	Located in the central-eastern portion of the Site, underlying the proposed buildings
WS108	Located in the north-eastern portion of the Site, near where Arcadis encountered refusals
WS109	Located in the north-eastern portion of the Site, within the soft landscaping, targeted to assess potential for contamination on Site from adjacent petrol station.
Phase 2	
WS201	Located in the north-western portion of the Site building
WS202	Located in the northern portion of the Site building
WS203	Located in the western portion of the Site building
WS204	Located in the eastern portion of the Site building
WS205	Located in the south-western portion of the Site building
WS206	Located in the central portion of the Site building
WS207	Located in the southern portion of the Site building

Exploratory Hole	Location
WS208	Located in the south-eastern portion of the Site building

3.3 Investigation Methodology

3.3.1 Ground Investigation

Phase 1 of the TRC Tier 2 investigation was conducted at the Site between the 17th to 20th March 2025.

TRC commissioned Endeavour Drilling (drilling contractor) to undertake the cable percussive drilling and windowless sampling drilling at the Site. Each cable percussive exploratory hole was advanced using a Dando rig. Each windowless sample exploratory hole was advanced using a Terrier rig. The drilling works were overseen by a TRC engineer who performed field assessment and logging of the exploratory holes.

Phase 1 works included the following key actions:

- Review of available underground services plans for the Site;
- Each of the proposed exploratory hole locations was cleared using a Cable Avoidance Tool (CAT) and ground penetrating radar (GPR) by an independent utilities surveyor;
- Cable percussive (CP) drilling was performed at each cable percussive location by the drilling contractor, including in-situ geotechnical testing. Four CPs (CP101 to CP104) were undertaken;
- Windowless sampling (WS) drilling was performed at each windowless sampling location by the drilling contractor, including in-situ geotechnical testing. Five WS boreholes (WS102, WS103, WS104, WS108 and WS109) were completed;
- Soil logging, testing, and assessment of potential indicators of contamination;
- Collection of soil samples for environmental and geotechnical laboratory analysis;
- Construction of gas and groundwater monitoring wells in six borehole locations, CP101, CP102, CP104, WS102, WS103, WS104;
- CP103, WS108, and WS109 were backfilled with arisings; and,
- Surveying of the exploratory holes final locations.

The following alterations to exploratory hole depths and positions were made during the course of the ground investigation during Phase 1:

- Due to a refusal on concrete within CP103 at 1.70m bgl, to achieve a third deep borehole, CP104 was drilled in the location of WS101;
- CP101, CP102, and CP104 were terminated due to competent chalk at 17m, 16.50m, and 16.50m bgl, respectively;
- WS101, WS105, WS106, and WS107 were not drilled due to slow progress which prevented completion of the scope. A decision was made based on existing site coverage to prioritise the other locations over these WS locations. CP104 was drilled in the location of WS101 as detailed above; and,
- WS108 terminated at 1.65m bgl due to drilling refusal on concrete.

Phase 2 of the TRC Tier 2 investigation was conducted at the Site between the 30th July to 1st August 2025.

TRC commissioned CK Drilling Ltd (drilling contractor) to undertake the windowless sampling drilling at the Site. Each windowless sample exploratory hole was advanced using a DART rig. The drilling works were overseen by a TRC engineer who performed field assessment and logging of the exploratory holes.

Phase 2 works included the following key actions:

- Review of available underground services plans for the Site;

- Each of the proposed exploratory hole locations was cleared using a CAT and GPR by an independent utilities surveyor;
- WS drilling was performed at each windowless sampling location by the drilling contractor, including in-situ geotechnical testing. Eight WS boreholes (WS201 to WS208) were completed;
- Soil logging, testing, and assessment of potential indicators of contamination;
- Collection of soil samples for environmental and geotechnical laboratory analysis; and,
- WS201 to WS208 were backfilled with arisings.

The following alterations to exploratory hole depths and positions were made during the course of the ground investigation during Phase 2:

- WS201, WS202, WS203, and WS205 refused at 2.10m, 2.40m, 2.31m, and 1.53m bgl, respectively due to encountering concrete.

The exploratory hole location plan for the ground investigations undertaken by TRC, is presented as Figure 3 in Annex A.

The exploratory hole logs are presented in Annex C and include the in-situ sampling and testing undertaken at the Site.

3.3.2 Groundwater and Ground Gas Monitoring

The ground conditions encountered within the response zone of the monitoring installations are summarised in the table below.

Table 3.2: Monitoring Wells Summary

Exploratory Hole	Response Zone (m bgl)	Response Zone Strata (m bgl)	
CP101	1.00 – 16.00	1.00 – 1.80	Glaciofluvial Deposits
		1.80 – 16.00	Holywell Nodular Chalk Formation and New Pit Chalk Formation
CP102	2.00 – 16.00	2.00 – 16.00	Holywell Nodular Chalk Formation and New Pit Chalk Formation
CP104	1.50 – 16.50	1.50 – 16.50	Holywell Nodular Chalk Formation and New Pit Chalk Formation
WS102	1.00 – 5.00	1.00 – 5.00	Holywell Nodular Chalk Formation and New Pit Chalk Formation
WS103	0.50 – 2.00	0.50 – 2.00	Made Ground
WS104	2.50-5.00	2.50-5.00	Holywell Nodular Chalk Formation and New Pit Chalk Formation

Groundwater and ground gas monitoring was conducted by Enital on four occasions. The dates of the monitoring visits were 25th March, 2nd April, 11th April, 16th April 2025.

During each visit, groundwater elevation and potential presence of any free phase oils was measured using an oil/water interface probe. Gas monitoring was undertaken using a portable gas analyser at each monitoring well head. The field assessment gathered data relating to the concentrations of permanent ground gases (e.g. methane, carbon dioxide, carbon monoxide and oxygen).

Groundwater sampling was not undertaken due to the monitoring wells being dry.

3.4 Geotechnical In-Situ Testing

In-situ testing was undertaken for geotechnical purposes. The details of the in-situ test results are presented in the logs within Annex C.

The site based geotechnical testing from both phases of investigation is summarised in the table below.

Table 3.3: In-situ Tests (Geotechnical)

Test Type and Standard	Number
Standard penetration test (BS EN ISO 22476-3:2005+A1:2011)	83

Any limitations to the in-situ testing that require consideration during the evaluation of the data are described in the following paragraphs.

Although the Standard Penetration Test (SPT) is a standardised test, uncorrected SPT 'N' values may display a considerable amount of scatter. Calibrated SPT hammers were used during the ground investigation and in our evaluation, presented in Section 5, the results have been normalised to 'N₆₀' in accordance with Eurocode 7.

Some elevated SPT N values, likely due to encountering hard chalk with cobbles of chalk and flint were recorded from 10m bgl. As discussed in Section 5, these are not considered representative of the stratum as a whole and have been discounted from subsequent analysis. SPT refusals on concrete obstructions were encountered at locations WS201, WS202, WS203 and WS205 at depths of between 1.53m and 2.40m bgl.

The following SPTs straddle two strata and so are considered to be representative of neither and have been discounted from subsequent analysis:

- WS103 at 2m bgl
- WS104 at 2m bgl
- WS109 at 3m bgl
- WS206 at 1.2m bgl

The above factors have been considered in the appraisal of geotechnical results presented in Section 5.

3.5 Geotechnical Laboratory Testing

Laboratory testing was undertaken for geotechnical purposes.

The geotechnical laboratory testing from both phases of investigation is summarised in the table below.

Table 3.4: Laboratory Tests (Geotechnical)

Test Type and Standard (BS 1377 unless stated differently)	Number
Water (moisture) content (BS EN ISO 17892-1)	11
Liquid and plastic limits and plasticity index (BS EN ISO 17892-12)	7
Particle size distribution - wet sieving (BS EN ISO 17892-4)	10
Soil pH (BRE SD1 2005)	22
Water soluble sulphate content 2:1 aqueous extract (BRE SD1 2005)	22
Acid soluble sulphate content (BRE SD1 2005)	15

Test Type and Standard (BS 1377 unless stated differently)	Number
Total sulphur content (BRE SD1 2005)	11
Saturation Moisture Content of Chalk (BS EN ISO 17892-12 : 2018+A2:2022)	4
Chalk Description in the Lab (CIRIA 574 Engineering in Chalk) based on UT100 samples	2

As with in-situ testing, it is necessary to consider the limitations associated with any laboratory testing and to review any potentially anomalous results. In all geotechnical tests the specimen is selected from a much larger volume of material which may have an inherent degree of variability, particularly in Made Ground.

Water content determinations on disturbed samples may not be representative due to the disturbance arising from the sampling process. Moisture content results can be influenced by climatic factors and it cannot be guaranteed that the values determined at the time of investigation will be the same as those at the time of construction.

Obtaining coarse grained soils from cable tool or windowless boreholes can result in a loss of materials due to the nature of the sampling process. This can have an influence on the results of particle size distribution analyses.

The above factors have been considered in the appraisal of the geotechnical results given in Section 5.

The full set of laboratory geotechnical results is presented in Annex E.

3.6 Environmental Laboratory Analysis

A total of seventeen soil samples was collected for environmental analysis during Phase 1 and a total of sixteen soil samples was collected for environmental analysis during Phase 2. All soil samples were packed in laboratory provided containers and delivered to I2 Analytical (I2) for chemical analysis.

All soil samples were collected in order to provide environmental data on the quality of near surface and shallow soils beneath the Site. Representative samples of Made Ground and natural deposits were collected where feasible. The analytical suite of soils included the following parameters:

- Asbestos (Made Ground Materials only);
- Heavy metals suite;
- Polycyclic aromatic hydrocarbons (PAH); and,
- Total petroleum hydrocarbons – Criteria Working Group (TPH-CWG);

Four soil samples were also analysed for the following:

- Per- and polyfluoroalkyl substances (PFAS); and,
- Chlorinated Solvents.

A total of three leachate samples were prepared from selected soil samples by I2 Analytical (I2) and analysed for the following:

- Heavy metals suite;
- Polycyclic aromatic hydrocarbons (PAH); and,
- Total petroleum hydrocarbons – Criteria Working Group (TPH-CWG).

The full set of chemical results are presented in Annex F.

4.0 Ground Conditions

4.1 Ground Profile

The investigations observed that the soils underlying the Site generally comprised the following:

Table 4.1: Ground Profile

Stratum	From		To		Thickness (m)
	m bgl	m aOD	m bgl	m aOD	
Made Ground	0.00	80.56/81.18	0.20/>2.40	79.10/80.81	0.20/>2.40
Made Ground – Reworked Natural	0.20/0.80	79.76/80.53	0.60/3.20	77.98/79.58	0.50/2.50
Glaciofluvial Deposits	0.50/2.00	78.56/80.34	1.80/2.30	78.26/79.04	0.30/1.30
Holywell Nodular Chalk Formation and New Pit Chalk Formation	0.20/3.20	77.98/80.64	>17.00	<63.84	Unknown

The geology encountered during the previous ground investigation was Made Ground to a maximum depth of 1.45m bgl. There was no differentiation between Made Ground and Reworked Natural. Also, no Glaciofluvial Deposits were recorded during the previous ground investigation.

With the exception of the Glaciofluvial Deposits that were not recorded during the previous ground investigation undertaken by Arcadis, the ground conditions encountered generally correspond with the publicly available records of ground conditions published by the British Geological Survey (BGS) and reported in the previous reports for the Site. Published BGS borehole records near the Site area reported similar results.

4.2 Made Ground

Made Ground was encountered in all of the exploratory holes from ground level to depths between 0.20m and >2.40m bgl (80.81m to 79.10m aOD). The base of Made Ground was not confirmed at locations WS201, WS202, WS203 and WS205 at depths of between 1.53m and 2.40m bgl due to refusals on concrete obstructions.

Made Ground was heterogeneous in nature and comprised brown, slightly clayey, slightly silty sandy GRAVEL or gravelly SAND, with inclusions of wood, plastic, bitumen, and glass. Sand was fine to coarse. Gravel was angular to subrounded fine to coarse brick, concrete and tarmac. Low to medium cobbles content of brick and concrete was recorded in the stratum.

Bituminous hardstanding and concrete surfaces up to 0.40m thick were recorded at the top of Made Ground. Refusal due to concrete obstruction was encountered within the Made Ground in WS108 and WS203.

4.3 Made Ground – Reworked Natural

A Reworked Natural stratum was encountered below Made Ground within boreholes CP102, CP103, CP104, WS103, WS104, WS108, WS109, WS204, WS206 and WS207, to a maximum variable depth of between 1.00m and 3.20m bgl (79.58m to 77.98m aOD).

The Reworked Natural material was heterogeneous in nature but generally comprised brownish greyish white slightly clayey silty SAND with rare inclusions of wire and wood. Sand was fine to coarse grained. Gravel was

angular to sub-rounded fine to coarse chalk, brick, and concrete. Low cobble content of concrete was noted locally.

Refusal due to an obstruction was encountered within the Reworked Natural material in CP103.

4.4 Glaciofluvial Deposits

The Glaciofluvial Deposits were encountered only locally in boreholes CP101, WS103, and WS104 to a maximum depth of between 1.80m and 2.30m bgl (79.04m to 78.26m aOD).

The Glaciofluvial Deposits comprised orangeish brown slightly gravelly very silty SAND. Sand was fine to coarse grained. Gravel was angular to rounded, fine to medium size comprising chert and flint.

4.5 Holywell Nodular Chalk and New Pit Chalk Formation

The Holywell Nodular Chalk and New Pit Chalk Formation were encountered in all of the exploratory holes, with the exception of WS108, CP103, WS201, WS202, WS203, and WS205, which terminated early due to obstructions. Chalk was encountered to a maximum proven depth of 17.00m bgl (63.84m aOD).

The Holywell Nodular Chalk and New Pit Chalk Formation comprised structureless Chalk composed of cream with rare orange staining, slightly gravelly sandy clayey SILT. Gravel was very weak to weak, low to medium density, white and subangular to subrounded with occasional black speckling. The Chalk encountered has been interpreted to correspond to CIRIA Grade Dm. The stratum was locally recorded as CIRIA Grade Dc.

4.6 Groundwater

No groundwater was encountered during this phase of ground investigation and subsequent monitoring.

During the previous ground investigation a groundwater strike was confirmed at 18.90m bgl in one location (BH101). During subsequent monitoring, groundwater was measured resting between 19.07m bgl (BH103) and 24.80m bgl (BH102). Further, groundwater monitoring found resting levels at depths ranging from 19.07m bgl to 24.23m bgl, within chalk.

According to the monitoring data, groundwater is anticipated within the Holywell Nodular Chalk and New Pit Chalk Formation, at depths generally greater than 18-19m bgl. The local presence of perched groundwater within the Made Ground, although not encountered during the ground investigation cannot be ruled out.

The groundwater monitoring data collected during this phase of ground investigation, are presented in Annex D.

4.7 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of contamination was encountered during the ground investigation.

5.0 Geotechnical Assessment

This following geotechnical assessment considers data obtained from both phases of TRC investigation.

5.1 Strata Properties

5.1.1 Made Ground

The Made Ground was heterogeneous in nature but generally comprised brown, slightly clayey / slightly silty sandy GRAVEL or gravelly SAND, with inclusions of wood, plastic, bitumen, and glass. Sand was fine to coarse. Gravel was angular to subrounded fine to coarse brick, concrete and tarmac. Low to medium cobbles content of brick and concrete was recorded in the stratum.

Two SPTs conducted in the Made Ground, yielded N_{60} values ranging between 9 and 20.

Five particle size distribution tests undertaken on samples of the Made Ground recorded 0% to 12% cobbles, 22% to 77% gravel, 12% to 22% sand and 4% to 62% clay/silt. These results indicate the variable nature of the stratum. Particle size distribution results are presented per stratum as Figure 6, Annex A.

5.1.2 Made Ground – Reworked Natural

The Reworked Natural was heterogeneous in nature but generally comprised brownish greyish white slightly clayey silty SAND with rare inclusions of wire and wood. Sand was fine to coarse grained. Gravel was angular to sub-rounded fine to coarse chalk, brick, and concrete. Low cobble content of concrete was noted locally.

Six SPTs conducted in the Reworked Natural, yielded N_{60} values ranging between 15 and 37.

Four particle size distribution tests undertaken on samples of the Reworked Natural recorded 0% to 21% cobbles, 39% to 65% gravel, 10% to 25% sand and 14% to 36% clay/silt. These results indicate the generally granular nature of the stratum, albeit with a variable clay content. Particle size distribution results are presented per stratum as Figure 6, Annex A.

5.1.3 Glaciofluvial Deposits

The Glaciofluvial Deposits comprised orangeish brown slightly gravelly very silty SAND. Sand was fine to coarse grained. Gravel was angular to rounded, fine to medium size, consisting of chert and flint.

One SPT was conducted in the Glaciofluvial Deposits, yielding an N_{60} value of 18, indicating the medium dense nature of the material.

One particle size distribution test undertaken on a sample of the Glaciofluvial Deposits recorded 0% cobbles, 10% gravel, 62% sand, and 28% clay/silt, indicating the granular nature of the stratum. Particle size distribution results are presented per stratum as Figure 6, Annex A.

5.1.4 Holywell Nodular Chalk and New Pit Chalk Formation

The Holywell Nodular Chalk and New Pit Chalk Formation comprised structureless CHALK composed of cream with rare orange staining, slightly gravelly sandy clayey SILT. Gravel was very weak to weak, low to medium density, white and subangular to subrounded with occasional black speckling (CIRIA Grade Dm and locally Grade Dc).

65 No. SPTs conducted in the Holywell Nodular Chalk and New Pit Chalk Formation, yielded N_{60} values ranging between 6 and 51, indicating the variable strength of the stratum.

Eleven moisture content tests undertaken on samples of the Holywell Nodular Chalk and New Pit Chalk Formation recorded values in the range of 22.3% to 31.8%. Moisture content results are plotted against depth in Figure 8, Annex A.

Four saturated moisture content of chalk tests undertaken on samples of the Holywell Nodular Chalk and New Pit Chalk Formation recorded saturated moisture content values of 28% to 31% and porosity values of 43% to 46%. These results are indicative of low density chalk.

Seven Atterberg limits tests undertaken on samples of the Holywell Nodular Chalk and New Pit Chalk Formation recorded values in the range of 24% to 30% for the liquid limit, 20% to 25% for the plastic limit, and 4% to 8% for the plasticity index. The modified plasticity index was 1.4% to 7%. The results indicate that the Holywell Nodular Chalk and New Pit Chalk Formation is of low plasticity and of negligible volume change potential (VCP) in accordance with NHBC Standards. Desiccation could theoretically exist at the Site, given the dense vegetation present, however, the water content and Atterberg limits tests undertaken do not suggest that a moisture content deficit exists at the Site. Plasticity results are presented in Figure 7, Annex A.

Table 5.1: Summary of Ground Parameters for Holywell Nodular Chalk and New Pit Chalk Formation

Soil Parameters	Number of Tests	Range of Results	Characteristic Value ¹
Liquid Limit (%)	5	24-30	27
Plastic Limit (%)	5	20-25	22
Plasticity Index (%)	5	4-8	7
Modified Plasticity Index (%)	5	1-7	7
Plasticity	5	ML	ML
Volume Change Potential (NHBC)	5	Negligible	Negligible
Moisture Content (%)	9	23-32	-
Saturation Moisture Content (%)	4	28-31	-
Porosity (%)	4	43-46	44
SPT N ₆₀ Values	65	6-51	Depth dependent - Refer to Figure 5 in Annex A

1. Cautious estimate

5.2 Buried Concrete

14 No. soil samples, comprising nine from the Made Ground, five from the Reworked Natural, and eight from the Holywell Nodular Chalk and New Pit Chalk Formation were subjected to pH and water soluble sulphate determinations.

The characteristic value of water soluble sulphate was 405mg/l for Made Ground, 240mg/l for Reworked Natural, and 278mg/l for the Holywell Nodular Chalk and New Pit Chalk Formation.

Nine soil samples of Made Ground and two of reworked natural material, were subjected to total sulphur and acid soluble sulphate content testing to allow an assessment to be made in relation to the potential thaumasite form of concrete attack. None of the oxidisable sulphides values calculated for Made Ground were in excess of 0.3%. Consequently, the results are not considered indicative of significant risk from this form of concrete attack. A modification to DS class is therefore not proposed for the Made Ground.

The characteristic value of pH was 8.3 for Made Ground, 9.0 for Reworked Natural, and 7.5 for the Holywell Nodular Chalk and New Pit Chalk Formation.

Overall, with reference to the BRE Digest SD1 (2005), and considering the results of soil samples, a design sulphate class of DS-1 and an ACEC class of AC-1s is appropriate for Made Ground and Reworked Natural, DS-1

and AC-1s is appropriate for the Holywell Nodular Chalk and New Pit Chalk Formation up to a maximum depth of 18m.

Static groundwater and brownfield conditions have been considered in this assessment in accordance with the ground investigation findings.

5.3 Dissolution Features Assessment

At the time of the investigation and during the Site walkover no ground depressions or subsidence or any other feature was observed at the ground surface to indicate the presence of any voids or dissolution features at depth.

The Envirocheck database report attached in TRC's Tier 1 report, indicated 'very low' hazard for ground dissolution at the Site and recorded no natural cavities within the vicinity of the Site.

During both rounds of ground investigation SPT N_{60} values in chalk were consistently recorded to be 6 or greater (up to 50), while no voids or infill materials were recorded in chalk which would be indicative of potential dissolution features. Also, localised "no recoveries" recorded in the exploratory hole logs during the previous ground investigation phase, most likely reflect failure to retrieve samples during rotary coring rather than voids, as the majority of in-situ testing (SPT) provided evidence that no voids were present at the same depths.

In this context, the dissolution features risk on-site within the Holywell Nodular Chalk and New Pit Chalk Formation, is considered to be low to negligible.

6.0 Geotechnical Recommendations

6.1 General

It is proposed to develop the Site for commercial / industrial end use consisting of two buildings comprising three units with associated hard standings and soft landscaping. Current proposals are indicated in Figure 2 in Annex A.

Details of the proposed structures, anticipated loadings and serviceability criteria were under development at the time of writing of this report, which is based on a preliminary investigation. Further investigation will be required post-demolition in areas currently restricted by the existing buildings, and once proposals are fully developed; a detailed Geotechnical Design Report may need to be prepared.

The primary purpose of this report is to identify risk, allow design development and inform cost estimates. This report does not constitute a detailed design report for the proposed development.

According to the latest proposed cut and fill plan ("Proposed Earthwork Plan", Burrows Graham Limited, drawing ref. 40365-BGL-XX-XX-DR-C-00201, rev.P01, 04/04/2025), attached in Figure 4 in Annex A, a maximum cut of circa 1.2m totalling 1,985 m³, and a maximum fill of about 1m totalling 4,176m³, is proposed across the Site.

6.2 Geotechnical Hazards

The previous reports and the current ground investigation have identified a number of geotechnical hazards at the Site which relate to the proposed development. These are summarised below and are discussed in more detail in the following sections along with mitigation measures where appropriate.

- Made Ground, including the Reworked Natural stratum, was recorded to a maximum depth of 3.20m bgl.;
- Buried obstructions, such as old foundations and slabs, cobbles and boulders in the Made Ground and the Reworked Natural, and flints in Chalk;
- Low CIRIA Grade Dm chalk recorded to depths of at least 17m bgl; and,
- Potential unrecorded chalk dissolution features in areas inaccessible during the investigation, albeit the risk appears to be low to negligible, based on available ground investigation data.

6.3 Foundations

As described in section 4, the Site is underlain by Made Ground (includes the Reworked Natural stratum) to a recorded maximum depth of 3.20m bgl over the Holywell Nodular Chalk and New Pit Chalk Formations to at least 30m depth. Glaciofluvial Deposits were only locally recorded below Made Ground, to a maximum depth of 2.30m bgl.

The Made Ground and Reworked Natural strata, unless treated to an appropriate specification, they are not considered competent foundation strata due to their lithological variability and poor engineering properties.

Further, relatively low SPT N60 values (<10) were encountered in a number of locations within the Holywell Nodular Chalk and New Pit Chalk Formation within the top 4m-5m bgl, therefore shallow foundations within chalk would not be feasible for the proposed structures.

In this context, a ground improvement solution could be considered, as discussed in the following section.

It is understood that a piling foundation solution, although feasible, would neither be cost-effective nor preferred by the Client, and therefore it is not discussed further in this report.

The minimum distances of any foundations and structures from proposed soakaways on-Site, as discussed in section 6.9 below, should be adhered to.

6.4 Ground Improvement

Ground improvement may enable shallow foundations to be used for the proposed structures. The advice of reputable specialist contractors experienced in the ground conditions discussed in this report should be sought. They should be responsible for the selection of appropriate equipment and the final design of the treatment.

Given the low to negligible dissolution features risk, the Site is considered likely to be amenable to treatment by the formation of vibro stone columns (VSC) to at least 5-6m depth targeting the Made Ground, Reworked Natural, and Glaciofluvial Deposits and the upper weathered layers of the Holywell Nodular Chalk and New Pit Chalk Formation. Upon treatment it should be possible to construct shallow foundations on top of VSCs with allowable bearing capacities between 125-150kN/m² or more, subject to confirmation by a specialist contractor.

The presence of obstructions including existing foundations and slabs, cobbles and boulders within the Made Ground and Reworked Natural, and flints in Chalk, should be considered in the selection of the most appropriate equipment and treatment method.

Enabling works for the removal of the slabs and concrete obstructions encountered during the ground investigation in a number of locations across the Site, will be required prior to undertaking any ground improvement works.

Some limited asbestos contamination has been encountered in the Made Ground, as discussed in section 7. This may have particular implications for the use of VSCs as the vibro-poker uses compressed air and so particular control measures or prior remediation will be required, which may make this option less economic. However, additional ground investigation by way of trial pitting may enable such matters to be reconsidered.

Regions of relatively deep Made Ground and Reworked Natural strata were observed to a maximum depth of 3.20m. Given the largely granular nature of these materials, the application of Rolling Dynamic Compaction (RDC) or Rapid Impact Compaction (RIC) or High Energy Impact Compaction (HEIC) or a similar technique could be considered in order to improve the Made Ground and the Reworked Natural strata to enable a ground bearing floor slab solution for the proposed scheme. Again, a specialist subcontractor should confirm the feasibility of any such technique after a thorough review of the ground investigation results and assessment presented in this report.

Should any form of penetrative ground improvement toe into the chalk or penetrate it, the potential for downward migration of mobile contaminants would need to be considered.

Consequently, a risk assessment would be required to determine the risk posed. In relation to such matters reference should be made to the Environment Agency's guidance document 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination' (2025).

6.5 Floor Slabs

Use of ground-bearing floor slabs following an appropriate (RDC, RIC, HEIC or similar, with VSC worst-case) ground improvement technique, as discussed in the previous section, is likely to be the most cost-effective solution for the proposed floor slabs, provided that the required settlement tolerances can be achieved. Advice from a specialist ground treatment contractor should be sought once the required floor loadings and settlement tolerances are known.

For a ground-bearing floor slab, the load bearing formation should be carefully inspected to ensure placement of the floor slab on competent strata. The formation should be proof rolled and any soft spots removed and replaced with compacted fill to an appropriate specification.

Based on the ground investigation findings, chalk could be as shallow as 0.20m bgl. As such, the ground-floor slabs and door thresholds of unheated, poorly insulated buildings, such as garages and outhouses with single

brick or similar outer walls, or any buildings where doors or windows may be left open in freezing weather, should not be founded directly on chalk or chalk filling, particularly where the outer walls are founded more deeply. A layer of well-compacted, free-draining material at least 300mm thick, should be placed between the underside of the concrete floor slab and the chalk or chalk filling beneath.

Ground-floor slabs of heated, well-insulated buildings under construction may be founded directly on chalk, or chalk filling. As soon as the mean daily air temperature is below freezing for more than five consecutive days, the slabs should be covered completely with a temporary layer of dry insulating material, dry hay or straw, at least 150 mm thick, secured in place with a waterproof sheeting to prevent the insulation from becoming saturated with precipitation or being blown away. Alternatively, the buildings should be closed and glazed within one additional day.

6.6 Excavations

Excavations for any shallow foundations, floor slabs, and laying services should be readily achievable using standard excavation plant. However, hard surfacing, old foundations and slabs, relict basement construction and the like, will require the use of breaking apparatus.

For any load bearing formations, careful inspection should be undertaken to ensure placement in competent natural strata unless ground treatment has been carried out and properly validated. Any soft spots identified should be excavated and replaced with compacted granular fill or lean mix concrete. Concrete should be placed as soon as possible following excavation to avoid softening of the ground. A similar recommendation is also made for road pavement formations, although compacted granular fill could be used instead of concrete.

Any relic foundations or other subterranean structures beneath the footprint of the proposed buildings should be fully grubbed out. Such excavations should be surveyed and backfilled with an acceptable granular fill, placed and compacted to an engineering specification. The same recommendations are made for excavations that may be required to remove soil contamination.

It may be impractical to remove some obstructions, such as former travelling crane foundations etc., beneath engineered fill. These should be adequately surveyed, and their locations accurately recorded. In this case, any retained relic structure or obstructions should be a minimum of 2m beneath the underside of proposed building foundations.

In areas of road pavements and hardstanding, relic subterranean structures should be broken down to around 1m below finished Site level to minimise the risk of differential settlement due to the presence of hard spots. In soft landscaped areas it may be possible to limit such operations to 0.50m bgl.

Stability of excavation faces in Made Ground, Reworked Natural, and Glaciofluvial Deposits cannot be relied on and allowance should be made for battering faces back to a safe angle of repose, or providing shuttering. Support or battering of the excavation faces to a safe angle of repose will be required for all excavations where man entry is necessary, the nature and extent of which will need to be evaluated under CDM regulations.

Dry ground conditions are anticipated during shallow excavations for conventional foundations and services. The contractor should consider the impact of weather and potential for rainwater and surface run-off to accumulate within excavations.

6.7 Pavements

Due to the variable thickness of the Made Ground and Reworked Natural soils which may create settlement issues at the Site, pavement surfaces should be constructed in flexible materials such as bituminous compounds or block paving which are more easily able to accommodate ground movement and can be more easily repaired. Heavily loaded areas such as concrete yards and loading areas where less ground settlement can be tolerated, could be constructed on previously treated ground and / or reinforced subbase with geogrids / geotextiles to satisfy design criteria.

It is recommended that any fill proposed is placed and compacted in accordance with a suitable specification based on the Specification for Highway Works (SHW 600 series). The formation level should be rolled and inspected for any soft or loose material. These materials should be removed and replaced with granular fill placed and compacted in accordance with a suitable specification.

Assuming excavation formation soils will comprise Made Ground, an equilibrium CBR value of 3% is recommended for preliminary design purposes, based on a qualitative assessment and the findings of the ground investigation.

In-situ CBR testing at formation level prior to construction is recommended to confirm the design CBR values adopted.

Chalk is a frost-susceptible material, so a minimum pavement construction thickness of 0.45m (including sub-base) must be adopted for any pavement laid onto it.

6.8 Buried Concrete

In the consideration of sulphate attack on buried concrete, reference has been made to BRE Digest SD1 (2005) which classifies the Site as a brownfield site with mobile groundwater conditions. Additionally, as Made Ground can be pyrite bearing, it has also been necessary to assess the potential for the thaumasite form of attack. Oxidisable sulphides values calculated for Made Ground were below 0.3% therefore a modification to DS class is not proposed for this stratum.

Overall, with reference to the BRE Digest SD1 (2005), and considering the results of soil samples, DS-1 and ACEC AC-1s are appropriate for any buried concrete within Made Ground, Reworked Natural, and Holywell Nodular Chalk and New Pit Chalk Formation up to a maximum depth of 18m.

6.9 Soakaway Potential

Soakaway testing did not form part of the scope of works, however, given the ground water level in the Holywell Nodular Chalk Formation and New Pit Chalk Formation is present at 18-19m bgl, shallow soakaways in chalk may be viable for future developments, subject to confirmation of ground infiltration rates via in-situ testing in accordance with BRE 365.

Based on CIRIA C574 report recommendations, concentrated ingress of water into the chalk can initiate dissolution features, particularly in low-density chalk, and destabilise the loose backfill of existing ones. For this reason, any soakaways should be sited well away from foundations for structures, roads or railways.

Based on the presence of low density Chalk, the closest part of any soakaway should not be within 10m from any foundation.

As the Chalk is a Principal Aquifer, the Environment Agency and local authority must be consulted when planning soakaway installations where chalk lies below the Site, even where it is mantled with superficial deposits.

6.10 Recommendations for Further Work

Further work may be required to quantify the risks and allow detailed design. Confirmation of ground infiltration rates in chalk via in-situ testing in accordance with BRE 365 should be considered if shallow soakaways are proposed.

Early consultation with a specialist ground improvement contractor is recommended to confirm the feasibility of ground improvement techniques discussed in this report. The ground investigation results and assessment presented in this report should be made available for an informed decision.

7.0 Human Health Risk Assessment

7.1 Soil Assessment

In order to appraise the significance of the concentrations reported by laboratory testing, TRC has assessed each contaminant species that is elevated above the laboratory method detection limits (MDL) against published screening criteria referred to as Generic Assessment Criteria (GAC). GACs are derived from the following reference material:

- Land Quality Management Limited and Chartered Institute of Environmental Health (November 2014), the LQM/CIEH S4ULs for Human Health Risk Assessment. Document reference: S4UL3435;
- Development of Category 4 Screening Levels for assessment of land affected by contamination – SP1010 (September 2014);
- LQM S4ULs: evaluation of 2017USEPA Toxicological Review of Benzo(a)pyrene; and,
- LQM/CIEH S4ULs for Nickel according to land use (Revised August 2015).

TRC has selected GAC commercial, based on the proposed development comprising a commercial/industrial end use.

A conservative value of 1% of soil organic matter (SOM) has been assumed based on the soil type.

A summary of the laboratory data and the relevant GACs is presented in Annex G.

7.2 Heavy Metals

Minor concentrations of heavy metals were detected in soil samples (both Made Ground and natural soils). None of the concentrations exceeded the GACs.

7.3 Hydrocarbons

Minor concentrations of hydrocarbons were detected in soil samples (both Made Ground and natural soils). None of the concentrations exceed the GACs.

7.4 Chlorinated Solvents

Chlorinated solvents were not detected in any of the Made Ground soil samples where it was analysed.

7.4 PFAS

PFAS were not detected in any of the four Made Ground soil samples where they were analysed.

7.4 Asbestos

Asbestos fibres in soil were encountered within two samples of the 10 analysed in the Made Ground. The samples containing asbestos were found to contain chrysotile and amosite in soil. Asbestos quantification was undertaken on these samples and identified a maximum concentration of 0.003% fibres in soil.

Asbestos fragments were not identified within the building footprint.

7.5 Discussion

Asbestos in soil was identified within two samples within Made Ground. Asbestos quantifications were found to be between 0.002% and 0.003%.

Given the shallow location of the asbestos impacted materials, there is a potential risk to future site users and future construction workers.

The proposed development will largely be covered in hardstanding and buildings which will act as a physical barrier between asbestos impacted materials and future site users. Any areas of soft landscaping should be capped with 300mm of clean cover with a geotextile membrane at the base to provide a barrier between future site users and the asbestos impacted materials.

Any works which have the potential to disturb asbestos must be undertaken in accordance with the Control of Asbestos Regulation (CAR) 2012. A risk assessment will need to be undertaken and a plan of work for dealing with risks from asbestos prepared and implemented by the Principal Contractor.

Hydrocarbons and heavy metals were identified within Made Ground and natural soils however none exceeded the GACs for a commercial end use.

There is considered to be a low risk from soils on the Site to the proposed development and future site users assuming that clean cover is constructed across all areas of soft landscaping.

8.0 Controlled Waters Risk Assessment

In order to appraise the significance of the soil leachate concentrations recorded, TRC has assessed each contaminant species that is elevated above the laboratory limit of detection (LOD) against the following published guidance values:

- Drinking Water Standards England and Wales (2000) (amended);
- Environmental Quality Standards (EQS) for freshwater; and,
- World Health Organisation (WHO) Guidelines.

Groundwater sampling could not be undertaken due to the monitoring wells being dry on all four occasions. In lieu of groundwater analysis, leachate derived from soil samples have been analysed.

8.1 Groundwater Risk Assessment

The laboratory analysis reported elevated concentrations of naphthalene and phenanthrene exceeding the UK DWS in one (CP104) of the three soil leachate samples collected. The exceedances are summarised in the below table.

Table 8.1: Summary of Groundwater Exceedances

Contaminant	DWS (µg/l)	Maximum Concentration (µg/l)	Location of Maximum Concentration	No. of Exceedances
Naphthalene	0.1	0.75	CP104	1
Phenanthrene	0.1	0.12	CP104	1

The Site is underlain directly by the Holywell Nodular and New Pit Chalk Formation which are designated as high permeability deposits. These deposits are classified as a Principal Aquifer and are sensitive to contamination. The Site lies within a Zone 1 groundwater SPZ and is therefore considered to be sensitive to contamination.

There is one groundwater abstraction approximately 261m south of the Site.

8.2 Surface Water Assessment

The laboratory analysis reported elevated concentrations of copper and mercury exceeding the EQS in the three soil leachate samples collected. The exceedances are summarised in the below table.

Table 8.2: Summary of Groundwater Exceedances

Contaminant	EQS (µg/l)	Maximum Concentration (µg/l)	Location of Maximum Concentration	No. of Exceedances
Copper	1.0	12	CP102	3
Mercury	0.07	0.6	CP101	1

The nearest surface water feature is a small pond (Western Lake) located 38m northwest of the Site. Western Lake sits above the level of the Site and considering that groundwater is circa 19m bgl, Western Lake is unlikely to be in hydraulic continuity with groundwater beneath the Site.

8.3 Discussion

Concentrations of naphthalene and phenanthrene were found to exceed the DWS, and concentrations of copper and mercury were found to exceed the EQS; however, the exceedances are considered to be relatively marginal.

The exceedances are all identified within Made Ground.

Based on the findings of this assessment, there is no evidence to suggest significant or widespread contamination, as no soil source of contamination has been identified.

9.0 Ground Gas and Organic Vapour Risk Assessment

A preliminary ground gas risk assessment has been undertaken in accordance with British Standard BS 8485:2015+A1:2019 to assess the impact of permanent ground gases upon the proposed development.

9.1 Ground Gas Assessment

Field monitoring for permanent ground gases was performed at six monitoring well locations on four occasions on the 25th March, 2nd April, 11th April, and 16th April 2025. The maximum concentrations are summarised in the table below and the complete monitoring data are provided within Annex D.

Table 9.1: Summary of Gas Monitoring Results

Location	Maximum Methane Concentration (%v/v)	Maximum Carbon Dioxide Concentration (%v/v)	Minimum Oxygen Concentration (%v/v)	Maximum Flow Rate (l/hr)
CP101	0.1	1.4	17.6	<0.1
CP102	0.1	0.9	19.5	<0.1
CP104	0.1	0.2	19.8	<0.1
WS102	0.1	0.4	19.9	<0.1
WS103	0.1	0.1	19.5	<0.1
WS104	0.1	1.1	18.3	<0.1

Methane was detected in all of the monitoring wells during one monitoring visit as a maximum concentration of 0.1%.

Carbon dioxide was detected in all of the monitoring wells with maximum concentrations ranging from 0.1% to 1.4%.

Oxygen concentrations were depleted in the monitoring wells and was noted to correlate to higher carbon dioxide concentrations in these monitoring wells.

No flow was detected in any of the monitoring wells during monitoring. On the first and final monitoring round, the pressure trend was rising, and on the second and third monitoring round, the pressure trend was falling.

TRC has assessed the permanent ground gas concentrations in accordance with current guidance (BS8485:2015). Based on the results, a gas screening value (GSV) of 0.0001 l/hr was calculated for methane and a GSV of 0.0014 l/hr was calculated for carbon dioxide, which would classify the Site as Characteristic Situation 1 (very low risk).

Based on the results, it is considered that ground gas protection may not be required at the proposed development.

9.2 Organic Vapour from Soil Assessment

For hydrocarbons and other VOCs, the LQM S4ULs are considered to be protective of human health from indoor inhalation of organic vapour. Based on the results presented in section 7, there were no exceedances of volatile contaminants.

Ground gas monitoring did not detect PID readings above the method detection limit. The results are consistent with the results of the soil analysis.

Organic vapour protection measures are not considered to be required.

9.3 Organic Vapour from Soil Leachate Assessment

In order to appraise the significance of volatile substances in soil leachates to human health, TRC has assessed each contaminant species that is elevated above the laboratory LOD against the following published guidance values:

- SoBRA, Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater, Version 1 (2017).

There are no exceedances of the SoBRA GAC.

Organic vapour protection measures are not considered to be required.

9.4 Discussion

The presence of Made Ground related to previous development at the Site is a potential source of ground gas generation.

TRC has assessed a gas screening value (GSV) of 0.0001 l/hr for methane and a GSV of 0.0014 l/hr for carbon dioxide, which would classify the Site as Characteristic Situation 1 (very low risk).

Based on the results, it is considered that ground gas protection may not be required at the proposed development.

10.0 Contaminated Land Risk Assessment

The methodology of this risk assessment uses the source-pathway-receptor pollutant linkage to provide a qualitative appraisal of environmental risks and potential liabilities associated with soil and groundwater contamination at the Site. The conceptual site model (CSM) has been prepared considering the proposed end use as a commercial end use.

10.1 Sources of Contamination

The ground investigation performed at the Site by TRC identified the following sources of contamination:

- Asbestos fibres in Made Ground
- Concentrations of copper and mercury in excess of EQS in soil leachate
- Concentrations of naphthalene and phenanthrene in excess of DWS in soil leachate

10.2 Pathways

Based on the information presented in this report the following potentially active pathways have been identified.

- Dermal contact or ingestion with soil and groundwater
- Inhalation of soil dust or respirable fibres of asbestos
- Surface runoff
- Leaching of contaminants and vertical migration into groundwater
- Lateral migration of contaminants in groundwater
- Contact with buried services

10.3 Receptors

Based on the information presented in this report the following receptors have been identified.

- Future site users could come into contact with soil contamination in areas of soft landscaping or with ground gas/organic vapour in indoor and/or outdoor air
- Neighbouring site users could come into contact with contaminated soil dust
- Construction and maintenance workers could be exposed to contamination during groundworks and future maintenance works
- Construction materials could come into contact with contamination in the ground
- Groundwater – the Site is underlain by a Principal Aquifer

10.4 Revised Conceptual Site Model

The following CSM has been prepared to take into consideration the findings from the intrusive investigation.

Table 10.1: Revised Conceptual Site Model

Source	Pathway	Receptor	Risk
Asbestos fibres in Made Ground	Inhalation pathways	Future site users	Moderate Asbestos in soil was identified in two locations of 10 which were tested. It is unlikely that asbestos will present a significant risk to human health within the future development scenario, as buildings and hardstanding will

Source	Pathway	Receptor	Risk
			provide a physical barrier against contact with contaminants. In areas of soft landscaping, the areas must be appropriately managed via an appropriate capping layer (300mm clean cover with a geotextile membrane at the base).
		Neighbouring site users	Low to moderate Neighbouring site users could be exposed to respirable fibres of asbestos, particularly during the construction phase. Any works which may disturb asbestos must be undertaken in accordance with the Control of Asbestos Regulations (CAR) 2012 and a Plan of Work will be required to manage risks from asbestos. Clean must also be constructed across areas of soft landscaping.
		Construction and maintenance workers	Moderate Risk pathway to be mitigated via Personal Protective Equipment (PPE), good hygiene practices and construction site management. Any works which may disturb asbestos must be undertaken in accordance with the Control of Asbestos Regulations (CAR) 2012 and a Plan of Work will be required to manage risks from asbestos.
Copper and mercury in excess of EQS Naphthalene and phenanthrene in excess of DWS	Leaching of contaminants and vertical migration into groundwater	Groundwater (Principal Aquifer in bedrock deposits)	Low The Made Ground is underlain by the Holywell Nodular and New Pit Chalk Formation, which are designated as Principal Aquifers and are unconfined. Therefore, the bedrock is considered sensitive to contamination. Considering that leachate exceedances were recorded in only one sample of three tested, that only a thin layer of Made Ground was present across the Site, that groundwater is greater than 18-19m bgl, and that infiltration will be limited by the presence of buildings and hardstanding across the majority of the Site, the risk from soil

Source	Pathway	Receptor	Risk
			leachates to the groundwater is considered to be low.
	Lateral migration in groundwater/surface runoff	Surface water (Western Lake)	Low The Site is directly underlain by a Principal Aquifer from the Holywell Nodular and New Pit Chalk Formation; however, the nearest surface water feature is a small pond (Western Lake) located 38m northwest of the Site, which sits above the level of the Site. Therefore, Western Lake is unlikely to be in hydraulic continuity with groundwater beneath the Site.

11.0 Summary and Conclusions

11.1 Findings

At the time of writing this assessment, the Site comprises a large, vacant single storey data centre, with several extensions, located to the east of Avenue One. There is a car park in the north-eastern portion of the Site and soft landscaping around the perimeter and in the south-eastern portion of the Site. An electricity substation was identified in the northern portion of the Site. At the time of writing this assessment, demolition contractors had recently completed the decommissioning and removal of the interior walls and equipment within the Site building.

From earliest available mapping (1880), the Site comprised agricultural fields. In the 1930s the Site is part of larger sports fields. By the 1960s, infrastructure associated with the adjacent “Metal Works” and tank overlaps within the Site boundary. By the early 1980s, the Site was redeveloped to contain two new buildings and associated tanks. By the late 1980s and early 1990s, the Site was redeveloped again to a data centre with offices and an associated car park, reflecting its current land use.

During TRC’s investigations, Made Ground was encountered from ground level to 0.80m bgl, overlying Reworked Natural strata to a recorded maximum depth of 3.20m bgl, overlying Glaciofluvial Deposits locally present to 2.30m bgl, overlying the Holywell Nodular and New Pit Chalk Formation to a maximum proven depth of 17.00m bgl. A previous ground investigation recorded similar ground conditions.

Groundwater was not encountered during the TRC investigations to at least 17m depth. Groundwater was recorded in a previous investigation greater than 18-19m bgl.

11.2 Summary of Geotechnical Assessment

The primary purpose of this assessment is to identify geotechnical risk, allow design development and inform cost estimates. This report does not constitute a detailed geotechnical design report for the proposed development.

The previous report and ground investigation have identified a number of geotechnical hazards at the Site which relate to the proposed development. These are Made Ground and Reworked Natural strata locally recorded to depths of at least 3.20m bgl; buried obstructions, such as old foundations and slabs, cobbles and boulders in Made Ground and the Reworked Natural, and flints in chalk; low CIRIA grade Dm chalk recorded to depths of at least 17m bgl, and potential unrecorded chalk dissolution features in areas inaccessible during the investigation, albeit the risk appears to be low to negligible based on available ground investigation data. These geotechnical hazards are discussed in detail along with mitigation measures in section 6 of this report.

Shallow foundations will not be viable for the proposed structures due to the variable thickness of non-engineered Made Ground and Reworked Natural strata and the presence of less competent Holywell Nodular Chalk and New Pit Chalk Formation recorded during the ground investigation. Ground improvement is considered to be a cost-effective solution for this site. Vibrostone columns (VSC) could be considered to be constructed within the competent strata of the Holywell Nodular Chalk and New Pit Chalk Formation at depth. Upon treatment it should be possible to construct shallow foundations on top of the VSCs, subject to confirmation by a specialist contractor.

Details of the foundation options including allowable bearing pressures are discussed in sections 6.3 and 6.4.

Dynamic compaction methods such as the Rolling Dynamic Compaction (RDC), the Rapid Impact Compaction (RIC) or the High Energy Impact Compaction (HEIC) or similar technique, given the granular nature of shallow strata, could be considered that may enable a ground bearing floor slab solution for the proposed buildings. Confirmation by a specialist subcontractor will be required. Details are provided in section 6.5 of this report.

Recommendations about proposed excavations, classification for buried concrete design, and proposed pavements for the development are given in sections 6.6 to 6.8.

Soakaway testing did not form part of the scope of works, however, given the presence of deep groundwater at 18-19m bgl within the Holywell Nodular and Newpit Chalk Formation, shallow soakaways may be viable for future developments. Based on the presence of low density Chalk, the closest part of any soakaway should not be within 10m from any foundation. In addition, as the Chalk is a Principal Aquifer, the Environment Agency and local authority must be consulted when planning soakaway installations where chalk lies below the Site, even where it is mantled with superficial deposits.

Additional ground investigation work is discussed in section 6.10.

11.3 Summary of Contaminated Land Risk Assessment

11.3.1 Soil

There were no exceedances of the GAC in soils for the proposed commercial end use.

Asbestos fibres were identified within two samples of Made Ground (WS103 and WS104) from 10 which were tested. Asbestos quantification was undertaken on these samples and identified a concentration of 0.002% and 0.003% fibres in soil. The asbestos identified in the samples tested is considered to pose a moderate risk to future site users and future construction workers.

Mitigation measures must be included in areas of soft landscaping to provide a barrier between future site users and the asbestos impacted materials in the form of a 300mm clean cover layer with geotextile membrane at the base.

Any work which may disturb asbestos impacted materials during construction must be undertaken in accordance with the Control of Asbestos Regulations (CAR) 2012 and a Plan of Work will be required to manage risks from asbestos.

11.3.2 Soil Leachate

The Site is underlain by the Holywell Nodular and New Pit Chalk Formation and lies within a zone 1 groundwater SPZ. Groundwater is therefore sensitive to contamination.

Groundwater beneath the Site is not in hydraulic connection with surface water in the Western Lake due to Western Lake sitting higher in elevation than the Site. Therefore, surface water is not considered to be sensitive to contamination.

Concentrations of naphthalene and phenanthrene were found to exceed the DWS. Considering that leachate exceedances were recorded in only one sample of three tested, that only a thin layer of Made Ground was present across the Site, that groundwater is greater than 18-19m bgl, and that infiltration will be limited by the presence of buildings and hardstanding across the majority of the Site, the risk from soil leachates to the groundwater is considered to be low.

11.3.3 Ground Gas and Organic Vapour

Based on the results of this assessment the Site would be classified as Characteristic Situation 1, and no ground gas protection measures would be required for the proposed development.

Organic vapour protection measures are not considered to be required.

11.3.4 Remediation and Mitigation Measures

Based on the results of the generic risk assessments undertaken, the following remediation/mitigation measures are recommended:

- Construction of a clean cover layer across soft landscaped areas.
- Any works which have the potential to disturb asbestos must be undertaken in accordance with CAR 2012 and a Plan of Work will be required. An asbestos in soils management plan should be prepared to further assess risks associated with the asbestos in soils identified.

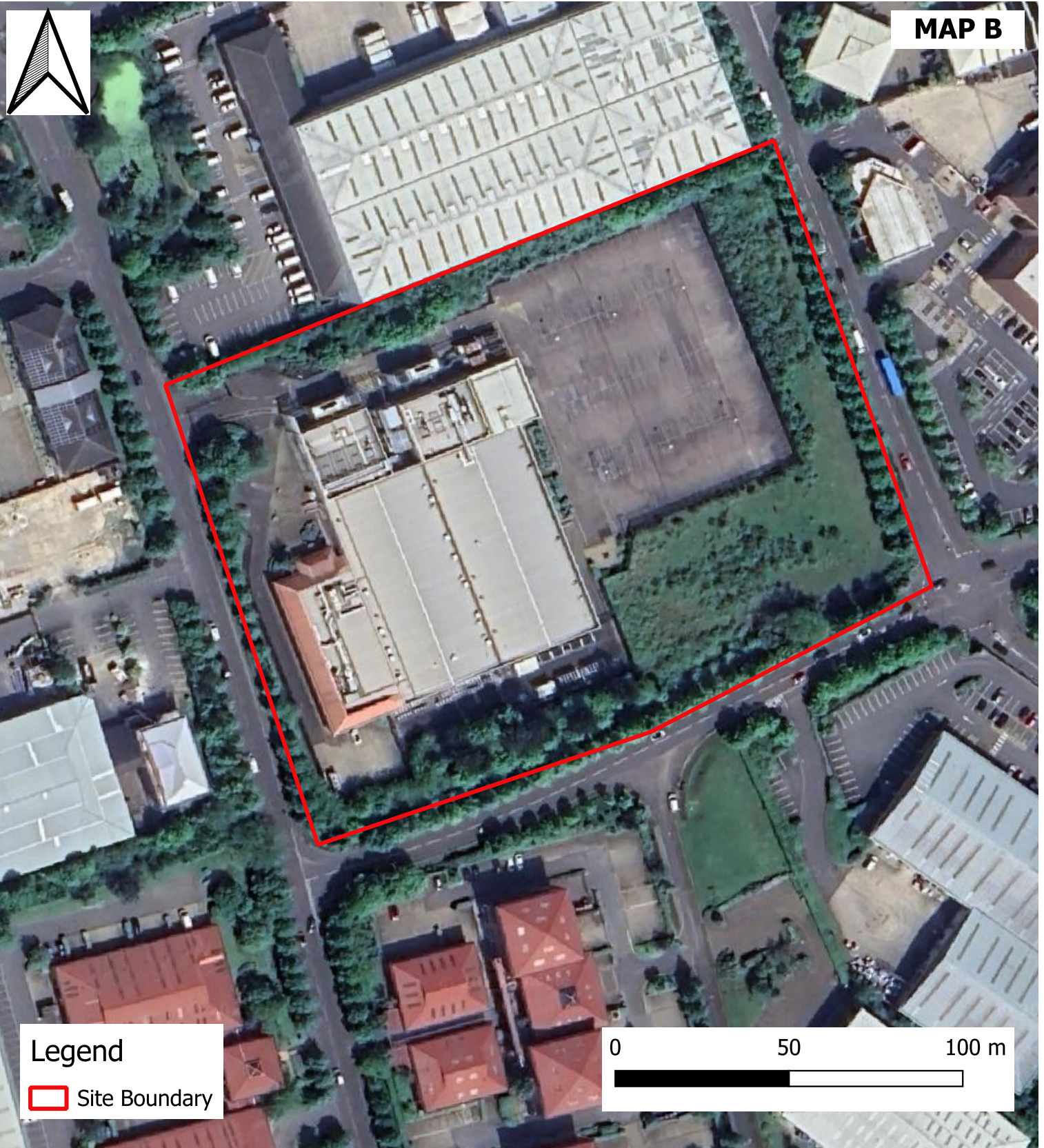
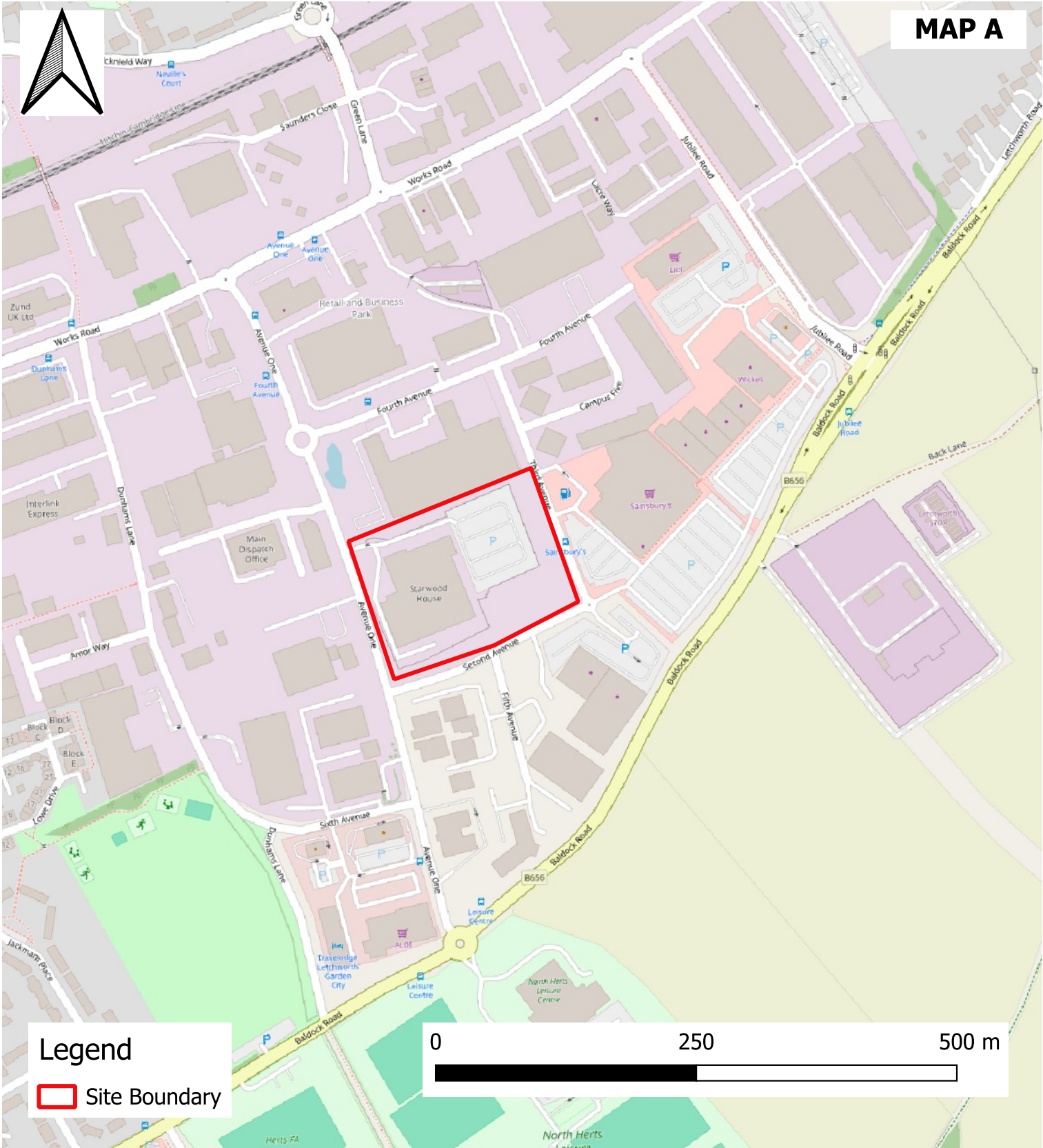
The selection of appropriate water supply pipework should be confirmed by the local water supply company.

A remediation strategy and verification plan is likely to be required by the local planning authority.

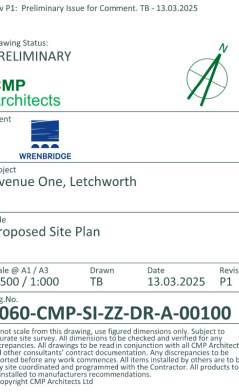
Materials destined for off-site disposal to landfill may require further assessment in accordance with WM3 'Guidance on the classification and assessment of waste' (1st edition version 1.2 GB 2021) to determine their waste classification.

If materials are to be re-used on site or imported from another development site, a materials management plan may be required in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice in order to demonstrate that the material is not a waste.

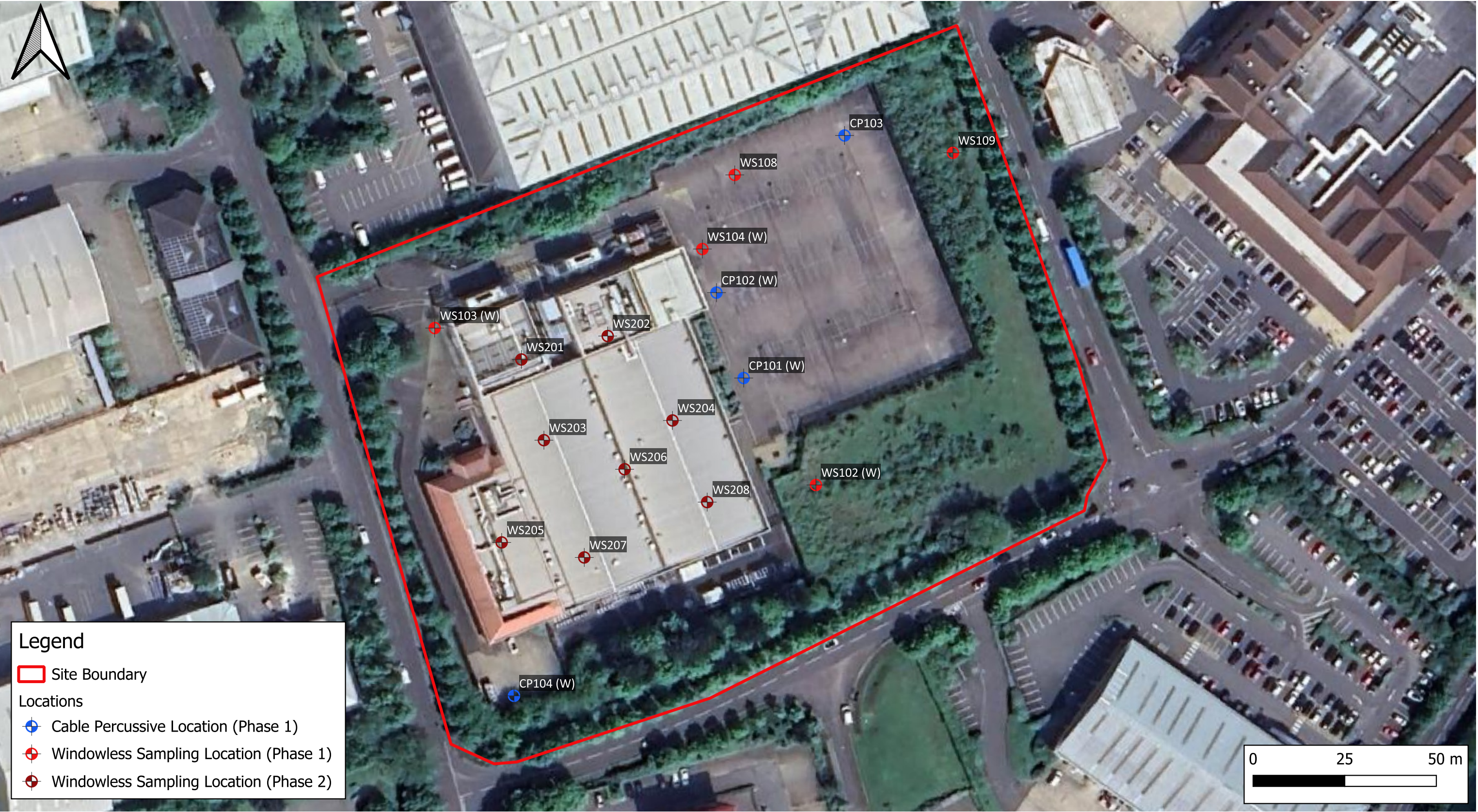
Annex A: Figures



NOTES	COPYRIGHT NOTES Google Imagery January 2025 © OpenStreetMap contributors - Data is available under the Open Database License. Cartography licensed as CC BY-SA.			REVISIONS				 Work.Life 20 Red Lion Street London WC1R 4PS		TITLE			
										SITE LOCATION PLAN			
										TRC PROJECT NO. 631621.0000.0000	SCALE MAP A: 1:5,000 @ A3 MAP B: 1:1,500 @ A3		
				P01		FIRST ISSUE		CLIENT LETCHWORTH INVESTMENT LLP		PURPOSE OF ISSUE		STATUS	
						Initials	KS			19/3/2025	SUITABLE FOR INFORMATION		
				REV.		REVISION NOTES/COMMENTS				PROJECT		DRAWING NO	
Initials									STARWOOD HOUSE, LETCHWORTH		FIGURE 01		



NOTES	COPYRIGHT NOTES	REVISIONS				TRC Work.Life 20 Red Lion Street London WC1R 4PS	TITLE		
							PROPOSED DEVELOPMENT PLAN		
							TRC PROJECT NO.	SCALE	
							631621.0000.0000	N/A	
		P01	FIRST ISSUE				CLIENT	PURPOSE OF ISSUE	
Initials	KS		19/3/2025		SUITABLE FOR INFORMATION				
REV.	REVISION NOTES/COMMENTS				PROJECT	DRAWING NO		REVISION	
	Initials					FIGURE 02			PO1



NOTES (W) = monitoring well installed at that location	COPYRIGHT NOTES Google Imagery January 2025			REVISIONS				TRC Work.Life 20 Red Lion Street London WC1R 4PS		TITLE EXPLORATORY HOLE LOCATION PLAN			
										TRC PROJECT NO. 680199.0000.0000		SCALE 1:1,000 @ A3	
										PURPOSE OF ISSUE SUITABLE FOR INFORMATION		STATUS	
										DRAWING NO 680199.0000.FIG03		REVISION PO1	
				P01	FIRST ISSUE				CLIENT LETCWORTH INVESTMENT LLP				
					Initials	LS	11/8/2025						
				REV.	REVISION NOTES/COMMENTS				PROJECT STARWOOD HOUSE, LETCWORTH				
					Initials								

