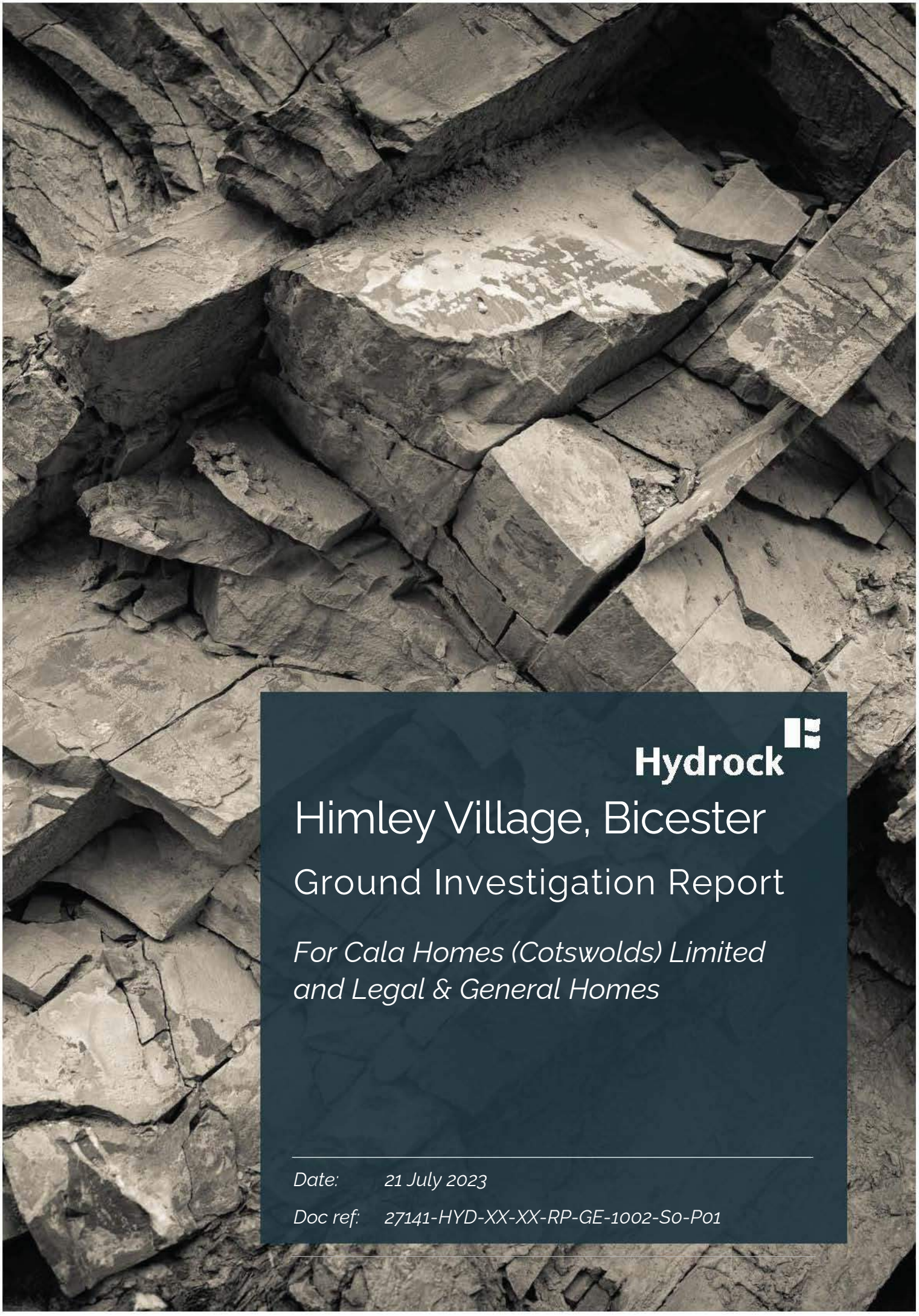

Hydrock

Himley Village, Bicester

Ground Investigation Report

For Cala Homes (Cotswolds) Limited and Legal & General Homes

Date: *21 July 2023*

Doc ref: *27141-HYD-XX-XX-RP-GE-1002-S0-P01*

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Issued by	Hydrock Consultants Limited Hawthorn Park Holdenby Road Spratton Northampton NN6 8LD United Kingdom	T +44 (0)1604 842888 F +44 (0)1604 842666 E northampton@hydrock.com hydrock.com
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Prepared by		Jamie Moore BSc (Hons) FGS
Checked by		Simon Cook BSc MSc C.Eng CGeol MIMMM FGS
Approved by		Paul Eastwood BSc MSc C Geol RoGEP

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Executive summary

Site information and setting	
Objectives	• to resolve any geotechnical and geo-environmental uncertainties identified in the Phase 1 Desk Study by refining and updating the preliminary Ground Model, based on the conditions met in accordance with the principles of Environment Agency (EA) 'Land Contamination: Risk Management' (LCRM) (2020); • to identify any geo-environmental mitigation requirements to enable development to progress; and • to provide preliminary geotechnical recommendations for design.
Client	Cala Homes (Cotswolds) Limited and Legal & General Homes
Site name and location	The site name is Himley Village and the site is located off the B4030 to the west of Bicester, Oxfordshire
Proposed development	The site comprises 2 phases of work, the Main site and the additional site area. The proposed development of the main site is to comprise residential housing with gardens, associated infrastructure and areas of Public Open Space. Development of the additional areas comprises a care home and two areas designated for 'mixed use neighbourhood centre'
Site description	The site is irregular in shape and comprises two agricultural fields and has a total area of approximately 30ha. The site is bound to the north and west by further agricultural fields, to the east by industrial units and to the south by the B4030.
Desk study summary	
Topography	The site slopes from approximately 95m OD to 84m OD from north-west to south-east.
Hydrology	There is a small shallow stream running along the boundary between the two fields.
Site History	Review of historical Ordnance Survey mapping indicates very little change in land use from 1876 (the date of earliest mapping) to the present day, with only footpaths and field boundaries changing. The surrounding area has also remined largely unchanged with the exception of land to the north-east where a lime kiln, quarry and railway appear in 1919 around 1km from the site.
Geology	The geology at the site is recorded by the BGS as Cornbrash Formation (limestone) overlying the Forest Marble Formation (limestone / mudstone). There are no superficial deposits recorded.
Hydrogeology	The Cornbrash Formation and the Forest Marble Formation are both Secondary A aquifers. The site is not within a Source Protection Zone and there are no groundwater abstractions within 500m.
UXO risk	A non-specialist UXO assessment indicates a low bomb risk.
Preliminary conceptual site model based on desk study	
Potential contaminant sources	• Pesticides and herbicides from agricultural practices • Hydrocarbon vapours from potential VOC and petroleum hydrocarbon spillages/leaks associated with farm machinery • PAH from on-site burning (identified as an activity undertaken very close to the site, and is likely to have occurred locally on site)

	• Spreading sewage waste on agricultural land (identified as an activity undertaken very close to the site and is likely to have occurred on site) • Use of waste in construction: asbestos waste was historically commonly used to reinforce/repair site entrances (identified as an activity undertaken close to the site, and likely to have locally occurred on site)
Potential contaminant linkages (for receptors for which there is or will be a pathway)	• People (site users, neighbours) • Development end use (buildings, utilities and landscaping) • Groundwater (Secondary A aquifer status of the Cornbrash Formation • Surface Water (drainage ditch)
Ground model proven by investigation	
Ground and groundwater conditions encountered by investigation	The ground conditions as proven by the investigation undertaken at the site comprise: • Localised Made Ground was encountered on the farmers track between 0.00m and 0.49m (bgl), comprising grey slightly sandy gravel with rare fragments of brick glass and asphalt • Topsoil – to maximum proven depth 0.50m below ground level (bgl), comprising brown slightly sandy gravelly clay with frequent rootlets of limestone and quartzite; over • Head Deposits – encountered between 0.20m and 0.80m bgl, comprising generally firm, locally stiff orangish brown sandy gravelly clay; over • Cornbrash Formation – encountered between 0.30m and 3.80m bgl, comprising generally, locally stiff, but occasionally soft, cream, orangish brown and grey mottled sandy clay with occasional limestone lithorelicts and beds of intact limestone; over, • Forest Marble Formation – encountered between 1.40m and >10.00m bgl, comprising stiff to very stiff grey and bluish grey laminated and slightly fissured sandy CLAY with occasional limestone lithorelicts. Groundwater was encountered at depths between 0.50m bgl and 3.20m bgl during the investigation in the Cornbrash Formation and the Forest Marble Formation. However, there are local variations in both probably due to the alternating beds of clay and limestone recorded. Water levels recorded post-fieldwork ranged from 1.15m to 2.31m bgl (92.67 to 84.25m OD)
Summary of geotechnical conclusions	
Groundwork	No buried man-made obstructions were encountered. However, whilst the likelihood of buried obstructions being encountered is low, difficult excavation is anticipated should excavations extend into the rock quality strata. Excavation to proposed founding depth generally should be readily achievable with standard excavation plant. Heavy duty excavation plant/breaking equipment may be required to excavate the rock quality strata. Whilst trial pit faces in the clay soils were noted to remain generally vertical without collapse, when fractured rock was encountered, some spalling was noted. Water seepages into excavations are likely to be adequately controlled by sump pumping, but in deep excavations alternative methods of dewatering are likely to be required.

Foundations	It is recommended that foundations comprise: • Strip/trench fill foundations at between 0.9m bgl and 2.5m bgl. • Pad foundations at between 0.9m bgl and 2.5m bgl (if framed buildings are constructed). • Piled foundations. Permissible net bearing pressure of 100 kN/m^2 should be available for strip/trench fill or pad foundations. Deepening of foundations/heave protection is likely to be required to allow for the effects of trees. Residential ground floor slabs should be suspended because of the presence of medium shrinkage potential clay soils; and suspended over a void where within the influencing distance of trees. Ground floor slabs for the community building(s) may require ground treatment to allow ground bearing slabs to be constructed. ***Foundation and ground floor slab recommendations are [preliminary and subject to change in the light of the finalised layout and confirmation of cut/fill requirements.***
Roads and pavements	For road/pavement design, a design CBR of 2.5% is recommended on natural soils. The design CBR for road/pavement design on newly placed fill will be dependent on the degree of compaction achieved.
Sustainable drainage	Soakaway drainage is considered unsuitable for this site.
Buried concrete	Design Sulfate Class - DS-1 and ACEC Class AC-1s/AC-1. Equivalent to Design Chemical Class DC-1 for a 50 year design life.
Summary of geo-environmental assessment	
Human Health	PAH in the Made Ground associated with the track in the centre of the site.
Phytotoxicity	Results indicate that all Chemicals of Potential Concern are below the relevant GAC, therefore contaminant linkage is incomplete.
Controlled waters	Whilst there are exceedances of the water quality targets, these exceedances are considered not to represent a significant risk of pollution of Controlled Waters.
Radon:	The site is not within a radon affected area.
Construction materials:	Plastic or bitumastic products may be at risk from elevated PAH concentrations in areas of Made Ground associated with the farm track.
Potable water supply pipes	• Across the majority of the site standard pipework is envisaged. However, confirmation should be sought from the water supply company at the earliest opportunity. • In the area surrounding the farm track PAHs are present and therefore barrier pipes should be installed in this area. However, confirmation should be sought from the water supply company at the earliest opportunity.
Ground gases or vapours:	Low risk from ground gases and CS1 conditions apply.

Enabling works	
Proposed mitigation measures	The mitigation measures proposed to remove unacceptable risks include the following two scenarios: • If the Made Ground associated with the Farm track is to remain on site: » The installation of a 600mm engineered cover system, in gardens and 450mm in public open space, comprising a bonded geogrid break layer (e.g. TX160G), subsoil beneath a topsoil thickness of between 150mm and 300mm » Installation of barrier pipework if water pipelines are to be installed. » If plastic pipes for drains and sewers are to be installed in this material, the pipework manufacturer should be consulted with regard the suitability of the pipework • If the Made Ground associated with the farm track is removed - the Made Ground must be removed from site or re-used underneath areas of hardstanding to break the SPR linkage and therefore no mitigation measures are required The methodology for the remediation should be presented in a Remediation Strategy, which will need to be submitted to the warranty provider and the regulatory authorities for approval. Verification reports by a competent independent geo-environmental specialist will be required following completion of any remedial works.
Earthworks	In order to undertake the proposed cut to fill earthworks and use of excavated materials in earthworks a site specific Earthwork Specification will be required to allow reuse of suitable materials along with the production of a Materials Management Plan and its approval by a Qualified Person. Verification reports by competent independent geotechnical specialists will be required following completion of any earthworks.
Waste management	Excavated soils to be disposed of as waste, are likely to be classed as non-hazardous. The Made Ground associated with the track is mostly classified as non-hazardous (4 out of 5 samples). However, one sample (HP01) is classified as hazardous waste.
Future considerations	
Further work	Following the ground investigation works undertaken to date, the following further works will be required: • discussion and agreement with utility providers regarding the materials suitable for pipework; • discussion and agreement with utility providers regarding the materials suitable for pipework; • discussions with regulatory bodies and the warranty provider regarding the conclusions of this report; • assessment of tree influence on foundations and design of foundations; • production of a Foundation Zonation Plan; • discussions with piling Contractors regarding conclusions of this report and design of the piles; • provision of geotechnical design for the Category 2 structures (earthworks, and retaining structures.); • production of a Remediation Strategy and Verification Plan; • production of a Geotechnical Design and Earthworks Specification;

- production of a Materials Management Plan relating to reuse of soils at the site and import of soils to the site; and
- verification of the earthworks, remediation and materials management.

This Executive Summary forms part of Hydrock Consultants Limited report number 27141-HYD-XX-XX-RP-GE-1002-S0-P01 and should not be used as a separate document.

1. Introduction

1.1 Terms of reference

In May 2023, Hydrock Consultants Limited (Hydrock) was commissioned by Cala Homes (Cotswolds) Limited and Legal & General Homes (the Clients) to undertake a Phase 2 supplementary ground investigation at Himley Village Bicester. The site is located off the B4030 to the west of Bicester, Oxfordshire.

The site is currently agricultural fields.

Hydrock understands that site comprises 2 phases of work, the Main site and the additional site area. The proposed development of the main site is to comprise residential housing with gardens, associated infrastructure and areas of Public Open Space. Development of the additional areas comprises a care home and two areas designated for 'mixed use neighbourhood centre'. A proposed development layout (Pegasus Group Drawing reference P22-3093_DE_100_C_02), is presented in Appendix A.

The investigation works have been undertaken in accordance with Hydrock's proposal referenced (27141-HYD-XX-XX-FP-GE-0003-S2-P01 Dated 10th May 2023) and the Client's instructions to proceed (email dated 11/05/2023).

1.2 Objectives

The works have been commissioned to assist with the design of the development.

The objectives of the Phase 2 Ground Investigation are:

- to resolve any geotechnical and geoenvironmental uncertainties identified in the Phase 1 Desk Study by refining and updating the preliminary Ground Model, based on the conditions met in accordance with the principles of Environment Agency (EA) 'Land Contamination: Risk Management' (LCRM) (2023);
- to identify any geo-environmental mitigation requirements to enable development to progress; and
- to provide preliminary geotechnical recommendations for design.

1.3 Scope

The site investigation includes a Phase 2 Ground Investigation.

The scope of the Phase 2 Ground Investigation comprises:

- a ground investigation including trial pitting, hand pitting and rotary drilling to:
  - obtain data on the ground and groundwater conditions of the site;
  - allow collection of samples for geotechnical and chemical laboratory analysis;
  - allow geotechnical field tests to be undertaken;
  - install gas and groundwater wells;
- groundwater and gas level monitoring;
- groundwater sampling;
- geotechnical and chemical laboratory analysis;
- updating of the preliminary Ground Model;
- preparation of a geotechnical risk register;
- presentation of an initial geotechnical design recommendations;

- formulation of an updated Conceptual Site Model (CSM), including identification of any plausible contaminant linkages;
- completion of a generic quantitative risk assessment of any identified chemical contaminants to establish 'suitability for use' under the current planning regime;
- discussion of any potential environmental liabilities associated with land contamination (soil, water and gas); and
- identification of outline mitigation requirements to ensure the site is 'suitable for use'.

1.4 Available information

The following documents, reports etc have been provided to Hydrock by Cala Homes (Cotswolds) Limited and Legal & General Homes for use in the preparation of this report:

- Tim O'Hare Associates'. January 2023. 'Himley, Bicester Topsoil Resource Survey', ref: TOHA/22/8643/1/AC.
- Dando Surveying Ltd. February 2023. 'Topographical Survey', ref: CHhimleyTOPO.
- Pegasus Group. January 2023. 'Phase 2, 500 Testing Layout', ref: P22-3093_DE_100_C_02.
- Hydrock. April 2023. 'Contamination Desk Study', Ref: 27141-HYD-XX-XX-RP-GE-1001-S2-P01, undertaken for Cala Homes (Cotswolds) Limited and Legal & General Homes.

It is understood that the Client defined in Section 1.1 has obtained assignment of the above documents and Hydrock has assumed full reliance can be placed upon their contents. Should this not be the case, Hydrock should be informed at the earliest opportunity.

1.5 Regulatory context and guidance

The investigation work has been carried out in general compliance with recognised best practice, including (but not limited to) BS 5930:2015, BS 10175:2011+A2:2017 and the AGS (2006) 'Good Practice Guidelines for Site Investigations'.

The geo-environmental section of this report is written in broad accordance with BS 10175:2011+A2:2017, EA LCRM), (2021) and the AGS (2006) 'Good Practice Guidelines for Site Investigations'.

The methods used follow a risk-based approach, the first stage of which is a Phase 1 desk study and field reconnaissance, with any potential geo-environmental risks assessed qualitatively. This is done using the 'source-pathway-receptor contaminant linkage' concept to assess risk as introduced in the Environmental Protection Act 1990 (EPA, 1990). Any potential geotechnical risks are also assessed from the Phase 1 desk study and site reconnaissance stage.

Phase 2 comprises intrusive ground investigation work and testing. The factual information from the desk study and the ground investigation are used to develop the Conceptual Site Model (CSM). This CSM is based on a ground model of the site physical conditions and an exposure model of the possible contaminant linkages. The CSM forms the basis for Generic Quantitative Risk Assessment (GQRA) in accordance with current guidelines. This GQRA might lead to more Detailed Quantitative Risk Assessment (DQRA).

Professional judgement is then used to evaluate the findings of the risk assessments and to provide recommendations for the development.

The geotechnical section of this report is prepared in general accordance with BS EN 1997-1+A1: 2013, BS EN 1997-2:2007 and BS 8004:2015. This report constitutes a Ground Investigation Report (GIR) as described in Part 2 of Eurocode 7 (BS EN 1997-2) (EC7). However, it is not intended to fulfil the requirements of a Geotechnical Design Report (GDR) as specified in EC7.

Where relevant the relevant requirements of the current edition of NHBC Standards have also been applied.

The geo-environmental and geotechnical aspects are discussed in separate sections. Throughout the report the term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential contamination). However, it should be appreciated that this is an integrated investigation and these two main aspects are inter-related. Designers should take all aspects of the investigation into account.

Remaining uncertainties and recommendations for further work are listed in Section 9 and Section 10.

2. Site Overview

2.1 Site referencing

The site is referenced in Table 2.1 and the location is indicated in Figure 2.1 and 2.2.

Table 2.1: Site referencing information

Item	Brief Description
Site name	Himley Village, Bicester
Site address	To the north of the B4030, west of Bicester, Oxfordshire. The nearest postcode is OX26 1RT.
Site location and grid reference	The site is located off the B4030 approximately 500m east of the M40 and 50m west of the A4095 Howes Lane, Bicester Western Bypass. The site is approximately 2km west of Bicester town centre. The National Grid Reference of the approximate centre of the site is 455855E, 223172N.

A site location plan (Hydrock Drawing 27141-HYD-XX-XX-DR-GE-1001) is presented in Appendix A.

2.2 Site description and field reconnaissance survey

A field reconnaissance survey was undertaken on 24/05/2023 to visually identify assess potential geotechnical hazards, contaminant sources for future investigation and identification of possible source-pathway-receptor linkages. The weather was sunny and the ground conditions were dry.

A description of the site is presented in .

Table 2.2 Additional photographs are presented in Appendix A.

Table 2.2: Site description

Item	Brief Description
Site access	The site was accessed from the B4030 road to the south. Both fields are accessible by vehicles. Field 'A' has access via open gate at the time of reconnaissance. Field 'B' has a gap in the south-east corner between two hedgerows.
Site area	The site is irregular in shape and has a total area of approximately 30 ha.
Elevation, topography and any geomorphic features	The site slopes from approximately 95m above Ordnance Datum (OD) to 84 (OD) from the north-west to the south-east. A small shallow stream runs along the perimeter (excluding the east) of field 'B'. At the time of the site reconnaissance this was not flowing.
Site boundaries and surrounding land	To the north of the site are further agricultural fields, with an active farm (Himley Farm) approximately 280m from the northern site boundary. The track running through the site providing access to field 'A' is frequently used by this farm. To the east of the site are industrial units, used by a food distribution company, and a service yar. There is a landscape bund on the eastern site boundary of field 'B'. Further to the east of the site is the town of Bicester. The southern boundary of the site is delineated by the B4030, into Bicester town. Further south of the site on the opposite side of the B4030 is Bignell Park with several forested areas including but not limited to; Bignell Belt, Big Covert

	and Robin Hood Covert. Gagle Brook runs through the centre of the park, flowing north-west to south-east. There is a large residential property (Lovelynch House) to the immediate south-west of field 'A'. There is an abandoned house, chicken coops and garage located off site to the west of the access into field 'A'. The garage has suspected asbestos roofing. The boundary between fields 'A' and 'B' is a fence and hedgerow, with a drainage ditch running in a north-south orientation. This ditch runs along the perimeter of field 'B' (excluding the east).
Present land use	Present land use of both fields is agricultural, with a concrete access road leading up to the farm off site to the north (Himley Farm), in the east of field 'A'. Services were noted on both fields, including several manhole covers close to Himley House and the house to the south-west of field 'A'. Overhead electricity cables were also noted, one running from the site access to field 'A' to the house to the south-west of field 'A', another running in a south-west to north-east orientation and one on field 'B' running in a south-east to north-west orientation. Localised fly tipping, including wooden pallets and general waste, was noted just off site to the west of the access into field 'B'. A number of boreholes and evidence of soakaway testing from previous ground investigations were present across both fields.
Vegetation	A number of deciduous trees (10-20m high) and several hedges were identified around the site boundaries.
General site sensitivity	The site is within a largely agricultural area, with occasional houses, and the industrial area to the east.
Geology	The solid geology across the entire site is recorded by the BGS to comprise Cornbrash Formation (Limestone); no superficial deposits have been recorded.

For the full desk study report please see Hydrock report 27141-HYD-XX-XX-DS-GE-1001.

3. Initial conceptual site model

3.1 Introduction

The initial Conceptual Site Model (iCSM) incorporates evidence from the site walkover and the Desk Study investigations carried out at the site. The formulation of an initial Conceptual Site Model is a key component of the LCRM methodology. The iCSM incorporates a ground model of the site physical conditions and an exposure model of the possible contaminant linkages; it forms the basis for Generic Quantitative Risk Assessment (GQRA) in accordance with current guidelines.

3.2 Ground model

The preliminary ground model presented in Section 2 provides an understanding of the ground conditions and is the basis for preparing the preliminary geotechnical hazard assessment (Section 3.3) and the preliminary geo-environmental exposure model (Section 3.4).

3.3 Geotechnical hazard identification

3.3.1 Context

The preliminary geotechnical hazard identification has been undertaken in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents HD 41/15 and CD 622.

The following section sets out the identified geotechnical hazards and the development elements potentially affected (see Table J.1 in Appendix F for further information).

3.3.2 Plausible geotechnical hazards

Plausible geotechnical hazards identified at the site are:

- Soft/loose compressible ground (low strength and high settlement potential).
- Shrinkage/swelling of the clay fraction of soils within the Cornbrash Formation under the influence of vegetation.
- Lateral and vertical changes in ground conditions.
- Shallow groundwater.
- Seasonally changing groundwater conditions.
- Difficulty excavating through the limestone beds
- Solution features in limestone

3.3.3 Potential development elements affected

Development elements potentially affected by geotechnical hazards are:

- Buildings – foundations.
- Buildings – floor slabs
- Roads and pavements.
- Concrete below ground.
- Services.

Health and safety risks to site Contractors and maintenance workers have not been assessed during these works and will need to be considered separately during design.

The above plausible geotechnical hazards and development elements affected have been carried forward for investigation and assessment. The investigation is presented in Section 5 and the assessment is presented in Section 0.

3.4 Geo-environmental exposure model

3.4.1 Context

The preliminary exposure model is used to identify geo-environmental hazards and to establish potential contaminant linkages, based on the source-pathway-receptor (SPR) approach.

A viable contaminant linkage requires all the components of an SPR to be present. If only one or two are present, there is no linkage and no further assessment is required.

3.4.2 Potential contaminants

For the purpose of this assessment the potential contaminants have been separated according to whether they are likely to have originated from an on-site or off-site source.

3.4.2.1 Potential on-site sources of contamination

- Pesticides and herbicides from agricultural practices (S1).
- Hydrocarbon vapours from potential VOC and petroleum hydrocarbon spillages/leaks associated with farm machinery (S2).
- PAH from on-site burning (identified as an activity undertaken very close to the site, and is likely to have occurred locally on site) (S3).
- Spreading sewage waste on agricultural land (identified as an activity undertaken very close to the site and is likely to have occurred on site) (S4).
- Use of waste in construction: asbestos waste was historically commonly used to reinforce/repair site entrances (identified as an activity undertaken close to the site, and likely to have occurred locally on site) (S5).

3.4.2.2 Potential off-site sources of contamination

- Pesticides and herbicides from agricultural practices (S6)
- Hydrocarbon vapours from potential VOC and petroleum hydrocarbon spillages/leaks associated with farm machinery (S7).
- PAH from off-site burning of agricultural waste (identified as an activity undertaken close to the site) (S8).
- Spreading waste on agricultural land (identified as an activity undertaken close to the site) (S9).
- Use of waste in construction (identified as an activity undertaken close to the site) (S10).
- Asbestos within abandoned house and garage to the west of the access track (S11)

3.4.3 Potential receptors

The following potential receptors, in relation to the proposed site use, have been identified.

- People (site users, neighbours) (R1)
- Development end use (buildings, utilities and landscaping) (R2).
- Groundwater: Secondary A aquifer status of the Cornbrash Formation (R3).
- Surface water: Pond and drainage ditch (R4).

3.4.4 Potential pathways

The following potential pathways have been identified.

- Ingestion, skin contact, inhalation of dust and outdoor air by people (P1).
- VOC, PAH and petroleum hydrocarbon contact with water supply pipes (P2).
- VOC and petroleum hydrocarbon vapour ingress via permeable soils and/or construction gaps (P3).
- Root uptake by plants (P4).
- Migration of contaminant via leachate migration through the unsaturated zone in the Cornbrash Formation (P5).
- Migration of contaminant via base flow to the surface waters (P6).
- Overland flow to the surface waters (P7).

Health and safety risks to site development contractors and maintenance workers have not been assessed as part of this study and will need to be considered separately.

The above sources, pathways and receptors have been considered as part of the Preliminary Risk Assessment in accordance with LCRM (2023), are considered to be plausible in the context of this site and have been carried forward for investigation and assessment. The investigation is presented in Section 5 and the assessment is presented in Section 7 An assessment of the Source – Pathway – Receptor linkages is undertaken following the assessment (Section 7) and is presented in Appendix G (Table K.1).

3.4.5 Potential implications of climate change

Climate change has the potential to change the risk profile for conceptual site models and associated contaminant linkages. The impact of climate change on the CSM is site-specific, and a qualitative assessment of the potential impact of climate change on the CSM for this site is summarised below. The assessment has primarily utilised the guidance in Environment Agency (2010)[1] and SoBRA (2022)[2] which set out the UK context to climate change and land contamination. Both guidance documents advocate a "what if" scenario approach in the context of changes in ambient temperatures, an increase in the frequency of extreme rainfall/storm events and heatwaves/droughts, and long-term changes in groundwater and sea levels.

Those "what if" scenarios that are relevant to this CSM are:

- Increased long-term rainfall leading to increased infiltration and seasonally higher groundwater levels.
- Increased frequency and/or magnitude of extreme rainfall events leading to short-term surface flooding, surface water run-off, groundwater flooding, and/or land-based erosion.
- Increased frequency and/or magnitude of storm events leading to short-term drops in barometric pressure and/or high winds.
- Occurrence of extreme cold and hot weather events leading to changes in ground conditions such as soil temperature, evapo(trans)piration, and soil moisture (for example freeze-thaw effects and desiccation), decreased infiltration and fall in groundwater levels.
- Long-term decrease in rainfall leading to lower infiltration and fall in groundwater levels.

[1] *Environment Agency, 2010. Guiding Principles for Land Contamination. Part 2. FAQs, technical information, detailed advice and references, March 2010.*

[2] *SoBRA, 2022. Guidance on Assessing Risk to Controlled Waters from UK Land Contamination Under Conditions of Future Climate Change, Society of Brownfield Risk Assessment, August 2022.*

4. Ground investigations

4.1 Site works

The ground investigation works, including the rationale which was based on the findings of the preliminary risk assessment is summarised in Section3. For the investigation rationale of the historical investigations, please refer to the historical reports in Appendix A

The fieldwork took place between 5th June 2023 and 13th June 2023. The ground investigation locations were surveyed in using a topographic survey quality GPS and are shown on the Exploratory Hole Location Plan (Hydrock Drawing 27141-HYD-XX-XX-DR-GE-1008) in Appendix A.

The logs, including details of ground conditions, soil sampling, in situ testing and any installations, are also presented in Appendix B.

The weather conditions during the Hydrock fieldwork and for the previous week were sunny with occasional thunderstorms.

Table 4.1: Summary of site works

Activity	Method	No.	Name	Depth Range (m bgl)	*In situ* tests	Rationale
Main Site						
Drilling and Pitting						
Boreholes	Rotary cored	1	RC01	10	SPT	To determine limestone thicknesses and competency, to assess shallow ground conditions and allow installation of gas and groundwater monitoring and sampling wells.
	Rotary open hole	4	RO01-RO04	5	SPT	
Trial pits	Machine (JCB 140X)	22	TP01 – TP22	1.60 – 3.45	Hand shear vane (HSV)	For general site coverage and collection of samples
	Hand-excavated	5	HP01 – HP05	0.30 – 0.50	-	To determine construction of the existing access track with recovery of disturbed samples for chemical and geotechnical analysis.
Additional Area						
Trial pits	Machine (JCB 140X)	22	TP23 – TP45	1.70 – 3.40	Hand shear vane (HSV)	For general site coverage and collection of samples

Monitoring wells to monitor groundwater levels and ground gas concentrations, and to facilitate the sampling of groundwater, were installed in all of the rotary boreholes. A summary of the monitoring well installations (including those from a previous ground investigation, which were also monitored as part of the current investigation (for completeness) is presented in Table 4.2.

Table 4.2: Summary of monitoring installations

Location	Ground level (m OD)	Standpipe diameter (mm)	Screen top and base depth (m bgl)	Screen top and base elevation (m OD)	Piezometer Tip depth (m bgl) / (m OD)	Strata targeted
Hydrock 2023						
RC01	94.73	19	2.80 to 3.80	91.93 to 90.93	3.35 / 91.38	Cornbrash Formation
RO01	92.46	19	1.50 to 2.50	90.96 to 89.96	2.30 / 90.16	
RO02	91.95	19	0.60 to 1.20	91.35 to 90.75	0.77 / 91.18	
RO03	86.94	19	1.00 to 1.80	85.94 to 85.14	1.36 / 85.58	
RO04	89.75	19	1.00 to 1.60	88.75 to 88.15	1.35 / 88.40	
Previous ground investigation						
R01	92.44	50	3.00 to 5.00	89.44 – 87.44	-	Forest Marble Formation
R02	94.68	50	1.50 to 5.00	93.18 – 89.68	-	Cornbrash Formation / Forest Marble Formation
R03	91.99	50	2.00 to 5.00	89.99 – 86.99	-	Forest Marble Formation
R04	90.71	50	1.50 to 3.50	89.21 – 87.21	-	Cornbrash Formation / Forest Marble Formation
R05	89.47	50	3.50 to 5.00	85.97 – 84.47	-	Forest Marble Formation
R06	89.7	50	3.00 to 5.00	86.70 – 84.70	-	
R07	86.86	50	2.70 to 5.00	84.16 – 81.86	-	
R08	86.04	50	1.00 to 3.00	85.04 – 83.04	-	

4.2 Geo-environmental testing

4.2.1 *Sampling strategy and protocols*

Exploratory hole positions were determined by reference to the site conditions and uncertainties identified in the Initial Conceptual Model.

Certain specific features such as the track in the centre of the site was targeted for specific investigation, but a reasonably even spacing was used for the remainder of the site.

No specific sampling statistics or grid were utilised in this instance.

Samples were taken, stored and transported in general accordance with BS 10175:2011+A2:2017.

4.2.2 *Geo-environmental monitoring*

Gas monitoring boreholes have been monitored on three occasions to date. The results are presented in Appendix D. Monitoring is ongoing and this report will be updated on completion of the monitoring.

4.2.3 *Geo-environmental laboratory analyses*

The chemical test certificates for testing undertaken as part of Hydrock's investigation are provided in Appendix E and summarised in the table below., UKAS and MCERTS accredited procedures have been used where indicated.

The geo-environmental analyses undertaken on soils are summarised in

Table 4.3.

Table 4.3: Geo-environmental analyses of soils

Determinand Suite	Topsoil	Made Ground	Head Deposits	Forest Marble Formation
Hydrock minimum suite of determinands for solids*[3]	8	14	2	1
Hydrock Tier 2 TPH Suite and BTEX	-	8	-	-
Asbestos quantification	-	10	-	-
Pesticide screen	5	2	-	-

The soils chemical test data are interpreted and assessed in Sections 7.3 and 7.4.

The geo-environmental analyses undertaken as part of Hydrock's investigation on waters, are summarised in Table 4.4.

Table 4.4: Geo-environmental analyses of waters

Determinand Suite	Groundwater
Hydrock minimum suite of determinands for waters	6

The groundwater chemical test data are interpreted and assessed in Section 7.5.

[3] Hydrock minimum soil suite comprises: As, B (water soluble), Be, Cd, Cr (total), Cr (VI), Cu, Hg, Ni, Pb, S (elemental), Se, V, Zn, cyanide (total), sulfide, pH, asbestos fibres, speciated polynuclear aromatic hydrocarbons (PAH, by GC-FID), total phenols and fraction of organic carbon

4.3 Geotechnical testing

4.3.1 Geotechnical laboratory testing

The geotechnical tests undertaken by Hydrock are summarised in Table 4.5 and the test certificates are provided in Appendix C. UKAS accredited procedures have been used as indicated on the laboratory test certificates

Table 4.5: Summary of sample numbers for geotechnical tests

Test	Made Ground	Head Deposits	Cornbrash Formation	Forest Marble Formation
Natural moisture content	-	3	19	4
Atterberg limits	-	3	19	4
Particle size distribution (wet sieve and sedimentation)	-	1	5	-
Sulfate and aggressive chemical environment classification for buried concrete classification (full BRE SD1 suite)	2	5	9	3
Remoulded California Bearing Ratio at natural moisture content	-	-	4	1
Dry density/moisture content relationship (2.5kg rammer compaction) with shear vane at each compaction point	-	-	3	-
Particle density	-	-	3	-
Uniaxial Compressive Strength (UCS)	-	-	-	1
Point Load Index	-	-	7	7

The geotechnical test data are summarised in Section 5.6 and interpreted in Section 6.

4.4 Constraints

Overhead services and underground services are present across the main site and additional works areas. Therefore areas around known services were not investigated as exploratory hole positions had to be located a minimum horizontal distance of 9m away from known underground and overhead services.

5. Ground investigation records and data

5.1 Physical ground conditions

5.1.1 Summary of strata encountered

The following presents a summary of the properties of the ground and groundwater conditions encountered, based on field observations, interpretation of the field data and laboratory test results, taking into account drilling, excavation and sampling methods, transport, handling and specimen preparation.

All relevant data from the Hydrock investigation discussed in Section 4 are used from this point forward.

Details of the Hydrock ground investigation works are provided in the logs in Appendix B, previous data are provided in Appendix A , a summary of the ground model is presented in Table 5.1 and the individual strata are described in the sections below. Relevant cross-sections are presented in Appendix A

Table 5.1: Strata encountered

Stratum	Depth to top (m bgl)	Depth to base (m bgl)	Thickness (m) (range)	Thickness (m) (average)
Made Ground	0.00	0.25 – 0.49	0.25 – 0.49	0.35
Topsoil	0.00	0.20 – 0.50	0.20 – 0.50	0.32
Head Deposits	0.20 – 0.40	0.30 – 0.80	0.05 – 0.40	0.14
Cornbrash Formation	0.30 – 0.80	0.40 – 3.80	0.01 – 3.30	1.48
Forest Marble Formation	1.40 – 3.80	>2.10 - >10.00	>0.50 – >6.20	1.36

5.1.2 Surface covering

The following surface cover was identified during the field reconnaissance and the fieldworks:

- Vegetation (grass, trees, hedges), covering approximately 90% of the site.
- A track which comprised gravel of limestone, flint, brick, and asphalt approximately 300m in length.
- Structures (derelict house in the south of the site) covering approximately 800m^2

5.1.3 Made Ground

Below the surface covering, Made Ground was recorded across both the main site and additional works areas, with the exception of the field east of the track in the main site area.

In general, there are two main types of Made Ground:

- 'General' Made Ground, across most of the main site and additional works areas to depths of between 0.25m and 0.40m, with an average thickness of 0.29m. Comprises brown slightly sandy gravelly clay, with gravel of limestone and rare fragments of brick.
- Made Ground associated with the track on site to depths of between 0.39m and 0.49m, with an average thickness of 0.42m. Comprises grey slightly sandy gravel, with rare fragments of brick, asphalt and glass.

5.1.4 Topsoil

Where the Made Ground was not encountered the exploratory holes encountered topsoil.

Topsoil was between 0.20m and 0.50m thick, with an average thickness of 0.32m across the main site and additional works areas. The topsoil comprised brown slightly sandy gravelly clay with frequent rootlets and fragments of limestone and quartzite.

For the purposes of this report, topsoil is defined as the upper layer of an in situ soil profile, usually darker in colour and more fertile than the layer below (subsoil), which is a product of natural chemical, physical, biological and environmental processes, but does not imply compliance with BS 3882:2015. Reuse of topsoil as a growing medium at the site should be determined by the landscape architect or the landscape Contractors.

5.1.5 Head Deposits

Head deposits were encountered underlying the Made Ground or topsoil across both the main site and additional works areas. They comprise generally firm, locally stiff orangish brown sandy gravelly clay, and were recorded as between 0.05m and 0.40m thick, with an average thickness of 0.14m.

5.1.6 Cornbrash Formation

Cornbrash Formation was encountered underlying the Made Ground, topsoil or head deposits across both the main site and additional works areas. Cornbrash Formation is between 0.01m and 3.30m thick, with an average thickness of 1.48m.

A base of Cornbrash Formation, Hydrock Drawing 27141-HYD-XX-ZZ-DR-GE-1009 is shown in Appendix A.

This generally consisted of a mixture of firm to stiff cream, orangish brown and grey mottled sandy clay with occasional limestone lithorelicts, cream gravel of limestone lithorelicts and strong grey vertically fractured limestone.

5.1.7 Forest Marble Formation

Forest Marble Formation was encountered underlying the Cornbrash Formation across both the main site and additional works areas and is between >0.50m and >6.20m thick.

This generally consisted of a mixture of stiff to very stiff grey mottled orangish brown and bluish grey, orangish brown laminated and fissured slightly sandy clay with occasional limestone lithorelicts, cream gravel of limestone lithorelicts and very strong grey limestone.

5.2 Obstructions

No obstructions were encountered during the investigation however, the less fractured, strong to very strong limestone encountered in the trial pits was very difficult to excavate.

5.3 Soil Organic Carbon Content

The fraction of organic carbon (FOC) and soil organic matter (SOM) derived from laboratory test results are summarised in Table 5.2. Further details of laboratory testing results are included in Appendix E.

Table 5.2: Summary of SOM and FOC

Stratum	Fraction of organic carbon (FOC) (range) (dimensionless)	Soil organic matter (SOM) (range) (%)
Main Site		
Made Ground	0.01 – 0.06	2.1 – 10.2
Topsoil	0.02 – 0.03	2.8 – 5.2
Head Deposits	0.01	1.9
Cornbrash Formation	0.01	1.6
Forest Marble Formation	0.01	1.7

5.4 Groundwater

5.4.1 Groundwater observations and levels

Groundwater encountered during the investigation is listed in Table 5.3. A groundwater observation represents the depth at which groundwater was first observed and is likely to be deeper than the actual water table level at that location.

Table 5.3: Groundwater occurrence

Stratum	Date	Location	Fieldwork	Comment
			Groundwater observation (m bgl)	
Cornbrash Formation	05/06/2023	RC01	1	
	06/06/2023	RO01	0.5	
	07/06/2023	RO02	0.5	
	09/06/2023	RO03	0.5	
	08/06/2023	RO04	0.5	
	06/06/2023	TP01	2.4	Moderate flow rate.
	06/06/2023	TP02	1.6	Moderate flow rate.
	06/06/2023	TP03	1.9	Slow flow rate.
	06/06/2023	TP07	1.4	Slow flow rate.
	07/06/2023	TP09	1.45	Slow flow rate.
	07/06/2023	TP10	1.8	Slow flow rate.
	07/06/2023	TP12	2.1	Slow flow rate.
	07/06/2023	TP13	1.8	Slow flow rate.
	13/06/2023	TP16	1.8	Slow flow rate.
	13/06/2023	TP18	1.9	Slow flow rate.
	12/06/2023	TP20	1.8	Moderate flow rate.

Stratum	Date	Location	Fieldwork	Comment
			Groundwater observation (m bgl)	
Cornbrash Formation	08/06/2023	TP26	1.7	Slow flow rate.
	07/06/2023	TP27	1.7	Slow flow rate.
	08/06/2023	TP28	1.6	Slow flow rate.
	09/06/2023	TP33	1.8	Slow flow rate.
	09/06/2023	TP35	1.7	Slow flow rate.
	09/06/2023	TP38	1.6	Slow flow rate.
	09/06/2023	TP41	1.8	Slow flow rate.
Forest Marble Formation	07/06/2023	TP04	3.2	Slow flow rate.
	06/06/2023	TP06	2.7	Slow flow rate.
	06/06/2023	TP07	2.0	Fast flow rate.
	13/06/2023	TP14	2.4	Slow flow rate.
	13/06/2023	TP15	2.2	Moderate flow rate.
	13/06/2023	TP17	3.0	Slow flow rate.
	13/06/2023	TP21	2.9	Moderate flow rate.
	12/06/2023	TP22	2.0	Moderate flow rate.
	08/06/2023	TP23	2.6	Slow flow rate.
	07/06/2023	TP31	2.6	Slow flow rate.
	07/06/2023	TP32	3.0	Slow flow rate.
	09/06/2023	TP34	2.0	Slow flow rate.
	12/06/2023	TP36	2.4	Slow flow rate.
	12/06/2023	TP37	2.8	Moderate flow rate.
	09/06/2023	TP39	1.8	Moderate flow rate.
	12/06/2023	TP40	2.5	Slow flow rate.
	09/06/2023	TP42	2.9	Slow flow rate.
	09/06/2023	TP43	1.7	Moderate flow rate.
	12/06/2023	TP44	2.8	Moderate flow rate.
	12/06/2023	TP45	2.5	Slow flow rate.

Groundwater levels recorded during post-fieldwork monitoring are summarised in Table 5.4.

Table 5.4: Groundwater level data summary

Stratum	Date range	Location	Post-fieldwork monitoring	
			Depth to groundwater (range) (m bgl)	**Groundwater elevation (range) (m OD)**
Cornbrash Formation	16/06/23 – 28/06/23	RC01	1.59 – 2.06	93.14 - 92.67
		RO01	1.75 – 1.84	90.71 - 90.62
		RO02	1.15 – 1.23	90.80 - 90.72
		RO03	1.79 – 1.90	85.15 - 85.04
		RO04	1.54 – 1.59	88.21 - 88.16
Cornbrash Formation / Forest Marble Formation		R02	1.97 – 2.04	92.67 - 92.64
		R04	1.73 – 1.79	88.93 - 88.85
Forest Marble Formation		R01	1.93 – 2.03	90.51 - 90.41
		R03	2.01 – 2.04	89.84 - 89.68
		R05	2.15 – 2.31	87.31 - 87.18
		R06	1.78 – 1.86	88.30 - 88.23
		R07	2.16 – 2.29	84.89 - 84.82
		R08	1.40 – 1.47	84.31 - 84.25

5.4.2 *Groundwater summary*

In general, groundwater was encountered at shallow depth in the Cornbrash Formation and the Forest Marble Formation. However, there are local variations in both the Cornbrash Formation and Forest Marble Formation probably associated with the alternating beds of clay and limestone recorded.

There is also deeper groundwater in the Forest Marble Formation, identified mainly in the south-east of the site, where this stratum is at shallow depth.

The hydraulic gradient of the groundwater, and hence the likely direction of flow, is generally towards the south/south-east, and these appear to be topographically controlled.

5.4.1 *Permeability tests*

The results of the permeability testing undertaken in the boreholes from the previous investigation on the site are summarised in Table 5.5. The results sheets are presented in Appendix B.

Testing was carried out in general accordance with the requirements of BS 5930:2015, using rising head methods.

Table 5.5: Permeability test results

Stratum	Location	Depth (m) (range)	Permeability (m/s)
Cornbrash and Forest Marble	R02	1.5 – 5.0	2.8×10^{-7}
Forest Marble	R01	3.0 – 5.0	4.4×10^{-7}
	R05	3.5 – 5.0	6.2×10^{-7}
	R06	3.0 – 5.0	6.3×10^{-8}
	R07	2.7 – 5.0	5.5×10^{-7}

5.5 Ground gases (carbon dioxide and methane)

Records from the gas monitoring boreholes are presented in Appendix D and summarised in Table 5.6.

Three monitoring visits have been undertaken and the monitoring programme is complete. The data are assessed in Section 7.6

Table 5.6: Range of ground gas data

Stratum	Methane (%)	Carbon dioxide (%)	Oxygen (%)	Steady flow rate (l/hr)	Comment
Forest Marble Formation	<0.1	0.4 – 3.6	16.7 – 19.8	0 – 0.1	All the methane readings are below the limit of detection and all the carbon dioxide readings are below 5%.
Cornbrash Formation / Forest Marble Formation	<0.1	0.2 – 2.3	16.7 – 19.2	-0.8 – 0.2	

5.6 Geotechnical data

5.6.1 Introduction

Laboratory test results are contained in Appendix C with *in situ* test results shown on the relevant exploratory hole log or datasheet in Appendix B. The following sections summarise the main findings and provide interpretation where appropriate.

5.6.2 Moisture content

The volume change potential in terms of NHBC Standard (Chapter 4.2) have been determined from the results of plasticity index tests on samples of soil. These are summarised in Table 5.8.

Table 5.7: Natural Moisture Content

Stratum	No. of tests	Natural Moisture Content (%) (Range)
Head Deposits	2	7.8 - 27
Cornbrash Formation	20	10 - 27
Forest Marble Formation	3	14 - 24

5.6.3 Plasticity

The volume change potential in terms of NHBC Standard (Chapter 4.2) have been determined from the results of plasticity index tests on samples of soil. These are summarised in Table 5.8.

Table 5.8: Volume change potential

Stratum	No. of tests	Plasticity Index			Modified Plasticity Index			Plasticity designation	Volume Change Potential
		Min.	Max.	Av.	Min.	Max.	Av.		
Head Deposits	2	28	40	-[4]	15	36	-[3]	High	Medium
Cornbrash Formation	20	16	41	26	11	41	23	Intermediate to high	Medium[5]
Forest Marble Formation	3	10	33	-[3]	18	19	-[3]	Low to high	Low

5.6.4 Particle size distribution

Particle Size Distribution test (PSDs) results are summarised in Table 5.9 and summary descriptions and PSD plots of the material analysed are presented in Appendix C.

Table 5.9: PSD results summary

Stratum	No. of tests	Clay %	Silt %	Sand %	Gravel %	General description
Cornbrash Formation	9	13 - 60	26 - 57	10 - 24	2 - 28	Sandy silty clay/clayey silt, with occasional to some fine to coarse gravel sized lithorelicts of limestone
Cornbrash Formation (weathered limestone)	1	5	8	4	14	Limestone recovered as clayey fine to coarse gravel sized lithorelicts of limestone

5.6.5 Soil strength

Table 5.10 summarises information pertaining to the shear strength of the soils according to geological stratum. Factual results are summarised for laboratory tests, field tests (e.g. hand shear vane) and uncorrected Standard Penetration Tests (SPT). Where the SPT is used to infer shear strength by published correlation, this is also tabulated.

Table 5.10: Soil strength results and derived values

[4] Insufficient data to calculate an 'average' value.

[5] Out of 20 tests, three Atterberg Limits tests indicated high volume change potential (PI = 40 to 41). However, overall, a medium volume change potential is considered appropriate.

Stratum	No. of tests	SPT N value (range)[6]	c_u (kPa)	Method
Head Deposits	1	-	120	Hand shear vane
Cornbrash Formation	7	8 – >50	40 - <240	Correlation with SPT (dynamic sampler)[7]
	53	-	40 - 145	Hand shear vane
Forest Marble Formation	12	35 – >50	200 - <290	Correlation with SPT (dynamic sampler)[8]
	38	-	90 - 147	Hand shear vane

It is recommended that the values based on SPT correlation in weathered rock, be taken as indicative only.

5.6.6 *Compressibility*

Table 5.11 presents a summary of the derived parameters for coefficient of consolidation and compressibility. The data indicates that the material is generally of medium to high compressibility over the pressure ranges tested.

Table 5.11: Summary of compressibility

Stratum	No. of tests / results	SPT N value (range)[5]	Method	Coefficient of volume compressibility (m_v) (m^2/MN)
Cornbrash Formation	3	8 - >50	Correlation with SPT (dynamic sampler)	0.26 - 0.04[9]
Forest Marble Formation	5	35 – >50		0.04 - 0.05[10]

As these values are based on SPT correlation in weathered rock, it is recommended that they be taken as indicative only.

5.6.7 *Compaction and moisture content*

Table 5.12 presents a summary of the moisture content tests and compaction studies undertaken at the site.

[6] Only data from clay strata are considered.

[7] Based on an f1 value of 4.8 (based on average modified plasticity).

[8] Based on an f1 value of 5.7 (based on lowest modified plasticity).

[9] Based on an f2 value of 0.50 (based on average modified plasticity).

[10] Based on an f2 value of 0.57 (based on lowest modified plasticity).

Table 5.12: Compaction study results

Stratum	No. tests	Method	Natural moisture content (%) (range)	Particle Density (Mg/m^3) (range)	Optimum Moisture Content (%) (range)	Maximum Dry Density (Mg/m^3) (range)
Cornbrash Formation	3	2.5kg Rammer	10 - 20	2.62 - 2.72	11 - 19	1.69 - 2.01

5.6.8 Shear strength of compacted sample

Table 5.12 presents a summary of the moisture content tests and compaction studies undertaken at the site.

Table 5.13: Shear strength of compacted sample

Stratum	Method	Natural moisture content (%)	Moisture content of test sample (%)	Shear strength[11] (kN/m^2)
Cornbrash Formation	Lab vane	10	12	24
			15	9
		16	19	52
		20	23	56

5.6.9 Subgrade stiffness

The subgrade stiffness (CBR and Modulus of Subgrade Reaction) results are summarised in Table 5.14.

Table 5.14: CBR results and derived values

Stratum	No. tests	Method	Modulus of Subgrade Reaction k ($MN/m^2/m$) (Range)	CBR (%) (Range)
Head Deposits	2	Correlation in accordance with CD 255 based on 'average' plasticity and thin construction	25	2.5
Cornbrash Formation	4	Laboratory remoulded sample at Natural Moisture Content (NMC)	38 - 61	5.3 - 12
	20	Correlation in accordance with CD 255 based on 'average' plasticity and thin construction	25	2.5

[11] Shear strength at lower moisture contents could not be measured due to the strength of the soil.

Forest Marble Formation	3	Correlation in accordance with CD 255 based on 'average' plasticity and thin construction	22	2.0

Where using the CD255, 'k' has been back calculated from the Equivalent CBR.

5.6.10 *Sulfate content*

In accordance with BRE (Special Digest 1), the Design Sulfate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in Table 5.15. The assessment summary sheets are presented in Appendix C.

Table 5.15: Aggressive chemical environment concrete classification

Stratum	No. tests	DS	ACEC
Made Ground	1	DS-1	AC-1
Head Deposits	5	DS-1	AC-1
Cornbrash Formation	10	DS-1	AC-1
Forest Marble Formation	3	DS-1	AC-1

5.6.11 *Intact material strength – rock*

Table 5.16 summarises information pertaining to the strength of the intact rock material (not rock mass) according to geological stratum and, if applicable, weathering zones or other variations within particular strata.

Where UCS testing has been scheduled but cannot be undertaken due to unsuitable core samples, point load tests have been undertaken in their place.

Factual results are summarised for laboratory and field tests. Where point load index tests are used to infer unconfined compressive strength (UCS), this is also tabulated. Rock strength terms follow the method of BS EN ISO 14689-1:2003.

Care should be exercised in using these assumed rock strength parameters for any purpose beyond the scope of this report because it may be that additional sampling and testing is required for certain purposes. The reader should refer to the original test results in Appendix C. Note also that rock mass properties, rather than intact rock material properties, may be more suitable for design purposes.

Table 5.16: Intact rock strength results and derived values

Stratum	No. of tests	Point load index (Range)		UCS (MPa) (range)	Method
		Is	$Is_{(50)}$		
Cornbrash Formation	7	0.14 – 2.55	0.18 – 2.92	-	Axial point load
Forest Marble Formation	7	0.56 – 2.21	0.72 – 2.58	-	Axial point load
	1	-	-	25.8	UCS test

6. Geotechnical assessment

The following recommendations do not take into account any filling works to bring ground levels to finished level, as finished levels have not been provided. This report will therefore need to be updated once finished ground levels and the proposed housing layout have been finalised, and all recommendations should be considered preliminary.

6.1 Geotechnical categorization of the proposed development

Eurocode 7, Section 2 advocates the use of geotechnical categorization of the proposed structures to establish the design requirements.

The proposed development of the main site is to comprise low rise (2 to 3 storey) residential dwellings, with associated gardens, Public Open Space and infrastructure. The proposed development of the additional area is to comprise two areas designated for 'mixed use neighbourhood centre'.

Finished ground levels have not been provided at this stage, and this report will need to be updated on receipt of those levels. However, it is understood that some fill (and possibly cut, and possibly some retaining structures, are required.

Based on the above, for the purposes of this investigation, the proposed housing, care home and areas designated for 'mixed use neighbourhood centre' have been classed as Geotechnical Category 1. However, the fill (and if required cut) is classed as Geotechnical Category 2.

For Category 2 structures, the Geotechnical Category should be reassessed at the design stage and specific geotechnical design is required.

Following ground investigation and as part of the assessment provided in the following section, the preliminary geotechnical hazard identification undertaken in Section 3.3 has been updated.

Assessment has been undertaken in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents HD 41/15 and CD 622. The preliminary Geotechnical Risk Register following investigation is provided in Appendix F (Table J.3) and will need to be updated during future design works.

6.2 Characteristic design values

For design of Category 1 structures in accordance with BS EN ISO 1997-1 (EC 7), the geotechnical parameters given in Table 6.1 can be used for design.

These values have been determined from laboratory testing, *in situ* testing and by professional judgement using published data together with knowledge and experience of the ground conditions. Care should be exercised in using these assumed soil strength parameters for any purpose beyond the scope of this report because it may be that additional sampling and testing is required for certain purposes. The reader should refer to the original test results summarised in Section 5 and provided in Appendix B and Appendix C.

Table 6.1: Geotechnical parameters recommended for design of Geotechnical Category 1 Structures (EC7)

Parameter Stratum	Bulk unit weight kN/m³ γ [a]	Effective angle of internal friction ° ϕ′ [b c]	Undrained shear strength kN/m² c_u [e]	Coefficient of compressibility m²/MN m_v [f]	Modulus of subgrade reaction (IAN73/06) MN/m²/m k [g]
Head Deposits	19	26	50	0.15	25
Cornbrash Formation	20	25	75	0.10	25
Forest Marble Formation	20	26	100	0.05	22

a. Estimated, based on the recommendations of BS 8004-2015.
b. Internal friction (φ') values for the cohesive in-situ material derived from BS 8004-2015, where φcv' is derived from plasticity index. The use of φcv' in the analysis is considered to provide a conservative estimate of φ'.BS 8002:1994 Code of practice for Earth retaining structures, British Standards institution.
c. Site measurements and laboratory data.
d. Laboratory data.
e. Based upon the equilibrium long term CBR from CD255..

In accordance with BS EN ISO 1997-1 (EC 7), Hydrock consider the proposed earthworks would be classified as Category 2 structures. As part of the separate geotechnical design, the designer should determine the geotechnical design values.

6.3 Groundwork

6.3.1 Site preparation

The site is previously undeveloped and no buried man-made obstructions were encountered by this investigation. However, whilst the likelihood of buried obstructions being encountered is low, difficult excavation is anticipated should excavations extend into the rock quality strata.

Topsoil should be removed from beneath all building and hardstanding areas.

6.3.2 Groundworks

Excavation of shallow soils should generally be readily undertaken by conventional plant and equipment. However, excavation through any intact rock quality strata may require heavy-duty excavation plant/ripping plant.

Whilst trial pit faces in the clay soils were noted to remain generally vertical without collapse, when fractured rock was encountered, some spalling was noted. On this basis, random and sudden falls should be expected from the faces of near vertically sided excavations put down at the site, particularly if they are carried down into the fractured rock.

Temporary trench support, or battering of excavation sides, is recommended for all excavations that are to be left open for any length of time and will definitely be required where man entry is required. Particular attention should be paid to excavation at, or close to, site boundaries/adjoining existing roads/structures, where collapse of excavation faces could have a disproportionate effect.

A risk assessment of the stability of any open excavation should be undertaken by a competent person and appropriate measures adopted to ensure safe working practise in and around open

excavations. Further guidance on responsibilities and requirements for working near, and in, excavations can be obtained from the Construction Design and Management Regulations (2015); Construction Information Sheet 47: Inspections and Reports (2005) and HSG47: Avoiding Danger from Underground Services.

To ensure no loads are imposed on the sides of the excavation, spoil should not be placed immediately adjacent to the excavation. Spoil should be placed a suitable distance from the side of the excavation (as assessed by a competent person).

Based on site observations, the rate of water ingress to the proposed excavations is likely to be slow. However, where deep excavation (below approximately 1.6m bgl) is required, for example for deep drainage, then slow to moderate water inflow should be anticipated.

On this basis, for shallow excavations, groundwater control by sump pumping is likely to be sufficient. However, should excavation into the deeper strata, particularly the fractured rock, be required, groundwater control by sump pumping may be insufficient to deal with anticipated flows and alternative methods of dewatering, such as well points should be allowed for.

It should be recognised that groundwater levels may vary from those at the time of the investigation, for example in response to seasonal fluctuations and the timing of construction may dictate the extent of groundwater control required.

Any water pumped from excavations may need to be passed via settlement tanks (to reduce suspended solids) before being discharged to the sewer. Discharge consents may also be required.

6.3.3 *Earthworks/reuse of site-won materials*

Whilst Hydrock has not been provided with the specific requirements for earthworks (cut/fill depths and volumes), it is understood earthworks are proposed at the site. An initial assessment has been completed on the potential to reuse site-won materials as a General Fill material. This is summarised in Table 6.2.

The classification of materials depends on both the proposed end use and whether the material will meet the performance requirements of that end use. Based on Hydrock's understanding, the following assessment is based on General Fill.

Table 6.2: Preliminary earthworks assessment

Stratum	Proposed end use	Preliminary classification (SHW Series 600)	Comment	Suitability for improvement by the inclusion of binders
Topsoil	Open Space	Class 4 (Landscape Fill)	Unsuitable for General Fill due to high organic content. Can only be used in areas which are not sensitive to settlement.	Unlikely to be suitable
Head Deposits	External areas	Class 2 General Fill	Locally may be significantly dry of Optimum Moisture Content (OMC). Moisture conditioning (e.g. wetting down by bowser and	Likely to be suitable, but unlikely to be required.

Stratum	Proposed end use	Preliminary classification (SHW Series 600)	Comment	Suitability for improvement by the inclusion of binders
			rotavator) likely to be required.	
Cornbrash Formation	External areas	Class 2 General Fill[12]	Generally at or close to Optimum Moisture Content (OMC).	Likely to be suitable, but unlikely to be required.
Forest Marble Formation	External areas	Class 2 General Fill[12]	Unlikely to be excavated in significant volumes, due to depth below ground level.	Likely to be suitable, but unlikely to be required.

The earthworks will need to be undertaken under a Materials Management Plan (see Section 8.3).

Before the use of hydraulic binders is approved (if required), comprehensive testing will need to be completed by a specialist Contractor to satisfy both themselves and the Engineer of the suitability of the soils for treatment and to confirm that the requisite end-performance of the material is achievable. In all instances where improvement by the inclusion of binders is considered, a mix design is required and as part of this design, samples should be checked for swelling, even where very low sulfate values are recorded.

Where it is proposed to reuse site won materials as an engineered fill it will be necessary to develop an appropriate site-specific Earthworks Specification. The basis for the Specification should be BS 6031:2009 and the latest version of the SHW, Series 600 Earthworks. Once site proposals have been further defined more specific consideration will need to be given to the reuse of materials and reference should be made back to Hydrock.

6.3.4 Consolidation settlement from land raising

It is understood that some site levels are to raised, although it is not known by how much. This is likely to lead to consolidation settlement of the underlying natural clays. However, unless significant thicknesses of fill are placed (considered unlikely) settlements are likely to be relatively small.

A separate geotechnical design will be required to fully assess the impact of settlement and to design the ground improvement works. Site monitoring during the earthwork construction will be required to confirm the required settlements has been achieved.

6.4 Slope stability

Whilst there are no significant existing slopes on the site, it is possible that following the earthworks, there may be. Should this prove to be the case, slope stability will need to be considered as part of the detailed geotechnical design.

6.5 Retaining walls

It is possible that following the earthworks, there may be a requirement for retaining structures. Should this prove to be the case, and they are greater than 2.0m high, they will need to be considered as part of the detailed geotechnical design.

[12] Care will be required on excavation to ensure that oversize fragments of rock are not mixed with otherwise suitable clay.

It is recommended that any required retaining walls are individually designed using site-specific design criteria, assessed as part of the required geotechnical design. Associated as-built records will be required for verification purposes.

Allowance should be made in any design of the retaining walls for adequate drainage behind the structure, or for water seepage through the face of the wall. The overall stability of the retaining wall is not considered in this report. The stability of the retaining wall should be considered in the design process.

6.6 Foundation recommendations – residential properties

This section provides recommendations for the foundations for houses, garages and related buildings, based on the current NHBC Standards (2023).

The houses and (if to be built) flats proposed for the main site are currently considered to Geotechnical Category 1. Preliminary foundation recommendations for the foundations for houses and related buildings in this section are based on the geotechnical parameters provided in Section 6.2.

The permissible bearing pressures for foundations quoted for Category 1 structures in this report take into consideration traditional factors of safety against the risk of shear failure of the ground and should prevent undue or excessive total and differential settlement from the anticipated structural loadings.

6.6.1 Foundation types

On the basis of the ground conditions indicated from the current investigation, strip/trench fill foundations should be suitable across all areas of the main site. However, this does not take into account any filling works to bring ground levels to finished level, as finished levels have not been provided. This report will therefore need to be updated once finished ground levels and the proposed housing layout have been finalised.

Once finished ground levels and the proposed housing layout have been finalised a Foundation Zonation Plan will also be prepared.

6.6.1.1 Trench fill/strip foundations

Strip or trench fill foundations should be constructed below any Made Ground and at least 300mm into the undisturbed natural firm (or better) clay of the Head Deposits or Cornbrash Formation.

A permissible net bearing pressure of 100kN/m^2 is considered appropriate.

If enlarging the foundations is considered (for example because loads are such that the quoted bearing pressure is inadequate) this could lead to increased settlements and the above recommendations should be reviewed.

Based on the worst-case (Cornbrash Formation soils) NHBC volume change potential (medium), the minimum founding depth for strip or trench fill foundations is 0.9m below ground level, and to below the base of the Made Ground. Where fill is to be placed, foundations should be constructed at least 0.9m below original ground (pre-filling). If cut is proposed, should be constructed at least 0.9m below finished ground (post-cut).

Where close to trees, foundations will need to be deepened to below the depth of influence of the trees, and visible roots. Care should be taken when deepening foundations to allow for tree influence, as shrinkable clay soils locally underlie intact, or fractured rock strata that might otherwise be considered suitable founding formations.

Where foundation depths are stepped, for instance to match changes in depths due to trees or changes in ground conditions, the steps should be designed in accordance with the requirements of the NHBC Standards.

If trees are to be removed, the roots should be grubbed out and foundations extended to below the zone of disturbance created by this activity and to below any remaining root hairs. In addition, deepening of foundations in accordance with NHBC Standards will be required where strip or trench fill foundations are within the zone of influence of existing, removed or proposed trees and proposed shrub planting. A tree survey should be undertaken by an arboriculturist in accordance with BS 5837:2012 to identify the type, and height of existing trees on the site and including any off-site trees, which could have an effect on foundation design.

Where foundations are within the zone of potential desiccation from trees and are deeper than 1.5m bgl, a suitable compressible material or void former will be required on the inside faces of foundations to external walls and beneath ground bearing floor slabs.

Excavation of trench fill foundations in excess of 2.5m bgl is unlikely to be economic and may be impracticable to undertake due to fractured rock strata, which may result in trench collapse.

If foundations in excess of 2.5m depth are proposed, they should be designed by a Structural Engineer in accordance with the requirements of the NHBC Standards (Chapter 4.2.8) and NHBC Technical Requirement R5.

Hydrock recommends when trench fill foundations are deeper than 2.5m due to tree influence, the design should take into account soil desiccation risk assessed by plot-specific testing.

Foundation formations should be inspected by a geotechnical engineer or other suitably competent person to ensure the founding conditions are suitable and as indicated in this report. Any formation materials deemed as unsuitable should be excavated and replaced with lean mix concrete or deepened to suitable strata. If this is not possible, alternative solutions (such as piling) should be undertaken.

As the ground conditions at formation level are likely to be of variable type and stiffness (clays and weathered rock), it is recommended that foundation concrete should be reinforced with mesh, installed at the top and bottom of the foundation, across the zone of variable soil conditions.

Foundation excavations should be protected from rainfall, inflow of surface water, frost and freezing conditions. They should also be protected from drying out in hot dry weather.

Groundwater monitoring indicates generally low groundwater flow. Any water that collects at the base of the foundation excavations should be removed by pumping from a sump in the base. If significant inflow of groundwater is encountered (for example due to deepening into fractured rock) more extensive dewatering may be required to allo0w foundation construction.

The Cornbrash Formation, and if encountered, the Forest Marble Formation are over consolidated clays, which can swell and soften in contact with water. Therefore, care will be required to ensure that foundation excavations are kept as free of water as practicable. Foundation concrete should be poured as soon as practicable after excavation.

6.6.1.2 Piled foundations

Should deepening of foundations due to tree influence, or due to depth of fill, mean that founding depths in excess of 2.5m are required, piled foundations are recommended.

Depending on column loads and layouts, piles should extend through any Made Ground and soft to firm clay soils, to a suitable depth into the underlying Cornbrash/Forest Marble.

Driven piles/bored piles with the use of casing/CFA piles should be suitable to support the foundations for the houses. However, the choice of piling system should be undertaken by a

specialist piling Contractor and the design of piles is beyond the scope of this report. The decision on pile type and design should take into account the following factors relevant to the site:

- Rock quality strata are expected which could cause piles to stop shallower than the design depths, or to deviate from the vertical, thereby reducing their capacity. In some circumstances, this could lead to pile breakage.
- Hard driving may be necessary to penetrate intact rock at shallow depth known, or suspected to be underlain by clay soils.
- Groundwater levels are in the range 1.15 – 2.31m bgl (92.67 to 84.25m OD) and temporary casing is likely to be required for bored piles. If CFA piles are used, concrete is placed as the auger is withdrawn, which can balance the water pressure if the operation is undertaken carefully.
- Piles should extend a minimum of five pile diameters into the bearing stratum to mobilise sufficient end-bearing resistance to carry the required loads without unacceptable settlement.
- Where piles are to be constructed through compressible soils that have had ill placed over them, they be designed to cater for the potential down-drag effects of negative skin friction from the secondary consolidation of both the recently placed fill and the underlying clays.
- Where foundations are constructed on clay soils within the influencing distance of trees design should include for the upper section of the pile to be sleeved or additional length allowed for to resist stresses from clay swelling or shrinkage. In addition, heave protection may be required on the inside faces and underside of the ground beams.

6.7 Foundation recommendations – 'mixed use neighbourhood centre'

6.7.1 Foundation types

On the basis of the ground conditions indicated from the current investigation, strip/trench fill foundations should be suitable for the 'mixed use neighbourhood centre'. However, this does not take into account any filling works to bring ground levels to finished level, as finished levels have not been provided. This report will therefore need to be updated once finished ground levels and the proposed housing layout have been finalised.

6.7.1.1 Trench fill/strip foundations

Strip or trench fill foundations should be constructed as detailed for residential properties above, with all the same caveats and precautions. A permissible net bearing pressure of 100kN/m^2 is considered appropriate.

6.7.1.2 Pad foundations

Should the 'mixed use neighbourhood centre' be designed as a framed building, pad foundations may be a more suitable founding solution.

A permissible net bearing pressure of 100kN/m^2 is considered appropriate.

If enlarging the foundations is considered (for example because loads are such that the quoted bearing pressure is inadequate) this could lead to increased settlements and the above recommendations should be reviewed.

Based on the worst-case (Cornbrash Formation soils) volume change potential (medium), the minimum founding depth for strip or trench fill foundations is 0.9m below ground level, and to below the base of the Made Ground. Where fill is to be placed, foundations should be constructed at least 0.9m below original ground (pre-filling). If cut is proposed, should be constructed at least 0.9m below finished ground (post-cut).

Deepening for tree influence, stepping of foundations and reinforcement across zones of different material type and/or stiffness should be undertaken in line with the recommendations above for strip/trench fill foundations for residential properties.

Excavation of pad foundations in excess of 2.5m bgl may be economic, but may still be impracticable to undertake due to fractured rock strata, which may result in excavation collapse.

If foundations in excess of 2.5m depth are proposed, they should be designed by a Structural Engineer, taking into account soil desiccation risk assessed by pad-specific testing.

Foundation formations should be inspected by a geotechnical engineer or other suitably competent person to ensure the founding conditions are suitable and as indicated in this report. Any formation materials deemed as unsuitable should be excavated and replaced with lean mix concrete or deepened to suitable strata. If this is not possible, alternative solutions (such as piling) should be undertaken.

Foundation excavations should be protected from rainfall, inflow of surface water, frost and freezing conditions. They should also be protected from drying out in hot dry weather.

Groundwater monitoring indicates a generally low groundwater flow. Any water that collects at the base of the foundation excavations should be removed by pumping from a sump in the base. If significant inflow of groundwater is encountered (for example due to deepening into fractured rock) more extensive dewatering may be required to allo0w foundation construction.

The Cornbrash Formation, and if encountered, the Forest Marble Formation are over consolidated clays, which can swell and soften in contact with water. Therefore, care will be required to ensure that foundation excavations are kept as free of water as practicable. Foundation concrete should be poured as soon as practicable after excavation.

6.7.1.3 Piled foundations

Should deepening of foundations due to tree influence, or due to depth of fill, mean that founding depths for trench fill or pad foundations are excessive, impractical or uneconomic, piled foundations are recommended.

The recommendations and caveats noted for piled foundations for residential properties apply equally to the 'mixed use neighbourhood centre'.

6.8 Working platform

A working platform will be required prior to the arrival on site of tracked piling plant. This should be designed and installed in accordance with BR470 (BRE 2004) based on data on the specific plant in accordance with an FPS certificate for the rig loadings.

6.9 Ground floor slabs - residential properties

In accordance with the NHBC standards, as Made Ground greater than 600mm thick and clay soils of medium volume change potential are present at the site, it is recommended that suspended floor slabs with a void be adopted.

6.10 Ground floor slabs - 'mixed use neighbourhood centre'

No details of the 'mixed use neighbourhood centre' have been provided so only generalised recommendations can be provided.

If practicable a suspended ground floor as outlined above for the residential properties, should be adopted for this building(s). If this is required, depending on the size of the building(s) and therefore the span of the floor, it is possible that the floor slab may have to be piled.

Slabs without a void (ground bearing or suspended cast in situ onto the ground) may be used if all of the following criteria are satisfied:

- the minimum foundation depth (allowing for the influence of trees) is less than 1.5m;
- any fill is suitable, well-compacted granular material and less than 600mm thick;
- it is demonstrated that the soils are not desiccated and are at their equilibrium moisture content; and
- ground floor construction is not undertaken when the surface soils are seasonally desiccated (i.e. during summer and autumn).

Another alternative would be local excavation and re-engineering of the upper layers of clay, to mitigate any desiccation effects and the adoption of a ground bearing slab. However, this is only likely to be suitable if the slab is entirely outwith the influence of trees.

Alternatively, if significant earthworks are proposed in this section of the site, consideration could be given to the placement of structural (as opposed to general) fill in the area of the proposed building(s) and a ground bearing slab adopted.

The floor slab should be designed by a structural engineer and a limit state assessment undertaken as part of the geotechnical design.

Prior to the placement of the founding materials and the construction of the ground bearing floor slab, the sub-formation and formation will need to be inspected and checked by a competent person to ensure the ground conditions at time of construction are consistent with the Specification and the design parameters derived from this ground investigation. Testing should be undertaken in accordance with The Concrete Society Technical Report 34 (The Concrete Society 2013) and DMRB IAN 73/06. It is recommended that the verification of the sub-formation and formation include, as a minimum, the measurement of modulus of sub-grade reaction (k) determined by static plate load testing.

6.11 Roads and pavements

Based on the test results and subject to *in situ* testing during construction, it is considered likely an equilibrium CBR of 2.5% will be achievable on the natural soils over the majority of the site.

Proof rolling of the formation level will be required and any loose or soft spots should be removed and replaced with an engineered fill, in accordance with a suitable Specification. The formation level will also need to be protected during inclement weather from deterioration; all slopes should be trimmed to falls to shed rain water and the surface sealed to limit infiltration.

Prior to the placement of the founding materials and the construction of the road pavement, the sub-formation and formation will need to be inspected and checked in accordance with a suitable specification to ensure the ground conditions are as expected. All testing should be carried out in accordance with DMRB IAN 73/06 to confirm that the ground conditions at time of construction are consistent with the previous design parameters.

Where the CBR is found to be less than 2.5%, the sub-grade may be unsuitable for both the trafficking of site plant and as support for a permanent foundation, without improvement works being undertaken. Improvement works should be carried out in accordance with DMRB IAN 73/06 Rev 1 Chapter 5.

In summary, consideration may be given to the following potential remedial techniques:

- excavation and re-engineering or replacement of weaker soils;
- the inclusion of geosynthetic reinforcement within the unbound layers of the capping and sub-grade; or

- where cohesive soils are present and they are deemed suitable for treatment with hydraulic binders, to employ modification and/or stabilisation techniques on the formation.

The design CBR for road/pavement design on newly placed fill will be dependent on the degree of compaction achieved.

6.12 Drainage

Indicative permeability values are presented in Appendix C and are summarised in Table 5.5.

Whilst these values do not equate to soil infiltration rates, they indicate that soakaways are unsuitable for the site. However, the infiltration rates recorded may assist with attenuation as part of a Sustainable Urban Drainage System (SUDS).

6.13 Buried concrete

Based on guidelines provided in BRE Special Digest 1 (BRE 2005) and the information presented in Section 5.6.10 (Table 5.15), the shallow soils (Head Deposits, Cornbrash Formation and Forest marble Formation) can all be classified as Design Sulfate Class DS-1 and ACEC Class AC-1s (AC-1 for the Made Ground).

This equates to a Design Chemical Class[13] of DC-1.

The designer should check and confirm the classification of concrete using the information presented in Appendix B and Appendix C during the design.

[13] The calculated ACEC class can be used in accordance with BS 8500-1+A2 (2019), Table A.9 to select the Designated Concrete (DC) class for an intended working life of 50 years. However, the designer is referred to BS 8500-1+A2 (2019), for full details and notes to Table A.9, including any Additional Protective Measures (APMs).

7. Geo-environmental assessment

7.1 Updated conceptual model

7.1.1 Updated ground model

The initial conceptual site model developed from the desk study and field reconnaissance survey Section 3 has been updated using the findings of the ground investigation and is presented in Cross-ref (usually Section 5). This CSM is the basis for the geo-environmental assessment presented in this section.

7.1.2 Updated exposure model

Following the ground investigation, the plausible contaminant sources, receptors and pathways identified in the preliminary geo-environmental exposure model (Section 3) have been updated or confirmed as follows.

7.1.2.1 Sources

The following potential source has been added to the exposure model.

- Made Ground associated with the track in the centre of the site, possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials (ACM), polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (S12).
- General Made Ground across both the main site and additional works areas, possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials (ACM), polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (S13)
- Potential asbestos containing materials associated with the abandoned house and garage on site. (S14)

7.1.2.2 Receptors

No receptors have been removed from, or added to, the exposure model.

7.1.2.3 Pathways

No pathways have been removed from, or added to, the exposure model.

Using the updated ground model and updated exposure model, generic risk assessment is undertaken as presented below.

7.2 Risk assessment approach

Using the updated CSM, a Tier 2 generic quantitative risk assessment (GQRA) for identified receptors based on all media sampled has been undertaken in accordance with the principles of LCRM.

Firstly, the risks associated with the identified potential contaminant linkages have been estimated using standardised methods (typically involving comparison of site data with published 'screening values'). Secondly, where screening values are exceeded, the result has been evaluated in an authoritative review of the findings with other pertinent information to determine whether or not the exceedance is or is not acceptable in the site-specific circumstances.

The data sets used in the assessment comprise the analytical results obtained by Hydrock as listed in Section 5.

In cases where potentially unacceptable risks are indicated and/or the land is potentially unsuitable for its intended use, actions such as more advanced stages of risk assessment (Tier 3, detailed quantitative risk assessment (DQRA)) or remediation are proposed in Section 7.10.

7.3 Human health risk assessment

7.3.1 Soils Assessment

7.3.1.1 Generic Assessment Criteria

The soil screening values used are generic assessment criteria (GAC) (i.e. derived in accordance with EA CLEA guidance (2009) using the updated exposure model detailed in Defra SP1010 (2014), with the exception of published C4SLs. The term 'GAC' used in this report is inclusive of all generic soil screening values.

Based on the proposed development, generic assessment criteria (GAC) based on a default residential with homegrown produce CLEA land use scenarios have been adopted.

GAC are selected based on the following hierarchy:

- Category 4 Screening Levels (C4SL), where available.
- SoBRA Acute GAC for free cyanide, as acute dose toxicity is the primary risk driver.
- Hydrock GAC, derived by Hydrock as detailed in Appendix E.

The results of the assessment are presented in Appendix E.

7.3.1.2 Data sets

The data sets used in this report are based on the conceptual site model and the proposed development, and are summarised as:

- Made Ground associated with the track in the centre of the site;
- 'General' Made Ground across the site;
- Topsoil;
- natural soils of the Head Deposits;
- natural soils of the Cornbrash Formation; and
- natural soils of the Forest Marble Formation

GAC based on a soil organic matter (SOM) of 2.5% have been adopted for all soils based on laboratory results. Assessment sheets are presented in Appendix E

7.3.1.3 Assessment Results

Based on individual test results that exceed the GAC, the chemicals of potential concern (CoPC) which require further assessment are summarised in Table 7.1.

Table 7.1: CoPC in soils which require further assessment (human health)

CoPC	GAC (mg/kg)	GAC Source	No. samples	Min. (mg/kg)	Max. (mg/kg)	No. samples >GAC
Made Ground associated with the track in the centre of the site						
Benz(a)anthracene	12	Hydrock Derived	15	0.10	34.00	2
Benzo(a)pyrene	5	C4SL - CL:AIRE 2014	15	0.10	28.90	3

Benzo(b)fluoranthene	3.3	Hydrock Derived	15	0.10	32.60	5
Chrysene	22	Hydrock Derived	15	0.10	33.70	2
Dibenz(ah)anthracene	0.29	Hydrock Derived	15	0.10	3.45	5

All samples submitted for analysis of metals, petroleum hydrocarbons (PHCs), and pesticides reported concentrations below the GAC and/or laboratory limit of detection.

As shown in Table 7.1, the CoPC in the Made Ground associated with the track in the centre of the site, are benz(a)anthracene (2 out of 6 samples), benzo(a)pyrene (3 out of 6 samples), benzo(b)fluoranthene (5 out of 6 samples), chrysene (2 out of 6 samples) and dibenz(ah)anthracene (5 out of 6 samples). The presence of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene and dibenz(ah)anthracene in the Made Ground associated with the track requires further consideration.

The phrase 'further assessment required' is used to denote soil concentrations that exceed a GAC. This does not necessarily mean that the soil is 'contaminated' or not otherwise suitable for use. The assessment and any mitigation required are to ensure the site does not pose an 'unacceptable risk' as defined under Planning and Part 2A of EPA 1990.

7.3.2 Asbestos

Asbestos was not identified in any of the laboratory testing of soil samples.

7.3.3 Risk evaluation

The screening exercise has identified PAH's in Made Ground associated with the track in the centre of the site, at concentrations above the GAC. These are considered further here to assess if the exceedance may be acceptable with respect to the proposed development. The phrase 'further assessment' does not necessarily mean that the soil is 'contaminated' or not fit for use.

7.3.3.1 PAH's in the Made Ground associated with the track in the centre of the site

There are a number of PAH's in exceedance of the GAC's for a residential with home grown produce (2.5% SOM) land use including:

- Benzo(a)anthracene at a maximum UCL of 34mg/kg above the GAC of 12mg/kg, recorded in samples taken from HP01 and HP05.
- Benzo(a)pyrene at a maximum UCL of 28.90mg/kg above the GAC of 5mg/kg, recorded in samples taken from HP01, HP02 and HP05.
- Benzo(b)fluoranthene at a maximum UCL of 32.60mg/kg above the GAC of 3.3mg/kg, recorded in samples taken from HP01, HP02, HP03 and HP05.
- Chrysene at a maximum UCL of 33.70mg/kg above the GAC of 22mg/kg, recorded in samples taken from HP01 and HP05.
- Dibenz(ah)anthracene at a maximum UCL of 3.45mg/kg above the GAC of 0.29mg/kg, recorded in samples taken from HP01, HP02, HP03 and HP05.

There are PAH's in exceedance of the GAC's in four out of the five samples taken along the track. Hydrock considers that the Made Ground associated with the track on site is unsuitable for a residential with home grown produce land use. In addition, the screening exercise identified that benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenz(ah)anthracene were also in exceedance of the POS GAC's and therefore is unsuitable for a POS end use. If residential with

home grown produce or POS land use is proposed in this area, an engineered cover system is required to break the source-pathway-receptor linkage with regard to human health, related to asbestos and heavy metal contamination.

This Made Ground material would however, be suitable for use underneath areas of hardstanding where direct contact with the soil is impossible. This is due to elevated concentrations of PAH's only presenting a risk to human health if direct contact is possible.

7.4 Phytotoxicity risk assessment

7.4.1 Risk estimation

Priority phytotoxic chemical concentrations have been screened against published values to determine the likely risk to plant growth (phytotoxic GAC). Phytotoxic GAC based on a pH of >7% have been adopted for all soils based on laboratory results.

As with human health, individual sample test results are compared directly with the phytotoxic GAC.

Results indicate that all CoPC are below the relevant phytotoxic GAC, therefore the contaminant linkage is incomplete.

7.5 Pollution of controlled waters risk assessment

7.5.1 Risk estimation

The risks to groundwater and surface water from contaminants on site have been assessed in accordance with the Environment Agency (2006) Remedial Targets Methodology (RTM).

Site contaminant loadings are compared with relevant screening values (Water Quality Targets(WQTs), which are linked to the CSM.

Acceptable WQT are defined for protection of human health (based on Drinking Water Standards (DWS)) and for protection of aquatic ecosystems (Environmental Quality Standards (EQS)).

As related specifically to this site, the data are compared with criteria selected in accordance with the methodology presented in Appendix E. This methodology involves selecting which of several alternative risk scenarios apply in this case. The assessment is presented in

Table 7.2 below, with the justification for the scenarios selected explained in the following text:

- Cornbrash Formation secondary A aquifer.
- Forest Marble Formation is a principal aquifer.
- There is a drainage ditch running down the centre of the site
- There is a pond just off the north eastern corner of the site, however this pond is up slope of the site and at very low risk of groundwater on site leeching into it,

Table 7.2: Summary of water quality risk assessment protocol

Hydrock scenario	Water body receptors	Secondary receptors	Example contaminant linkages	RTM level and data used	Water quality targets
D	Groundwater Surface water.	Human health (abstraction).	Contaminants from site leach or seep into a groundwater body that feeds inland surface	RTM Level 2 - Groundwater. Direct comparison of	DWS EQS (inland)

Hydrock scenario	Water body receptors	Secondary receptors	Example contaminant linkages	RTM level and data used	Water quality targets
		Aquatic ecosystem.	water by base flow. The surface water may be used for human consumption and is an aquatic ecosystem.	surface water samples	

Notes:

Some EQS are water hardness dependent. This is measured either in the receiving surface water or in groundwater (if it is part of the pathway), or is estimated from national maps.

Inland waters EQS applicable to freshwater, 'other' waters EQS applicable to coastal or transitional waters.

This table and the results of the assessment are considered as a first screening for potential risks of pollution of Controlled Waters. More specific requirements may be stipulated by the relevant Agency.

The results of the screening assessment are presented in Appendix E and are summarised in Table 7.3.

In some instances, the reporting limit (or detection limit) quoted by the laboratory may be greater than the WQT that it is being assessed against. As the current exercise is an initial screening assessment, further assessment of these elements has not been undertaken.

Table 7.3: CoPC which require further assessment (controlled waters)

CoPC	WQT (µg/l)	Basis for WQT	No. samples	No. samples above LoD	Min. (µg/l)	Max. (µg/l)	No. samples exceeding WQT and above LoD
Shallow groundwater in the Cornbrash Formation and Forest Marble Formation							
Copper	1	EQS	5	5	0.7	2.7	4
Nickel	4	EQS	5	5	5	6.5	5
Lead	1.2	EQS	5	5	0.7	2.3	4
Free Cyanide	1	EQS	5	5	1.5	5.1	5

Note: the maximum recorded value is compared with the water quality target.

7.5.2 Risk evaluation

The EQS for copper, nickel, lead and free cyanide are exceeded as shown above in Table 7.4.

Whilst there are exceedances of the water quality targets, these exceedances are considered not to represent a significant risk of pollution of Controlled Waters from an on-site source as there is no

evidence of artificial accumulations of these substances on the site. Either they originate from the natural geology (Shand et. al. 2007) or they represent inflow from an off-site source. +

Furthermore, the inland waters EQSs for copper, nickel and lead are based on the bioavailable fraction and because bioavailability has not been calculated for these metals the assessment is conservative as it assumes 100% bioavailability.

It would be technically challenging and probably disproportionately costly to remove these natural contaminants from the water or to prevent further infiltration.

Hydrock believes that the risks to Controlled Waters do not need further consideration.

7.6 Ground gases risk assessment

7.6.1 Data

It is judged from the available evidence that the gas generation potential at the site is negligible and as such the monitoring regime suggested by CIRIA is not proportionate to the risk. The justification for this is there are no landfills are located within 500m of the site and there is no evidence of significant thicknesses of biodegradable or Made Ground material on the site. However, three monitoring rounds over three weeks have been undertaken to confirm the insignificant nature of risk.

Hydrock has undertaken the three monitoring rounds, including during periods of falling, but not low atmospheric pressure. As such, the conclusions presented below are not considered to approximate to worst-case conditions.

7.6.2 Assessment

The risks associated with the ground gases methane (CH_4) and carbon dioxide (CO_2) have been assessed using BS 8485:2015 +A1:2019, which cites the guidelines published by CIRIA (C655, 2007) (known as Situation A).

There is an alternative assessment method described by the NHBC (2007) which is referenced in BS8485 as good practice guidance and is directly relevant to residential houses built under the NHBC scheme with beam and block construction ground floors. As this building construction design is not applicable for the planned development being considered in this report the risk assessment has been carried out using the characteristic situation approach detailed in BS 8485.

The assessment guidelines set out in Table 2 of BS 8485 are based on interpretation of the gas concentrations and the gas flow rates. The quantitative assessment has been carried out by comparing the individual gas concentrations and gas screening values (GSV[14]) in Appendix A with the published CS thresholds (BS 8485 Table 2), in addition to a worst-case GSV assessment in accordance with section 6.3.7 of BS 8485. The assessment is summarised in Table 7.4 and the full assessment is presented in Appendix D.

In addition, Table 7.4 summarises a ternary plot assessment of the data (assessment of ground gas ratios (O_2 + N_2, CO_2 and CH_4)), undertaken in general accordance with guidance by Wilson et. al. (2018). The ternary plot assessment is presented in Appendix D.

Table 7.4: Ground gas risk assessment

	Min	Max	Typical [(i)]	Comment
Steady Flow Rate (l/hr)	0	0.8	<1	87.5% of the steady flow rates are <0.01.

[14] Note: GSV is synonymous with 'site characteristic hazardous gas flow rate' (Q_{hgs}) of BS 8485:2015 +A1:2019 Table.

	Min	Max	Typical [i]	Comment
Methane (%)	0.1	0.1	<1	There are no concentrations of methane elevated above 1% and no concentrations of carbon dioxide, elevated above 5%. Assessment of the data on a ternary plot of ground gas ratios (O_2 + N_2, CO_2 and CH_4), in accordance with guidance by Wilson et. al. (2018), indicates the ground gas present is likely to represent fresh air.
Carbon Dioxide (%)	0.2	3.6	<5	
Carbon Monoxide (ppm)	0	2	>1	-
Hydrogen Sulphide (ppm)	0	1	>1	-
Oxygen (%)	16.7	19.8	<17	-
Carbon Dioxide GSV based on Maximum Values (Site) (l/hr)	0	0.00027	<0.07	CS1
Methane GSV based on Maximum Values (Site) (l/hr)	0	0.0008	<0.07	CS1

[i] Hydrock assume that values are considered to be atypical if 95% or more of the remaining data are less than the value under consideration

For the purposes of the calculation, where the recorded gas flow rate is below the manufacturer's limit of detection for the instrument used, the detection limit has been adopted for the gas flow rate.

As indicated in Table 7.4, the computed GSV for carbon dioxide and methane indicates CS1 conditions and methane and carbon dioxide at concentrations are 'typically' below 1% and 5% respectively. As such, the site is classified as Characteristic Situation 1 (Situation A).

Based on the data no mitigation measures are required.

7.6.3 Off-site risks from carbon dioxide and methane

The National Planning Policy Framework requires that a developed site should be incapable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990. This position includes a consideration of the potential for off-site migration of ground gases that may impact on adjacent properties.

Consequently, it may be necessary to consider the imposition of measures to protect adjacent, off-site receptors. In this case due to the negligible ground gas level recorded, this is not required.

7.7 Construction materials risk assessment

7.7.1 Water pipelines

A formal water pipe investigation and risk assessment is beyond the scope of this report. However, the findings of this investigation have been compared to the threshold values in Water UK HBF (2014), Table 1 as far as is practicable.

The site is predominantly previously undeveloped, with a small area of Made Ground associated with the track in the centre of the site. Assessment has indicated no exceedance of the threshold

values in the greenfield part of the site therefore standard pipework is considered suitable, subject to agreement with the water supply company.

However, in the area surrounding the Made Ground track on site, a number of the threshold values for petroleum hydrocarbons are exceeded. Therefore, barrier pipes are required for water pipelines installed in this material, subject to agreement with the water supply company.

7.7.2 Other construction materials

Plastic pipes for drains and sewers are manufactured from unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) or polyethylene (PE). These materials may be affected by the presence of organic compounds in the soil.

In accordance with the British Plastics Federation Guidance (August, 2018), in the greenfield areas of the site, concentrations of PAH, and BTEX are below 100mg/kg and concentrations of petroleum hydrocarbons (TPH) are below 200 mg/kg, PVC-U, PP or PE pipework is considered suitable.

In accordance with the British Plastics Federation Guidance (August, 2018), in the Made Ground track material, concentrations of PAH are above 100mg/kg and the concentrations of petroleum hydrocarbons (TPH) are above 200 mg/kg, the pipework manufacturer should be consulted with regard the suitability of the pipework.

The implications for buried concrete are discussed in Section 6.13.

7.8 Contamination risks to ground workers

7.8.1 Introduction

Whilst risks to construction workers are not discussed in detail, the following section discusses potential risks that should be considered.

Information presented in this document is provided to assist in managing the risk associated with contamination in soil and groundwater at the site but is not definitive. The Contractors are responsible for undertaking their own assessments and assessing what risks are present and what control measures are required.

Task specific risk assessments and method statements should be in place, and risks and required mitigation measures communicated to all relevant personnel prior to the works commencing. Appropriate PPE and, if required, RPE should be provided and utilised.

7.8.2 Metals, metalloids, PAH and petroleum hydrocarbons

The soils contain PAH's recorded as pervasive concentrations throughout the Made Ground associated with the track in the centre of the site.

7.8.3 Ground Gas

It is noted that concentrations of carbon dioxide (an asphyxiant) in the soil exceed HSE Workplace Exposure Limits for personnel in the working environment of 1.5% for short term (15 minutes) exposure and 0.5% for long term exposure. Furthermore, soil concentrations of oxygen are below the HSE recommendations of 18%.

Soil gas concentrations are not necessarily reflected by those in the breathing zone, as such, all Contractors and maintenance workers should be made aware of the possible presence of carbon dioxide and should take all necessary health and safety precautions when working in trenches or confined spaces.

7.8.4 Asbestos

As no clearly identifiable ACM has been seen during the site walkover or during the ground investigation and no fibres have been detected in soil samples analysed by laboratory testing, CAR2012 does not apply. The contractors should undertake a watching brief during the works. If any suspect material is encountered, works in that area of the site should stop, the area fenced off and Hydrock should be notified.

7.9 Findings of the generic contamination risk assessments

The potential sources, pathways and receptors identified in the desk study (27141-HYD-XX-XX-RP-GE-1001-S2-P01) have been investigated (Sections 5 and 0) and assessed (Sections 7.2 to 7.7). A Source-Pathway-Receptor linkage assessment has been undertaken and is presented in Appendix G (Table K.2).

A summary of the Source-Pathway-Receptor (SPR) contaminant linkages for which the risks may be unacceptable and require mitigation (those that are moderate or higher) are discussed in

Table 7.5.

Table 7.5 assumes the following SPR linkages which have been discounted (subject to agreement) at the risk evaluation stage are confirmed by the regulators and the warranty provider as not requiring further consideration (mitigation). If these assumptions are not agreed during regulatory discussions, the conclusions as noted in

Table 7.5

Table 7.5: Residual risks following risk evaluation

Contaminant Linkage				Comments	
Pollutant Linkage	Sources	Pathways	Receptors	General	Mitigation
PL 1.	Pervasive PAH's in the Made Ground associated with the track in the centre of the site.	Ingestion, inhalation or direct contact.	Human health. Water Supply Pipes	Significant exceedance of the GAC in relation to PAH's.	Mitigation required in the form of an engineered cover system in the area of the track should this material remain in place. In addition, barrier pipes are required for water pipelines installed in this material, subject to agreement with the water supply company. If plastic pipes for drains and sewers are to be installed in this material, the pipework manufacturer should be consulted with regard the suitability of the pipework. Alternatively, if this Made Ground material was removed from site or

Contaminant Linkage				Comments	
Pollutant Linkage	Sources	Pathways	Receptors	General	Mitigation
					reused in areas underneath hard-standing, this would break the SPR linkage and no mitigation measure would be required.

7.10 Mitigation measures

The outline remediation strategy presented below is provided for guidance only, and does not represent a 'Remediation Options Appraisal', or a 'Remediation Strategy', prepared in accordance with LCRM (2021).

As shown in

Table 7.5 (and subject to regulatory (and NHBC) agreement), Hydrock consider the following mitigation is required to ensure the site is suitable for use for the proposed end use.

If the Made Ground track is to remain on site:

- The installation of a 600mm engineered cover system, in gardens and 450mm in public open space, comprising a bonded geogrid break layer (e.g. TX160G), subsoil beneath a topsoil thickness of between 150mm and 300mm (PL1).
- Installation of barrier pipework if water pipelines are to be installed. (PL1).
- If plastic pipes for drains and sewers are to be installed in this material, the pipework manufacturer should be consulted with regard the suitability of the pipework (PL1).

If the Made Ground track is to be removed the Made Ground must be removed from site or re-used underneath areas of hardstanding to break the SPR linkage and therefore no mitigation measures are required. (PL1).

The methodology for the remediation should be set out in a Remediation Strategy (which will include the 'Implementation Plan', the 'Verification Plan' and the 'Long Term Monitoring and Maintenance Plan'), which will need to be submitted to the warranty provider and the regulatory authorities for approval.

In addition, the production of a Materials Management Plan and its approval by a Qualified Person will be required to allow reuse of suitable material at the site in accordance with waste regulations.

Verification reports by a competent independent geo-environmental specialist will be required following completion of any remedial works (including ground gas membrane installation).

8. Waste and materials management

8.1 Introduction

The Waste Framework Directive (WFD) (2009/98/EC) defines waste as '*any substance which the holder discards or intends to discard.*' In a geo-environmental context, the waste is most often 'soil' and the two main scenarios are offsite disposal of the material as a waste and/or reuse of the material on site. For cost and sustainability reasons, reuse is preferred to off-site disposal.

Section 8.2 below describes the key issues relating to off-site disposal to landfill and Section 8.3 considers requirements relating to reuse of soils and materials management.

8.2 Waste disposal

8.2.1 Principles

Based on the WFD, any material excavated on site may be classified as waste and it is the responsibility of the producer of a material to determine whether or not it is waste. Where off-site disposal is undertaken, the following guidance applies.

Classification is a staged process:

- A hazardous waste is defined under the WFD as one which possesses one or more of fifteen defined hazardous properties. If a waste is not defined as hazardous, then it is non-hazardous.
- Where the materials are soil, it is then be assigned using the 'List of Waste Codes', which classifies the material as either:
  - hazardous (17-05-03), which is defined as "*soil and stones containing hazardous substances*"; or
  - non-hazardous (17-05-04), which is defined as "*soil and stones other than those mentioned in 17-05-03*".
  - Hydrock utilise the proprietary assessment tool, HazWasteOnline™ to undertake this assessment.
- Waste Acceptance Criteria (WAC) testing is then undertaken if required, and are only applicable following classification of the waste, and only where the waste is destined for disposal to landfill. The WAC are both qualitative and quantitative. The WAC and the associated laboratory analyses (leaching tests) are not suitable for use in the determination of whether a waste is hazardous or non-hazardous.

It should be noted that some non-hazardous wastes may be suitable for disposal at an inert landfill as non-hazardous waste, subject to meeting the appropriate waste acceptance criteria.

It should be noted that classification must be undertaken on the waste produced, by the waste producer. Necessary sampling frequency to adequately characterise a soil population is defined within WM3.

Further discussion with regards to the characterisation process for different scenarios and waste types is provided below.

Topsoil

Topsoil is biodegradable, therefore if it is surplus to requirements and cannot be re-used in accordance with a Materials Management Plan, it cannot be classified as inert. As such, topsoil needs to be classified by a staged assessment and sampling process and would either be classified as hazardous or non-hazardous, depending upon the results of the assessment.

Greenfield sites

Waste from completely greenfield sites may be accepted at a landfill as inert waste if it meets the requirements of paragraph 10 (wastes acceptable without testing at landfills for inert waste) of the Landfill (England and Wales) (Amendment) Regulations (2005) ('the Regulations') can be met. Paragraph 10 of the Regulations states, "*soils may be able to be classified as inert waste without testing, if:*

- *they are single stream waste of a single waste type;*
- *there is no suspicion of contamination and they do not contain other material or substances such as metals, asbestos, plastics, chemicals, etc…..*"

As such, where the site is greenfield and the waste producer is confident about the quality of a soil (i.e. naturally occurring and uncontaminated), further sampling and laboratory testing is not necessary for the Basic Characterisation and this can be undertaken on qualitative Waste Acceptance Criteria testing.

In this instance the waste producer can characterise the waste based on visual assessment and written description of the waste in addition to supporting evidence such as a desk study assessment of the greenfield status. However, it should be noted this characterisation is subject to agreement by the landfill operator who may require testing to be undertaken to confirm classification.

Contaminated or potentially contaminated sites

If the site is brownfield, contaminated or potentially contaminated, the waste must undergo an initial waste classification exercise using background information on the source and origin of the waste and assessment of chemical test data in accordance with Environment Agency Technical Guidance WM3.

If following the initial waste classification exercise, the soils are acceptable for disposal to a non-hazardous landfill, further qualitative Waste Acceptance Criteria (WAC) testing is not required.

However, if soils are potentially able to be disposed to an inert landfill as non-hazardous waste, or require testing to determine if they can be disposed of to a stable non-reactive hazardous or hazardous class of landfill, the next stage of assessment is to undertake qualitative WAC testing. This will determine the Basic Characterisation and the landfill category at which the soils can be accepted.

Hazardous material must be subjected to WAC testing to determine whether it requires treatment before it can be accepted at the hazardous landfill, while non-hazardous material can be tested to determine whether it may be suitable for placement in an inert landfill.

8.2.2 HazWasteOnline™ assessment

As the site is greenfield, HazWasteOnline™ assessment is not technically required. However, it has been undertaken for completeness during the site investigation. The output of the HazWasteOnline™ assessment is provided in Appendix E and a summary of the preliminary waste classification is provided below in Section 8.2.4.

8.2.3 WAC testing

As the site is greenfield, quantitative WAC testing is not required and as such has not been undertaken at this stage. Whilst unlikely, if requested, WAC testing may be required during the Basic Characterisation process required by the Landfill operator for the excavated material prior to disposal.

8.2.4 Preliminary waste disposal options

The site is greenfield (as proven by the desk study assessment and a visual assessment of the soils). However, the HazWasteOnline™ assessment have been undertaken. As long as no unexpected contamination is encountered and if suitable segregation of different types of natural waste streams is put in place, for soils to be disposed of, it is considered that:

- The Made Ground associated with the track is mostly classified (4 out of 5 samples) as non-hazardous based on the HazWasteOnline™ assessment. However, one sample (HP01) is classified as hazardous waste based on HP 3(i): Flammable, HP 7: Carcinogenic and HP11: Mutgenic, further details are included in the HazWasteOnline™ assessment (Appendix E).
- The 'general' Made Ground, topsoil, head deposits, Cornbrash Formation and Forest Marble Formation are likely to be classified as non-hazardous waste.

8.2.5 General waste comments

It should be noted that:

- It is the waste producer's responsibility to segregate the waste at source and waste producers must not mix waste materials/streams or dilute hazardous components, for example by mixing with less or non-hazardous waste on site to meet WAC limit values.
- The above preliminary assessment has been made on the basis of the soils tested as part of the ground investigation, using the HazWasteOnline™ assessment. However, the formal classification of waste can only be undertaken on the material to be disposed of, and by the waste producer and the receiving landfill as license conditions vary from landfill to landfill.
- Basic Characterisation should be undertaken in accordance with Environment Agency guidance by the waste producer. Hydrock can assist if required and this report will assist the characterisation. However, Basic Characterisation does not form part of the current commission and would require further assessment and testing on the wastes actually to be disposed.
- Once the waste producer has undertaken an initial Basic Characterisation on each waste stream, they can manage the soils as part of the on-site processing programme (for example, stockpiling, treatment, screening and separation). The waste producer and landfill operator will then need to agree the suite of compliance testing for regularly generated waste to demonstrate compliance with the initial Basic Characterisation prior to disposal.
- At the time of disposal, additional testing on the excavated soils to be disposed of, will likely be necessary.
- Non-hazardous and hazardous soils require pre-treatment (separation, sorting and screening) prior to disposal.
- The costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material.

- In addition to disposal costs, landfill tax will be applicable. Non-hazardous and hazardous waste will generally be subject to the Standard Rate Landfill Tax. Inert or inactive waste will generally be subject to the Lower Rate Landfill Tax. The landfill tax value changes each April and can be found at https://www.gov.uk/government/publications/rates-and-allowances-landfill-tax/landfill-tax-rates-from-1-april-2013.
- Before a waste producer can move waste to a landfill site for disposal, they need to check the landfill site has the appropriate permit and must have completed the following[15]:
  - Duty of care transfer note / Hazardous Waste consignment note, including comment as to if pre-treatment has been undertaken; and
  - Basic Characterisation of the waste, to include: description of the waste; waste code (using list of wastes); composition of the waste (by testing, if necessary) and; WAC testing (if required).

8.3 Materials management

8.3.1 Introduction

Soils that are to remain on site, should be managed and reused in accordance with a Materials Management Plan (MMP), prepared in accordance with 'The Definition of Waste: Development Industry Code of Practice', Version 2 (CL:AIRE), known as the DoWCoP. Where all aspects of the DoWCoP are followed the soils are considered not to be waste, because they were never discarded in the first place.

Version 2 of the DoWCoP clearly sets out the principles and an outline of the requirements of a MMP. The following compliance criteria must be seen to apply to the MMP for the site:

- Factor 1: Protection of human health and protection of the environment.
- Factor 2: Suitability for use, without further treatment.
- Factor 3: Certainty of Use.
- Factor 4: Fixed Quantity of Material.

The reuse of soils at sites should be considered during the planning and development design process so that compliance with issues such as fixed quantity and certainty of use clearly relate to agreed site levels. Suitability of Use is normally evident from the remediation strategy or the design statement, which form an integral part of a MMP. However, some soils may need to be tested post-excavation to prove they are suitable for use.

Once the MMP is finalised, it must be declared by a Qualified Person (QP). The Declaration is an on-line submission as part of which the QP is required to confirm that the declaration is being made before the relevant works have commenced (i.e. it is not a retrospective application).

Once all material movements have been completed in accordance with the MMP a verification report must be produced, kept for 2 years and provided to the EA on request.

It should be noted that failure to comply with the requirements of the DoWCoP when re-using materials has potentially significant consequences for the waste holder. The risk is that the reused materials are still regarded as a waste that has been illegally deposited. From 1 April 2018, the scope of Landfill Tax has been extended to sites operating without the appropriate environmental disposal permit, and operators of illegal waste sites will now be liable for Landfill Tax. Further

[15] ENVIRONMENT AGENCY. November 2010. Guidance on waste acceptance procedures and criteria. Waste acceptance at landfills. The Environment Agency.

information is available at: https://www.gov.uk/government/publications/landfill-tax-disposals-not-made-at-landfill-sites/landfill-tax-disposals-not-made-at-landfill-sites.

If soils are excavated and reused on sites (or moved to another site) without a MMP, exemption, or appropriate Permit in place, anyone who knowingly facilitates the disposal may be *'jointly and severally liable'* to any assessment of tax, fines or prosecution.

8.3.2 Materials management scenarios

The materials management scenarios present on site are discussed below.

It should be noted that more than one scenario may apply, dependent upon where the soils are proposed for reuse.

8.3.2.1 Clean, naturally occurring materials – reused on the site of origin

Where soils are naturally occurring, uncontaminated and are reused on the site they are excavated (i.e. greenfield site with documented site history, with no Made Ground), they will fall outside the Waste Framework Directive (WFD) (i.e. they will not be a waste when reused on the site of origin).

However, there needs to be certainty of that reuse, and evidence is necessary to support this strategy, for example through information provided during the planning process. The onus is on the developer to demonstrate that the materials are not a waste and will never become a waste. As such, a Materials Re-use Strategy is recommended to show certainty. Alternatively, if the volume of material is under 1,000 tonnes, then a U1 waste exemption may be applied for from the Environment Agency.

It may be noted that some 'clean naturally occurring materials' may still fail the 'suitable for use' test, for example, soils with a naturally high organic content may not be suitable for use because of their propensity to produce ground gases such as methane. Rules regarding other more unusual circumstances such as where natural soils contain an unacceptably high mineral content are described in the DoWCoP.

8.3.2.2 Clean, naturally occurring materials – transferred to other sites

Where soils are naturally occurring, uncontaminated and are transferred to other sites (i.e. direct transfer), they will not become waste as long as the transfer is undertaken in accordance with the DoWCoP. A MMP must be prepared for the receiving site and the materials movement must be noted in the MMP of the Donor site. This movement must have been declared to CL:AIRE prior to the works commencing.

8.3.2.3 Made Ground and other contaminated soils

On sites where Made Ground or contaminated soils are present, any soils excavated will be a waste as soon as they are excavated (even if they are clean, naturally occurring materials), unless they are subject to reuse in accordance with the DoWCoP. As such, for any brownfield site or a site where Made Ground is present and soils are being moved and reused, the materials could be deemed a waste, subject to either:

- a Materials Management Plan (MMP), to prevent the material being classified as a waste following reuse; or
- an exemption (for limited volumes); or
- an environmental permit, dependant on its status.

Other commonly occurring circumstances are:

If Made Ground is being moved between sites, it must be ensured that appropriate permits are in place to ensure the soils are not classified as a waste. Made Ground cannot be moved between sites under DoWCoP alone and would require relevant permits as part of the MMP documentation for the Hub site the material is being treated at.

8.3.2.4 Made Ground and other contaminated soils

All recycled materials (6F2 etc.) must be produced under the 2013 WRAP 'Quality Protocol: Aggregates from inert waste', whether on site or off-site. If they are not, they will be deemed a waste and can only be used on site under a permit. More information can be found at https://www.gov.uk/government/publications/quality-protocol-production-of-aggregates-frm-inert-waste.

8.3.2.5 Geotechnical improvement requirements

Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties e.g. lime / cement modification, are not generally regarded as waste treatment operations and do not require a permit.

However, should processing be needed (such as screening, treatment or improvement), that would constitute a waste activity and require a mobile treatment permit. This may be as simple as removing oversize material with an excavator bucket, to using a riddle bucket to remove hardcore to full mechanical screening.

9. Uncertainties and limitations

9.1 Site-specific comments

Overhead services and underground services are present across the main site and additional works areas. Therefore areas around known services were not investigated as exploratory hole positions had to be located a minimum horizontal distance of 9m away from known underground and overhead services.

9.2 General comments

Hydrock Consultants Limited (Hydrock) has prepared this report in accordance with the instructions of Cala Homes (Cotswolds) Limited and Legal & General Homes (the Client), by e-mail under the terms of appointment for Hydrock, for the sole and specific use of the Client and parties commissioned by them to undertake work where reliance is placed on this report. Any third parties who use the information contained herein do so at their own risk. Hydrock shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared or for use of the report by any parties not defined in Hydrock's appointment.

This report details the findings of work carried out in June 2023. The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, not all potential environmental constraints or liabilities associated with the site may have been revealed.

Hydrock has used reasonable skill, care and diligence in the design of the investigation of the site and in its interpretation of the information obtained. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths of trial pits and boreholes at the time of the investigation. At intermediate locations, conditions can only be inferred.

Groundwater data are only representative of the dates on which they were obtained and both levels and quality may vary.

Unless otherwise stated, the recommendations in this report assume that ground levels will remain as existing. If there is to be any re-profiling (e.g. to create development platforms or for flood alleviation) then the recommendations may not apply.

Information provided by third parties has been used in good faith and is taken at face value; however, Hydrock cannot guarantee its accuracy or completeness.

Where the existing reports prepared by others have been provided by the Client, it is assumed that these have been either commissioned by the Client, or can be assigned to the Client, and can be relied upon by Hydrock. Should this not be the case Hydrock should be informed immediately as additional work may be required. Hydrock is not responsible for any factual errors or omissions in the supplied data, or for the opinions and recommendations of others. It is possible that the conditions described may have since changed through natural processes or later activities.

The work has been carried out in general accordance with recognised best practice. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance. Where the phrase 'suitable for use' is used in this report, it is in keeping with the terminology used in planning control and does not imply any specific warranty or guarantee offered by Hydrock.

The chemical analyses reported were scheduled for the purposes of risk assessment with respect to human health, plant life and controlled waters as discussed in the report. Whilst the results may be useful in applying the Hazardous Waste Assessment Methodology given in Environment Agency Technical Guidance WM3, they are not primarily intended for that purpose and additional analysis will be required at the time of disposal to fully classify waste. Discussion and comment with regards to waste classification are preliminary and do not form the requirements of 'Basic Characterisation' as required.

Assessment and testing for the presence of coal tar has only been completed at the locations of exploratory holes undertaken for risk assessment purposes. This investigation is not designed to provide a definitive assessment of the risk from coal tar, nor the waste classification for bituminous bound pavement arisings at the site.

Unless otherwise stated, at the time of this investigation the future routes of water supply pipes had not been established. This investigation and sampling strategy may not be fully compliant with UKWIR recommendations. Consequently, a targeted investigation and specific sampling and chemical testing may be required at a later date once the routes of the supply pipes are known. In addition, it is recommended that the relevant water supply company be contacted at an early stage to confirm its requirements for assessment, which may not necessarily be the same as those recommended by UKWIR.

Whilst the preliminary risk assessment process has identified potential risks to construction workers, consideration of occupational health and safety issues is beyond the scope of this report.

The non-specialist UXO screening has been undertaken for the purposes of ground investigation only (i.e. low risk activity in accordance with CIRIA Report C681). Further assessment should be undertaken with regards to other higher risk activities e.g. construction.

Please note that notwithstanding any site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds, this report does not constitute a formal survey of these potential constraints and specialist advice should be sought.

Any site boundary line depicted on plans does not imply legal ownership of land.

10. Recommendations for further work

Following the ground investigation works undertaken to date, the following further works will be required:

- discussion and agreement with utility providers regarding the materials suitable for pipework;
- discussions with regulatory bodies and the warranty provider regarding the conclusions of this report;
- assessment of tree influence on foundations and design of foundations;
- production of a Foundation Zonation Plan;
- discussions with piling Contractors regarding conclusions of this report and design of the piles;
- provision of geotechnical design for the Category 2 structures (earthworks, and retaining structures.);
- production of a Remediation Strategy and Verification Plan;
- production of a Geotechnical Design and Earthworks Specification;
- production of a Materials Management Plan relating to reuse of soils at the site and import of soils to the site; and
- verification of the earthworks, remediation and materials management.

11. References

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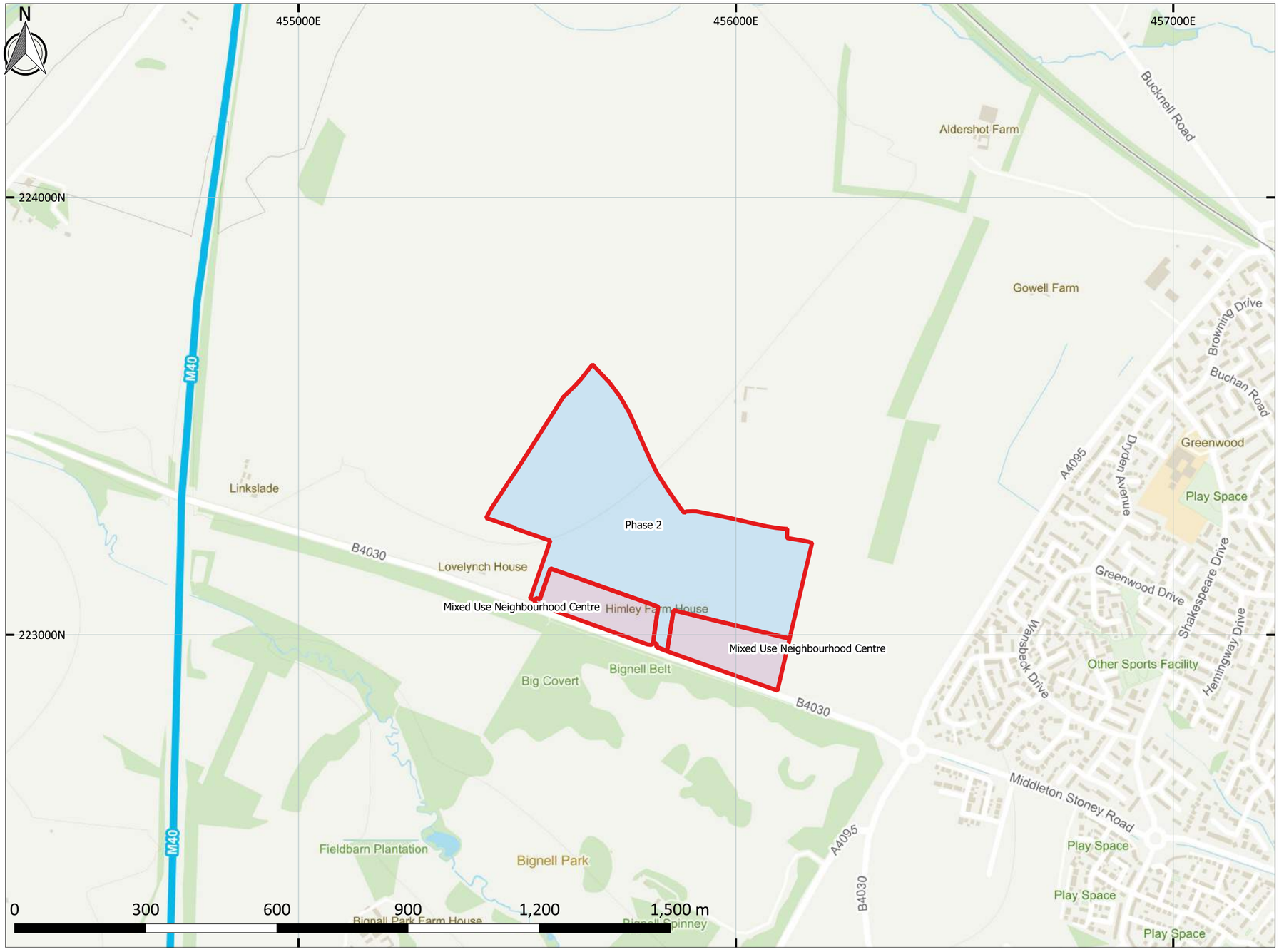
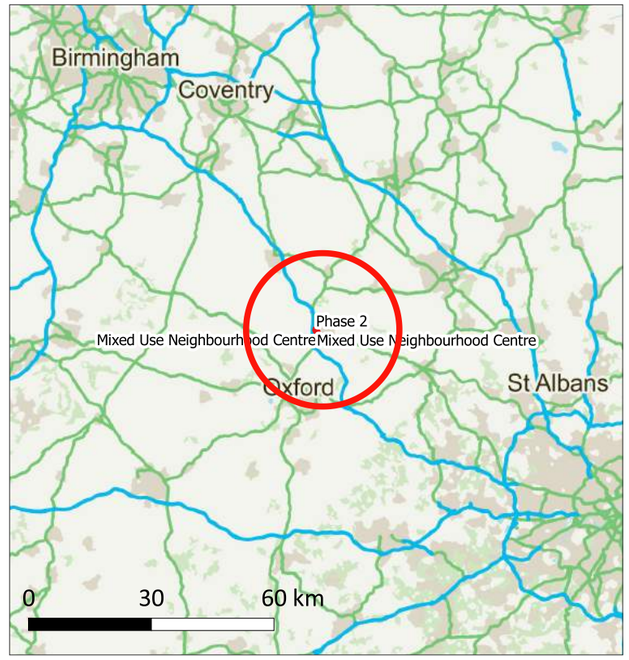
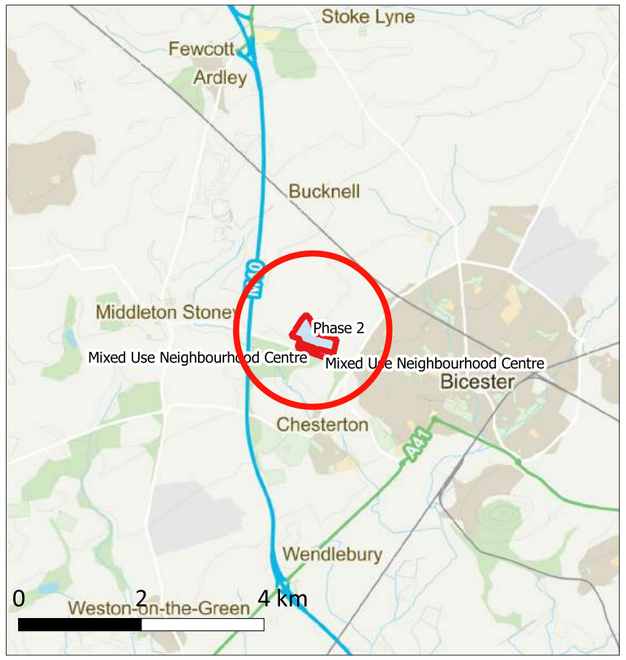
Appendix A Drawings







KEY PLAN

Wider Site Boundary

NOTES

1. Contains OS data © Crown copyright and database right (2022)

REVISIONS

REV.	DRAWN BY INITIALS	CHECKED BY INITIALS	DATE	REVISION NOTES/COMMENTS
P01	AA	CD	17/01/23	First issue
P02	MA	SC	21/07/23	Update for GI

Hydrock

TITLE
SITE LOCATION PLAN

HYDROCK PROJECT NO.
27141

SCALE @ A3
1:10,000

CLIENT
Cala Homes (Cotswolds) Ltd

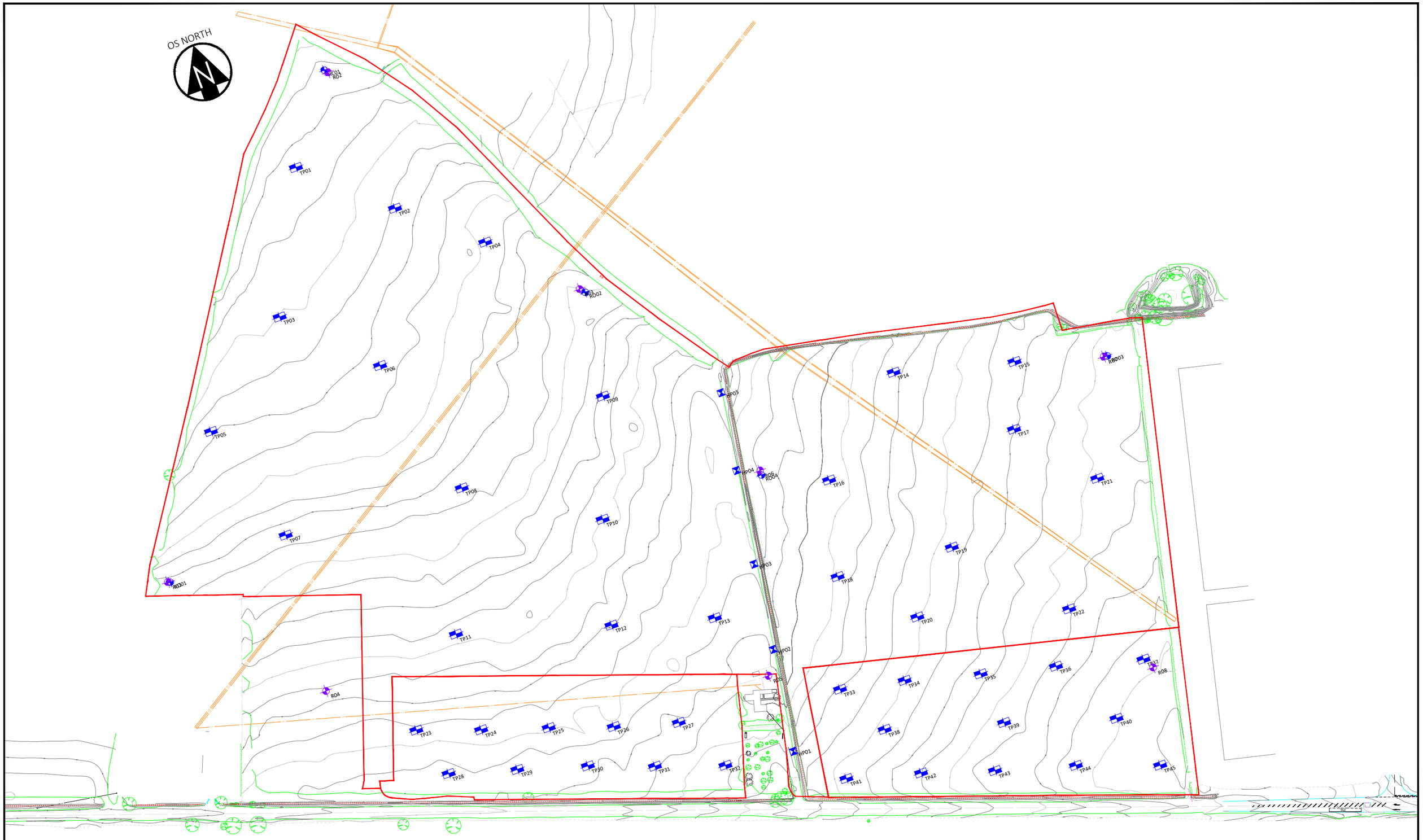
PURPOSE OF ISSUE
SUITABLE FOR INFORMATION

STATUS
S2

PROJECT
Himley Village, Bicester

DRAWING NO.
27141-HYD-XX-XX-DR-GE-1000

REVISION
P02



KEY

Hydrock SI (May/june 2023)

- RC## Rotary Borehole
- TP## Trial Pit
- HP## Hand Pit
- Redline Boundary
- Overhead cables

Hydrock Historical SI (Nov 2020)

- R## Rotary Borehole

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information: 27141-HYD-XX-XX-M2-C-0021 - Topo

REV.						
P1	FIRST ISSUE					
	RT	13/07/23	MA	13/07/23	JC	13/07/23
	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

Hydrock
Hawthorn Park
Holdenby Road
Spratton
Northampton NN6 8LD
TEL: 01604 842 888
E-Mail: northampton@hydrock.com
or visit www.hydrock.com

CLIENT
Cala Homes (Costwolds) Ltd

PROJECT
Himley Village, Bicester

TITLE
Exploratory Hole Plan

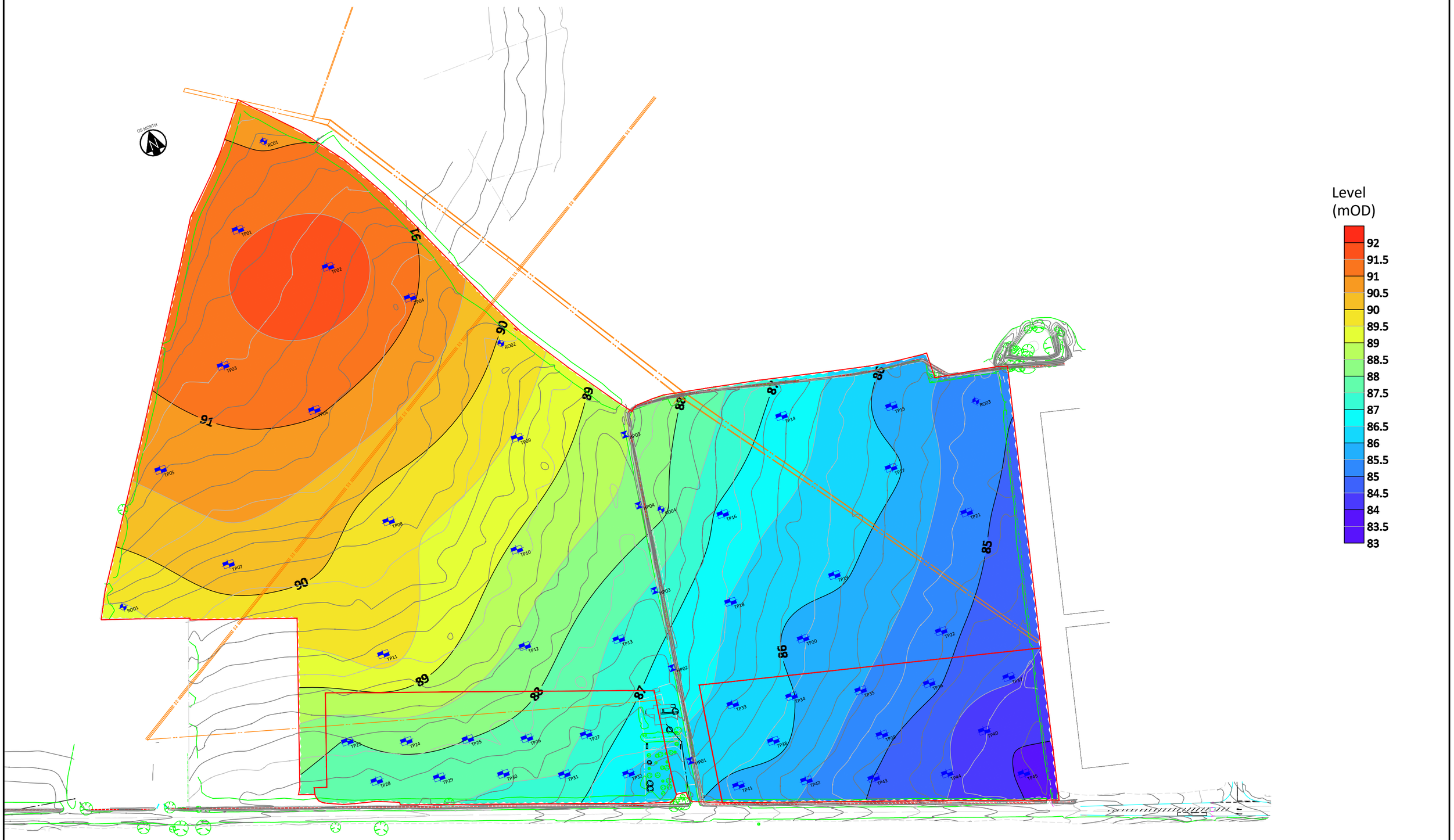
HYDROCK PROJECT NO.	SCALE @ A3
27141	1:3500

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

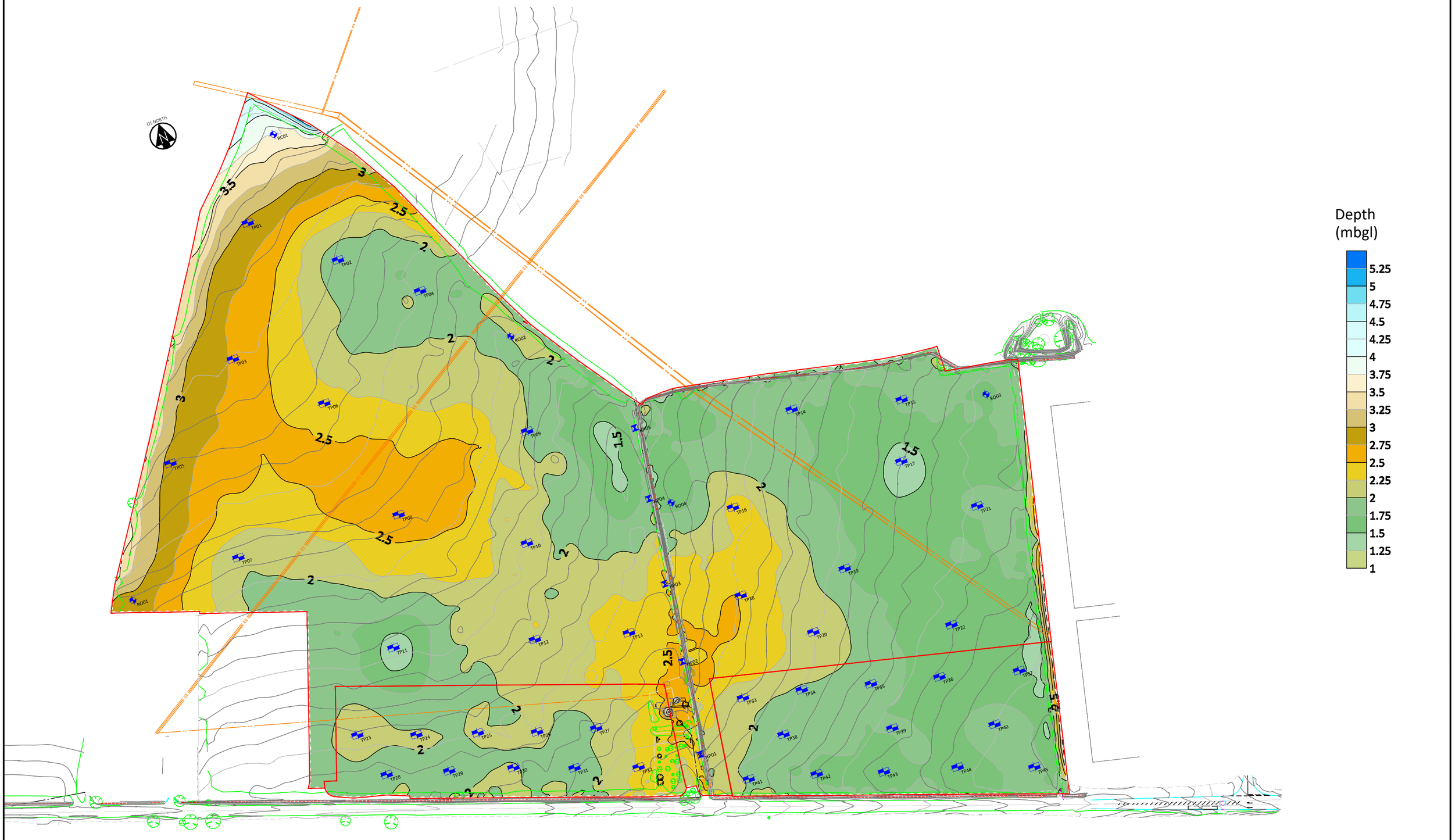
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 27141-HYD-PH1-XX-DR-GE-1008

REVISION P1

Level of Base of Cornbrash Formation (mOD)



Depth to Base of Cornbrash Formation (mbgl)



KEY

Hydrock SI (May/june 2023)

- RO## Rotary Borehole
- TP## Trial Pit
- HP## Hand Pit
- Redline Boundary
- Overhead cables

NOTES

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2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.
3. This drawing has been based on the following drawings and information: 27141-HYD-XX-XX-M2-C-0021 - Topo
4. Surfaces have been created using Hydrock Site Investigation data (May/June 2023). Levels and depths are accurate at investigation locations. Between investigation locations, levels and depths have been extrapolated and are indicative only.

REV.						
P1	FIRST ISSUE					
	RT	13.07.23	MA	13.07.23	JC	13.07.23
	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

Hydrock

Hawthorn Park
Holdenby Road
Spratton
Northampton NN6 8LD
TEL: 01604 842 888
E-Mail: northampton@hydrock.com
or visit www.hydrock.com

CLIENT

Cala Homes (Costwolds) Ltd

PROJECT

Himley Village, Bicester

TITLE

Base of Cornbrash
(mOD and mbgl)

HYDROCK PROJECT NO.	SCALE @ A1
27141	1:2000

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
27141-HYD-PH1-XX-DR-GE-1009

REVISION
P1

Issue:

Himley Schedule of Accommodation

70% - Private Housing

Housetype	No. of Beds	Storey Height	SQFT	Ph2 A	Ph2 B	Ph2C	TOTAL COUNT ON SITE	Total SQFT	Plotted %	CALA Private mix required %
Flat	1	3 to 4	540	14	0	0	14	7,560	4%	2.86%
Flat	2	3 to 4	760	11	0	0	15	11,400		
Aspen	2	2	737	3	0	6	15	11,055	16%	20.00%
Bayberry	2	2	863	4	13	8	25	21,575		
Blackthorn **ADDED	3	2	952	1	8	2	13	12,376		
Chestnut	3	2	1001	0	1	4	5	5,005		
Cedar **ADDED	3	2	1001	0	1	2	3	3,003		
Evergado	3	2	1085	7	21	11	39	42,315		
Fir **ADDED	3	2	1089	4	6	5	17	18,513		
Fourcot	3	2	1119	3	10	9	22	24,618	48%	48.57%
Foxglove	3	2.5	1132	4	0	0	4	4,528		
Hornbeam **ADDED	3* (4B)	2	1262	3	6	8	17	21,454		
Lancewood **ADDED	3* (4B)	2.5	1256	4	4	11	17	22,232		
Laurel	3*	2	1357	5	8	15	28	37,996		
Mulberry **ADDED	4	2.5	1444	4	11	0	15	21,660		
Pine** ADDED	4	2.5	1547	9	9	2	20	30,940		
Poplar **ADDED	4	2	1553	1	3	1	5	7,765		
Rosewood	4	2.5	1599	3	3	5	11	17,589	33%	28.57%
Sycamore	4	2	1672	1	12	5	18	30,096		
Tullipwood	4	2.5	1684	8	8	8	24	40,416		
Whitebeam	5	2	1957	1	15	5	21	41097		
Wisteria **ADDED	5	2	1984	0	0	0	0	0		
			Private Total	100	143	107	350	435,895		100%

30% - Affordable Housing (all NDSS)

Affordable Rent (70%):

Housetype	No. of Beds	Storey Height	SQFT	Ph2 A	Ph2 B	Ph2C	TOTAL COUNT ON SITE	Total SQFT	Plotted %	CALA AR mix required %
Flat	1	3 to 4	540	6	8	10	24	12,960	23%	26%
Flat	2	3 to 4	760	9	9	15	33	25,080	51%	49%
Bellflower	2	2	850	4	13	2	21	17,850		
Bungalow	3	1	1001	0	0	3	3	3,003		
Clover** ADDED	3	2	1016	7	8	3	18	18,288	22%	22%
Daisy	3	2	1016	1	1	0	2	2,032		
Heather	4	2	1250	0	2	2	4	5,000	4%	4%
			AR/SR Total	27	43	35	105	84,213		

Intermediate Housing (30%):

Housetype	No. of Beds	Storey Height	SQFT	Ph2 A	Ph2 B	Ph2C	Count on Site	Total SQFT	Plotted %	CALA Intermediate mix required %
Flat	1	3 to 4	540	0	0	0	0	0	0%	9%
Flat	2	3 to 4	760	4	9	0	17	12,920		
Bellflower	2	2	850	0	7	6	13	11,050	69%	60%
Bungalow	2	1	850	0	0	1	1	850		
Clover** ADDED	3	2	1016	3	4	2	9	9,144	27%	27%
Daisy	3	2	1016	0	1	2	3	3,048		
Gardenia	4	2	1148	0	0	2	2	2,296	4%	4%
			Intermediate Total	11	21	13	45	39,308		

Private Total	100	143	107	**350**	**435,895**
AR/SR Total	27	43	35	**105**	**84,213**
Intermediate Total	11	21	13	**45**	**39,308**
Affordable TOTAL	38	64	48	**150**	**123,521**
Grand Total	138	207	155	**500**	**559,416**

	ha	ac
NDA (gross)	**13.2342**	**32.70**
Coverage		**17,100.28 sqft / acre**
DPH		**37.78 dph**

KEY:

- CALA PURCHASED LAND
- SWALE PROPOSAL
- ATTENUATION
- ILLUSTRATIVE LANDSCAPE
- NDA
- AFFORDABLE RENT
- SHARED OWNERSHIP
- VISITOR PARKING
- ILLUSTRATIVE ORCHARD PLANTING AREA WITHIN POS
- ILLUSTRATIVE PLANTING WITHIN SWALE

3RD MAR'23
WORKING 2ND DRAFT LAYOUT
FOR REVIEW FOLLOWING ISSUE:
-HYDROCK REVISED DRAINAGE CAD SCHEME / REVIEW EXTENT OF CRATES AND PLANTING
-HYDROCK HIGHWAYS GENERAL
- CHARACTER AREA / MATERIAL REVIEW WITH CLIENT

DATE	NO	REVISION NOTE
03/03/2023	C	500 units split into three phases. Amendments made to highways and drainage following consultant comments
03/02/2023	B	Minor amendment around plots 6-9
03/02/2023	A	First formal issue

CONFIDENTIAL - DRAFT

Phase 2, 500 Testing Layout

HIMLEY VILLAGE, BICESTER

CLIENT
CALA (Cotswolds)

DATE	SCALE	TEAM	APPRVD
26/01/2023	1:1000 @A0	EDE	EMH/MCC

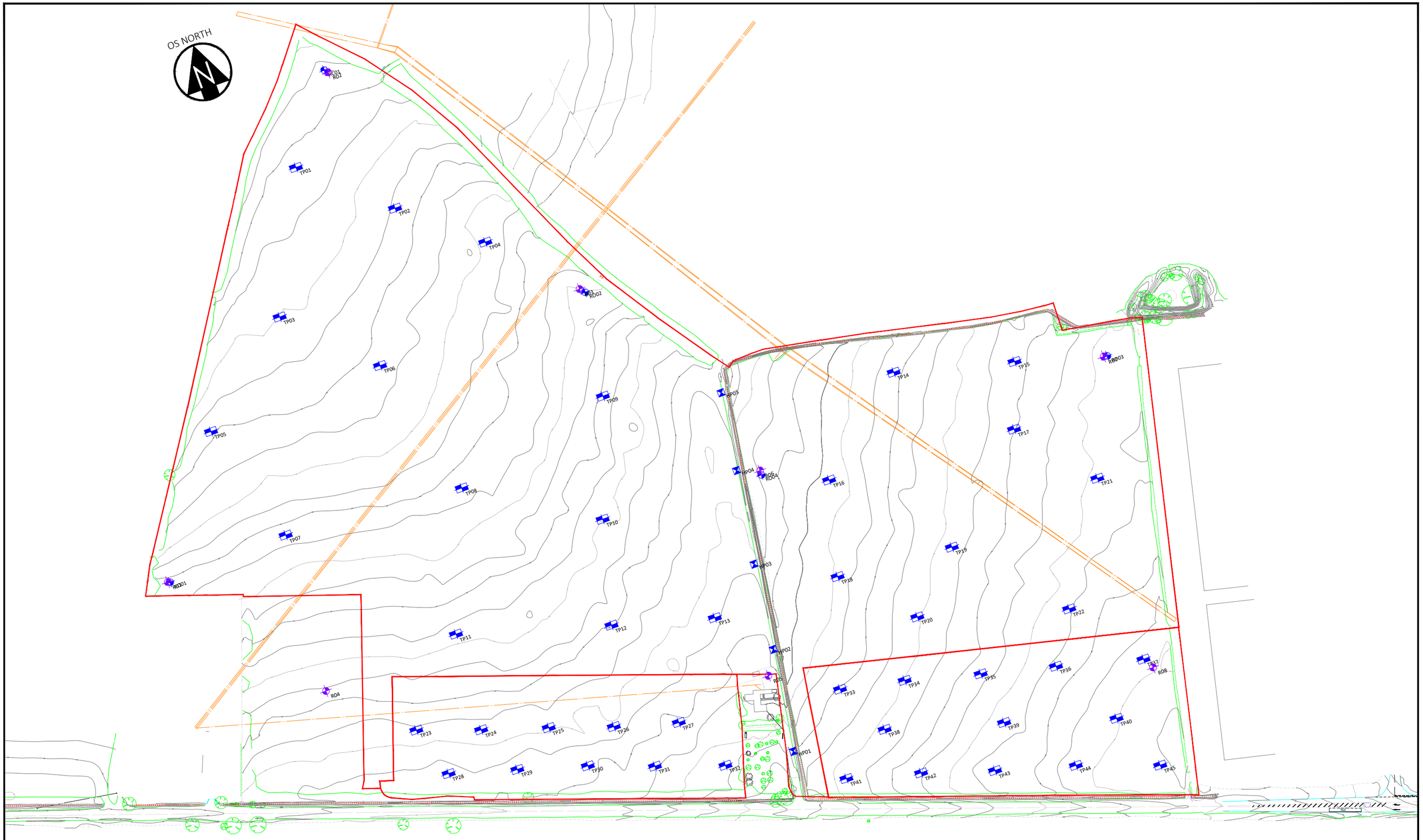
DRAWING NUMBER

P22-3093_DE_100_C_02

PEGASUS GROUP

Appendix B Exploratory hole location plan, exploratory hole logs and photographs

Exploratory hole location plan



KEY

Hydrock SI (May/june 2023)

- RC## Rotary Borehole
- TP## Trial Pit
- HP## Hand Pit
- Redline Boundary
- Overhead cables

Hydrock Historical SI (Nov 2020)

- R## Rotary Borehole

NOTES

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REV.						
P1	FIRST ISSUE					
	RT	13/07/23	MA	13/07/23	JC	13/07/23
	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

Hydrock
Hawthorn Park
Holdenby Road
Spratton
Northampton NN6 8LD
TEL: 01604 842 888
E-Mail: northampton@hydrock.com
or visit www.hydrock.com

CLIENT
Cala Homes (Costwolds) Ltd

PROJECT
Himley Village, Bicester

TITLE
Exploratory Hole Plan

HYDROCK PROJECT NO.	SCALE @ A3
27141	1:3500

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 27141-HYD-PH1-XX-DR-GE-1008

REVISION P1

Exploratory hole logs

Hydrock

Project: Himley Village

Borehole No
RC01
Page No. 1 of 1

Method: Rotary Cored	Date(s): 05/06/2023 - 06/06/2023	Logged By: JM	Drilled By: Marshalls
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455680.17, 223579.82	Checked By: MA/SC	Flush: Water
Hydrock Project No: 27141	Ground Level: 94.73m OD		Scale: 1:50

Sample/Core Run (m)	Depth (m)	Type	Results	TCR	SCR	RQD	If: Min Mean Max	Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
	0.00 - 0.50	B							Firm brown slightly sandy slightly gravelly dry CLAY with frequent rootlets. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.50	(0.50)	94.23		
	0.10	ES												
	0.50 - 0.80	B							Firm orangish brown, light brown and grey mottled sandy CLAY with occasional sub-angular fine to coarse gravel sized oolitic limestone lithorelicts and rootlets. (CORNBRASH FORMATION) 1					
	0.90	D						▼						
1.20 - 1.80 100% rec	1.20	SPT	N=8 (2,3,2,2,1,3)								(1.30)			
1.80 - 3.00	1.75	D							*... From 1.70m: Becoming stiff.*	1.80		92.93		
	2.08 - 2.15	C					15 50 90		Strong light orangish brown shelly oolitic calcarenite slightly weathered LIMESTONE. Fractures are very closely 2 to closely spaced, undulating rough, open to moderately wide with orangish brown staining and clay infill, horizontal, sub-horizontal, vertical and sub-vertical. Vertical fractures from 2.10m to 2.12m, 2.16m to 2.20m, 2.56m to 2.71m and 2.82m to 3.00m. Vertical fractures are undulating rough with orangish brown staining. (CORNBRASH FORMATION)					
	2.30 - 2.34	C		100	61	0					(1.20)			
	2.58 - 2.62	C												
	2.92 - 3.03	C								3.00		91.73		
3.00 - 4.00	3.00	SPT	50/50mm (22,3,50)				40 75 90		Soft brown mottled grey CLAY with occasional sub-angular fine to coarse gravel sized limestone lithorelicts. (CORNBRASH FORMATION)	3.10	(0.10)	91.63		
	3.21 - 3.28	C		100	100	47			Strong thinly bedded light orangish brown shelly oolitic coarse grained calcarenite slightly weathered LIMESTONE. Beds are light grey and orangish brown and closely spaced. Fractures are very closely to closely spaced, undulating rough, open to moderately wide with 4 orangish brown staining and clay infill, horizontal, sub-horizontal, vertical (CORNBRASH FORMATION)	3.80	(0.70)	90.93		
	3.30 - 3.40	C												
4.00 - 5.50	3.71 - 3.89	C								4.25	(0.45)	90.48		
	3.98 - 4.14	C							*... From 3.10m to 3.15m: Non-intact.* Very strong grey shelly fine grained calcarenite LIMESTONE with occasional veins of calcite and rare green staining. (FOREST MARBLE FORMATION) 5					
	4.00	SPT	50/30mm (25,50)						*... From 4.00m to 4.16m: Non-intact.* Stiff greyish green CLAY with occasional sub-angular fine limestone lithorelicts, fine to medium gravel sized shell fossils and rare possible selenite powder. (FOREST MARBLE FORMATION)		(1.25)			
	4.10 - 4.25	C		15	13	10								
	4.80	D							*... From 4.95m: Becoming light grey and very stiff.* Very stiff grey CLAY with occasional sub-angular to sub-rounded fine to coarse gravel sized limestone lithorelicts 6 and rare fine sand to coarse gravel sized carbonised plant material. (FOREST MARBLE FORMATION)	5.50		89.23		
5.50 - 7.00 100% rec 5.50 - 7.00	5.50	SPT	50/150mm (7,11,21,27)											
	6.00	D		0	0	0				6.70	(1.20)	88.03		
7.00 - 8.50	7.10	D							Very stiff dark grey CLAY with extremely closely spaced horizontal bedding fissures and rare medium gravel sized fish scale fossils and carbonised plant fossils. 7 (FOREST MARBLE FORMATION) *... Below 7.25: Becoming dark grey mottled dark green.*	7.40	(0.70)	87.33		
	7.85	D		27	27	15			Very stiff dark greyish green CLAY with occasional sub-angular fine to coarse gravel sized limestone lithorelicts, extremely closely spaced horizontal bedding fissures and rare medium gravel sized fish scale fossils and carbonised 8 plant fossils. (FOREST MARBLE FORMATION)	8.02	(0.62)	86.71		
	8.35 - 8.48	C					60 230 490							
8.50 - 10.00	8.60 - 8.80	C							Very strong grey shelly fine grained calcarenite LIMESTONE with occasional medium to coarse gravel sized fragments of bivalve fossils and rare green staining. Fractures are closely to medium spaced, undulating rough clean horizontal, sub-horizontal and sub-vertical. Sub-vertical fracture from 8.50m to 8.90m undulating rough with 9 brown staining 80 degrees. (FOREST MARBLE FORMATION)					
	8.80 - 9.00	C									(1.98)			
	9.00 - 9.18	C		100	98	98								
	9.22 - 9.50	C												
	9.72 - 10.00	C								10.00		84.73		
									End of Borehole at 10.00m 10					

Progress and Observations

Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)
	05/06	1030	1.80				Water	
	05/06	1300	3.00				Water	
	05/06	1400	4.00				Water	
	05/06	1700	5.50	2.50		1.00	Water	
	06/06	0800	7.00	2.50		1.00	Water	
	06/06	1130	5.50				Water	
	06/06	1330	7.00				Water	
	06/06	1400	8.50				Water	

Chiselling

From (m)	To (m)	Duration (HH:MM)

General Remarks:
1) Hand pit dug to 1.20m bgl. 2) Dynamic sampled to 1.80m bgl then rotary cored to 10.00m bgl. 3) Casing diameter 142mm from 1.20m to 1.80m bgl then 116mm to 10.00m bgl. 4) Borehole collapsed from 7.00m bgl to 5.50m bgl overnight. 5) Groundwater encountered at 1.00m bgl. 6) Piezometer tip installed at 3.35m bgl. Response zone between 2.80m and 3.80m bgl. Borehole backfilled with bentonite from 3.80m to 10.00m bgl.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Borehole No
RO01
Page No. 1 of 1

Method: Rotary Cored	Date(s): 06/06/2023 - 07/06/2023	Logged By: JM	Drilled By: Marshalls
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455448.95, 223270.58	Checked By: MA/SC	Flush: Water
Hydrock Project No: 27141	Ground Level: 92.46m OD		Scale: 1:50

Sample/Core Run (m)	Samples / Tests			Mechanical Log				Water Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
	Depth (m)	Type	Results	TCR	SCR	RQD	If: Min Mean Max							
	0.00 - 0.50	B							Brown gravelly CLAY. Gravel is angular to sub-rounded fine to coarse limestone. (TOPSOIL)	0.30	(0.30)	92.16		
									LIMESTONE. (CORNBRASH FORMATION)	0.80	(0.50)	91.66		
	1.20	SPT	50/150mm (7,14,11,30)						Yellow CLAY with limestone cobbles. (CORNBRASH FORMATION)					
	2.00	SPT	50/45mm (25,50)								(2.20)			
	3.00	SPT	50/55mm (22,50)							3.00		89.46		
									LIMESTONE. (FOREST MARBLE FORMATION)		(2.00)			
									End of Borehole at 5.00m	5.00		87.46		

Progress and Observations

Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)
	06/06	1430	0.40	0.00			Water	
	06/06	1515	1.20	0.00			Water	
	06/06	1550	2.00	0.00			Water	
	06/06	1630	3.00	0.00			Water	
	06/06	1705	5.00	0.00		0.50	Water	

Chiselling

From (m)	To (m)	Duration (HH:MM)

General Remarks:
1) Hand pit dug to 1.20m bgl. 2) Rotary open holed from 0.00m to 5.00m bgl. 3) Borehole did not collapse. 4) Groundwater encountered at 0.50m bgl. 5) Piezometer tip installed at 2.30m bgl. Response zone between 1.50m and 2.50m bgl. Borehole backfilled with bentonite from 2.50m to 5.00m bgl. 6) Ground conditions interpreted from drillers logs and an adjacent Hydrock borehole from a previous phase of works.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Borehole No
RO02
Page No. 1 of 1

Method: Rotary Cored	Date(s): 07/06/2023 - 08/06/2023	Logged By: JM	Drilled By: Marshalls
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455802.27, 223364.79	Checked By: MA/SC	Flush: Water
Hydrock Project No: 27141	Ground Level: 91.95m OD		Scale: 1:50

Sample/Core Run (m)	Samples / Tests			Mechanical Log				Water Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
	Depth (m)	Type	Results	TCR	SCR	RQD	If: Min Mean Max							
	0.00 - 0.50	B							Brown gravelly CLAY. Gravel is angular to sub-rounded fine to coarse limestone. (TOPSOIL)	0.50	(0.50)	91.45		
	1.20	SPT	N=34 (3,4,16,8,5,5)						Yellow LIMESTONE. (CORNBRASH FORMATION)	1.20	(0.70)	90.75		
									Grey CLAY. (CORNBRASH FORMATION)	1.50	(0.30)	90.45		
	2.00	SPT	50/55mm (25,50)						Grey CLAY with limestone cobbles. (CORNBRASH FORMATION)	2.00	(0.50)	89.95		
	3.00	SPT	N=35 (13,10,6,7,8,14)						Grey LIMESTONE. (FOREST MARBLE FORMATION)		(3.00)			
	4.00	SPT	50/45mm (25,50)											
	5.00	SPT	50/45mm (25,50)						End of Borehole at 5.00m	5.00		86.95		

Progress and Observations

Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)
	07/06	1200	0.50				Water	
	07/06	1300	1.20				Water	
	07/06	1400	2.00				Water	
	07/06	1500	3.00				Water	
	07/06	1645	4.00				Water	
	07/06	1705	5.00	1.20		0.50	Water	

Chiselling

From (m)	To (m)	Duration (HH:MM)

General Remarks:
1) Hand pit dug to 1.20m bgl. 2) Rotary open holed from 0.00m to 5.00m bgl. 3) Casing diameter 142mm from 0.00m to 1.20m bgl. 4) Borehole did not collapse. 5) Groundwater encountered at 0.50m bgl. 6) Piezometer tip installed at 0.77m bgl. Response zone between 0.60m and 1.20m bgl. Borehole backfilled with bentonite from 1.20m bgl to 5.00m bgl. 7) Ground conditions interpreted from drillers logs and an adjacent Hydrock borehole from a previous phase of works.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Borehole No
RO03
Page No. 1 of 1

Method: Rotary Cored	Date(s): 09/06/2023	Logged By: JM	Drilled By: Marshalls
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456140.89, 223192.69	Checked By: MA/SC	Flush: Water
Hydrock Project No: 27141	Ground Level: 86.94m OD		Scale: 1:50

Sample/Core Run (m)	Samples / Tests			Mechanical Log				Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
	Depth (m)	Type	Results	TCR	SCR	RQD	If: Min Mean Max							
	0.00 - 0.50	B							Brown gravelly CLAY. Gravel is angular to sub-rounded fine to coarse limestone. (TOPSOIL)	0.43	(0.43)	86.51		
	1.20	SPT	N=33 (5,11,10,8,9,6)						Orange brown LIMESTONE. (CORNBRASH FORMATION)	1.80	(1.37)	85.14		
	2.00	SPT	50/35mm (17,50)						Grey CLAY. (FOREST MARBLE FORMATION)	2.70	(0.90)	84.24		
	3.00	SPT	50/30mm (25,50)						Grey LIMESTONE (FOREST MARBLE FORMATION)	4.70	(2.00)	82.24		
	4.00	SPT	50/50mm (25,50)											
									Grey CLAY. (FOREST MARBLE FORMATION)	5.00	(0.30)	81.94		
									End of Borehole at 5.00m					

Progress and Observations

Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)
	09/06	1100	0.50	0.00			Water	
	09/06	1430	4.00	0.00		0.50	Water	
	09/06	1500	5.00	0.00		0.50	Water	

Chiselling

From (m)	To (m)	Duration (HH:MM)

General Remarks:
1) Hand pit dug to 1.20m bgl. 2) Rotary open holed from 0.00m bgl to 5.00m bgl. 3) Borehole did not collapse. 4) Groundwater encountered at 0.50m bgl. 5) Piezometer tip installed at 1.36m bgl. Response zone between 1.00m and 1.80m bgl. Borehole backfilled with bentonite from 1.80m to 5.00m bgl. 6) Ground conditions interpreted from drillers logs and an adjacent Hydrock borehole from a previous phase of works.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Borehole No
RO04
Page No. 1 of 1

Method: Rotary Cored	Date(s): 08/06/2023	Logged By: JM	Drilled By: Marshalls
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455876.76, 223197.38	Checked By: MA/SC	Flush: Water
Hydrock Project No: 27141	Ground Level: 89.75m OD		Scale: 1:50

Sample/Core Run (m)	Samples / Tests			Mechanical Log				Water Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
	Depth (m)	Type	Results	TCR	SCR	RQD	If: Min Mean Max							
	0.00 - 0.50	B							Brown gravelly CLAY. Gravel is angular to sub-rounded fine to coarse limestone. (TOPSOIL)	0.50	(0.50)	89.25		
	1.20	SPT	50/150mm (7,14,11,30)						Yellow LIMESTONE. (CORNBRASH FORMATION)	1.60	(1.10)	88.15		
	2.00	SPT	50/45mm (25,50)						Grey CLAY. (FOREST MARBLE FORMATION)					
	3.00	SPT	50/55mm (22,50)							4.00	(2.40)	85.75		
									LIMESTONE. (FOREST MARBLE FORMATION)	5.00	(1.00)	84.75		
									End of Borehole at 5.00m					

Progress and Observations

Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)
	08/06	1400	0.50	0.00		0.50	Water	
	08/06	1450	1.20	0.00		0.50	Water	
	08/06	1530	2.00	0.00		0.50	Water	
	08/06	1600	3.00	0.00		0.50	Water	

Chiselling

From (m)	To (m)	Duration (HH:MM)

General Remarks:
1) Hand pit dug to 1.20m bgl. 2) Rotary open holed from 0.00m to 5.00m bgl. 3) Borehole did not collapse. 4) Groundwater encountered at 0.50m bgl. 5) Piezometer tip installed at 1.35m bgl. Response zone between 1.00m and 1.60m bgl. Borehole backfilled with bentonite from 1.60m to 5.00m bgl. 6) Ground conditions interpreted from drillers logs and an adjacent Hydrock borehole from a previous phase of works.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP01
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Method: Trial Pit	Date(s): 06/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455636.96, 223520.91	Stability: Unstable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 94.44m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.40	(0.40)	94.04	
				Brown slightly sandy CLAY with frequent rootlets and occasional roots, sub-angular fine to coarse gravel sized limestone lithorelicts and a low cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION)	0.90	(0.50)	93.54	
				Stiff orangish brown mottled grey slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized limestone lithorelicts. (CORNBRASH FORMATION)	1.40	(0.50)	93.04	
1.35	HSV	122kPa						
1.50	B			Firm orangish brown mottled grey slightly sandy CLAY with occasional fine to coarse gravel sized limestone lithorelicts and a medium cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION)	2.10	(0.70)	92.34	
2.30	HSV	127kPa		Stiff orangish brown mottled grey slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized limestone lithorelicts. (CORNBRASH FORMATION)	2.50	(0.40)	91.94	
2.40	D		▼					
				LIMESTONE. (CORNBRASH FORMATION) *... Below 2.50m: Very hard digging.*	2.60	(0.10)	91.84	
				Base of Excavation at 2.60m				

General Remarks:
1) Trial pit terminated at 2.60m bgl due to very difficult digging in shallow rock. 2) Trial pit sides spalling from 0.40m to 2.60m due to fractured rock. 3) Groundwater encountered at 2.40m bgl. Groundwater entered the pit at a moderate rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP02
Page No. 1 of 1

Method: Trial Pit	Date(s): 06/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455694.12, 223468.79	Stability: Unstable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 93.72m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fine gravel sized fragment of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	93.42	
				Firm orangish brownish slightly sandy gravelly CLAY with a medium cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone and white calcareous nodules. (HEAD DEPOSITS)	0.50	(0.20)	93.22	
0.70	D			Firm brownish grey mottled orangish brown slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(0.80)		
					1.30		92.42	
1.70	B			Firm cream, dark grey and orangish brown mottled sandy CLAY with occasional sub-angular fine to coarse gravel sized oolitic limestone lithorelicts. (CORNBRASH FORMATION) *... From 1.40m to 1.50m: Band of limestone cobbles.*	1.80	(0.50)	91.92	
2.50 2.50	D HSV	107kPa		Firm brownish grey mottled orangish brown slightly sandy CLAY with occasional sub-angular fine to coarse tabular limestone lithorelicts. (FOREST MARBLE FORMATION) *... From 1.80m to 2.60m: Possible polished surfaces.*	2 3	(1.40)		
					3.20		90.52	
				Base of Excavation at 3.20m	4 5			

General Remarks:
1) Trial pit terminated at 3.20m bgl due to collapse. 2) Trial pit sides spalling from 1.00m to 2.60m due to water ingress. 3) Groundwater encountered at 1.60m bgl. Groundwater entered the pit at a moderate rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP03
Page No. 1 of 1

Method: Trial Pit	Date(s): 06/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455588.95, 223423.48	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 93.97m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a medium cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.35	(0.35)	93.62	
0.50	ES			Stiff light brown slightly sandy slightly gravelly CLAY with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone and white calcareous nodules. (HEAD DEPOSITS)	0.60	(0.25)	93.37	
1.00 1.00	D HSV	90kPa		Firm orangish brown mottled grey slightly sandy gravelly CLAY with occasional sub-angular fine to coarse gravel sized limestone lithorelicts and a medium cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION)	1.20	(0.60)	92.77	
1.85	B			Cream mottled orangish brown clayey sub-angular fine to coarse GRAVEL of limestone lithorelicts with a high cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION) *... From 1.20m to 1.90m: High cobble content of sub-angular limestone.*	1.90	(0.70)	92.07	
				Very strong light grey stained orangish brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION) *... From 1.90m to 2.00m: Very hard digging.* Base of Excavation at 2.00m	2.00	(0.10)	91.97	

General Remarks:
1) Trial pit terminated at 2.00m bgl due to very difficult digging in shallow rock. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.90m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP04
Page No. 1 of 1

Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455746.99, 223423.50	Stability: Stable.	Dimensions: 2.50m / 0.65m; Scale: 1:25
Hydrock Project No: 27141	Ground Level: 92.87m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fine gravel sized fragment of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	92.57	
				Firm light brown sandy slightly gravelly CLAY with a medium cobble content of sub-angular limestone and occasional rootlets. Gravel is sub-angular fine to coarse of limestone. (HEAD DEPOSITS)	0.60	(0.30)	92.27	
0.65 0.65	D ES			Firm brownish grey mottled orangish brown slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a high cobble content of sub-angular tabular oolitic and micritic limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.00	(0.40)	91.87	
1.00 - 1.10 1.05	B HSV	83kPa		Stiff cream, orangish brown and grey mottled sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1	(0.80)		
1.50 1.50	D HSV	128kPa			1.80		91.07	
				Firm brownish grey mottled orangish brown slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular fine grained limestone lithorelicts. (FOREST MARBLE FORMATION)	2			
2.30 2.30	B HSV	118kPa				(1.10)		
					2.90		89.97	
				Stiff bluish grey slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized grey micritic limestone lithorelicts and randomly oriented fissures. (FOREST MARBLE FORMATION)	3			
3.10 3.10	B HSV	123kPa	▼			(0.30)		
				Base of Excavation at 3.20m	3.20		89.67	
					4			
					5			

General Remarks:
1) Trial pit terminated at 3.20m bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 3.20m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP05
Page No. 1 of 1

Method: Trial Pit	Date(s): 06/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455514.08, 223362.73	Stability: Unstable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 93.55m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.35	(0.35)	93.20	
0.60	D			Firm brownish grey mottled orangish brown slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized of tabular limestone lithorelicts and a high cobble content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)				
0.60	HSV	117kPa			1.00	(0.65)	92.55	
0.95	D			Strong light grey stained orangish brown oolitic coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)				
				... At 1.50m: Very hard digging and limestone less fractured.	1.60	(0.60)	91.95	
				Base of Excavation at 1.60m				

General Remarks:
1) Trial pit terminated at 1.60m bgl due to very difficult digging in shallow rock. 2) Trial pit sides spalling from 1.00m to 1.60m due to fractured rock. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP06
Page No. 1 of 1

Method: Trial Pit	Date(s): 06/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455645.09, 223365.70	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 93.37m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and one fine gravel sized fragment of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	93.07	
0.50 0.50	B HSV	115kPa		Firm brownish grey mottled orangish brown slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized of tabular limestone lithorelicts and a medium cobble content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)		(0.90)		
1.00 1.00	D HSV	75kPa		1	1.20		92.17	
				Strong light grey stained orangish brown oolitic coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.40	(0.20)	91.97	
				Cream mottled orangish brown very clayey sub-angular fine to coarse GRAVEL of limestone lithorelicts with a high cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION)		(0.90)		
2.00	B			2	2.30		91.07	
2.35 2.35	D HSV	123kPa	▼	Stiff brownish grey mottled orangish brown silty CLAY with occasional sub-angular fine to coarse gravel sized of oolitic and micritic limestone lithorelicts. (FOREST MARBLE FORMATION)	2.70	(0.40)	90.67	
2.90 2.90	B HSV	115kPa		Stiff grey silty CLAY with randomly oriented fissures. (FOREST MARBLE FORMATION)		(0.50)		
				3	3.20		90.17	
				Base of Excavation at 3.20m				
				4				
				5				

General Remarks:
1) Trial pit terminated at 3.20m bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.70m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP07
Page No. 1 of 1

Method: Trial Pit	Date(s): 06/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455539.19, 223273.99	Stability: Unstable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 92.33m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and one fine gravel sized fragment of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.25	(0.25)	92.08	
0.50 0.50 0.50	D ES HSV	120kPa		Firm brownish grey mottled orangish brown slightly sandy gravelly CLAY with a medium cobble content of sub-angular tabular limestone and rare rootlets. Gravel is sub-angular fine to coarse of tabular limestone and white calcareous nodules. (HEAD DEPOSITS)	0.65	(0.40)	91.68	
0.80	B			Strong light grey stained orangish brown coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.10	(0.45)	91.23	
				Cream mottled orangish brown clayey sub-angular fine to coarse GRAVEL of limestone lithorelicts with a high cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION)	1.40	(0.30)	90.93	
				Very strong light grey oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION) *... From 1.40m to 2.00m: Very hard digging and limestone less fractured. Switched to toothed bucket.*	2.00	(0.60)	90.33	
2.10 2.10	D HSV	112kPa		Stiff grey mottled orangish brown silty CLAY. (FOREST MARBLE FORMATION)	2.80	(0.80)	89.53	
2.80	D			Base of Excavation at 2.80m				

General Remarks:
1) Trial pit terminated at 2.80m bgl due to collapse. 2) Trial pit sides spalling from 1.40m to 2.80m due to fractured rock. 3) Groundwater encountered at 1.40m. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP08
Page No. 1 of 1

Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455670.29, 223262.49	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 92.39m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fine gravel sized fragment of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.25	(0.25)	92.14	
0.40	B			Firm orangish brownish slightly sandy gravelly CLAY with a medium cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.45	(0.20)	91.94	
0.60	HSV	98kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content and low boulder content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1	(0.65)		
1.00	D							
1.00	HSV	82kPa			1.10		91.29	
				Strong brown oolitic coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.50	(0.40)	90.89	
1.80	B			Stiff cream, orangish brown and grey mottled sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)				
1.90	HSV	145kPa			2	(1.30)		
					2.80		89.59	
3.00	B			Firm brownish grey mottled orangish brown slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular fine grained limestone lithorelicts and purple rootlets. (FOREST MARBLE FORMATION)	3	(0.50)		
3.00	HSV	90kPa			3.30		89.09	
				Base of Excavation at 3.30m				
					4			
					5			

General Remarks:
1) Trial pit terminated at 3.30m bgl 2) Trial pit sides didn't collapse. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP09
Page No. 1 of 1

Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455788.75, 223289.93	Stability: Unstable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 91.44m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.40	(0.40)	91.04	
0.60	B			Firm light brown sandy slightly gravelly CLAY with a medium cobble content of sub-angular limestone and occasional rootlets and a pocket (1m x 1m) of limestone cobbles. Gravel is sub-angular fine to coarse of light grey stained orangish brown limestone. (HEAD DEPOSITS)	0.80	(0.40)	90.64	
0.90	HSV	93kPa		Stiff cream, orangish brown and grey mottled sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1	(0.65)	89.99	
1.00	D				1.45			
				Strong light grey stained orangish brown coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.60	(0.15)	89.84	
1.80	B			Cream mottled orangish brown clayey sub-angular fine to coarse GRAVEL of limestone lithorelicts with a high cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION)	2	(0.40)	89.44	
				Base of Excavation at 2.00m	2.00			
					3			
					4			
					5			

General Remarks:
1) Trial pit terminated at 2.00m bgl due to collapse. 2) Trial pit sides spalling from 0.60m to 2.00m. 3) Groundwater encountered at 1.45m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP10
Page No. 1 of 1

Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455758.20, 223206.45	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 91.00m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fine gravel sized fragments of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.25	(0.25)	90.75	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	90.70	
				Strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.60	(0.30)	90.40	
1.00 1.00	B HSV	95kPa		Stiff cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content and low boulder content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1	(1.20)		
1.40	HSV	93kPa						
					1.80		89.20	
				Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	2.00	(0.20)	89.00	
				Base of Excavation at 2.00m	2			
					3			
					4			
					5			

General Remarks:
1) Trial pit terminated at 2.00m bgl due to very difficult digging in shallow rock. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.80m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP11
Page No. 1 of 1

Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455630.30, 223164.75	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 91.20m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20 0.20	D ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	90.90	
				Orangish brownish clayey sub-angular fine to coarse COBBLES of tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	0.40	(0.10)	90.80	
				Strong light grey stained orangish brown coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.70	(0.30)	90.50	
1.00	B			Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content and low boulder content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1.10	(0.40)	90.10	
				Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.40	(0.30)	89.80	
1.50 1.50	B HSV	138kPa		Stiff thinly laminated cream, orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	2.10	(0.70)	89.10	
				Base of Excavation at 2.10m				

General Remarks:
1) Trial pit terminated at 2.10m bgl 2) Trial pit sides didn't collapse. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP12
Page No. 1 of 1

Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455738.00, 223132.42	Stability: Unstable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 90.53m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	90.28	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	90.23	
				Strong light grey stained orangish brown coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.10	(0.80)	89.43	
1.30 1.30	D HSV	127kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	2.00	(0.90)	88.53	
			▼	Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	2.20	(0.20)	88.33	
				Base of Excavation at 2.20m				

General Remarks:
1) Trial pit terminated at 2.20m bgl due to very difficult digging in shallow rock. 2) Trial pit sides spalling from 0.60m to 2.20m. 3) Groundwater encountered at 2.20m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP13
Page No. 1 of 1

Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455809.95, 223111.94	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 89.78m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fine gravel sized fragments of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	89.48	
				Strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.20	(0.90)	88.58	
1.40 1.40	D HSV	97kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content and low boulder content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1.80	(0.60)	87.98	
1.75	B		▼	Strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	2.10	(0.30)	87.68	
2.20	B			Cream mottled orangish brown clayey sub-angular fine to coarse GRAVEL of limestone lithorelicts with a high cobble content of sub-angular limestone lithorelicts. (CORNBRASH FORMATION)	2.40	(0.30)	87.38	
2.80 2.80	D HSV	137kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	3.20	(0.80)	86.58	
				Base of Excavation at 3.20m				

General Remarks:
1) Trial pit terminated at 3.20m bgl 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.80m. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP14
Page No. 1 of 1

Method: Trial Pit	Date(s): 13/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455991.98, 223234.33	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 88.61m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular to rounded fine to coarse of limestone and quartzite. (TOPSOIL)	0.30	(0.30)	88.31	
0.45 0.50	B ES			Firm light yellowish brown slightly sandy slightly gravelly CLAY with a medium cobble content of sub-angular tabular limestone. Gravel is sub-angular fine to coarse of limestone. (HEAD DEPOSITS)	0.52	(0.22)	88.09	
				... From 0.30m to 0.52m: In the eastern half of the pit - Very strong light grey stained orangish brown ooilitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horiztonal bedding fractures. Recovered as clayey cobbles and boulders.				
0.80	HSV	85kPa						
1.00	D			Firm cream, orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and occasional purple rootlets. (CORNBRASH FORMATION)	1	(1.28)		
					1.80		86.81	
2.00 2.00	B HSV	133kPa		Stiff thinly laminated orangish brown and grey mottled with light grey gleying slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone lithorelicts and sand. (FOREST MARBLE FORMATION)	2	(0.30)	86.51	
					2.10			
2.30	B			Cream clayey sub-angular fine to coarse GRAVEL of grey micritic limestone lithorelicts with a high cobble content of sub-angular tabular micritic limestone lithorelicts (FOREST MARBLE FORMATION)	2.40	(0.30)	86.21	
2.70 2.70	D HSV	127kPa		Stiff thinly laminated greyish brown and grey mottled slightly sandy CLAY with sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	3	(0.65)		
					3.05		85.56	
				Very strong grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	3.10	(0.05)	85.51	
				Base of Excavation at 3.10m	4			
					5			

General Remarks:
1) Trial pit terminated 3.10m bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.40m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP15
Page No. 1 of 1

Method: Trial Pit	Date(s): 13/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456076.59, 223211.74	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 87.56m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular to rounded fine to coarse of limestone and quartzite. (TOPSOIL)	0.30	(0.30)	87.26	
				Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.10)	87.16	
				Very strong light grey stained orangish brown oolitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.00	(0.60)	86.56	
1.20 1.20	D HSV	105kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and occasional purple rootlets. (CORNBRASH FORMATION)	1.80	(0.80)	85.76	
2.00 2.00 2.10	D HSV B	125kPa		Stiff thinly laminated orangish brown and grey mottled with light grey gleying slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.20	(0.40)	85.36	
				Cream clayey sub-angular fine to coarse GRAVEL of grey micritic limestone lithorelicts with a high cobble content of sub-angular tabular micritic limestone lithorelicts. (FOREST MARBLE FORMATION)	2.60	(0.40)	84.96	
2.80	D			Stiff thinly laminated greyish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.90	(0.30)	84.66	
				Very strong grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	2.95	(0.05)	84.61	
				Base of Excavation at 2.95m				

General Remarks:
1) Trial pit terminated 2.95m bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.20m bgl. Groundwater entered the pit at a moderate rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP16
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Method: Trial Pit	Date(s): 13/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455921.53, 223177.16	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 89.22m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	88.97	
				Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	88.92	
				Very strong light grey stained orangish brown oolitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.70	(0.40)	88.52	
0.80 0.80	B HSV	100kPa		Firm light yellowish brown, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and occasional purple rootlets. (CORNBRASH FORMATION)	1	(1.10)		
				Strong grey micritic fine grained LIMESTONE. (CORNBRASH FORMATION)	1.80	(0.10)	87.42	
				... From 1.80m to 1.85m: Band of cream gravelly clay with a low cobble content of micritic limestone. Gravel is sub-angular fine to coarse of micritic limestone.	1.90		87.32	
2.20	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone lithorelicts. (CORNBRASH FORMATION)	2	(0.50)		
				Stiff thinly laminated greyish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.40		86.82	
3.00 3.00	D HSV	128kPa			3	(1.00)		
				Very strong dark grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	3.40		85.82	
				Base of Excavation at 3.45m	3.45	(0.05)	85.77	
					4			
					5			

General Remarks:
1) Trial pit terminated 3.45m bgl. 2) Trial pit sides mostly didn't collapse, spalling from 1.80m to 2.40m. 3) Groundwater encountered at 1.80m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP17
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Method: Trial Pit	Date(s): 13/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456059.59, 223165.97	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 87.55m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	87.25	
0.40	ES			Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.50	(0.20)	87.05	
				Very strong light grey stained orangish brown oolitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.10	(0.60)	86.45	
1.35 1.35	D HSV	110kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare purple rootlets. (CORNBRASH FORMATION)	1.40	(0.30)	86.15	
				Stiff thinly laminated orangish brown and grey mottled with light grey gleying slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and rare fish scale fossils. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION) *... From 1.40m to 1.70m: Pocket of cream gravel 1.5m wide*		(1.60)		
2.30 2.30 2.30	B ES HSV	132kPa		*... Below 2.60m: Becoming greyish brown mottled orangish brown.*				
2.90	D				3.00		84.55	
				Very strong grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	3.10	(0.10)	84.45	
				Base of Excavation at 3.10m				

General Remarks:
1) Trial pit terminated 3.10 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 3.00m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP18
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Method: Trial Pit	Date(s): 13/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455903.45, 223109.53	Stability: Stable.	Dimensions: 2.50m x 0.65m; Scale: 1:25
Hydrock Project No: 27141	Ground Level: 88.96m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	88.71	
				Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	88.66	
				Very strong light grey stained orangish brown oolitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.20	(0.90)	87.76	
1.30 1.30 1.40	D ES HSV	127kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone and purple rootlets. (CORNBRASH FORMATION)	1.70	(0.50)	87.26	
1.80	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts. (CORNBRASH FORMATION)	1.90	(0.20)	87.06	
				Strong grey micritic fine grained LIMESTONE. Recovered as tabular gravel. (CORNBRASH FORMATION)	2.50	(0.60)	86.46	
2.55 2.55 2.70	D HSV HSV	147kPa 130kPa		Stiff thinly laminated greyish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.60	(0.10)	86.36	
2.85	B			Stiff thinly laminated bluish grey silty CLAY with frequent micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	3.20	(0.60)	85.76	
				Base of Excavation at 3.20m				

General Remarks:
1) Trial pit terminated 3.20 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.90m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

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Project: Himley Village

Trialpit No
TP19
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Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455988.26, 223101.30	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 87.92m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone and flint. (TOPSOIL)	0.30	(0.30)	87.62	
				Very strong light grey stained orangish brown oolitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.99	(0.69)	86.93	
1.00 1.10	D HSV	120kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and purple rootlets. (CORNBRASH FORMATION)	1.60	(0.61)	86.32	
1.70	B			Cream clayey sub-angular fine to coarse GRAVEL of grey micritic limestone lithorelicts with a high cobble content of sub-angular tabular micritic limestone lithorelicts. (CORNBRASH FORMATION)	1.80	(0.20)	86.12	
2.30 2.30	D HSV	130kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and rare fish scale fossils. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.60	(0.80)	85.32	
				Base of Excavation at 2.60m				

General Remarks:
1) Trial pit terminated 2.60 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP20
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Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455947.61, 223062.47	Stability: Stable.	Dimensions: 2.50m x 0.65m; Scale: 1:25
Hydrock Project No: 27141	Ground Level: 88.09m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	87.84	
0.27	ES			Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	87.79	
				Very strong light grey stained orangish brown oolitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1	(0.90)		
1.20 - 1.40	B				1.20		86.89	
1.30	HSV	135kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare purple rootlets. (CORNBRASH FORMATION)	1.80	(0.60)	86.29	
				Very strong grey oolitic coarse grained shelly LIMESTONE. (CORNBRASH FORMATION)	1.90	(0.10)	86.19	
2.00	B			Cream clayey sub-angular fine to coarse GRAVEL of grey micritic limestone lithorelicts with a high cobble content of sub-angular tabular micritic limestone lithorelicts. (CORNBRASH FORMATION)	2	(0.40)		
					2.30		85.79	
2.50	HSV	138kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and rare fish scale fossils. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)				
2.70	D				3	(1.10)		
3.30	D				3.40		84.69	
				Very strong dark grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	3.45	(0.05)	84.64	
				Base of Excavation at 3.45m	4			
					5			

General Remarks:
Trial pit terminated 3.45 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.80m bgl. Groundwater entered the pit at a moderate rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP21
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Method: Trial Pit	Date(s): 13/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456104.00, 223112.07	Stability: Unstable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 86.95m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	86.65	
0.35	B			Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.10)	86.55	
				Very strong light grey stained orangish brown oolitic shelly coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.90	(0.50)	86.05	
1.00 1.00	D HSV	100kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare purple rootlets. (CORNBRASH FORMATION)	1	(0.70)		
1.70	B			Cream clayey sub-angular fine to coarse GRAVEL of grey micritic limestone lithorelicts with a high cobble content of sub-angular tabular micritic limestone lithorelicts. (CORNBRASH FORMATION)	1.60 1.80	(0.20)	85.35 85.15	
2.00 2.00	D HSV	113kPa		Stiff thinly laminated orangish brown and grey mottled with light grey gleying slightly sandy CLAY with sub-angular fine to coarse gravel sized tabular limestone lithorelicts and rare fish scale fossils. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2	(1.10)		
				... Below 2.40m: Becoming greyish brown mottled orangish brown.				
2.75	D				2.90		84.05	
				Very strong dark grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	2.95	(0.05)	84.00	
				Base of Excavation at 2.95m	3			
					4			
					5			

General Remarks:
Trial pit terminated 2.95m bgl. 2) Trial pit sides spalling from 0.40m to 1.80m. 3) Groundwater encountered at 2.90m bgl. Groundwater entered the pit at a moderate rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

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Project: Himley Village

Trialpit No
TP22
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Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456052.65, 223030.46	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 86.83m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	86.58	
0.27	ES			Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	86.53	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.80	(0.50)	86.03	
0.90 0.90	D HSV	107kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1.50	(0.70)	85.33	
				Very strong light grey stained orangish brown oolitic coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.55	(0.05)	85.28	
1.60	B			Firm cream slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of grey oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.70	(0.15)	85.13	
2.30 2.30	D HSV	97kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and occasional carbonised rootlets. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.80	(1.10)	84.03	
2.90	D			Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION) *... From 2.80m to 2.85m: Band of very strong grey ooidal limestone.*	3.00	(0.20)	83.83	
				Base of Excavation at 3.00m				

General Remarks:
Trial pit terminated 3.00 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.00m bgl. Groundwater entered the pit at a moderate rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP23
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Method: Trial Pit	Date(s): 08/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455579.69, 223109.42	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 90.25m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular to rounded fine to coarse of limestone and quartzite. (TOPSOIL)	0.20	(0.20)	90.05	
				Firm orangish brown slightly sandy gravelly CLAY with a low cobble content of sub-angular tabular limestone and frequent rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.20)	89.85	
0.50	D			Orangish brownish clayey sub-angular COBBLES of grey crystalline limestone lithorelicts with occasional boulders of limestone lithorelicts and rare rootlets and insect burrows. (CORNBRASH FORMATION)	1.10	(0.70)	89.15	
0.70	B							
1.40	HSV	98kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.50	(0.40)	88.75	
1.80 - 1.90	B			Brown clayey sub-angular COBBLES of tabular brown oolitic limestone lithorelicts with a rare boulders of tabular oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.80	(0.30)	88.45	
				Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone lithorelicts. (CORNBRASH FORMATION)	2.00	(0.20)	88.25	
				Strong brown oolitic coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	2.30	(0.30)	87.95	
2.50 2.50	ES HSV	130kPa	▼	Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	2.80	(0.50)	87.45	
2.90	D			Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	3.00	(0.20)	87.25	
				Base of Excavation at 3.00m				

General Remarks:
Trial pit terminated 3.00 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.60m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP24
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Method: Trial Pit	Date(s): 08/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455623.78, 223093.64	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 90.17m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	89.87	
				Firm orangish brown slightly sandy gravelly CLAY with a low cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.35	(0.05)	89.82	
				Strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.80	(0.45)	89.37	
1.00 1.00	D HSV	113kPa		Stiff cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(1.05)		
1.80 1.80	B HSV	130kPa		Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.85	(0.15)	88.32	
				Base of Excavation at 2.00m	2.00		88.17	
					2			
					3			
					4			
					5			

General Remarks:
1) Trial pit terminated at 2.00m bgl due to very difficult digging in shallow rock. 2) Trial pit sides didn't collapse. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP25
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Method: Trial Pit	Date(s): 08/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455670.17, 223078.40	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 90.10m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	89.85	
0.40 0.40 0.50	D ES B			Firm orangish brownish slightly sandy gravelly CLAY with a low cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.45	(0.20)	89.65	
				Orangish brown clayey sub-angular fine to coarse GRAVEL of tabular grey crystalline limestone lithorelicts and a high cobble content limestone lithorelicts. (CORNBRASH FORMATION)	0.60	(0.15)	89.50	
0.80 0.80	D HSV	110kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(1.00)		
				Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.60 1.80	(0.20)	88.50 88.30	
2.00	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone lithorelicts. (CORNBRASH FORMATION)	2	(0.30)		
				Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	2.10	(0.70)	88.00	
2.50 2.50	D HSV	127kPa			2.80		87.30	
2.90	ES			Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	3	(0.30)		
				Base of Excavation at 3.10m	3.10		87.00	
					4			
					5			

General Remarks:
1) Trial pit terminated at 3.10m bgl. 2) Trial pit sides didn't collapse. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP26
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Method: Trial Pit	Date(s): 08/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455714.56, 223063.05	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 89.82m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fragments of brick (1cm) and glass (5cm). Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.25	(0.25)	89.57	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	89.52	
				Strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.50	(0.20)	89.32	
1.00 1.00	D HSV	103kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(1.20)		
1.65 1.65	B HSV	93kPa	▼	Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.70		88.12	
					2	(0.40)		
				Base of Excavation at 2.10m	2.10		87.72	
					3			
					4			
					5			

General Remarks:
Trial pit terminated 2.10 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.70m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP27
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Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455759.70, 223049.77	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 89.46m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	89.21	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	89.16	
0.50	ES			Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare pockets (10cm x 10cm max) of carbonaceous material and rootlets. (CORNBRASH FORMATION)				
1.00 1.00	D HSV	113kPa			1	(1.40)		
				Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.70	(0.30)	87.76	
				Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with rare micritic limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	2.00	(0.80)	87.46	
2.30 2.40	B HSV	133kPa			2			
				Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	2.80	(0.20)	86.66	
2.90	B			Base of Excavation at 3.00m	3.00		86.46	
					3			
					4			
					5			

General Remarks:
Trial pit terminated 3.00 bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.70m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP28
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Method: Trial Pit	Date(s): 08/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455590.89, 223071.96	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 89.79m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fragments of brick (1cm) and glass (5cm). Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	89.49	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.10)	89.39	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.90	(0.50)	88.89	
1.00 1.00	D HSV	125kPa		Stiff cream, orangish brown and grey mottled slightly sandy CLAY with a occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(0.70)		
1.50	B				1.60		88.19	
				Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)		(0.40)		
				Base of Excavation at 2.00m	2.00		87.79	
					2			
					3			
					4			
					5			

General Remarks:
Trial pit terminated at 2.00m bgl due to very difficult digging in shallow rock. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 1.60m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP29
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Method: Trial Pit	Date(s): 08/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455638.50, 223057.78	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 89.69m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fragments of brick (1cm) and glass (5cm). Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	89.39	
0.40	B			Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.60	(0.30)	89.09	
1.00 1.00	D HSV	92kPa		Firm orangish brownish slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a high cobble content of sub-angular tabular limestone lithorelicts and rare rootlets and insect burrows. (CORNBRASH FORMATION)	1.40	(0.80)	88.29	
				Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.70	(0.30)	87.99	
				Base of Excavation at 1.70m				

General Remarks:
Trial pit terminated at 1.70m bgl due to very difficult digging in shallow rock. 2) Trial pit sides didn't collapse. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP30
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Method: Trial Pit	Date(s): 08/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455687.30, 223042.84	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 89.56m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fragments of brick (1cm) and glass (5cm). Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	89.26	
0.35	ES			Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.10)	89.16	
				Orangish brown COBBLES of tabular grey crystalline limestone lithorelicts with occasional boulders and rare rootlets. (CORNBRASH FORMATION)	0.60	(0.20)	88.96	
0.90	B			Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1			
1.00	HSV	88kPa				(0.90)		
				Very strong orangish brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.50	(0.30)	88.06	
1.90	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts and a high cobble content of sub-angular micritic limestone lithorelicts. (CORNBRASH FORMATION)	1.80	(0.20)	87.76	
				Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	2			
2.30	B				2.00	(0.50)	87.56	
2.30	HSV	125kPa						
				Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	2.50	(0.20)	87.06	
2.60	D				2.70		86.86	
				Base of Excavation at 2.70m				
					3			
					4			
					5			

General Remarks:
1) Trial pit terminated at 2.70m bgl. 2) Trial pit sides didn't collapse. 3) Groundwater not encountered. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP31
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Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455732.69, 223026.00	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 89.29m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.27	B			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	89.04	
				Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	88.99	
1.20 1.20 1.20	D ES HSV	130kPa		Stiff cream, orangish brown and grey mottled slightly sandy slightly CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare medium gravel sized fragments of shell fossils and rootlets. (CORNBRASH FORMATION)	1.60	(1.30)	87.69	
1.75	B			Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.70	(0.10)	87.59	
				Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone lithorelicts. (CORNBRASH FORMATION)	1.80	(0.10)	87.49	
2.40 2.50	D HSV	132kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	2.60	(0.80)	86.69	
				Base of Excavation at 2.60m				

General Remarks:
Trial pit terminated 2.60m bgl. 2) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.60m bgl. Groundwater entered the pit at a slow rate. 4) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP32
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Method: Trial Pit	Date(s): 07/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455780.73, 223009.18	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 88.87m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows with a low cobble content of sub-angular limestone and rare fine gravel sized fragments of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	88.57	
				Strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.80	(0.50)	88.07	
1.00 1.00	B HSV	88kPa		Firm cream, orangish brown and grey mottled slightly sandy slightly gravelly CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare pockets (10cm x 10cm max) of carbonaceous material and rootlets. (CORNBRASH FORMATION)	1			
2.00 2.00	D HSV	108kPa			2	(1.60)		
					2.40		86.47	
3.00 3.00	B HSV	103kPa	▼	Firm thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent micritic limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone. (FOREST MARBLE FORMATION)	3	(1.00)		
					3.40		85.47	
				Base of Excavation at 3.40m	4			
					5			

General Remarks:
1) Trial pit terminated 3.40m bgl. 2) 1) Trial pit sides didn't collapse. 3) Groundwater encountered at 3.00m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP33
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Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455877.32, 223032.55	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 88.48m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	88.18	
0.33	B			Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.35	(0.05)	88.13	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	1.00	(0.65)	87.48	
1.20 1.20	B HSV	98kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.70	(0.70)	86.78	
1.90	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone and brown shelly oolitic limestone lithorelicts. (CORNBRASH FORMATION)	2.10	(0.40)	86.38	
2.30	D			Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.60	(0.50)	85.88	
				Base of Excavation at 2.60m				

General Remarks:
1) Trial pit terminated 2.60m bgl. 2) 1) Trial pit sides mostly stable sides spalling from 1.70m to 2.10m. 3) Groundwater encountered at 1.80m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP34
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Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455923.35, 223022.57	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 88.03m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	87.73	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.90	(0.60)	87.13	
1.00 1.00	B HSV	95kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(0.90)		
1.60	B				1.80		86.23	
				Firm cream slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. (CORNBRASH FORMATION)	2.00	(0.20)	86.03	
2.50 2.50	D HSV	105kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	3	(1.25)		
				Very strong light grey micritic fine grained LIMESTONE. (FOREST MARBLE FORMATION)	3.25 3.30	(0.05)	84.78 84.73	
				Base of Excavation at 3.30m	4			
					5			

General Remarks:
1) Trial pit terminated 3.30m bgl. 2) 1) Trial pit sides mostly stable sides spalling from 1.70m to 2.10m. 3) Groundwater encountered at 1.80m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP35
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Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455976.54, 223008.22	Stability: Stable.	Dimensions: 2.50m x 0.65m; Scale: 1:25
Hydrock Project No: 27141	Ground Level: 87.40m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	87.10	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.90	(0.60)	86.50	
1.00 1.00 1.00	D ES HSV	93kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.60	(0.70)	85.80	
1.70	B		▼	Firm cream slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. (CORNBRASH FORMATION)	1.90	(0.30)	85.50	
2.00 2.40	HSV ES	140kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.60	(0.70)	84.80	
				Very strong light grey micritic fine grained LIMESTONE. (FOREST MARBLE FORMATION)	2.80	(0.20)	84.60	
2.85	D			Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	2.90	(0.10)	84.50	
				Base of Excavation at 2.90m				

General Remarks:
1) Trial pit terminated 2.90m bgl. 2) 1) Trial pit sides mostly stable sides spalling from 0.30m to 0.90m. 3) Groundwater encountered at 1.70m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP36
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Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456029.51, 222994.80	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 86.76m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows and rare fine to coarse gravel sized fragments of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.30	(0.30)	86.46	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.80	(0.50)	85.96	
1.00 1.00	B HSV	84kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and rare purple rootlets. (CORNBRASH FORMATION)	1.30	(0.50)	85.46	
1.45	B			Firm cream slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of grey oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.60	(0.30)	85.16	
2.30 2.40	HSV D	93kPa	▼	Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and purple rootlets and rare fish scale fossils. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION) *... Below 2.40m: Becoming greyish brown mottled orangish brown.*	2.85	(1.25)	83.91	
				Very strong brown oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION) Base of Excavation at 2.90m	2.90	(0.05)	83.86	

General Remarks:
1) Trial pit terminated 2.90m bgl due to very difficult digging in shallow rock. 2) 1) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.40m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP37
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Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456090.60, 222977.95	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 86.18m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	85.93	
0.50	D			Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	85.88	
1.00	B			Firm light yellowish brown, orangish brown and grey mottled slightly sandy slightly CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a high cobble content of sub-angular tabular limestone lithorelicts. (CORNBRASH FORMATION)	1.20	(0.90)	84.98	
1.45	HSV	100kPa		Firm cream, orangish brown and grey mottled slightly sandy slightly CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and occasional purple rootlets. (CORNBRASH FORMATION)	1.50	(0.30)	84.68	
1.55	D			Firm cream slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of grey oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.60	(0.10)	84.58	
2.00	HSV	120kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and occasional purple rootlets and rare fish scale fossils. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.70	(1.10)	83.48	
2.75	B			Firm brown slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a medium cobble content of grey micritic limestone lithorelicts. (FOREST MARBLE FORMATION)	2.80	(0.10)	83.38	
2.85	D			Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	2.90	(0.10)	83.28	
				Very strong dark grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	3.00	(0.10)	83.18	
				Base of Excavation at 3.00m				

General Remarks:
1) Trial pit terminated 3.00m bgl due to very difficult digging in shallow rock. 2) 1) Trial pit sides didn't collapse. 3) Groundwater encountered at 2.80m bgl. Groundwater entered the pit at a moderate rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP38
Page No. 1 of 1

Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455897.64, 222994.23	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 88.00m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows and rare medium gravel sized fragments of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.25	(0.25)	87.75	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.30	(0.05)	87.70	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.70	(0.40)	87.30	
0.80 0.80 0.80	B ES HSV	87kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(0.80)		
1.40 1.40	D HSV	110kPa			1.50		86.50	
				Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone and brown shelly oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.60	(0.10)	86.40	
					1.70	(0.10)	86.30	
1.75	B			Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.80	(0.10)	86.20	
2.00	D			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone lithorelicts. (CORNBRASH FORMATION)	2			
				Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)		(1.20)		
2.90	D				3			
				Very strong light grey micritic fine grained LIMESTONE. (FOREST MARBLE FORMATION)	3.00 3.05	(0.05)	85.00 84.95	
				Base of Excavation at 3.05m				
					4			
					5			

General Remarks:
1) Trial pit terminated 3.05m bgl due to very difficult digging in shallow rock. 2) 1) Trial pit sides mostly stable sides spalling from 0.30m to 0.70m. 3) Groundwater encountered at 1.60m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP39
Page No. 1 of 1

Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455980.40, 222969.40	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 86.89m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	86.59	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.90	(0.60)	85.99	
1.00 1.00	B HSV	100kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.50	(0.60)	85.39	
1.70	B			Firm cream slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone a low cobble content of brown oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.80	(0.30)	85.09	
2.60 2.70	HSV D	140kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.90	(1.10)	83.99	
				Very strong light grey micritic fine grained LIMESTONE. (FOREST MARBLE FORMATION)	2.95	(0.05)	83.94	
				Base of Excavation at 2.95m				

General Remarks:
1) Trial pit terminated 2.95m bgl due to very difficult digging in shallow rock. 2) 1) Trial pit sides mostly stable sides spalling from 0.30m to 0.90m. 3) Groundwater encountered at 1.80m bgl. Groundwater entered the pit at a moderate rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP40
Page No. 1 of 1

Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456057.73, 222944.48	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 86.04m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	85.74	
0.35	D			Orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.10)	85.64	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.75	(0.35)	85.29	
1.00 1.00 1.00	B ES HSV	113kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and occasional purple rootlets. (CORNBRASH FORMATION)	1.60	(0.85)	84.44	
1.80	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone and brown shelly oolitic limestone lithorelicts. (CORNBRASH FORMATION)	2.00	(0.40)	84.04	
2.30 2.30 2.40	D HSV D	118kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy gravelly CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and rare purple rootlets. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.35	(0.35)	83.69	
2.60	D			Firm brown slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of grey oolitic limestone lithorelicts. (FOREST MARBLE FORMATION)	2.45	(0.10)	83.59	
				Stiff thinly laminated bluish grey silty CLAY with occasional micritic limestone lithorelicts and horizontal bedding fissures. (FOREST MARBLE FORMATION)	2.90	(0.45)	83.14	
				Very strong dark grey oolitic fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	3.00	(0.10)	83.04	
				Base of Excavation at 3.00m				

General Remarks:
1) Trial pit terminated 3.00m bgl. 2) 1) Trial pit sides mostly stable sides spalling from 0.40m to 1.00m. 3) Groundwater encountered at 2.50m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP41
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Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455859.56, 222970.35	Stability: Stable.	Dimensions: 2.50m / 0.65m
Hydrock Project No: 27141	Ground Level: 87.97m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.10	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows and rare fragments of brick (1cm) and glass (5cm). Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.25	(0.25)	87.72	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.15)	87.57	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.90	(0.50)	87.07	
1.00 1.00	B HSV	140kPa		Stiff cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1	(0.90)		
1.70	D		▼		1.80		86.17	
				Very strong brown oolitic coarse grained calcarenite LIMESTONE. (CORNBRASH FORMATION)	1.90	(0.10)	86.07	
2.00	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone lithorelicts. (CORNBRASH FORMATION)	2 2.10	(0.20)	85.87	
2.30 2.30	D HSV	120kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	3	(1.20)		
				Base of Excavation at 3.30m	3.30		84.67	
					4			
					5			

General Remarks:
1) Trial pit terminated 3.30m bgl. 2) 1) Trial pit sides mostly stable sides spalling from 1.70m to 2.10m. 3) Groundwater encountered at 1.80m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP42
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Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455911.65, 222955.76	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 87.33m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows and rare medium gravel sized fragments of brick. Gravel is sub-angular fine to coarse of limestone. (MADE GROUND)	0.40	(0.40)	86.93	
0.40 - 0.45	B			Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.50	(0.10)	86.83	
0.80 0.80	D HSV	68kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.60	(1.10)	85.73	
1.60 - 1.70	B			Cream clayey sub-angular fine to coarse GRAVEL of micritic limestone lithorelicts with a high cobble content of sub-angular micritic limestone and brown shelly oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.80	(0.20)	85.53	
2.20	D			Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.90	(1.10)	84.43	
2.80	D			Very strong light grey micritic fine grained LIMESTONE. (FOREST MARBLE FORMATION)	2.95	(0.05)	84.38	
				Base of Excavation at 2.95m				

General Remarks:
1) Trial pit terminated 2.95m bgl. 2) 1) Trial pit sides mostly stable sides spalling from 1.70m to 2.10m. 3) Groundwater encountered at 2.90m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP43
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Method: Trial Pit	Date(s): 09/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455962.41, 222939.09	Stability: Stable.	Dimensions: 2.50m x 0.65m
Hydrock Project No: 27141	Ground Level: 86.69m OD	Plant: JCB 140X	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.15	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.30	(0.30)	86.39	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.70	(0.40)	85.99	
0.75 0.75	D HSV	40kPa		Soft cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.40	(0.70)	85.29	
				Firm cream slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a moderate cobble content of brown oolitic limestone. (CORNBRASH FORMATION)	1.70	(0.30)	84.99	
2.00 2.00	B HSV	108kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy gravelly CLAY. Gravel is sub-angular fine to coarse gravel sized tabular limestone. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2.90	(1.20)	83.79	
2.80	D			Very strong light grey micritic fine grained LIMESTONE. (FOREST MARBLE FORMATION)	2.95	(0.05)	83.74	
				Base of Excavation at 2.95m				

General Remarks:
1) Trial pit terminated 2.95m bgl due to very difficult digging in shallow rock. 2) 1) Trial pit sides mostly stable sides spalling from 0.30m to 0.70m. 3) Groundwater encountered at 1.70m bgl. Groundwater entered the pit at a moderate rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP44
Page No. 1 of 1

Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456018.53, 222922.60	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 86.17m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown slightly sandy gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.40	(0.40)	85.77	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with clay infill and horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.75	(0.35)	85.42	
1.00 1.00	B HSV	77kPa		Firm cream, orangish brown and grey mottled slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content and low boulder content of sub-angular tabular limestone lithorelicts and rare rootlets. (CORNBRASH FORMATION)	1.40	(0.65)	84.77	
1.50	D			Firm cream slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts a low cobble content of brown oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.60	(0.20)	84.57	
1.70 1.70	D HSV	130kPa		Stiff thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION) ... Below 2.50m: Becoming grey.	2.80	(1.20)	83.37	
2.75 2.75	B HSV	132kPa		Very strong light grey micritic fine grained LIMESTONE. (FOREST MARBLE FORMATION)	2.90	(0.10)	83.27	
				Base of Excavation at 2.90m				

General Remarks:
1) Trial pit terminated 2.90m bgl. 2) 1) Trial pit sides mostly stable sides spalling from 1.40m to 1.60m. 3) Groundwater encountered at 2.80m bgl. Groundwater entered the pit at a moderate rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
TP45
Page No. 1 of 1

Method: Trial Pit	Date(s): 12/06/2023	Logged By: JM	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 456075.81, 222901.91	Stability: Stable.	Dimensions: 2.50m x 0.65m / Scale: 1:25
Hydrock Project No: 27141	Ground Level: 85.81m OD	Plant: JCB 140X	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Brown sandy slightly gravelly CLAY with frequent rootlets and occasional roots and insect burrows. Gravel is sub-angular fine to coarse of limestone. (TOPSOIL)	0.25	(0.25)	85.56	
				Firm orangish brownish slightly sandy gravelly CLAY with a high cobble content of sub-angular tabular limestone and rare rootlets and insect burrows. Gravel is sub-angular fine to coarse of tabular limestone. (HEAD DEPOSITS)	0.40	(0.15)	85.41	
				Very strong light grey stained orangish brown crystalline coarse grained calcarenite LIMESTONE. Vertical fractures are randomly oriented with horizontal bedding fractures. Recovered as cobbles and boulders. (CORNBRASH FORMATION)	0.75	(0.35)	85.06	
0.90 0.90	B HSV	48kPa		Soft cream, orangish brown and grey mottled slightly sandy slightly CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone lithorelicts and a low cobble content of sub-angular tabular limestone lithorelicts and purple rootlets. (CORNBRASH FORMATION)	1			
1.40	HSV	125kPa		*... Below 1.40m: Becoming firm.*		(1.05)		
					1.80		84.01	
1.83	D			Firm cream slightly sandy CLAY with occasional sub-angular fine to coarse gravel sized tabular limestone a low cobble content of grey oolitic limestone lithorelicts. (CORNBRASH FORMATION)	1.85	(0.05)	83.96	
2.00	HSV	93kPa		Firm thinly laminated orangish brown and grey mottled slightly sandy CLAY with frequent sub-angular fine to coarse gravel sized tabular limestone lithorelicts and occasional purple rootlets. Laminations are extremely closely spaced orangish brown oolitic limestone and sand. (FOREST MARBLE FORMATION)	2	(0.55)		
2.30 2.30	D HSV	97kPa			2.40		83.41	
				Very strong dark grey fine grained shelly LIMESTONE. (FOREST MARBLE FORMATION)	2.50	(0.10)	83.31	
				Base of Excavation at 2.50m				
					3			
					4			
					5			

General Remarks:
1) Trial pit terminated 2.50m bgl due to very difficult digging in shallow rock. 2) 1) Trial pit sides stable. 3) Groundwater encountered at 2.50m bgl. Groundwater entered the pit at a slow rate. 4) 1) Trial pit backfilled with arisings on completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
HP01
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Method: Hand-dug Pit	Date(s): 24/05/2023	Logged By: CR	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 442265.52, 213919.33	Stability: Stable	Dimensions: 0.30m x 0.30m; Scale: 1:10
Hydrock Project No: 27141	Ground Level: 98.32m OD	Plant: Insulated hand tools	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.05 - 0.15 0.05 - 0.15	D ES			Grey slightly sandy GRAVEL. Gravel is angular to sub angular fine to coarse of limestone and flint with rare gravel sized fragments of brick glass and asphalt. (MADE GROUND)	0.39	(0.39)	97.93	
				Greyish brown LIMESTONE. (CORNBRASH FORMATION)	0.50	(0.11)	97.82	
				Base of Excavation at 0.50m				

General Remarks:
1) Hand pit terminated at 0.50m bgl. 2) Hand pit sides didn't collapse. 3) Groundwater not encountered. 4) Backfilled with lightly compacted arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
HP02
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Method: Hand-dug Pit	Date(s): 24/05/2023	Logged By: CR	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 442253.09, 213858.71	Stability: Stable	Dimensions: 0.30m x 0.30m
Hydrock Project No: 27141	Ground Level: 98.93m OD	Plant: Insulated hand tools	Scale: 1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20 - 0.30	D			Greyish brown slightly sandy GRAVEL. Gravel is angular to sub angular fine to coarse of limestone and flint with rare gravel sized fragments of brick and asphalt. (MADE GROUND)		(0.39)		
0.25 - 0.35	ES				0.39		98.54	
				Greyish brown LIMESTONE. (CORNBRASH FORMATION)	0.40	(0.01)	98.53	
				Base of Excavation at 0.40m				

General Remarks:
1) Hand pit terminated at 0.40m bgl. 2) Hand pit sides didn't collapse. 3) Groundwater not encountered. 4) Backfilled with lightly compacted arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
HP03
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Method: Hand-dug Pit	Date(s): 09/06/2023	Logged By: CR	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455849.84, 223138.61	Stability: Stable	Dimensions: 0.30m x 0.30m / Scale: 1:10
Hydrock Project No: 27141	Ground Level: 89.85m OD	Plant: Insulated hand tools	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Greyish brown GRAVEL. Gravel is angular to sub angular fine to coarse of flint and limestone with rare gravel sized fragments of brick and frequent rootlets. (MADE GROUND)	0.09	(0.09)	89.76	
0.10 - 0.20 0.10 - 0.20	D ES			Greyish brown slightly sandy GRAVEL. Gravel is angular to sub angular fine to coarse of limestone and flint with rare gravel sized fragments of brick and asphalt. (MADE GROUND)	0.45	(0.36)	89.40	
				Greyish brown LIMESTONE. (CORNBRASH FORMATION)	0.46	(0.01)	89.39	
				Base of Excavation at 0.45m				

General Remarks:
1) Hand pit terminated at 0.46m bgl. 2) Hand pit sides didn't collapse. 3) Groundwater not encountered. 4) Backfilled with lightly compacted arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
HP04
Page No. 1 of 1

Method: Hand-dug Pit	Date(s): 09/06/2023	Logged By: CR	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455861.09, 223206.44	Stability: Stable	Dimensions: 0.30m x 0.30m
Hydrock Project No: 27141	Ground Level: 90.22m OD	Plant: Insulated hand tools	Scale: 1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20 - 0.30	ES			Greyish brown slightly sandy GRAVEL. Gravel is angular to sub angular fine to coarse of limestone and flint with rare gravel sized fragments of glass and asphalt. (MADE GROUND)		(0.39)		
0.30 - 0.40	D				0.39		89.83	
				Greyish brown LIMESTONE. (CORNBRASH FORMATION)	0.40	(0.01)	89.82	
				Base of Excavation at 0.40m				

General Remarks:
1) Hand pit terminated at 0.40m bgl. 2) Hand pit sides didn't collapse. 3) Groundwater not encountered. 4) Backfilled with lightly compacted arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Himley Village

Trialpit No
HP05
Page No. 1 of 1

Method: Hand-dug Pit	Date(s): 09/06/2023	Logged By: CR	Checked By: MA/SC
Client: Cala Homes Cotswolds and Legal & General Homes	Co-ords: 455869.83, 223263.04	Stability: Stable	Dimensions: 0.30m x 0.30m; Scale: 1:10
Hydrock Project No: 27141	Ground Level: 90.45m OD	Plant: Insulated hand tools	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.03 - 0.05	ES			Greyish brown GRAVEL. Gravel is angular to sub angular fine to coarse of flint and limestone with rare gravel sized fragments of brick and frequent rootlets. (MADE GROUND)	0.06	(0.06)	90.39	
				Greyish brown GRAVEL. Gravel is angular to sub angular fine to coarse of flint and limestone with rare gravel sized fragments of asphalt. (MADE GROUND)				
0.30 - 0.40	ES					(0.43)		
0.40 - 0.45	D							
				Greyish brown LIMESTONE. (CORNBRASH FORMATION)	0.49	(0.01)	89.96	
				Base of Excavation at 0.50m	0.50		89.95	

General Remarks:
1) Hand pit terminated at 0.50m bgl. 2) Hand pit sides didn't collapse. 3) Groundwater not encountered. 4) Backfilled with lightly compacted arisings.

Logged in general accordance with BS5930:2015

Exploratory hole photographs

Site Investigation Photograph 1	
Date: 09/06/2023	
Direction Photograph Taken: N/A.	
Description: HP01 showing Made Ground over Cornbrash Formation.	

Site Investigation Photograph 2	
Date: 09/06/2023	
Direction Photograph Taken: n/a.	
Description: HP02 showing Made Ground over Cornbrash Formation.	

Site Investigation Photograph 3	
Date: 09/06/2023	
Direction Photograph Taken: n/a.	
Description: HP03 showing Made Ground over Cornbrash Formation.	

Site Investigation Photograph 4	
Date: 09/06/2023	
Direction Photograph Taken: n/a.	
Description: HP04 showing Made Ground over Cornbrash Formation.	

Site Investigation Photograph 5	
Date: 09/06/2023	
Direction Photograph Taken: n/a.	
Description: HP05 showing Made Ground over Cornbrash Formation.	

Site Investigation Photograph 6	
Date: 05/06/2023	
Direction Photograph Taken: N/A.	
Description: RC01 1.20m to 1.80m showing Cornbrash Formation.	

Site Investigation Photograph 7	
Date: 05/06/2023	
Direction Photograph Taken: N/A.	
Description: RC01 1.80m to 3.00m showing Cornbrash Formation.	

Site Investigation Photograph 8	
Date: 05/06/2023	
Direction Photograph Taken: N/A.	
Description: RC01 3.00m to 4.00m showing Cornbrash Formation and Forest Marble Formation.	

Site Investigation Photograph 9	
Date: 05/06/2023	
Direction Photograph Taken: N/A.	
Description: RC01 4.00m to 5.50m showing Forest Marble Formation.	

Site Investigation Photograph 10	
Date: 15/06/2023	
Direction Photograph Taken: N/A.	
Description: RC01 5.50m to 7.00m showing Forest Marble Formation.	

Site Investigation Photograph 11	
Date: 15/06/2023	
Direction Photograph Taken: N/A.	
Description: RC01 7.00m to 8.50m showing Forest Marble Formation.	

Site Investigation Photograph 12	
Date: 15/06/2023	
Direction Photograph Taken: N/A.	
Description: RC01 8.50m to 10.00m showing Forest Marble Formation.	

Site Investigation Photograph 13	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: TP01 showing Topsoil over Cornbrash Formation.	

Site Investigation Photograph 14	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: Spoil from TP01 showing Topsoil and Cornbrash Formation.	

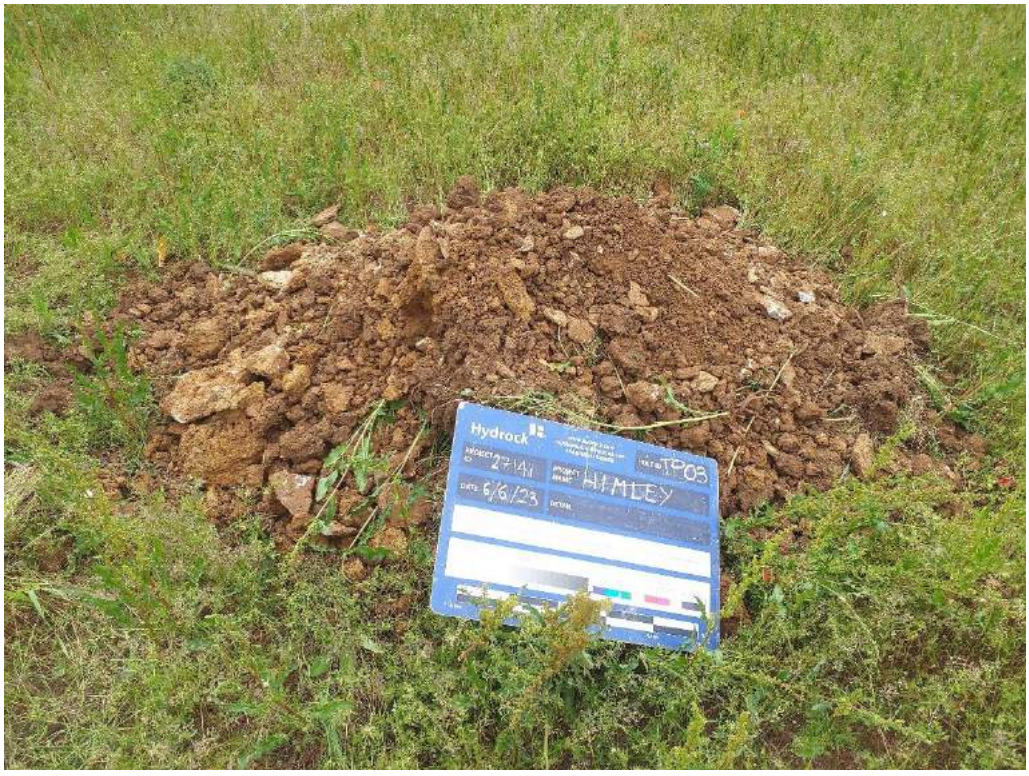
Site Investigation Photograph 15	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: Spoil from TP01 showing Cornbrash Formation.	

Site Investigation Photograph 16	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: TP02 showing Made Ground over Head Deposits over Cornbrash Formation over Forest Marble Formation.	

Site Investigation Photograph 17	
Date: 06/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP02 showing Made Ground, Head Deposits and Cornbrash Formation.	

Site Investigation Photograph 18	
Date: 06/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP02 showing Cornbrash Formation and Forest Marble Formation.	

Site Investigation Photograph 19	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: TP03 showing Topsoil over Head Deposits over Cornbrash Formation.	

Site Investigation Photograph 20	
Date: 06/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP03 showing Topsoil, Head Deposits and Cornbrash Formation.	

Site Investigation Photograph 21	
Date: 06/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP03 showing Topsoil, Head Deposits and Cornbrash Formation.	

Site Investigation Photograph 22	
Date: 07/06/2023	
Direction Photograph Taken: North.	
Description: TP04 showing Made Ground over Head Deposits over Cornbrash Formation over Forest Marble Formation.	

Site Investigation Photograph 23	
Date: 07/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP04 showing Topsoil, Head Deposits and Cornbrash Formation.	

Site Investigation Photograph 24	
Date: 07/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP04 showing Cornbrash Formation and Forest Marble Formation.	

Site Investigation Photograph 25	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: TP05 showing Topsoil over Cornbrash Formation.	

Site Investigation Photograph 26	
Date: 06/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP05 showing Topsoil and Cornbrash Formation.	

Site Investigation Photograph 27	
Date: 06/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP05 showing Cornbrash Formation.	

Site Investigation Photograph 28	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: TP06 showing Made Ground over Cornbrash Formation over Forest Marble Formation.	

Site Investigation Photograph 29	
Date: 06/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP06 showing Made Ground and Cornbrash Formation.	

Site Investigation Photograph 30	
Date: 06/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP06 showing Made Ground and Cornbrash Formation.	

Site Investigation Photograph 31	
Date: 06/06/2023	
Direction Photograph Taken: North.	
Description: TP07 showing Made Ground over Head Deposits over Cornbrash Formation over Forest Marble Formation.	

Site Investigation Photograph 32	
Date: 06/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP07 showing Made Ground, Head Deposits, Cornbrash Formation and Forest Marble Formation.	

Site Investigation Photograph 33	
Date: 06/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP07 showing Made Ground, Head Deposits, Cornbrash Formation and Forest Marble Formation.	

Site Investigation Photograph 34	
Date: 07/06/2023	
Direction Photograph Taken: North.	
Description: TP08 showing Made Ground over Head Deposits over Cornbrash Formation over Forest Marble Formation.	

Site Investigation Photograph 35	
Date: 07/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP08 showing Made Ground, Head Deposits and Cornbrash Formation.	

Site Investigation Photograph 36	
Date: 07/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP08 showing Cornbrash Formation and Forest Marble Formation.	

Site Investigation Photograph 37	
Date: 07/06/2023	
Direction Photograph Taken: North.	
Description: TP09 showing Topsoil over Head Deposits over Cornbrash Formation.	

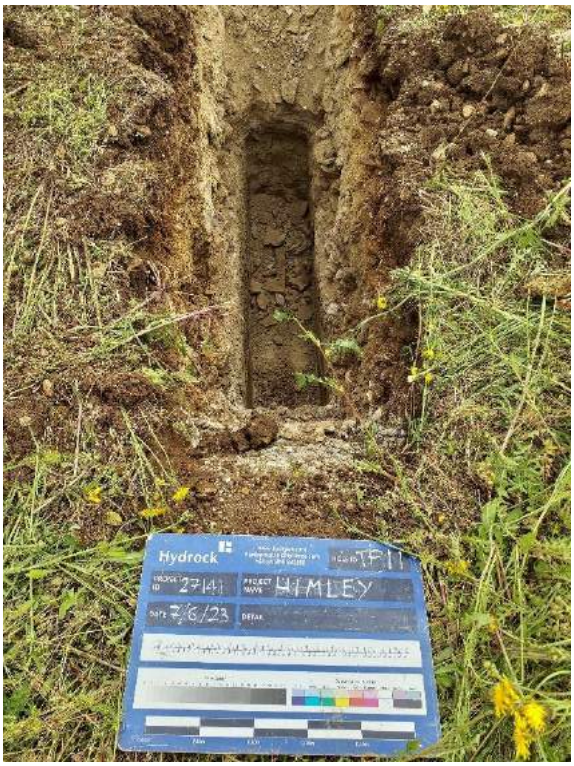
Site Investigation Photograph 38	
Date: 07/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP09 showing Topsoil, Head Deposits, Cornbrash Formation and Forest Marble Formation.	

Site Investigation Photograph 39	
Date: 07/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP09 showing Cornbrash Formation.	

Site Investigation Photograph 40	
Date: 07/06/2023	
Direction Photograph Taken: North.	
Description: TP10 showing Made Ground over Head Deposits over Cornbrash Formation.	

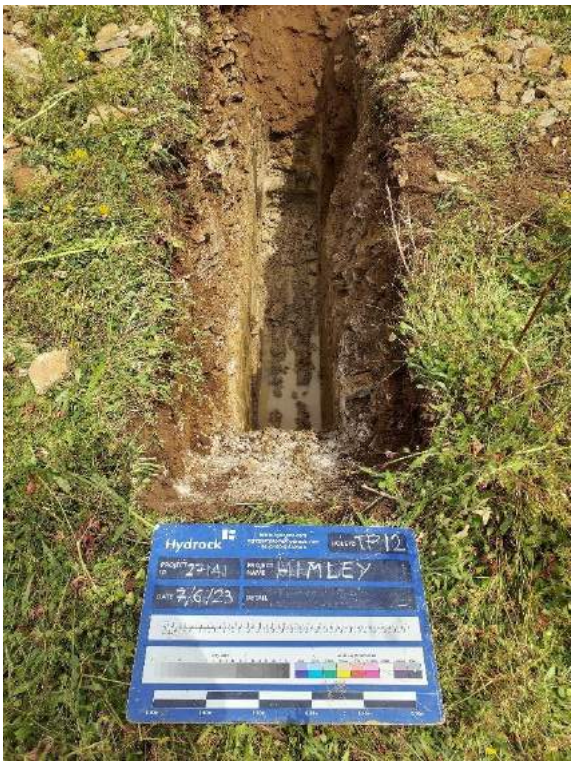
Site Investigation Photograph 41	
Date: 07/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP10 showing Made Ground, Head Deposits and Cornbrash Formation.	

Site Investigation Photograph 42	
Date: 07/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP10 showing Cornbrash Formation.	

Site Investigation Photograph 43	
Date: 07/06/2023	
Direction Photograph Taken: North.	
Description: TP11 showing Made Ground over Head Deposits over Cornbrash Formation.	

Site Investigation Photograph 44	
Date: 07/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP11 showing Made Ground, Head Deposits and Cornbrash Formation.	

Site Investigation Photograph 45	
Date: 07/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP11 showing Cornbrash Formation.	

Site Investigation Photograph 46	
Date: 07/06/2023	
Direction Photograph Taken: North.	
Description: TP12 showing Topsoil over Head Deposits over Cornbrash Formation.	

Site Investigation Photograph 47	
Date: 07/06/2023	
Direction Photograph Taken: East.	
Description: Spoil from TP12 showing Topsoil, Head Deposits, Cornbrash Formation.	

Site Investigation Photograph 48	
Date: 07/06/2023	
Direction Photograph Taken: West.	
Description: Spoil from TP12 showing Cornbrash Formation.	

Site Investigation Photograph 49	
Date: 07/06/2023	
Direction Photograph Taken: North.	
Description: TP13 showing Topsoil over Head Deposits over Cornbrash Formation.	

Site Investigation Photograph 50	
Date: XX/XX/XX	
Direction Photograph Taken: XXXXX.	
Description: XXXXX.	

Site Investigation Photograph 51	
Date: XX/XX/XX	
Direction Photograph Taken: XXXXX.	
Description: XXXXX.	

Site Investigation Photograph 52	
Date: XX/XX/XX	
Direction Photograph Taken: XXXXX.	
Description: XXXXX.	

Appendix C Geotechnical test results and geotechnical plots

Geotechnical laboratory test results

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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

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

4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	06/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	29/06/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

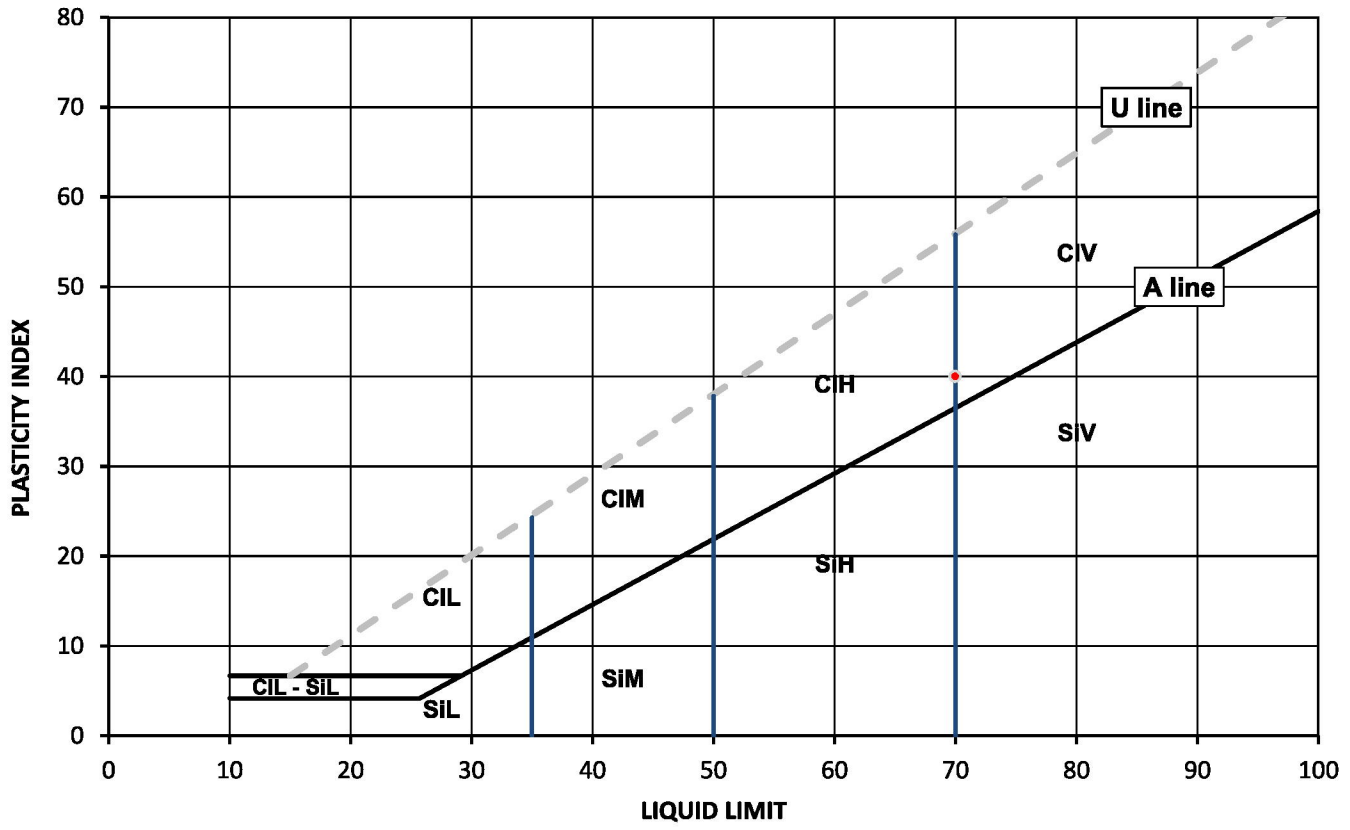
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2723073	Depth Top [m]:	0.50
Hole No.:	TP07	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Brown slightly gravelly CLAY		

Sample Preparation: Tested after washing to remove >425 µm

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	70	30	40	91



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 232.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

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

4041

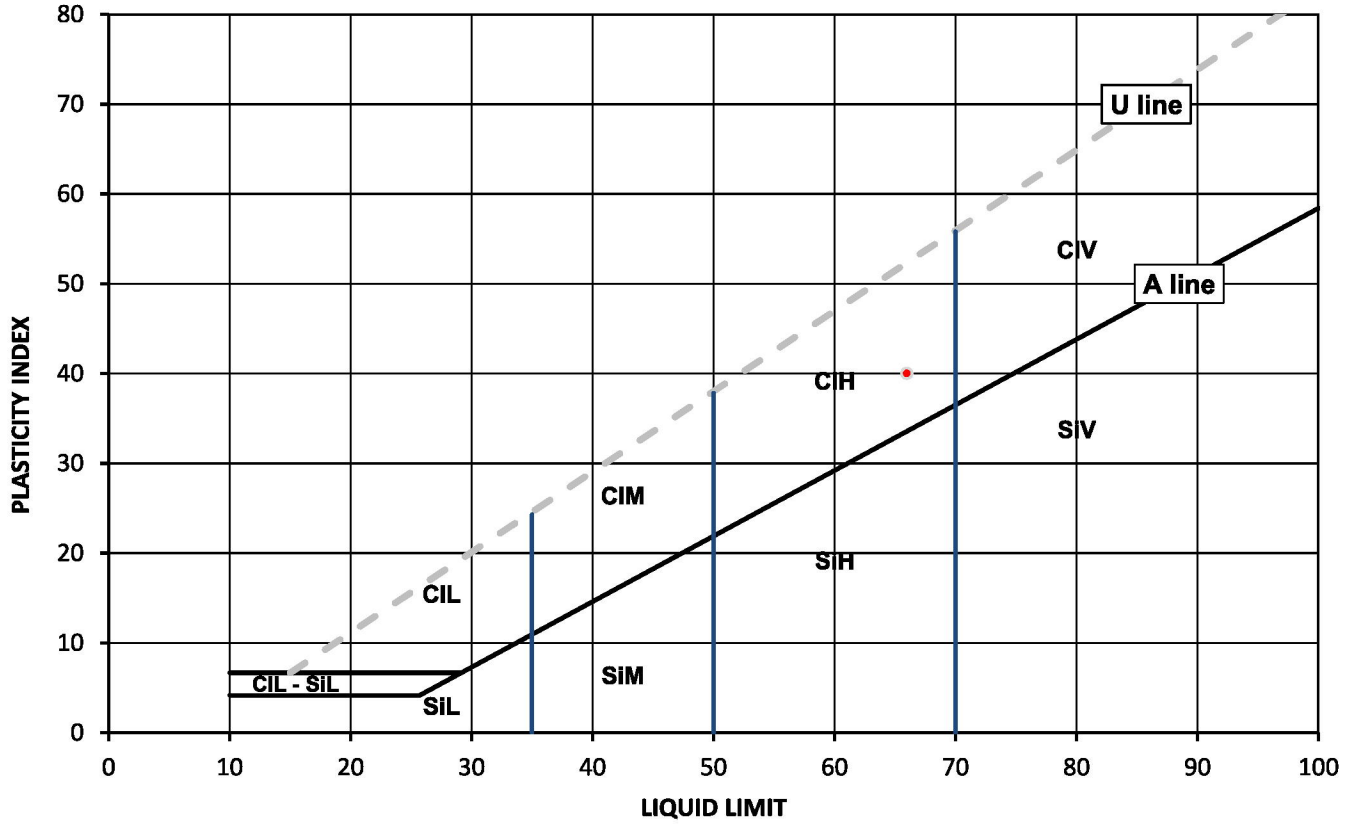
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	13/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	29/06/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723077	Depth Top [m]:	1.00
Hole No.:	TP14	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Brownish grey CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	66	26	40	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 232.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

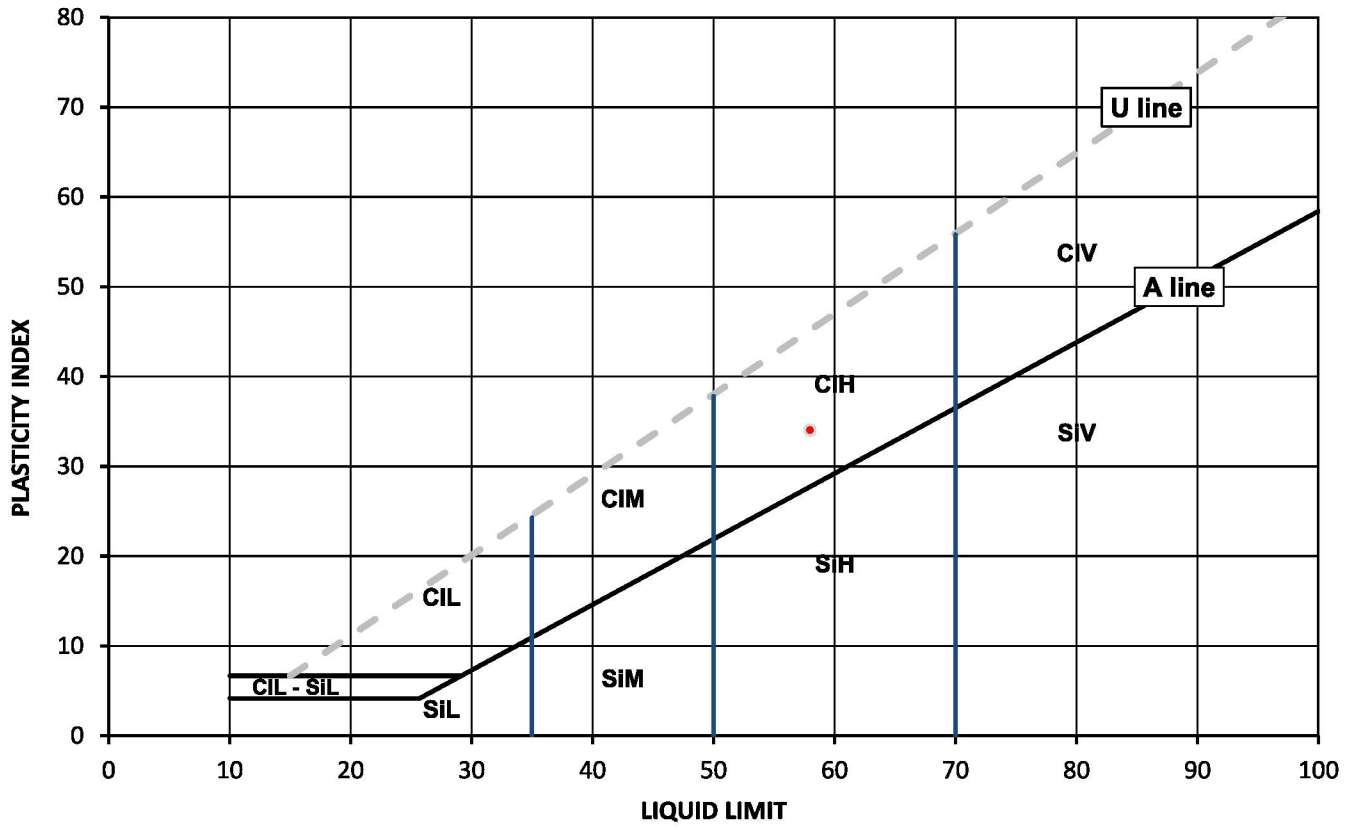
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	06/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	01/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723069	Depth Top [m]:	1.50
Hole No.:	TP01	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Sample Description:	Yellowish brown slightly gravelly CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	58	24	34	85



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	06/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	29/06/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

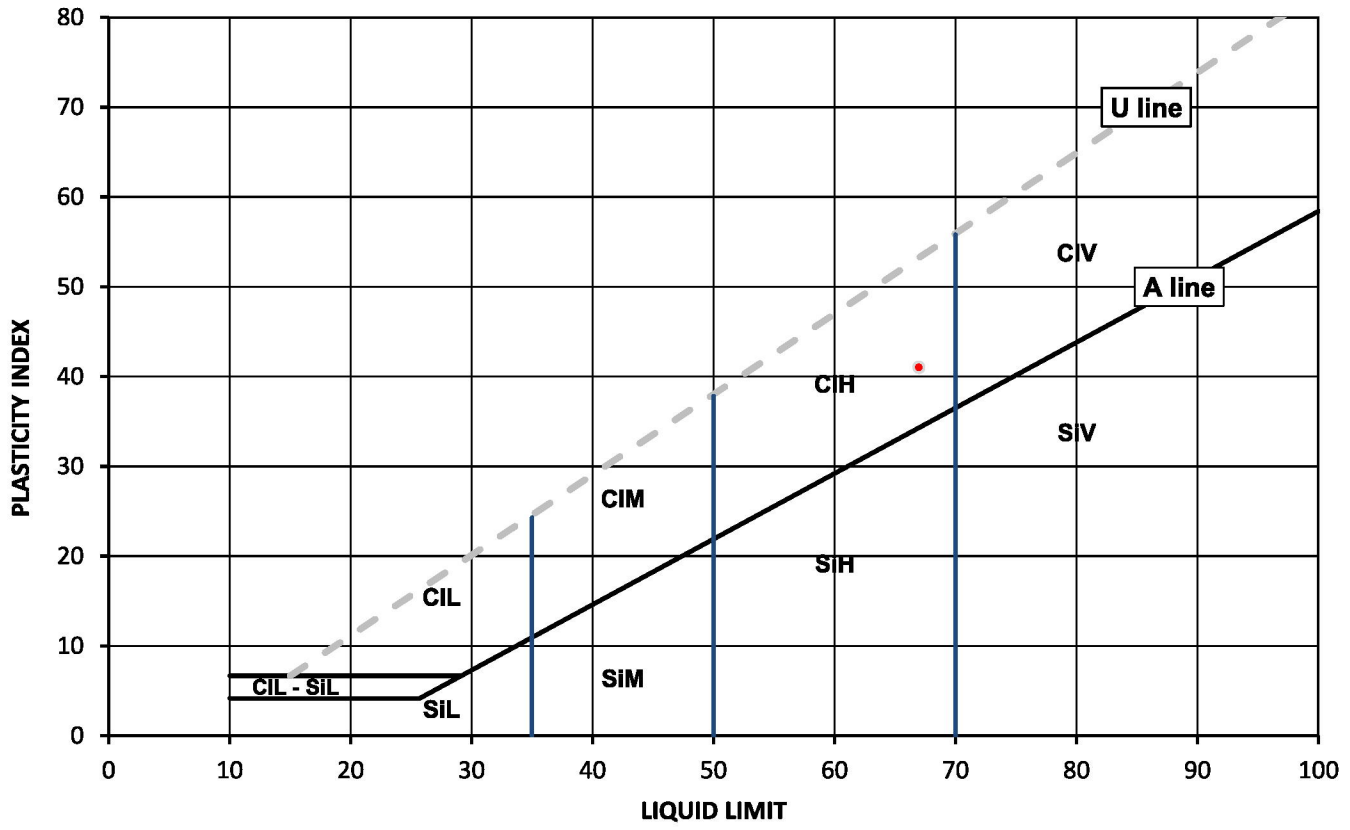
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2723070	Depth Top [m]:	1.00
Hole No.:	TP03	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Light brown CLAY		

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	67	26	41	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

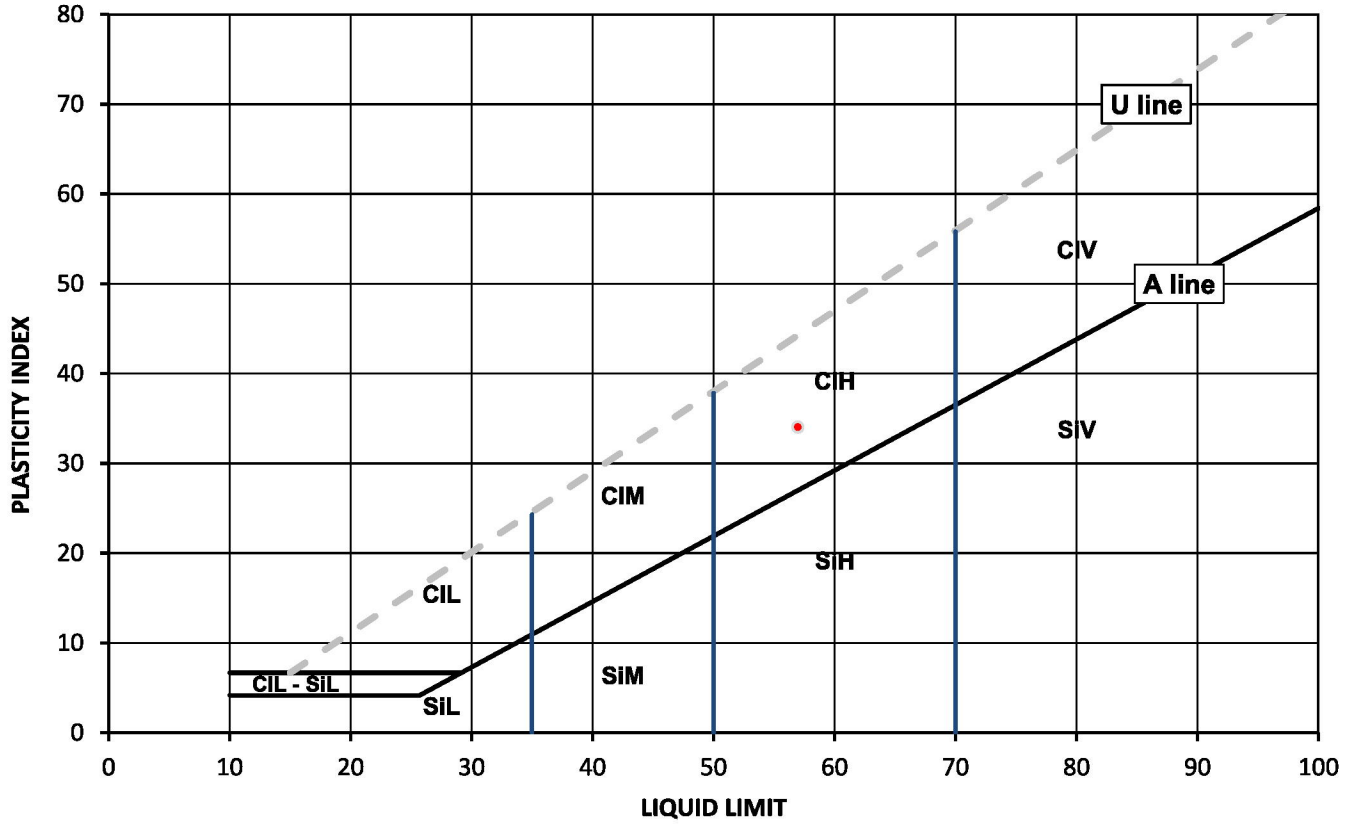
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	07/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	05/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723071	Depth Top [m]:	1.00
Hole No.:	TP04	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Yellowish brown to grey slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	57	23	34	91



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

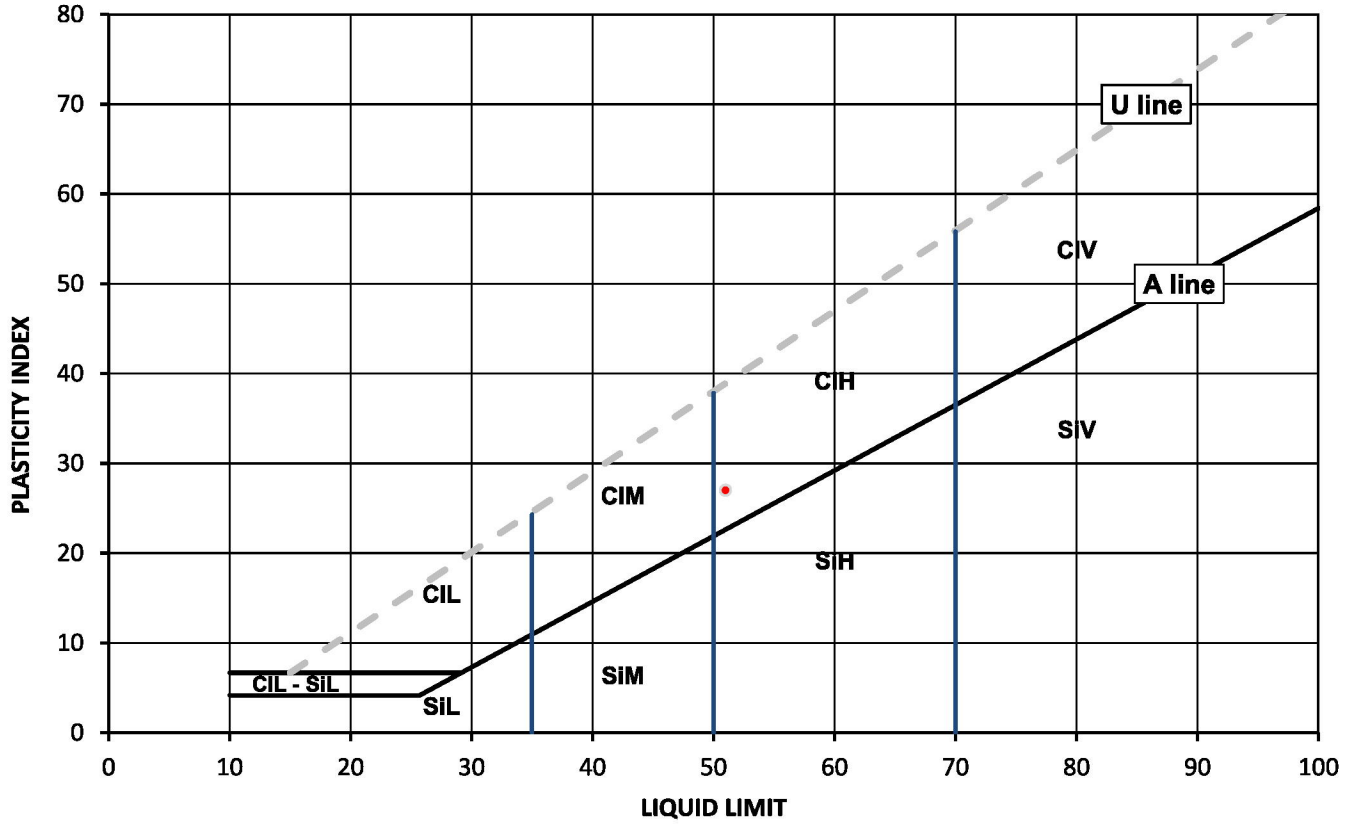
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	07/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	05/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723075	Depth Top [m]:	1.00
Hole No.:	TP11	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Brownish grey slightly gravelly slightly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	51	24	27	91



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

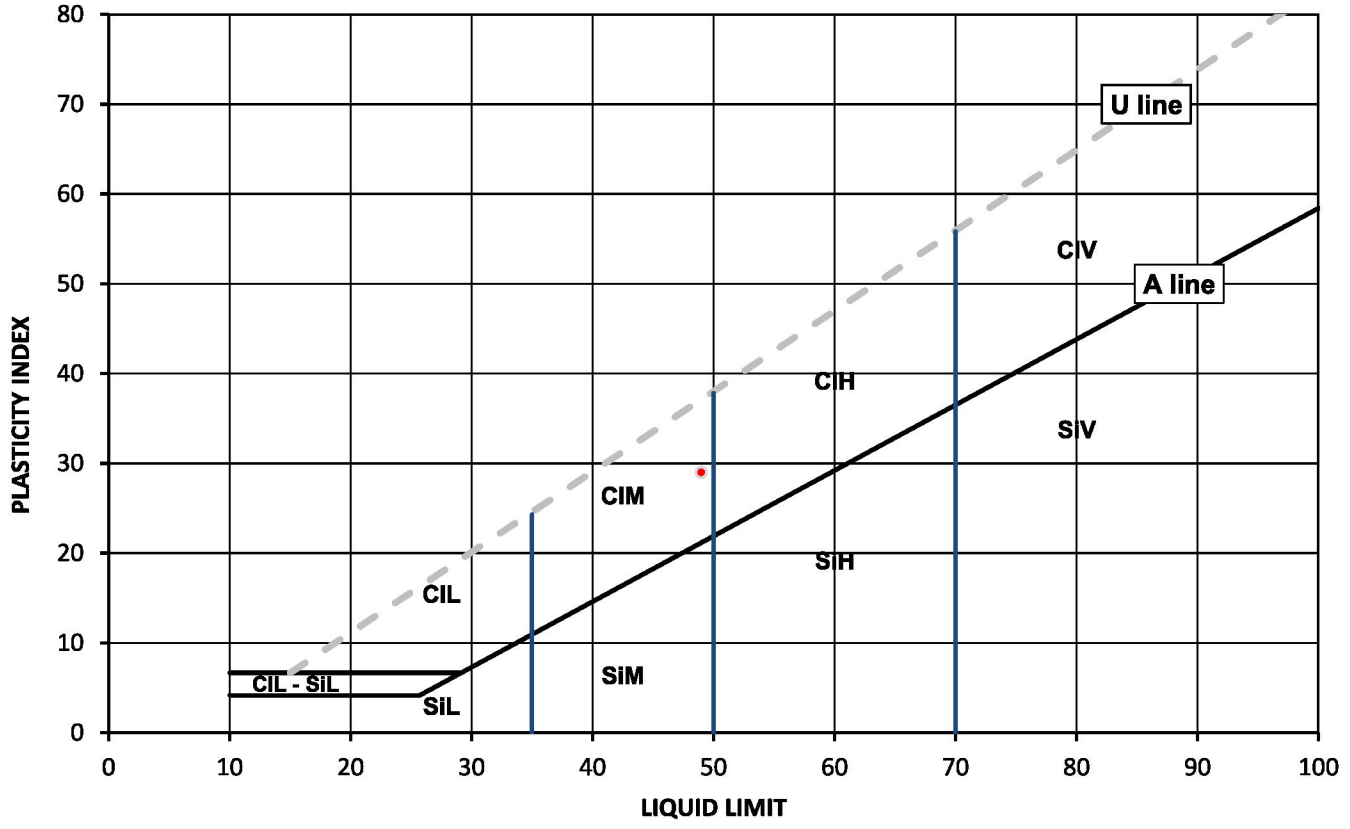
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	07/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	29/06/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723076	Depth Top [m]:	1.30
Hole No.:	TP12	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Light brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	49	20	29	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

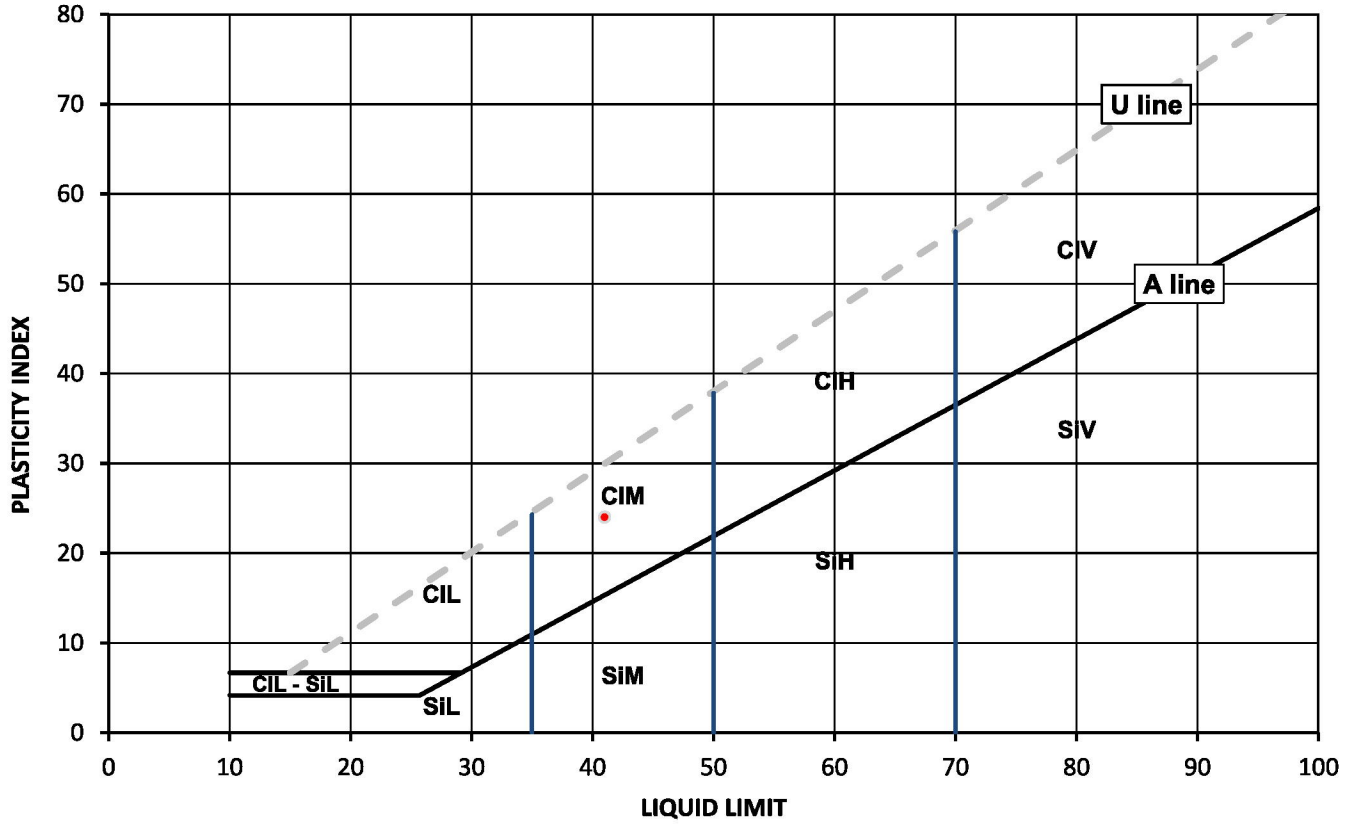
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	13/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	29/06/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723079	Depth Top [m]:	1.35
Hole No.:	TP17	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Light brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
15	41	17	24	84



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

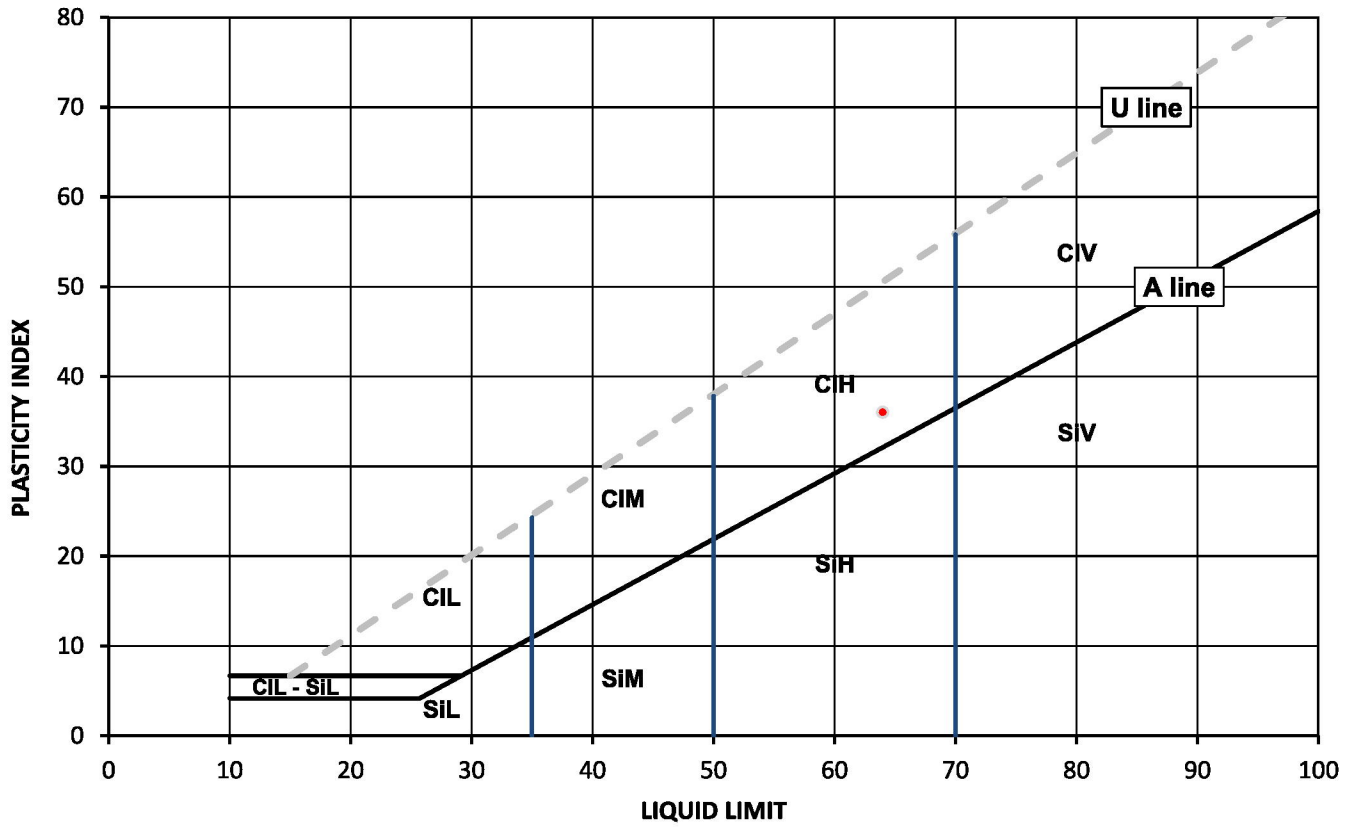
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	13/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	05/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723080	Depth Top [m]:	2.30
Hole No.:	TP17 and TP18	Depth Base [m]:	2.85
Sample Reference:	B1+B2	Sample Type:	B
Sample Description:	Greyish brown CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	64	28	36	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks: Replaces Analytical Report Number 23-40788, issue no. 1; Hole No amended

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

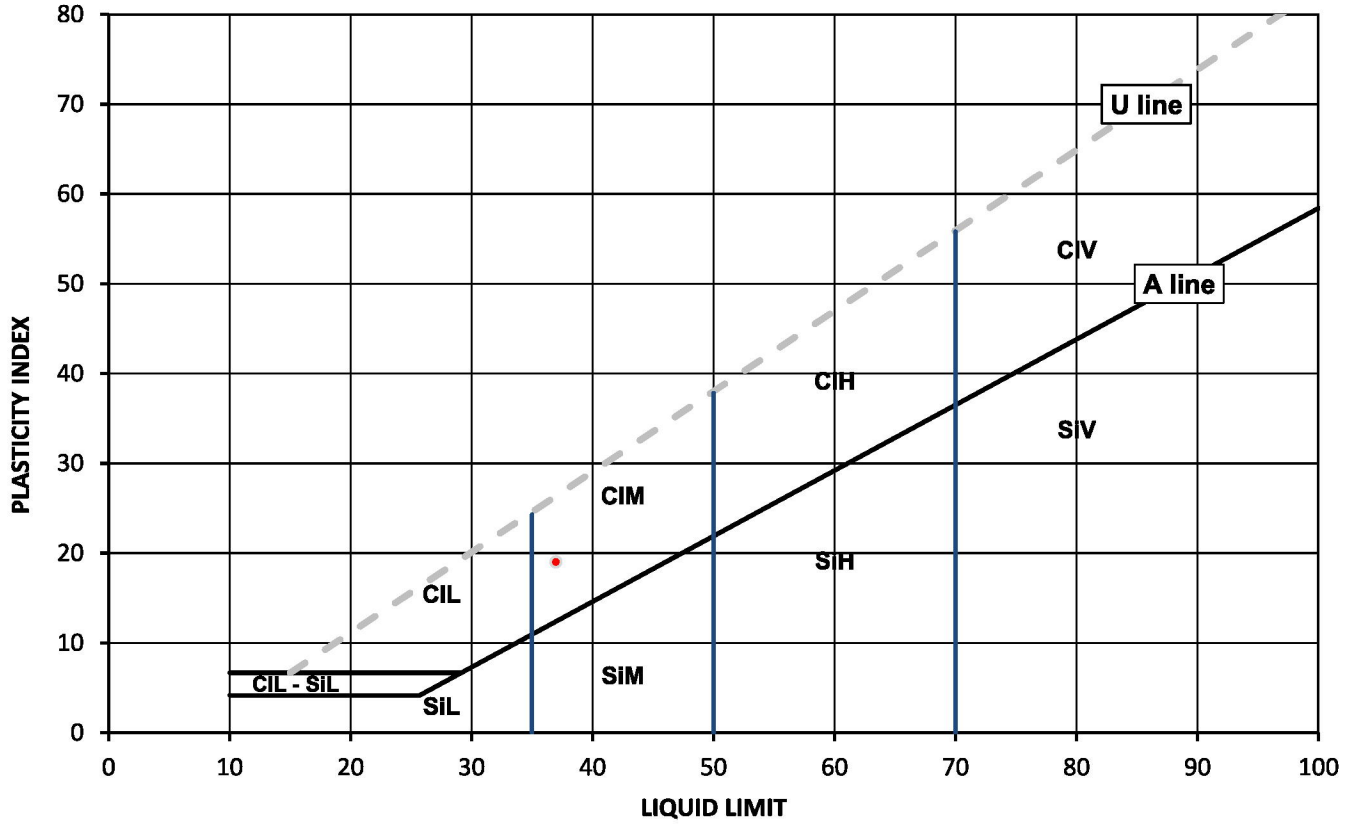
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	29/06/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723081	Depth Top [m]:	2.30
Hole No.:	TP19	Depth Base [m]:	Not Given
Sample Reference:	D2	Sample Type:	D
Sample Description:	Light brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	37	18	19	95



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
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TEST CERTIFICATE

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

4041

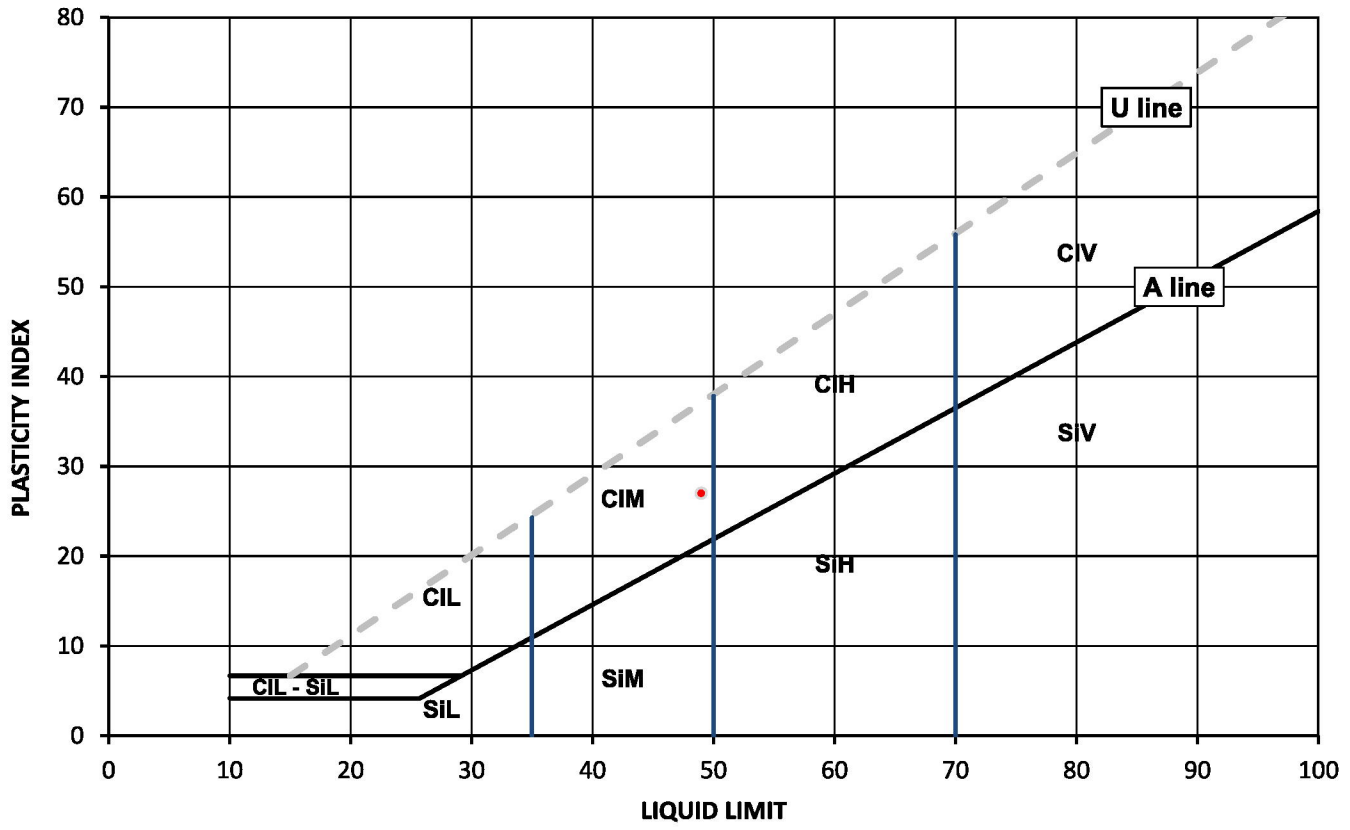
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	05/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723082	Depth Top [m]:	1.20
Hole No.:	TP20	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Sample Description:	Yellowish brown sandy gravelly CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	49	22	27	88



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
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Northampton NN4 7EB

4041

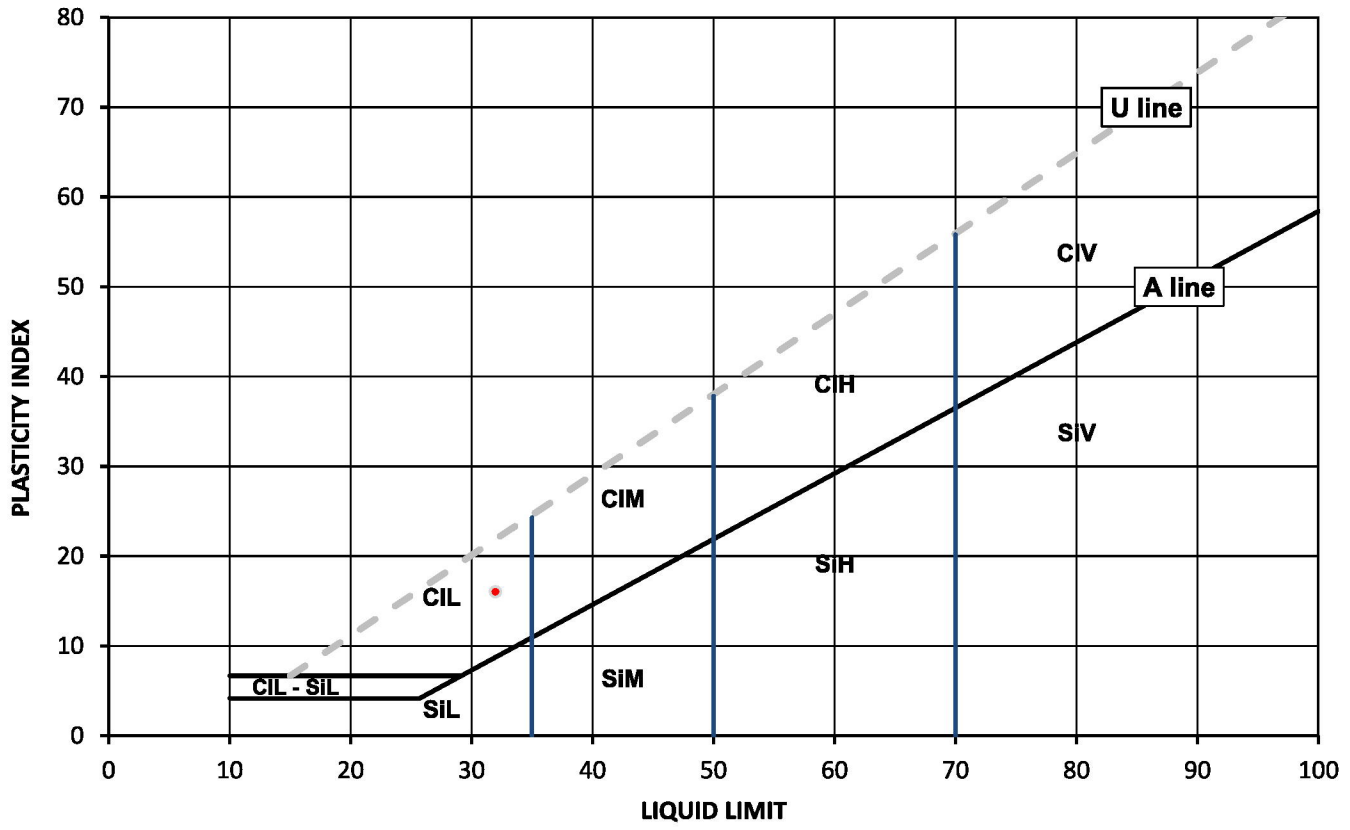
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	29/06/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723083	Depth Top [m]:	0.90
Hole No.:	TP22	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Yellowish brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	32	16	16	90



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

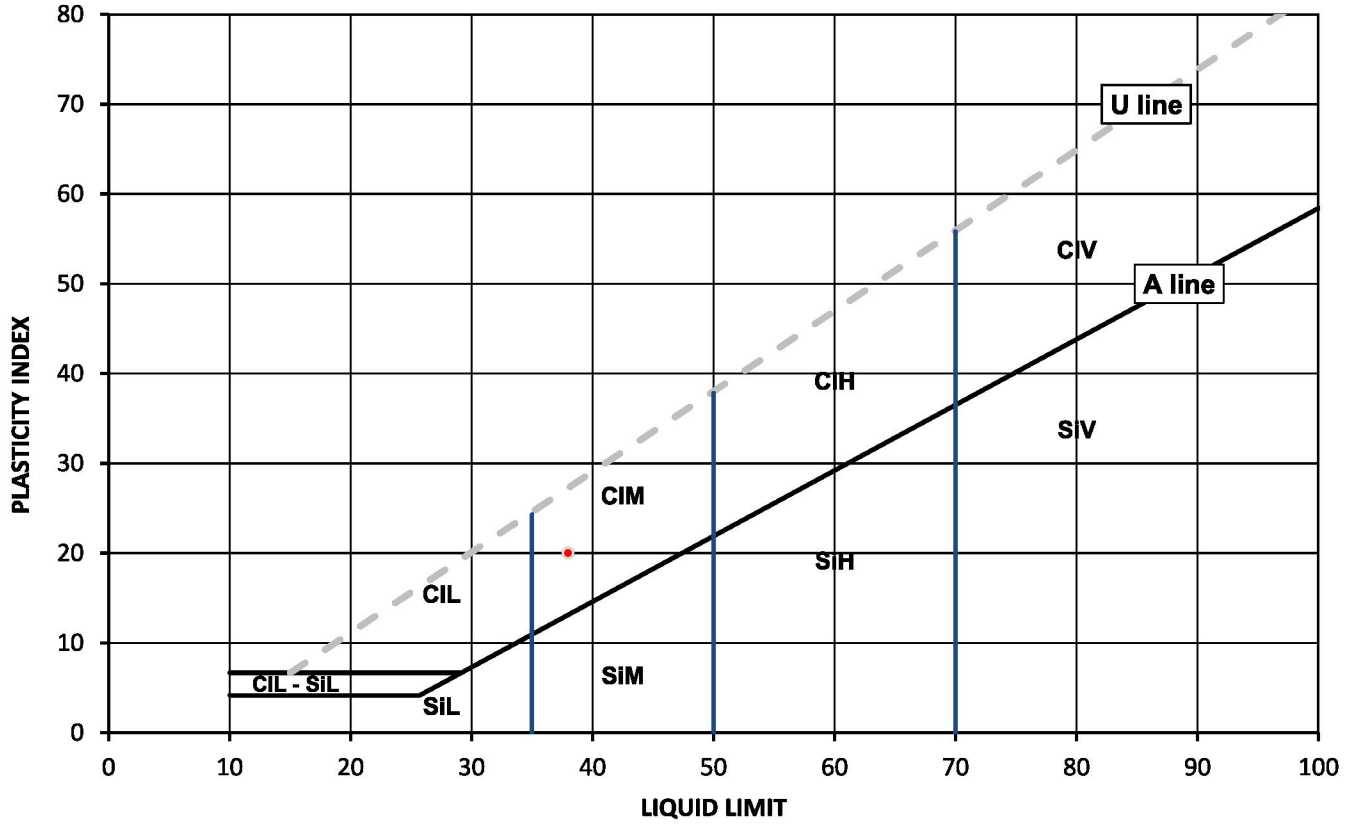
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	05/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2724103	Depth Top [m]:	0.50
Hole No.:	RC01	Depth Base [m]:	0.80
Sample Reference:	B2	Sample Type:	B
Sample Description:	Light brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
10	38	18	20	67



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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

4041

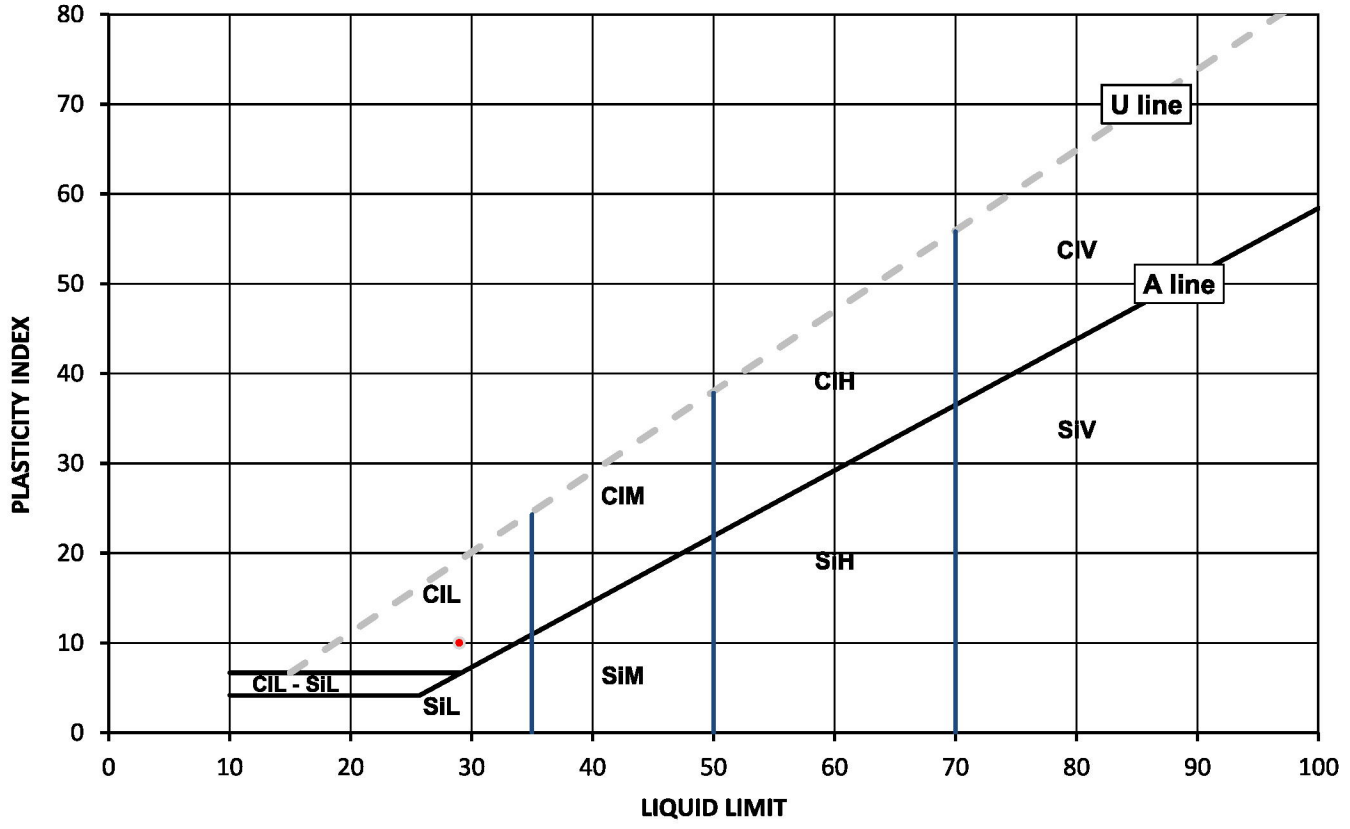
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	13/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2724104	Depth Top [m]:	2.10
Hole No.:	TP15	Depth Base [m]:	Not Given
Sample Reference:	B	Sample Type:	B
Sample Description:	Brown very sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
14	29	19	10	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

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TEST CERTIFICATE

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i2 Analytical Ltd
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Brackmills Industrial Estate
Northampton NN4 7EB

4041

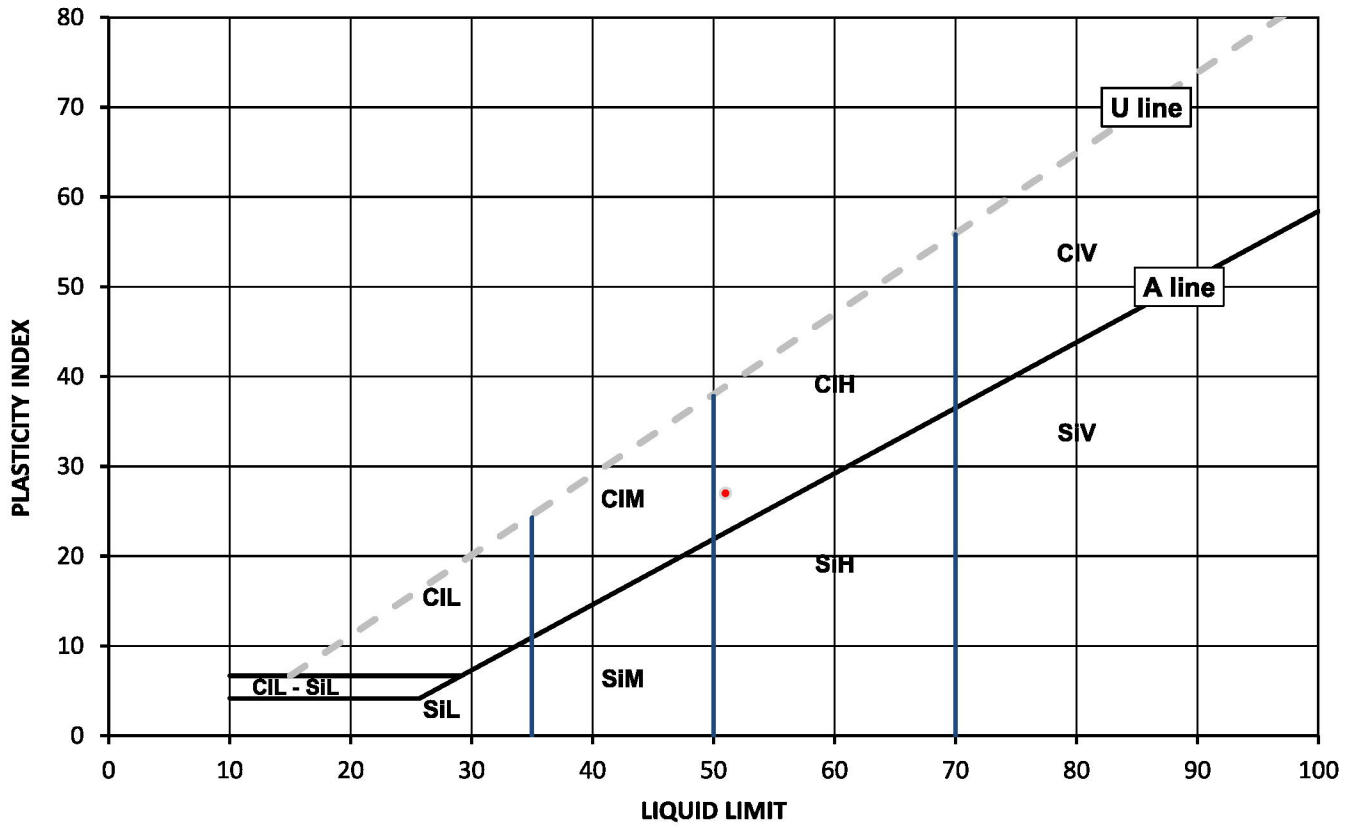
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726321	Depth Top [m]:	0.60
Hole No.:	TP25	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	51	24	27	78



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

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DETERMINATION OF LIQUID AND PLASTIC LIMITS
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4041

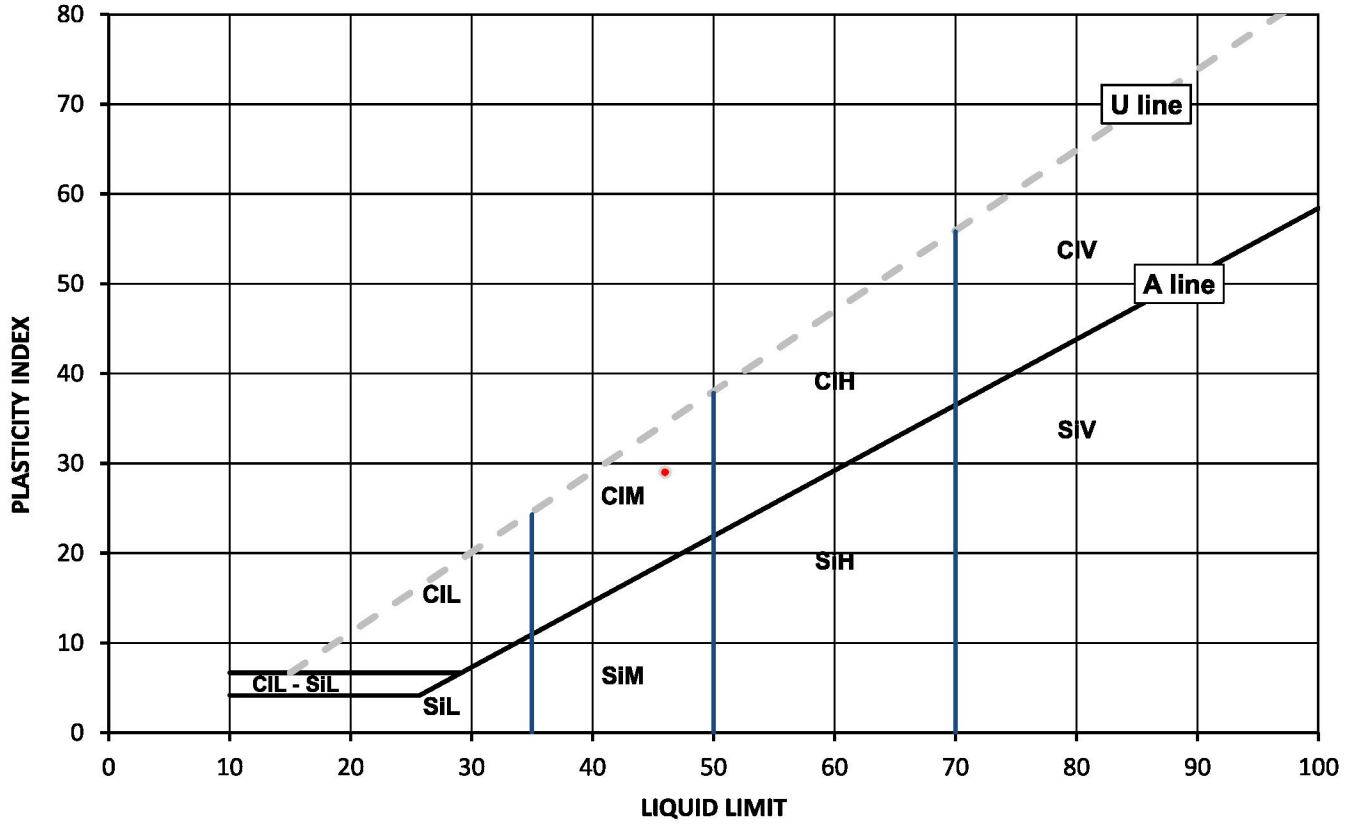
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726322	Depth Top [m]:	0.80
Hole No.:	TP25	Depth Base [m]:	Not Given
Sample Reference:	D2	Sample Type:	D
Sample Description:	Light brown slightly gravelly slightly sandy CLAY with chalk		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	46	17	29	83



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
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Northampton NN4 7EB

4041

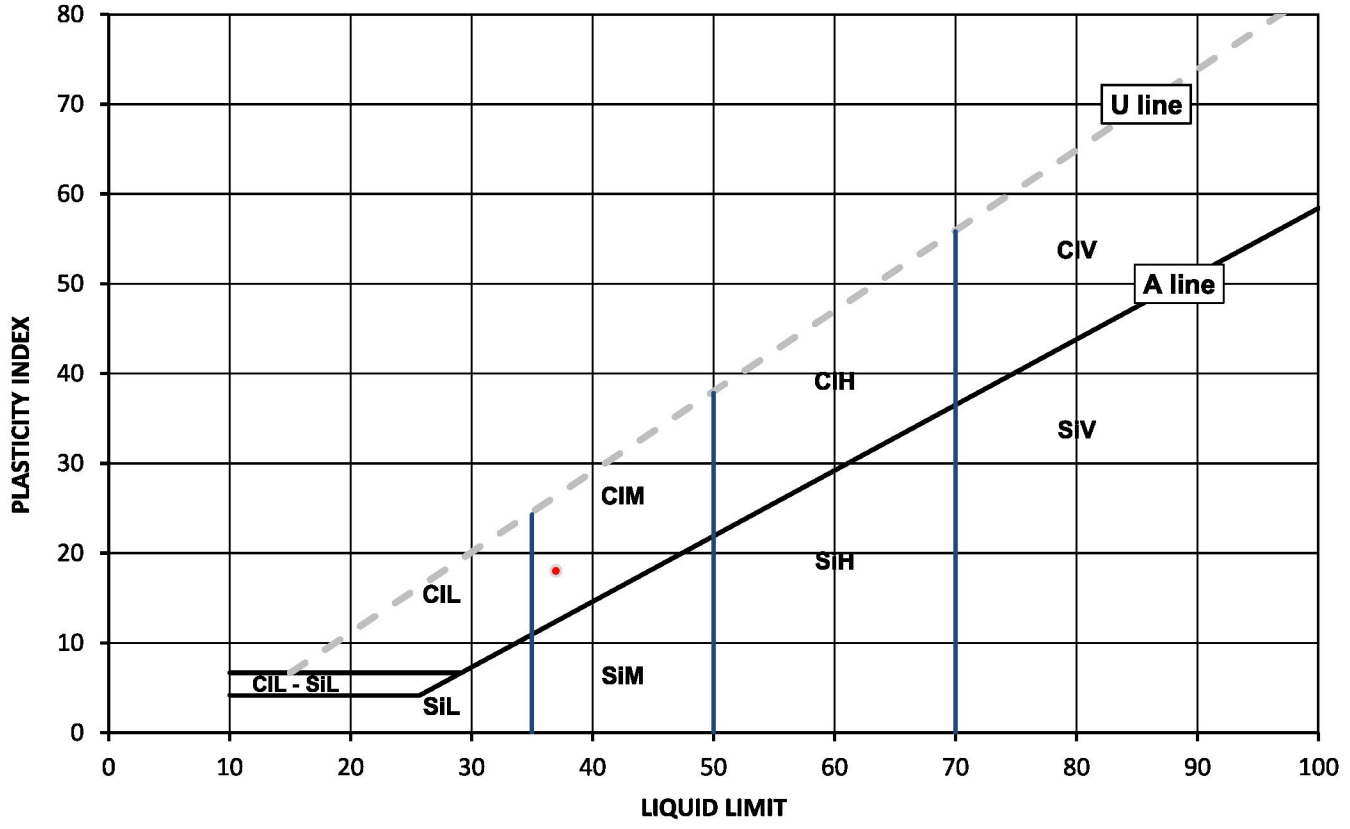
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726324	Depth Top [m]:	1.00
Hole No.:	TP28	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Light brown slightly gravelly sandy CLAY with chalk		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	37	19	18	75



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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4041

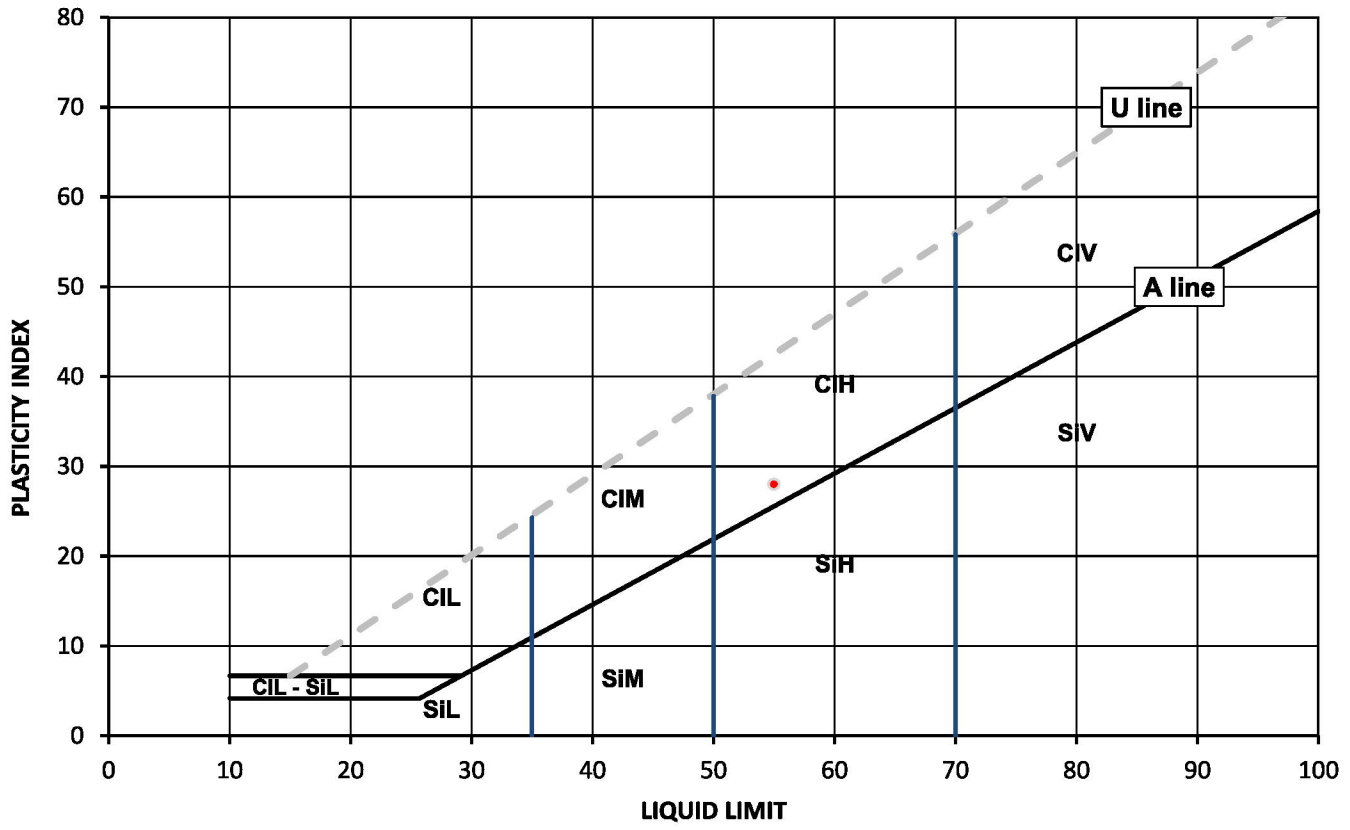
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726325	Depth Top [m]:	0.40
Hole No.:	TP29	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Orangish brown gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
7.8	55	27	28	55



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

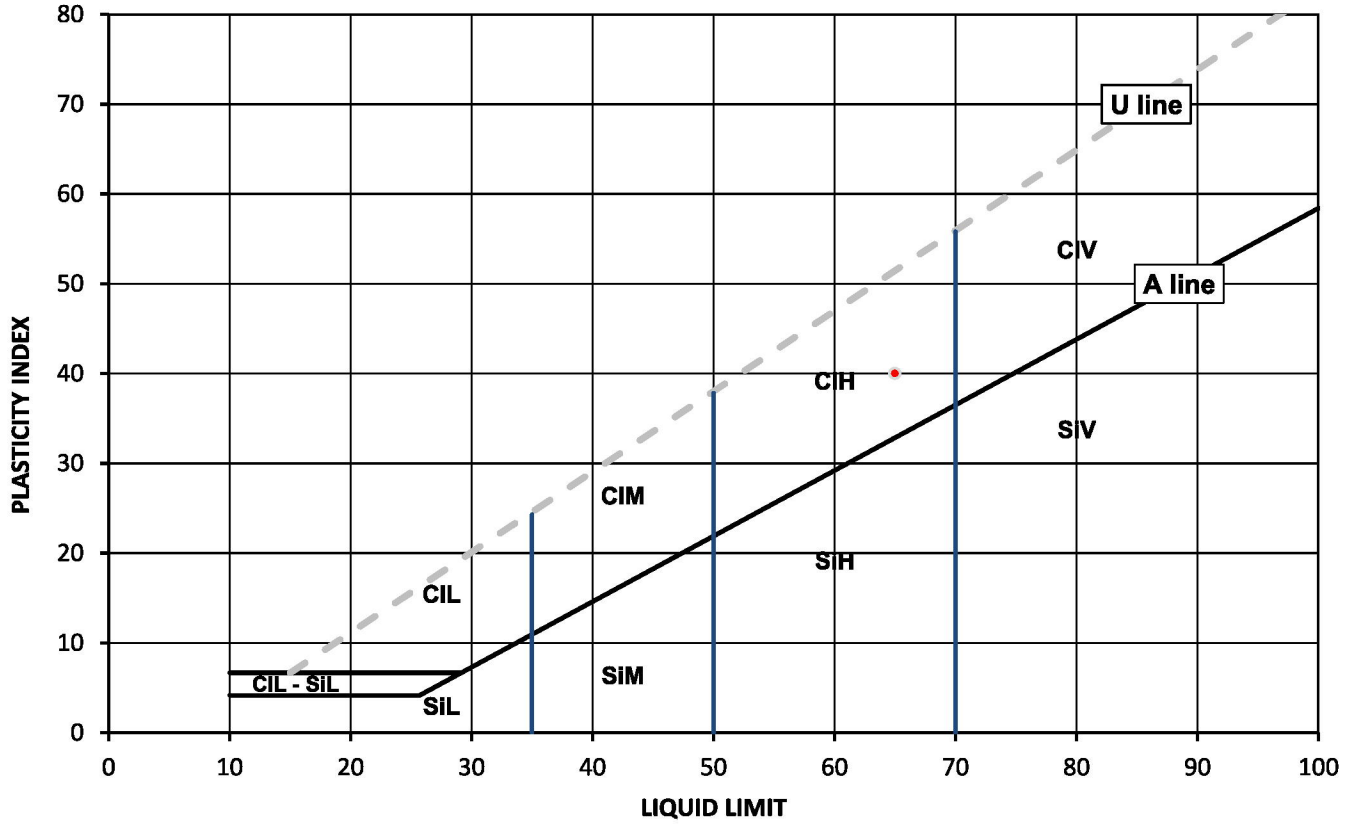
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726326	Depth Top [m]:	0.90
Hole No.:	TP30	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	B
Sample Description:	Brownish grey CLAY with fragments of chalk		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	65	25	40	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

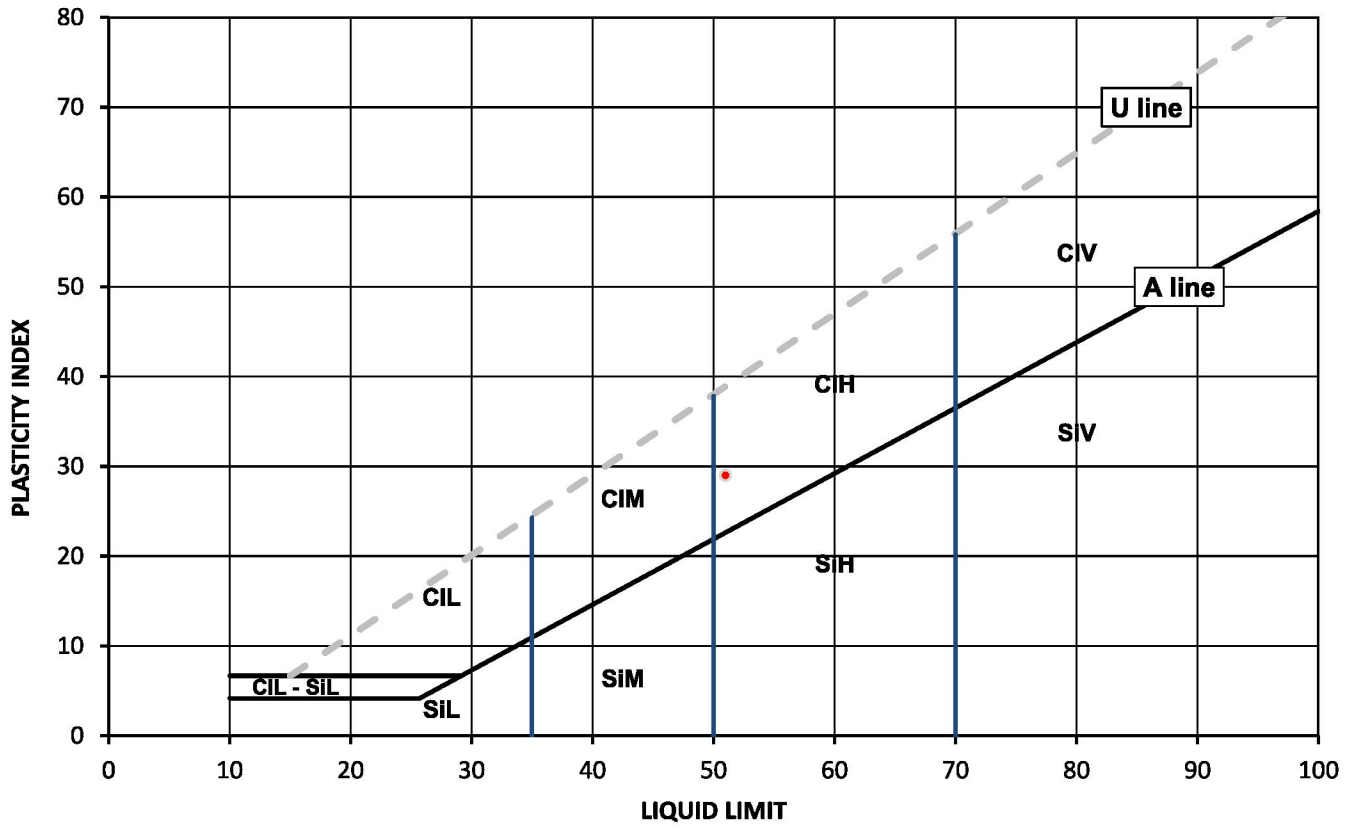
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	06/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726327	Depth Top [m]:	1.00
Hole No.:	TP32	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	51	22	29	86



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

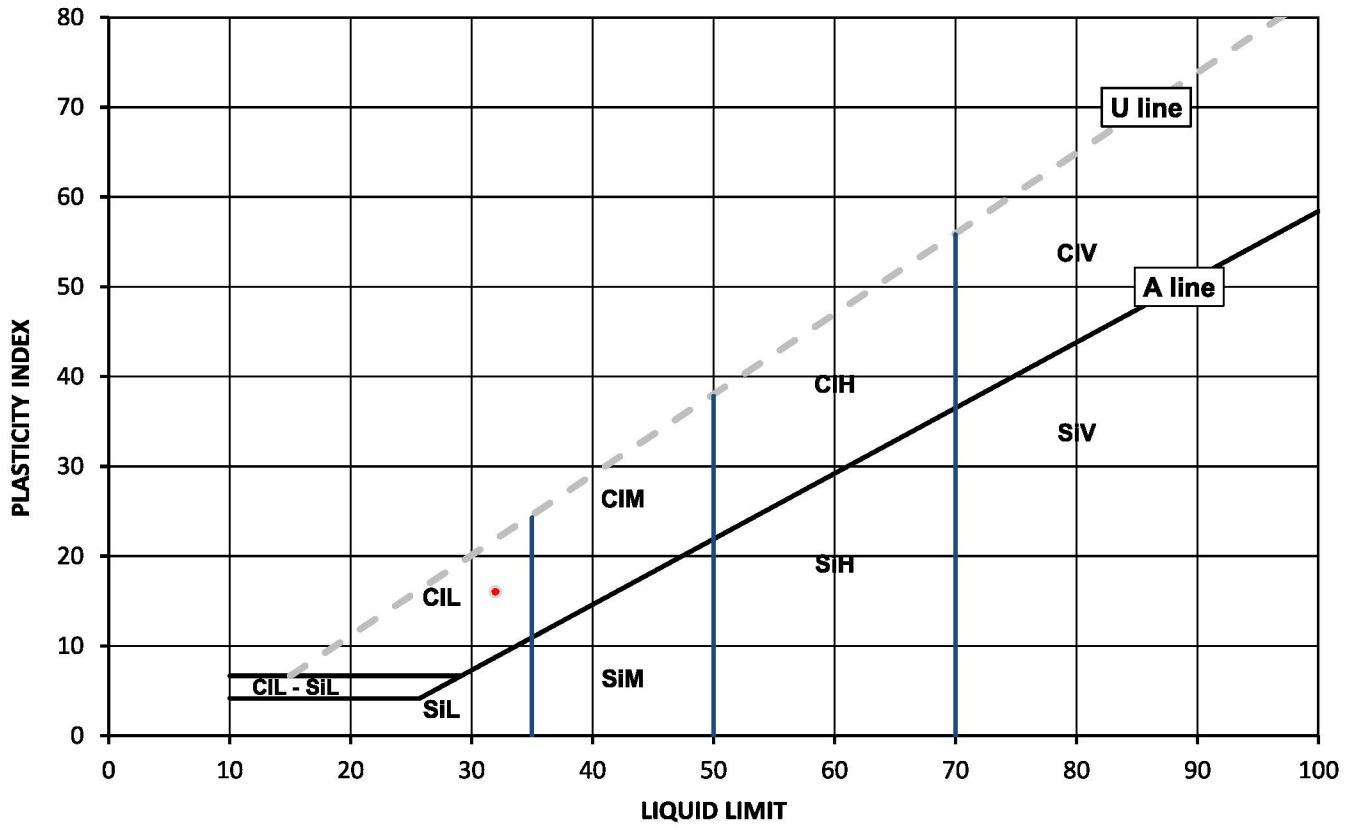
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726331	Depth Top [m]:	0.75
Hole No.:	TP43	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Yellowish brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
13	32	16	16	67



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

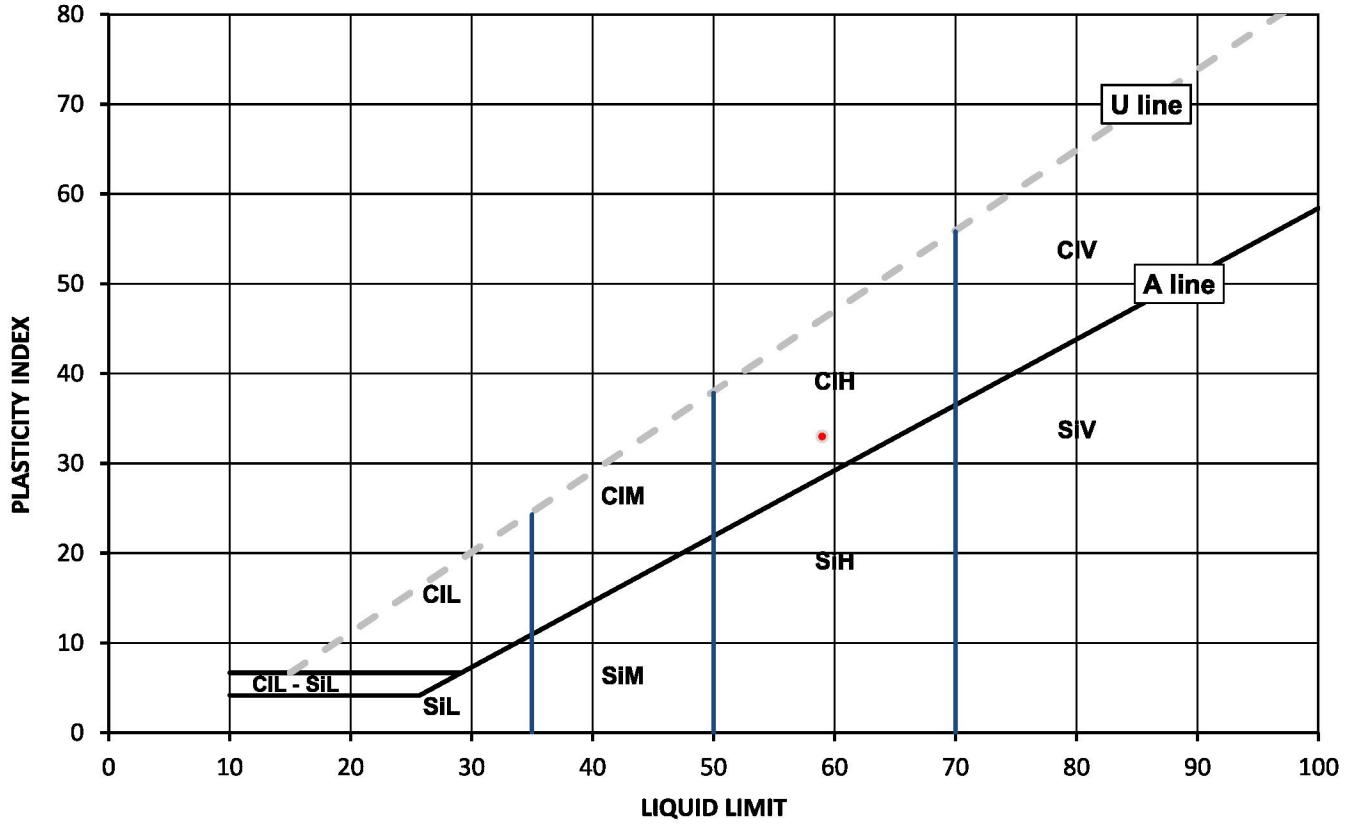
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726332	Depth Top [m]:	2.00
Hole No.:	TP43	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Brown slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
24	59	26	33	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

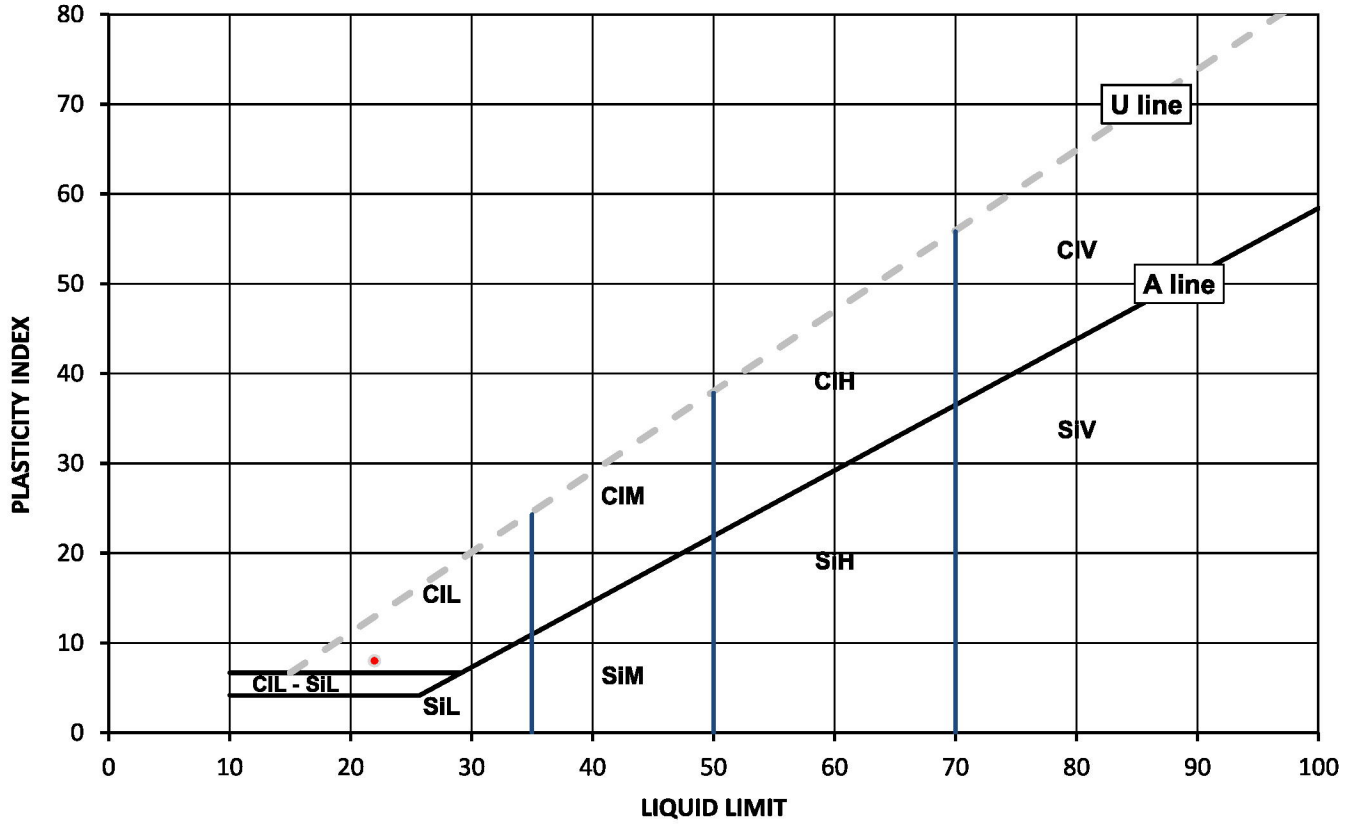
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726333	Depth Top [m]:	1.83
Hole No.:	TP45	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Light brown slightly gravelly very sandy CLAY with chalk		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
13	22	14	8	89



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

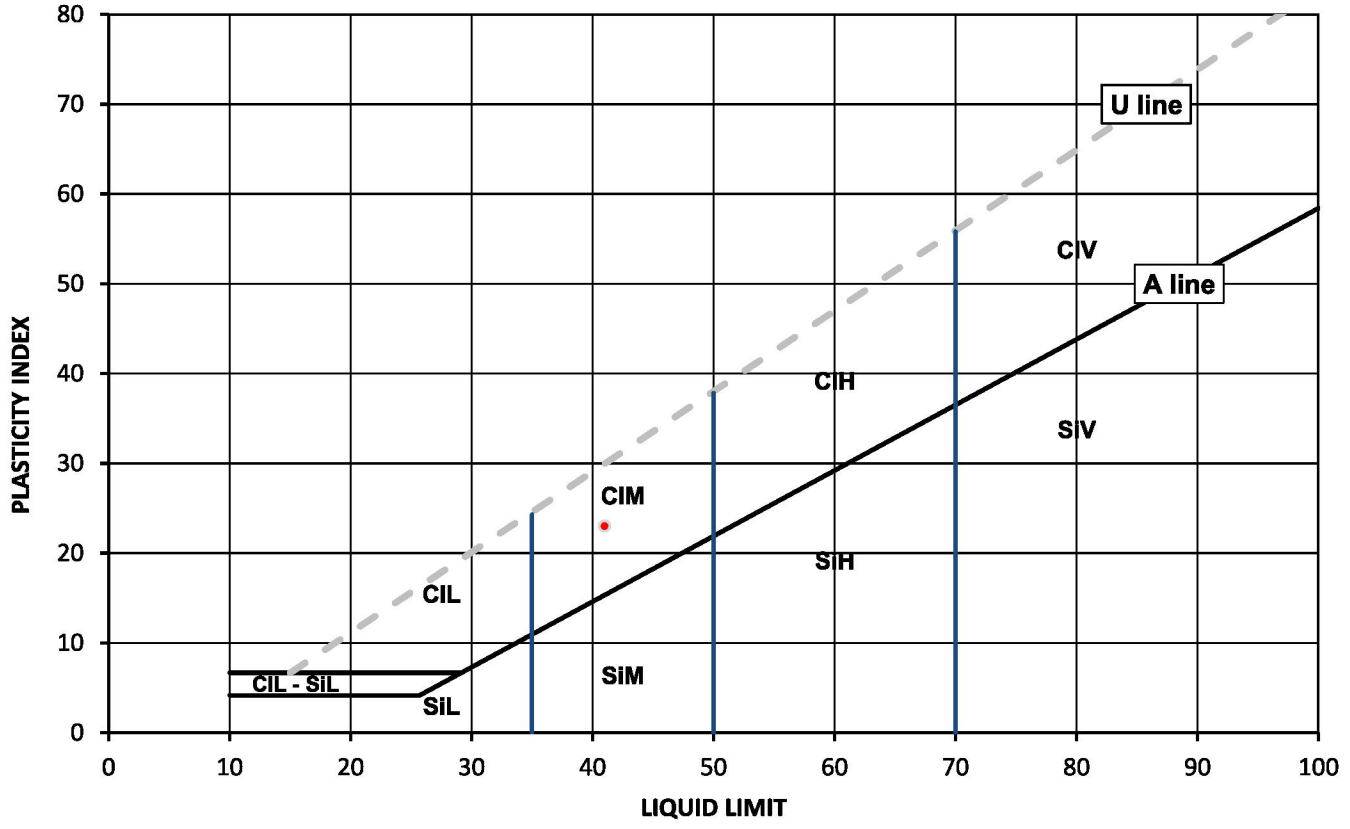
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2728173	Depth Top [m]:	0.65
Hole No.:	TP04	Depth Base [m]:	Not Given
Sample Reference:	D1	Sample Type:	D
Sample Description:	Yellowish brown gravelly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
13	41	18	23	64



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

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

4041

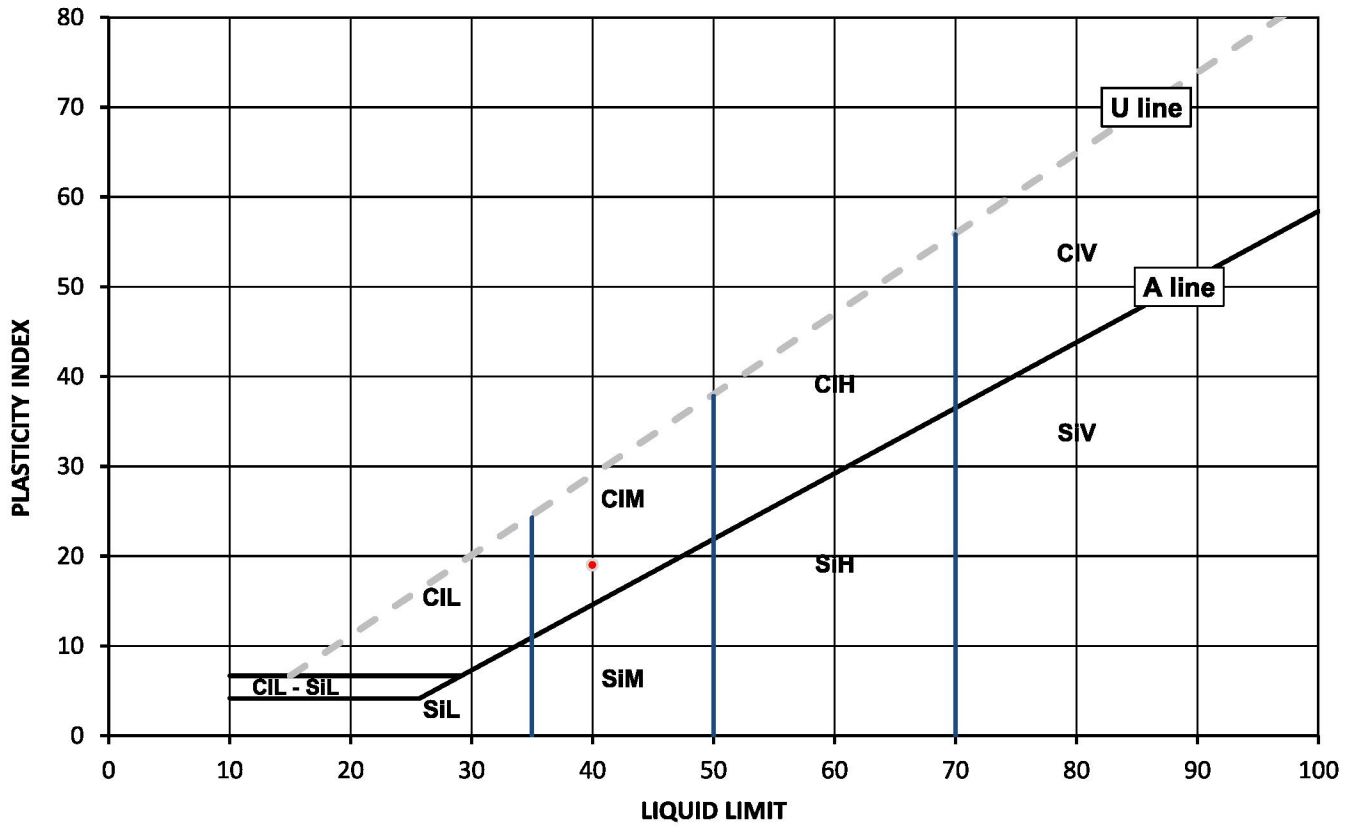
Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2728174	Depth Top [m]:	1.80
Hole No.:	TP08	Depth Base [m]:	Not Given
Sample Reference:	B2	Sample Type:	B
Sample Description:	Brownish grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	40	21	19	88



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

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

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 236.13

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Water Content by BS 1377-2:1990: Clause 3.2Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: 06/06 - 13/06/2023
Date Received: 21/06/2023
Date Tested: 29/06 - 05/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2723069	TP01	LB1	1.50	Not Given	LB	Yellowish brown slightly gravelly CLAY	Atterberg 4 Point	18		85	58	24	34			2.65			
2723070	TP03	D1	1.00	Not Given	D	Light brown CLAY	Atterberg 4 Point	20		100	67	26	41						
2723071	TP04	B1	1.00	Not Given	B	Yellowish brown to grey slightly gravelly slightly sandy CLAY	Atterberg 4 Point	21		91	57	23	34						
2723073	TP07	D1	0.50	Not Given	D	Brown slightly gravelly CLAY	Atterberg 1 Point	27		91	70	30	40						
2723075	TP11	B1	1.00	Not Given	B	Brownish grey slightly gravelly slightly sandy CLAY with fragments of chalk	Atterberg 4 Point	18		91	51	24	27						
2723076	TP12	D1	1.30	Not Given	D	Light brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	20		98	49	20	29						
2723077	TP14	D1	1.00	Not Given	D	Brownish grey CLAY	Atterberg 1 Point	23		100	66	26	40						
2723079	TP17	D1	1.35	Not Given	D	Light brown slightly gravelly sandy CLAY	Atterberg 4 Point	15		84	41	17	24						
2723080	TP17 and TP18	B1+B2	2.30	2.85	B	Greyish brown CLAY	Atterberg 4 Point	27		100	64	28	36						
2723081	TP19	D2	2.30	Not Given	D	Light brown slightly gravelly sandy CLAY	Atterberg 4 Point	18		95	37	18	19						

Note: # Non accredited; NP - Non plastic

Comments: Replaces Analytical Report Number 23-40788, issue no. 1; Hole No amended

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 238.16

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Water Content by BS 1377-2:1990: Clause 3.2Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: 05/06 - 13/06/2023
Date Received: 21/06/2023
Date Tested: 29/06 - 05/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2723082	TP20	LB1	1.20	Not Given	LB	Yellowish brown sandy gravelly CLAY	Atterberg 4 Point	18		88	49	22	27			2.72			
2723083	TP22	D1	0.90	Not Given	D	Yellowish brown slightly gravelly very sandy CLAY	Atterberg 4 Point	16		90	32	16	16						
2724103	RC01	B2	0.50	0.80	B	Light brown slightly gravelly sandy CLAY	Atterberg 4 Point	10		67	38	18	20						
2724104	TP15	B	2.10	Not Given	B	Brown very sandy CLAY	Atterberg 4 Point	14		100	29	19	10						
2726321	TP25	D1	0.60	Not Given	D	Brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	19		78	51	24	27						
2726322	TP25	D2	0.80	Not Given	D	Light brown slightly gravelly slightly sandy CLAY with chalk	Atterberg 4 Point	22		83	46	17	29						
2726323	TP26	B1	1.65	Not Given	B	Brownish grey CLAY with fragments of chalk		20											
2726324	TP28	D1	1.00	Not Given	D	Light brown slightly gravelly sandy CLAY with chalk	Atterberg 4 Point	19		75	37	19	18						
2726325	TP29	B1	0.40	Not Given	B	Orangish brown gravelly slightly sandy CLAY	Atterberg 4 Point	7.8		55	55	27	28						
2726326	TP30	LB1	0.90	Not Given	B	Brownish grey CLAY with fragments of chalk	Atterberg 4 Point	21		98	65	25	40			2.62			

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Water Content by BS 1377-2:1990: Clause 3.2Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: Not Given
Date Received: 21/06/2023
Date Tested: 04/07 - 06/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-2 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2726327	TP32	B1	1.00	Not Given	B	Brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	19		86	51	22	29						
2726328	TP37	B1	1.00	Not Given	B	Brownish grey clayey SILT		14											
2726329	TP40	B1	1.00	Not Given	B	Light brown CLAY		23											
2726330	TP41	B1	1.00	Not Given	B	Yellowish brown silty CLAY		14											
2726331	TP43	D1	0.75	Not Given	D	Yellowish brown slightly gravelly very sandy CLAY	Atterberg 4 Point	13		67	32	16	16						
2726332	TP43	B1	2.00	Not Given	B	Brown slightly sandy CLAY	Atterberg 4 Point	24		100	59	26	33						
2726333	TP45	D1	1.83	Not Given	D	Light brown slightly gravelly very sandy CLAY with chalk	Atterberg 4 Point	13		89	22	14	8						
2728173	TP04	D1	0.65	Not Given	D	Yellowish brown gravelly sandy CLAY	Atterberg 4 Point	13		64	41	18	23						
2728174	TP08	B2	1.80	Not Given	B	Brownish grey slightly gravelly sandy CLAY	Atterberg 4 Point	18		88	40	21	19						

Note: # Non accredited; NP - Non plastic

Comments:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: 06/06 - 13/06/2023
Date Received: 21/06/2023
Date Tested: 29/06 - 05/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2723069	TP01	LB1	1.50	Not Given	LB	Yellowish brown slightly gravelly CLAY		18	Sample was quartered, oven dried at 109 °C			
2723070	TP03	D1	1.00	Not Given	D	Light brown CLAY		20	Sample was quartered, oven dried at 108.9 °C			
2723071	TP04	B1	1.00	Not Given	B	Yellowish brown to grey slightly gravelly slightly sandy CLAY		21	Sample was quartered, oven dried at 106.7 °C			
2723073	TP07	D1	0.50	Not Given	D	Brown slightly gravelly CLAY		27	Sample was quartered, oven dried at 108.9 °C			
2723075	TP11	B1	1.00	Not Given	B	Brownish grey slightly gravelly slightly sandy CLAY with fragments of chalk		18	Sample was quartered, oven dried at 106 °C			
2723076	TP12	D1	1.30	Not Given	D	Light brown slightly gravelly slightly sandy CLAY		20	Sample was quartered, oven dried at 108.9 °C			
2723077	TP14	D1	1.00	Not Given	D	Brownish grey CLAY		23	Sample was quartered, oven dried at 108.9 °C			
2723079	TP17	D1	1.35	Not Given	D	Light brown slightly gravelly sandy CLAY		15	Sample was quartered, oven dried at 108.9 °C			
2723080	TP17 and TP18	B1+B2	2.30	2.85	B	Greyish brown CLAY		27	Sample was quartered, oven dried at 106 °C			
2723081	TP19	D2	2.30	Not Given	D	Light brown slightly gravelly sandy CLAY		18	Sample was quartered, oven dried at 108.9 °C			

Comments: Replaces Analytical Report Number 23-40788, issue no. 1; Hole no amended (sample 2723080)

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: 05/06 - 13/06/2023
Date Received: 21/06/2023
Date Tested: 29/06 - 10/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2723082	TP20	LB1	1.20	Not Given	LB	Yellowish brown gravelly sandy CLAY		18	Sample was quartered, oven dried at 106 °C			
2723083	TP22	D1	0.90	Not Given	D	Yellowish brown slightly gravelly very sandy CLAY		16	Sample was quartered, oven dried at 108.9 °C			
2724103	RC01	B2	0.50	0.80	B	Light brown slightly gravelly sandy CLAY		10	Sample was quartered, oven dried at 106.7 °C			
2724104	TP15	B	2.10	Not Given	B	Brown very sandy CLAY		14	Sample was quartered, oven dried at 106 °C			
2726321	TP25	D1	0.60	Not Given	D	Brown slightly gravelly slightly sandy CLAY		19	Sample was quartered, oven dried at 108.9 °C			
2726322	TP25	D2	0.80	Not Given	D	Light brown slightly gravelly slightly sandy CLAY with chalk		22	Sample was quartered, oven dried at 108.9 °C			
2726323	TP26	B1	1.65	Not Given	B	Brownish grey CLAY with fragments of chalk		20	Sample was quartered, oven dried at 108.9 °C			
2726324	TP28	D1	1.00	Not Given	D	Light brown slightly gravelly sandy CLAY with chalk		19	Sample was quartered, oven dried at 108.9 °C			
2726325	TP29	B1	0.40	Not Given	B	Orangish brown gravelly slightly sandy CLAY		7.8	Sample was quartered, oven dried at 106 °C			
2726326	TP30	LB1	0.90	Not Given	B	Brownish grey CLAY with fragments of chalk		21	Sample was quartered, oven dried at 108.2 °C			

Comments:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: Not Given
Date Received: 21/06/2023
Date Tested: 04/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2726327	TP32	B1	1.00	Not Given	B	Brown slightly gravelly slightly sandy CLAY		19	Sample was quartered, oven dried at 108.2 °C			
2726328	TP37	B1	1.00	Not Given	B	Brownish grey clayey SILT		14	Sample was quartered, oven dried at 108.2 °C			
2726329	TP40	B1	1.00	Not Given	B	Light brown CLAY		23	Sample was quartered, oven dried at 109 °C			
2726330	TP41	B1	1.00	Not Given	B	Yellowish brown silty CLAY		14	Sample was quartered, oven dried at 106 °C			
2726331	TP43	D1	0.75	Not Given	D	Yellowish brown slightly gravelly very sandy CLAY		13	Sample was quartered, oven dried at 108.9 °C			
2726332	TP43	B1	2.00	Not Given	B	Brown slightly sandy CLAY		24	Sample was quartered, oven dried at 107.4 °C			
2726333	TP45	D1	1.83	Not Given	D	Light brown slightly gravelly very sandy CLAY with chalk		13	Sample was quartered, oven dried at 108.9 °C			
2728173	TP04	D1	0.65	Not Given	D	Yellowish brown gravelly sandy CLAY		13	Sample was quartered, oven dried at 108.9 °C			
2728174	TP08	B2	1.80	Not Given	B	Brownish grey slightly gravelly sandy CLAY		18	Sample was quartered, oven dried at 106 °C			

Comments:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

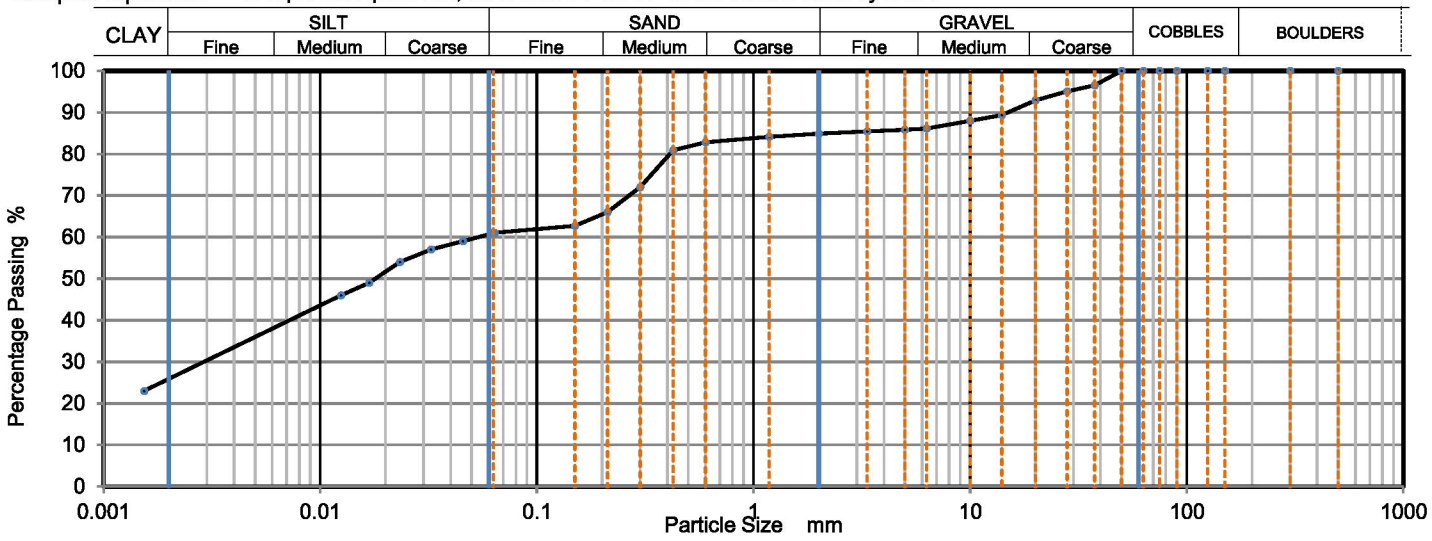
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	05/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	05/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723052	Depth Top [m]:	0.50
Hole No.:	RC01	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Yellowish brown sandy silty CLAY		
Sample Preparation:	Sample was quartered, oven dried at 107.3 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0639	61
300	100	0.0455	59
150	100	0.0324	57
125	100	0.0233	54
90	100	0.0168	49
75	100	0.0125	46
63	100	0.0015	23
50	100		
37.5	97		
28	95		
20	93		
14	89		
10	88		
6.3	86		
5	86		
3.35	85	Particle density	(assumed)
2	85	2.65	Mg/m3
1.18	84		
0.6	83		
0.425	81		
0.3	72		
0.212	66		
0.15	63		
0.063	61		

Sample Proportions	% dry mass
Very coarse	0
Gravel	15
Sand	24
Silt	35
Clay	26

Grading Analysis		
D100	mm	50
D60	mm	0.0564
D30	mm	0.00293
D10	mm	
Uniformity Coefficient		> 37
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

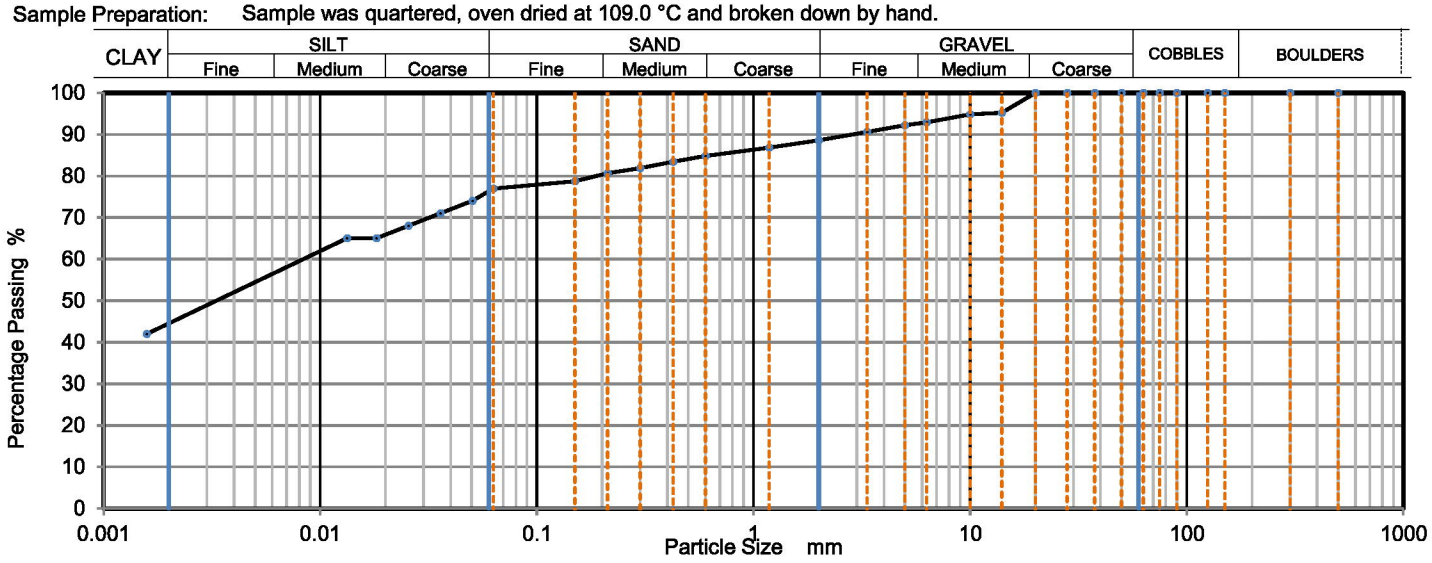
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	06/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	01/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723069	Depth Top [m]:	1.50
Hole No.:	TP01	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Sample Description:	Yellowish brown slightly gravelly CLAY		
Sample Preparation:	Sample was quartered, oven dried at 109.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	77
300	100	0.0505	74
150	100	0.0359	71
125	100	0.0256	68
90	100	0.0182	65
75	100	0.0133	65
63	100	0.0016	42
50	100		
37.5	100		
28	100		
20	100		
14	95		
10	95		
6.3	93		
5	92		
3.35	91	Particle density	(measured)
2	89	2.65	Mg/m3
1.18	87		
0.6	85		
0.425	83		
0.3	82		
0.212	81		
0.15	79		
0.063	77		

Sample Proportions	% dry mass
Very coarse	0
Gravel	11
Sand	11
Silt	34
Clay	44

Grading Analysis		
D100	mm	20
D60	mm	0.00819
D30	mm	
D10	mm	
Uniformity Coefficient		> 5.2
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

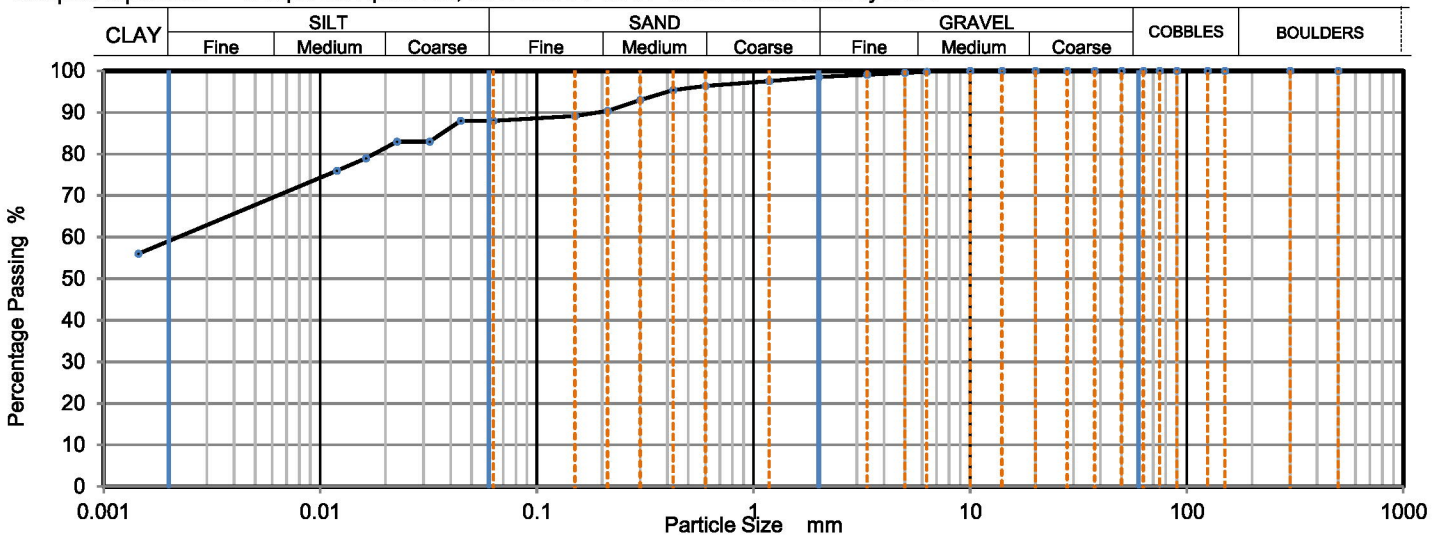
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	06/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	05/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723072	Depth Top [m]:	0.50
Hole No.:	TP06	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Brownish grey CLAY		
Sample Preparation:	Sample was quartered, oven dried at 107.3 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0629	88
300	100	0.0445	88
150	100	0.0320	83
125	100	0.0226	83
90	100	0.0162	79
75	100	0.0119	76
63	100	0.0014	56
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99	Particle density	(assumed)
2	99	2.65	Mg/m3
1.18	98		
0.6	96		
0.425	95		
0.3	93		
0.212	90		
0.15	89		
0.063	88		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	11
Silt	28
Clay	59

Grading Analysis		
D100	mm	10
D60	mm	0.00215
D30	mm	
D10	mm	
Uniformity Coefficient		> 1.5
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

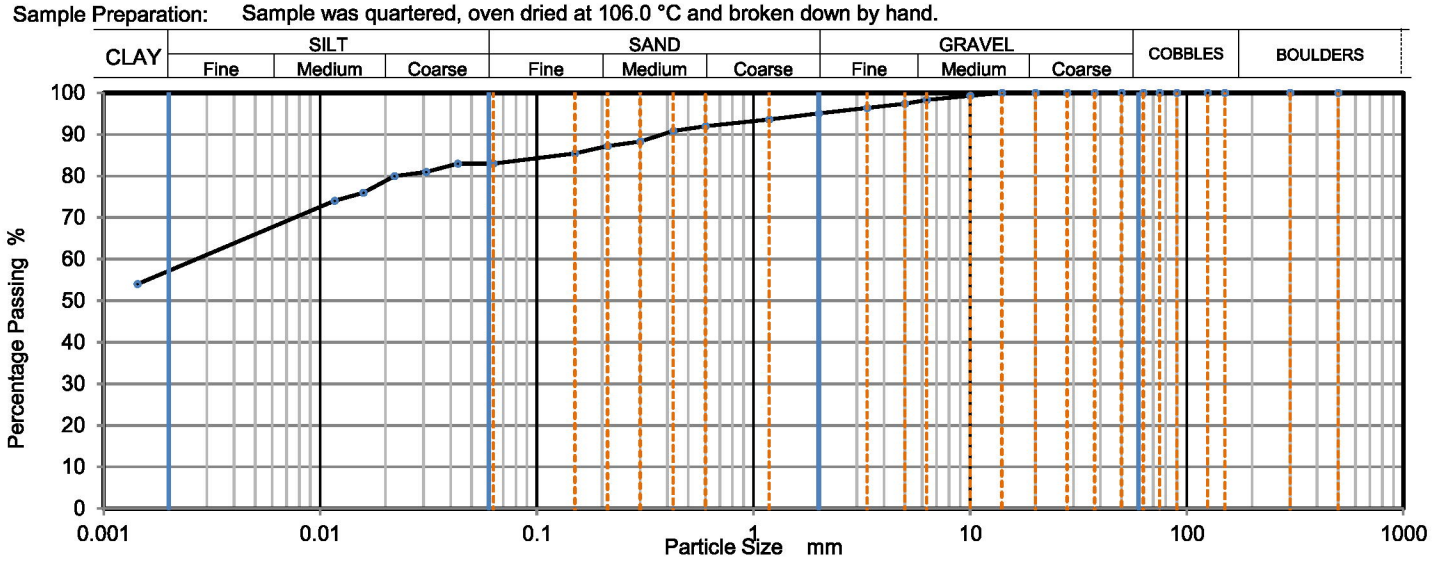
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	05/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723082	Depth Top [m]:	1.20
Hole No.:	TP20	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Sample Description:	Yellowish brown sandy gravelly CLAY		
Sample Preparation:	Sample was quartered, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0611	83
300	100	0.0432	83
150	100	0.0308	81
125	100	0.0220	80
90	100	0.0158	76
75	100	0.0116	74
63	100	0.0014	54
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	97		
3.35	96	Particle density	(measured)
2	95	2.72	Mg/m3
1.18	94		
0.6	92		
0.425	91		
0.3	88		
0.212	87		
0.15	85		
0.063	83		

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	12
Silt	26
Clay	57

Grading Analysis		
D100	mm	14
D60	mm	0.0026
D30	mm	
D10	mm	
Uniformity Coefficient		> 1.8
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

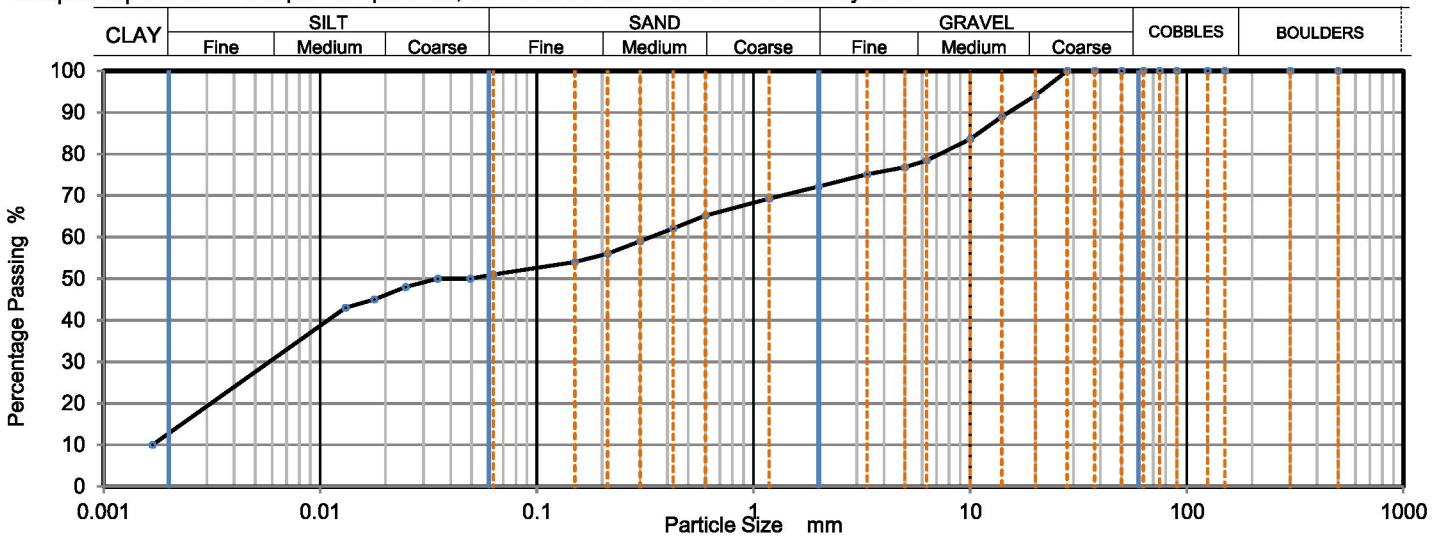
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2724105	Depth Top [m]:	1.60
Hole No.:	TP22	Depth Base [m]:	Not Given
Sample Reference:	B	Sample Type:	B
Sample Description:	Light brown sandy gravelly clayey SILT		
Sample Preparation:	Sample was quartered, oven dried at 109 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	51
300	100	0.0493	50
150	100	0.0348	50
125	100	0.0248	48
90	100	0.0178	45
75	100	0.0131	43
63	100	0.0017	10
50	100		
37.5	100		
28	100		
20	94		
14	89		
10	84		
6.3	78		
5	77		
3.35	75	Particle density	(assumed)
2	72	2.65	Mg/m3
1.18	69		
0.6	65		
0.425	62		
0.3	59		
0.212	56		
0.15	54		
0.063	51		

Sample Proportions	% dry mass
Very coarse	0
Gravel	28
Sand	21
Silt	38
Clay	13

Grading Analysis		
D100	mm	28
D60	mm	0.335
D30	mm	0.00582
D10	mm	
Uniformity Coefficient		> 200
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

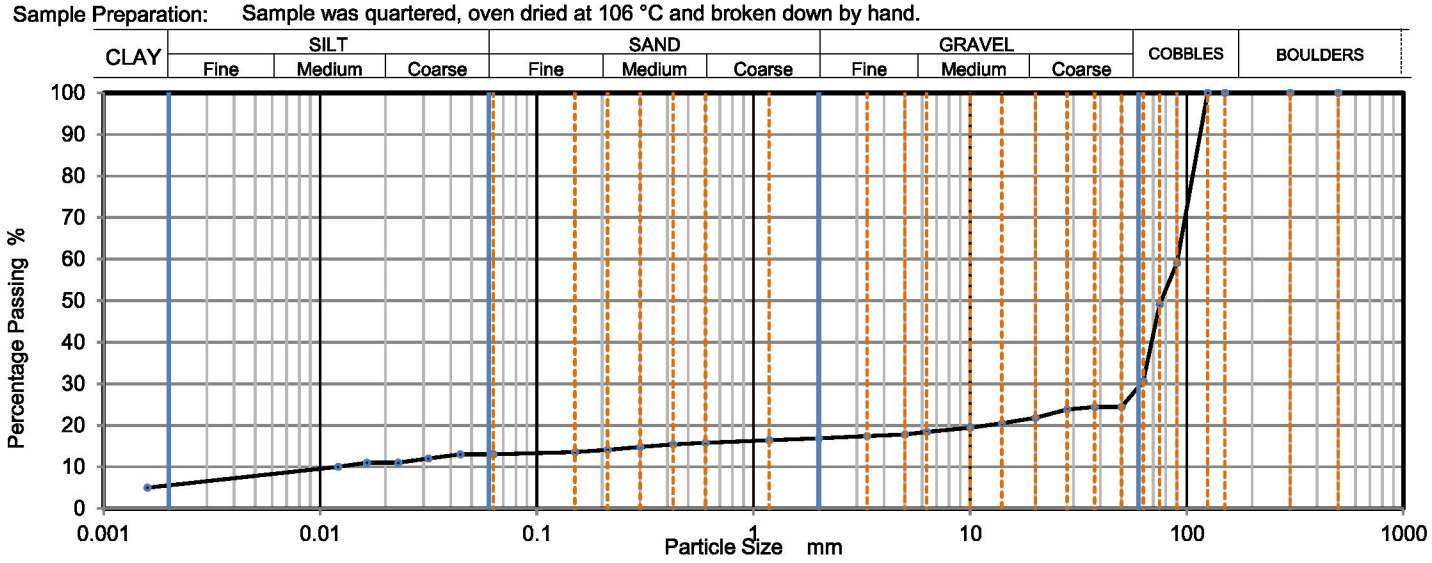
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	07/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	04/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2724246	Depth Top [m]:	0.60
Hole No.:	TP09	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Yellowish brown GRAVEL with fragments of cobbles		
Sample Preparation:	Sample was quartered, oven dried at 106 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0621	13
300	100	0.0443	13
150	100	0.0316	12
125	100	0.0229	11
90	59	0.0164	11
75	49	0.0121	10
63	31	0.0016	5
50	24		
37.5	24		
28	24		
20	22		
14	21		
10	19		
6.3	18		
5	18		
3.35	17	Particle density	(assumed)
2	17	2.65	Mg/m3
1.18	16		
0.6	16		
0.425	15		
0.3	15		
0.212	14		
0.15	14		
0.063	13		

Sample Proportions	% dry mass
Very coarse	69
Gravel	14
Sand	4
Silt	8
Clay	5

Grading Analysis		
D100	mm	125
D60	mm	90.7
D30	mm	61.6
D10	mm	0.0103
Uniformity Coefficient		8800
Curvature Coefficient		4100

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

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

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

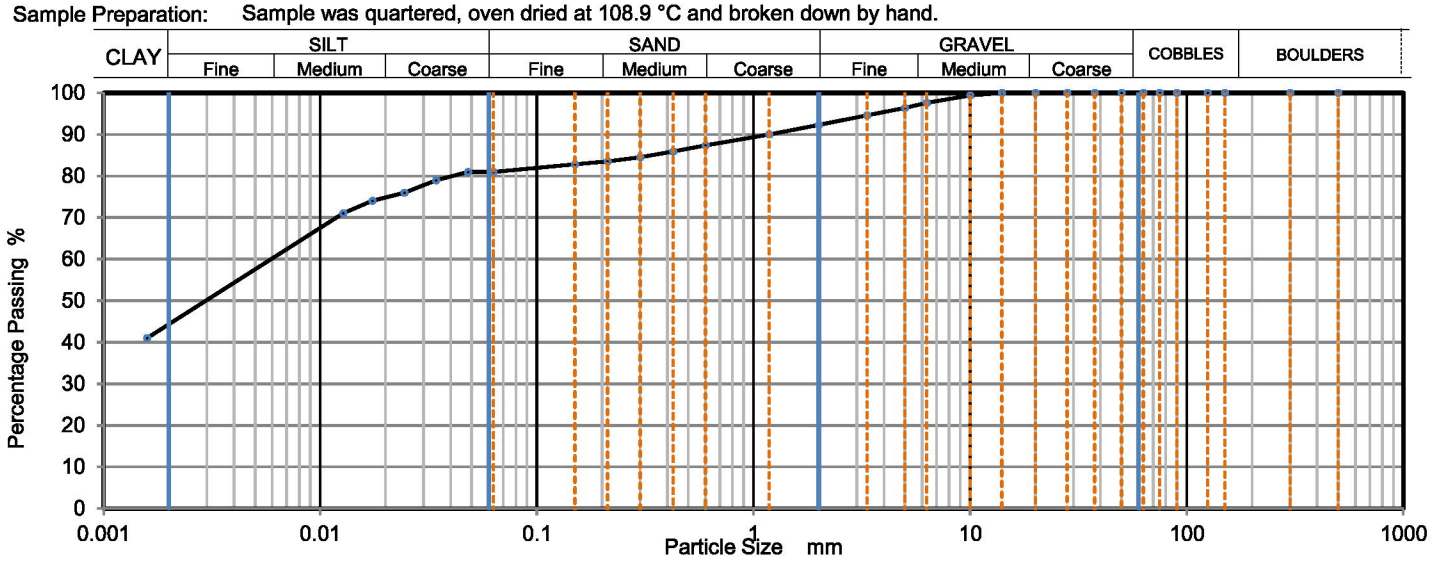
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	03/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726323	Depth Top [m]:	1.65
Hole No.:	TP26	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Brownish grey CLAY with fragments of chalk		
Sample Preparation:	Sample was quartered, oven dried at 108.9 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	81
300	100	0.0481	81
150	100	0.0343	79
125	100	0.0244	76
90	100	0.0174	74
75	100	0.0128	71
63	100	0.0016	41
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	96		
3.35	95	Particle density	(assumed)
2	92	2.65	Mg/m3
1.18	90		
0.6	87		
0.425	86		
0.3	85		
0.212	84		
0.15	83		
0.063	81		

Sample Proportions	% dry mass
Very coarse	0
Gravel	8
Sand	11
Silt	37
Clay	44

Grading Analysis		
D100	mm	14
D60	mm	0.00599
D30	mm	
D10	mm	
Uniformity Coefficient		> 3.8
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

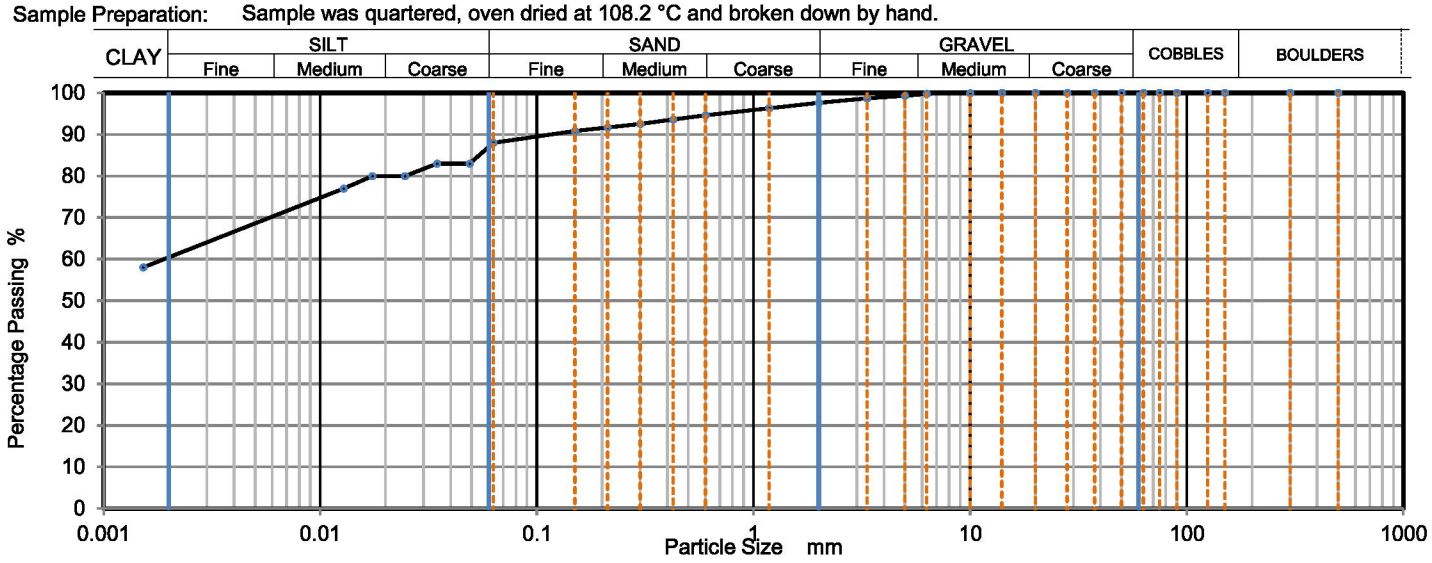
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	03/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726326	Depth Top [m]:	0.90
Hole No.:	TP30	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	B
Sample Description:	Brownish grey CLAY with fragments of chalk		
Sample Preparation:	Sample was quartered, oven dried at 108.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	88
300	100	0.0489	83
150	100	0.0346	83
125	100	0.0246	80
90	100	0.0174	80
75	100	0.0128	77
63	100	0.0015	58
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99	Particle density	(measured)
2	98	2.62	Mg/m3
1.18	96		
0.6	95		
0.425	94		
0.3	93		
0.212	92		
0.15	91		
0.063	88		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	10
Silt	28
Clay	60

Grading Analysis		
D100	mm	14
D60	mm	0.00195
D30	mm	
D10	mm	
Uniformity Coefficient		> 1.3
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

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

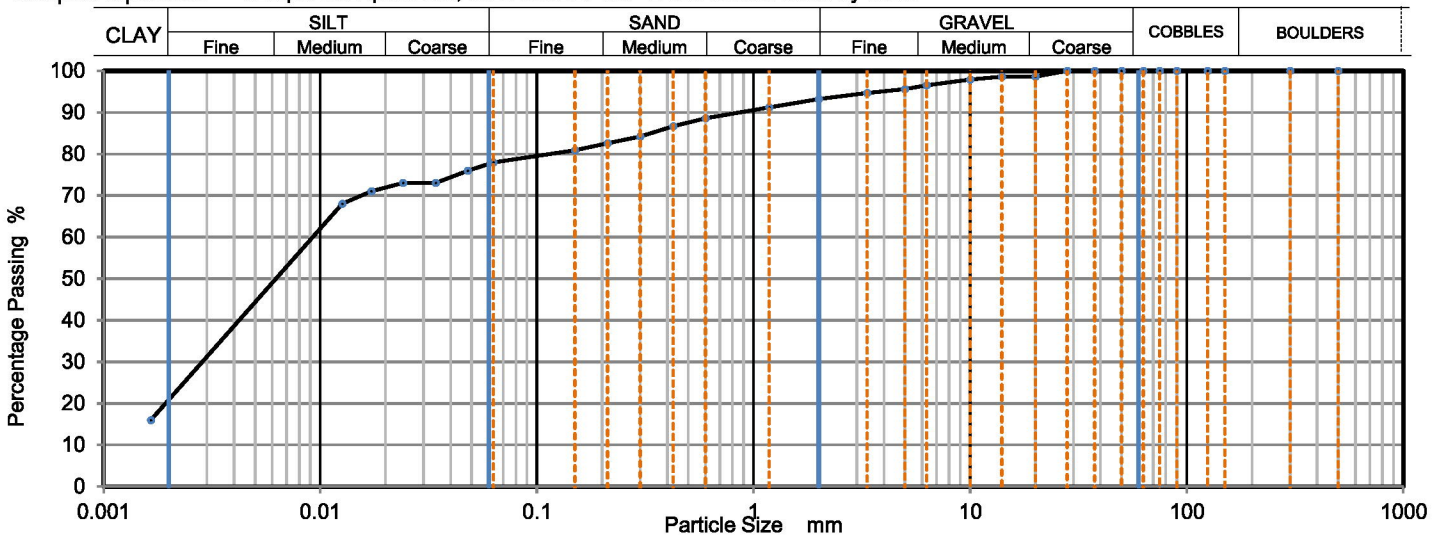
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	03/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726330	Depth Top [m]:	1.00
Hole No.:	TP41	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Yellowish brown silty CLAY		
Sample Preparation:	Sample was quartered, oven dried at 106 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	78
300	100	0.0479	76
150	100	0.0341	73
125	100	0.0241	73
90	100	0.0172	71
75	100	0.0126	68
63	100	0.0017	16
50	100		
37.5	100		
28	100		
20	99		
14	99		
10	98		
6.3	97		
5	96		
3.35	95	Particle density	(assumed)
2	93	2.65	Mg/m3
1.18	91		
0.6	89		
0.425	87		
0.3	84		
0.212	83		
0.15	81		
0.063	78		

Sample Proportions	% dry mass
Very coarse	0
Gravel	7
Sand	15
Silt	57
Clay	21

Grading Analysis		
D100	mm	28
D60	mm	0.00928
D30	mm	0.00289
D10	mm	
Uniformity Coefficient		> 5.6
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 100.23

TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 2.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

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

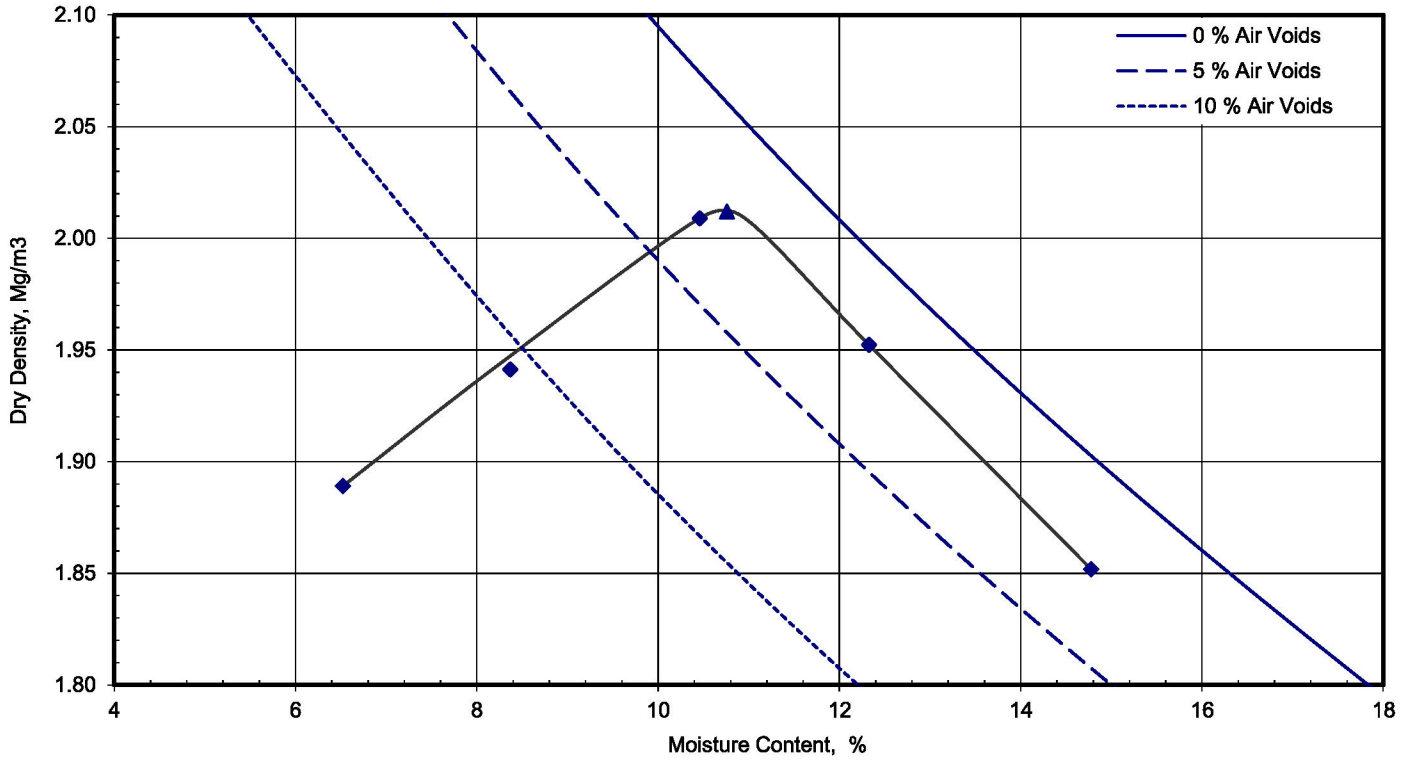
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	06/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723069	Depth Top [m]:	1.50
Hole No.:	TP01	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Sample Description:	Yellowish brown CLAY		
Sample Preparation:	Sample was quartered and broken down by hand. Material used was natural.		



Compaction Point No.		1	2	3	4	5
Moisture Content	%	6.5	8.4	10	12	15
Dry Density	Mg/m³	1.89	1.94	2.01	1.95	1.85

Mould Type		CBR
Samples Used		Single sample tested
Dry Mass Retained on 37.5 mm Sieve	%	0
Dry Mass Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.65
As received Moisture Content	%	10
Maximum Dry Density	Mg/m³	**2.01**

Optimum Moisture Content	%	**11**

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.4 using 2.5kg [light] Rammer

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 109.24

TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 2.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

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

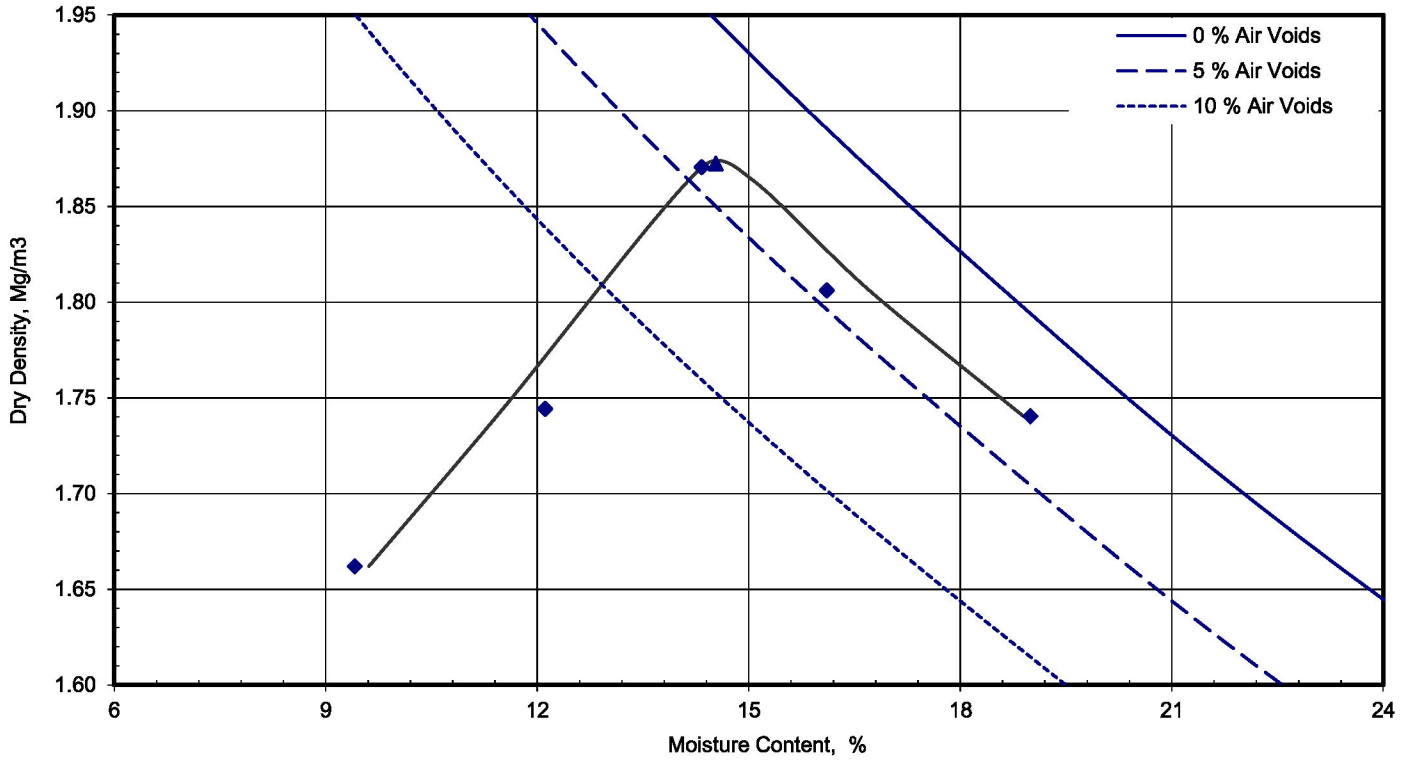
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723082	Depth Top [m]:	1.20
Hole No.:	TP20	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Sample Description:	Yellowish brown slightly gravelly CLAY		
Sample Preparation:	Sample was quartered and broken down by hand. Material used was natural.		



Compaction Point No.		1	2	3	4	5
Moisture Content	%	9.4	12	14	16	19
Dry Density	Mg/m³	1.66	1.74	1.87	1.81	1.74

Mould Type		CBR
Samples Used		Single sample tested
Dry Mass Retained on 37.5 mm Sieve	%	0
Dry Mass Retained on 20.0 mm Sieve	%	0
Particle Density - Measured using gas jar	Mg/m³	2.72
As received Moisture Content	%	16
Maximum Dry Density	Mg/m³	**1.87**

Optimum Moisture Content	%	**15**

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.4 using 2.5kg [light] Rammer

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 109.24

TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 2.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

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

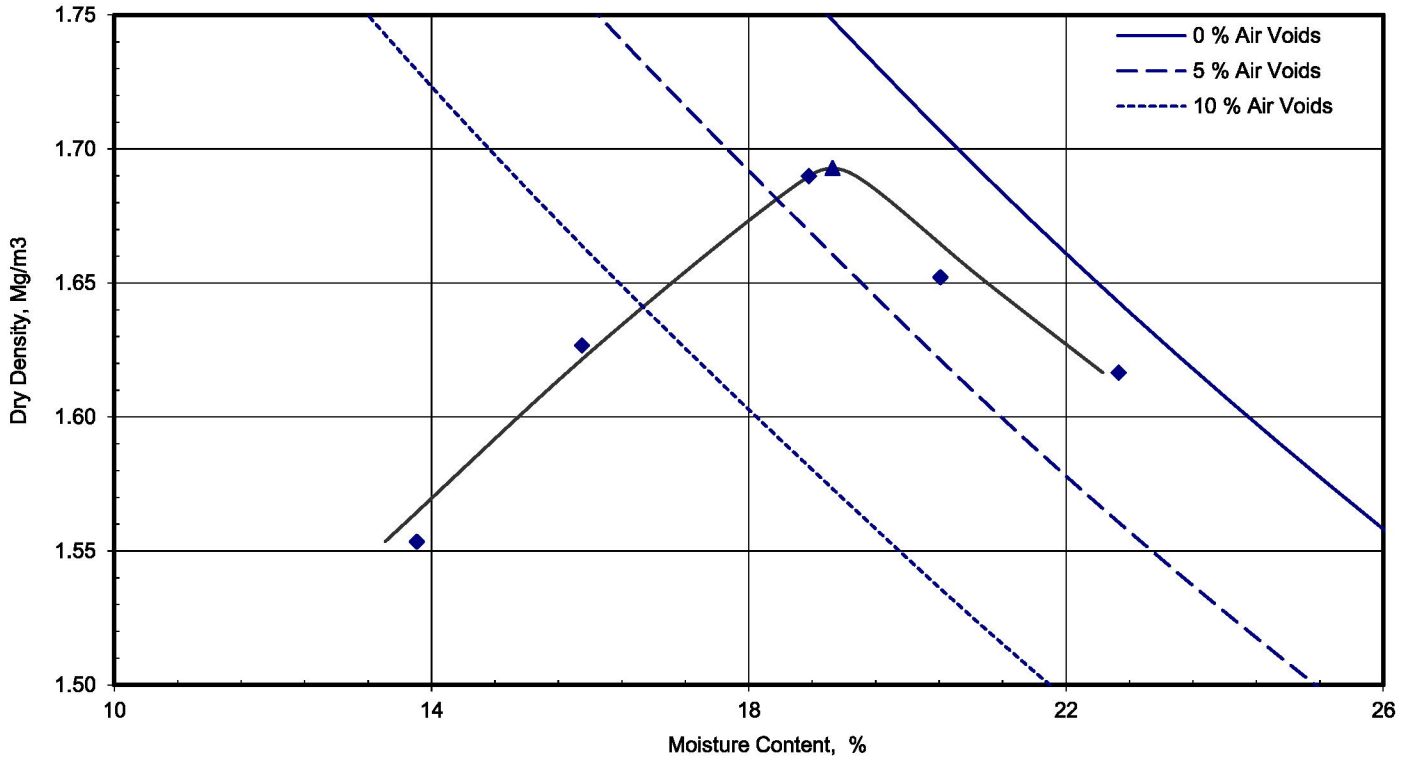
4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726326	Depth Top [m]:	0.90
Hole No.:	TP30	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	B
Sample Description:	Brownish grey CLAY with fragments of chalk		
Sample Preparation:	Sample was quartered and broken down by hand. Material used was natural.		



Compaction Point No.		1	2	3	4	5
Moisture Content	%	14	16	19	20	23
Dry Density	Mg/m³	1.55	1.63	1.69	1.65	1.62

Mould Type		CBR
Samples Used		Single sample tested
Dry Mass Retained on 37.5 mm Sieve	%	0
Dry Mass Retained on 20.0 mm Sieve	%	16
Particle Density - Measured using gas jar	Mg/m³	2.62
As received Moisture Content	%	20
Maximum Dry Density	Mg/m³	**1.69**

Optimum Moisture Content	%	**19**

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.4 using 2.5kg [light] Rammer

Remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 109.24

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

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

4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	07/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	15/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

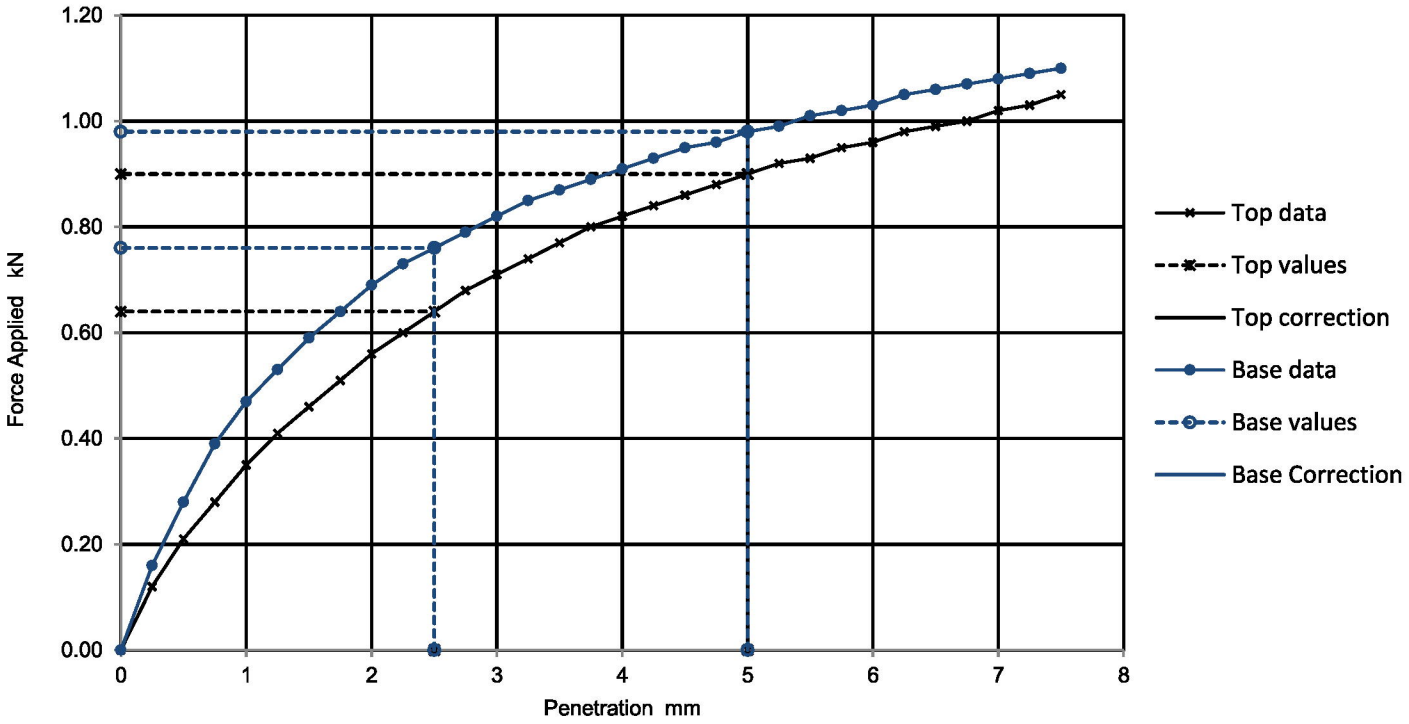
Laboratory Reference:	2723071	Depth Top [m]:	1.00
Hole No.:	TP04	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Yellowish brown to grey slightly gravelly slightly sandy CLAY		

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	9 %	Dry density after soaking	Mg/m3

Initial Specimen details	Bulk density	2.02	Mg/m3	Surcharge applied	8 kg
	Dry density	1.66	Mg/m3		4.8 kPa
	Moisture content	22	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	4.8	4.5	4.8	5.3	22
BASE	No	5.8	4.9	5.8		21

Remarks:

Test/ Specimen specific remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 108.17

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

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

4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	13/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	15/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

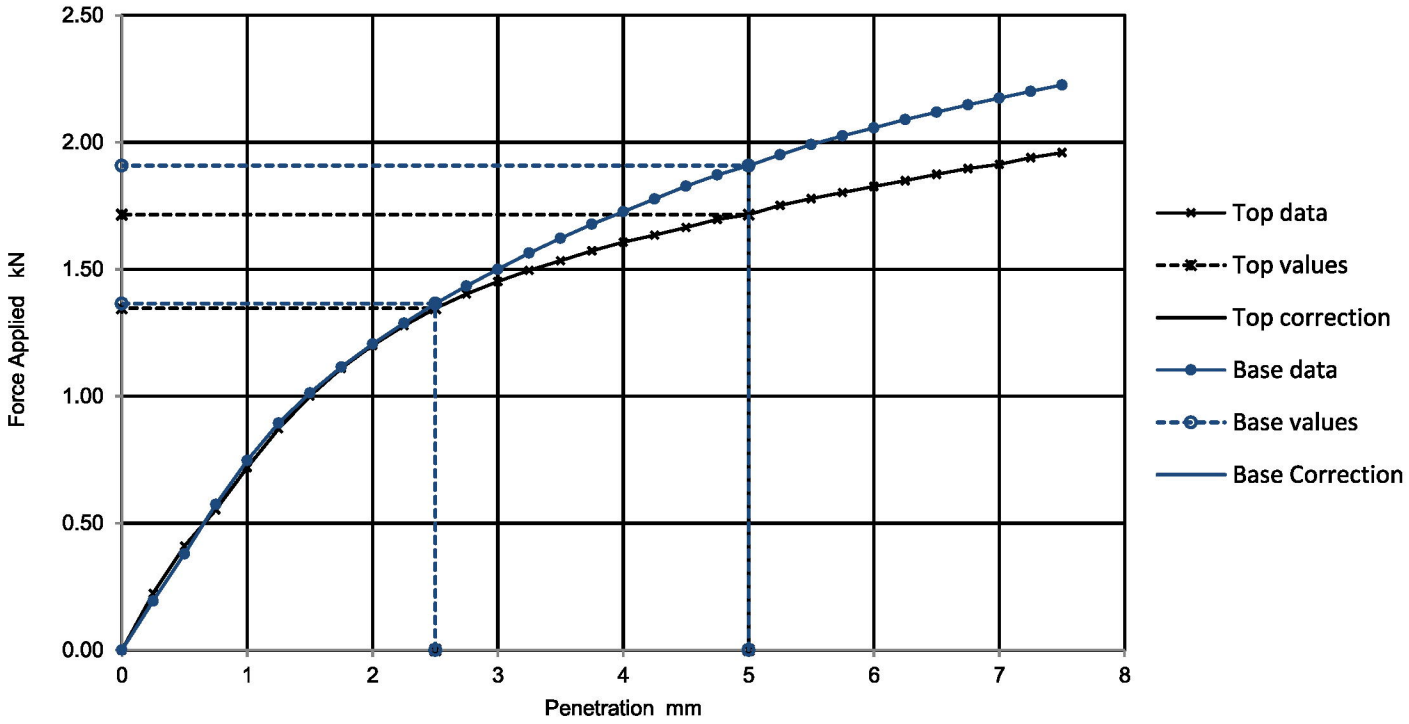
Test Results:

Laboratory Reference:	2723080	Depth Top [m]:	2.30
Hole No.:	TP17 and TP18	Depth Base [m]:	2.85
Sample Reference:	B1+B2	Sample Type:	B
Sample Description:	Greyish brown CLAY		

Specimen Preparation:

Condition	Remoulded			Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking	days
				Time to surface	days
				Amount of swell recorded	mm
Material retained on 20mm sieve removed		0	%	Dry density after soaking	Mg/m3
Initial Specimen details	Bulk density	1.96	Mg/m3	Surcharge applied	8 kg
	Dry density	1.58	Mg/m3		4.9 kPa
	Moisture content	24	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	10	8.6	10	10	23
BASE	No	10	9.5	10		23

Remarks: Replaces Analytical Report Number 23-40788, issue no. 1; Hole No amended

Test/ Specimen specific remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 108.17

4041

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

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

Environmental Science

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

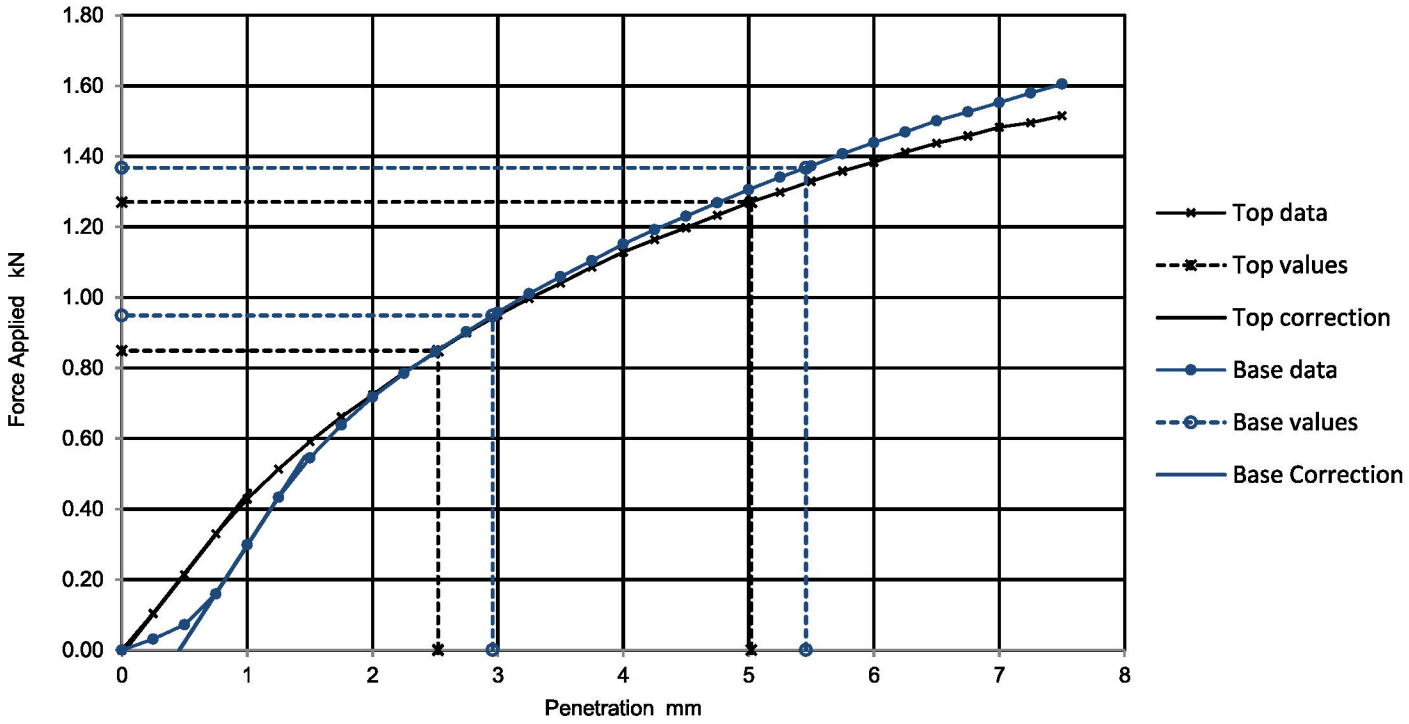
Laboratory Reference:	2723082	Depth Top [m]:	1.20
Hole No.:	TP20	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Sample Description:	Yellowish brown sandy gravelly CLAY		

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	0 %	Dry density after soaking	Mg/m3

Initial Specimen details	Bulk density	2.09	Mg/m3	Surcharge applied	8 kg
	Dry density	1.76	Mg/m3		4.9 kPa
	Moisture content	19	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	Yes	6.4	6.4	6.4	6.8	17
BASE	Yes	7.2	6.8	7.2		17

Remarks:

Test/ Specimen specific remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 108.17

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

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

4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

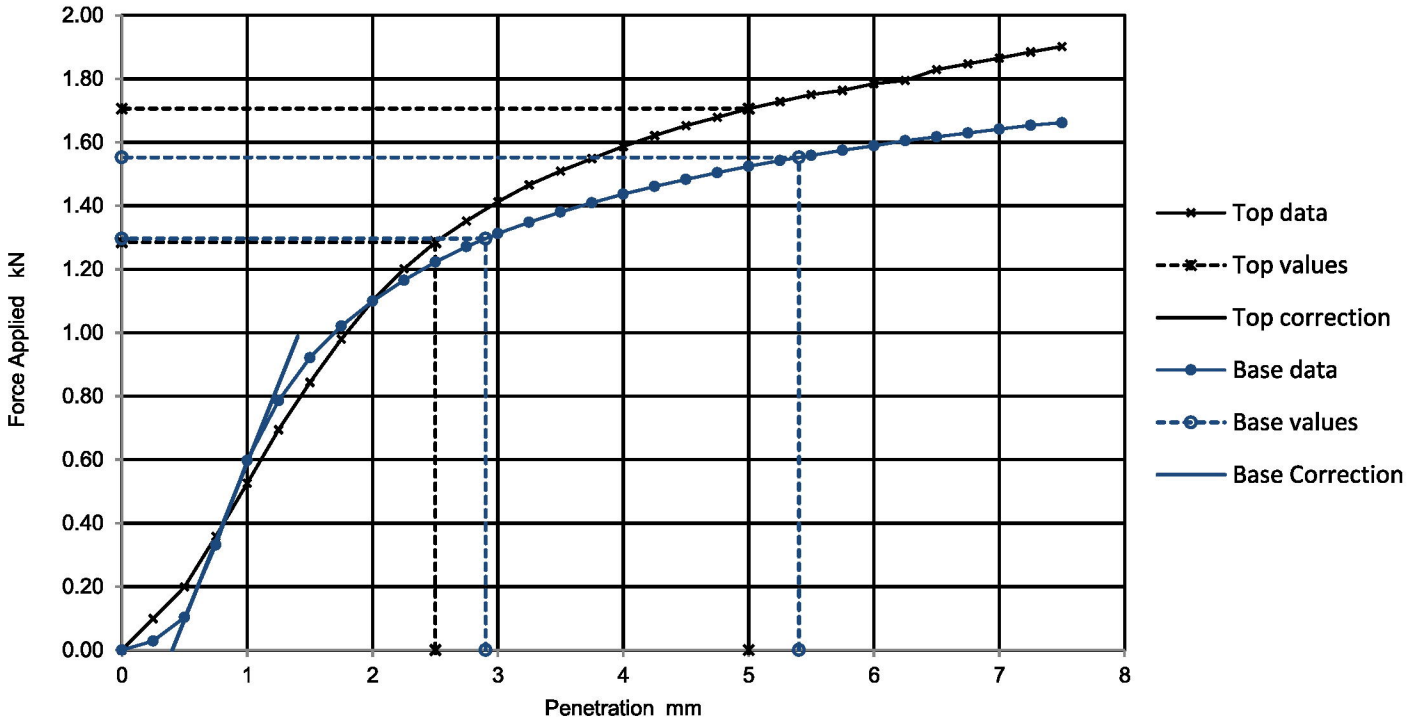
Laboratory Reference:	2726326	Depth Top [m]:	0.90
Hole No.:	TP30	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	B
Sample Description:	Brownish grey CLAY with fragments of chalk		

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	0 %	Dry density after soaking	Mg/m3

Initial Specimen details	Bulk density	1.97	Mg/m3	Surcharge applied	8 kg
	Dry density	1.60	Mg/m3		4.8 kPa
	Moisture content	23	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	9.7	8.5	9.7	9.8	22
BASE	Yes	9.8	7.8	9.8		24

Remarks:

Test/ Specimen specific remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 108.17

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

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

4041

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	Not Given
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	15/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

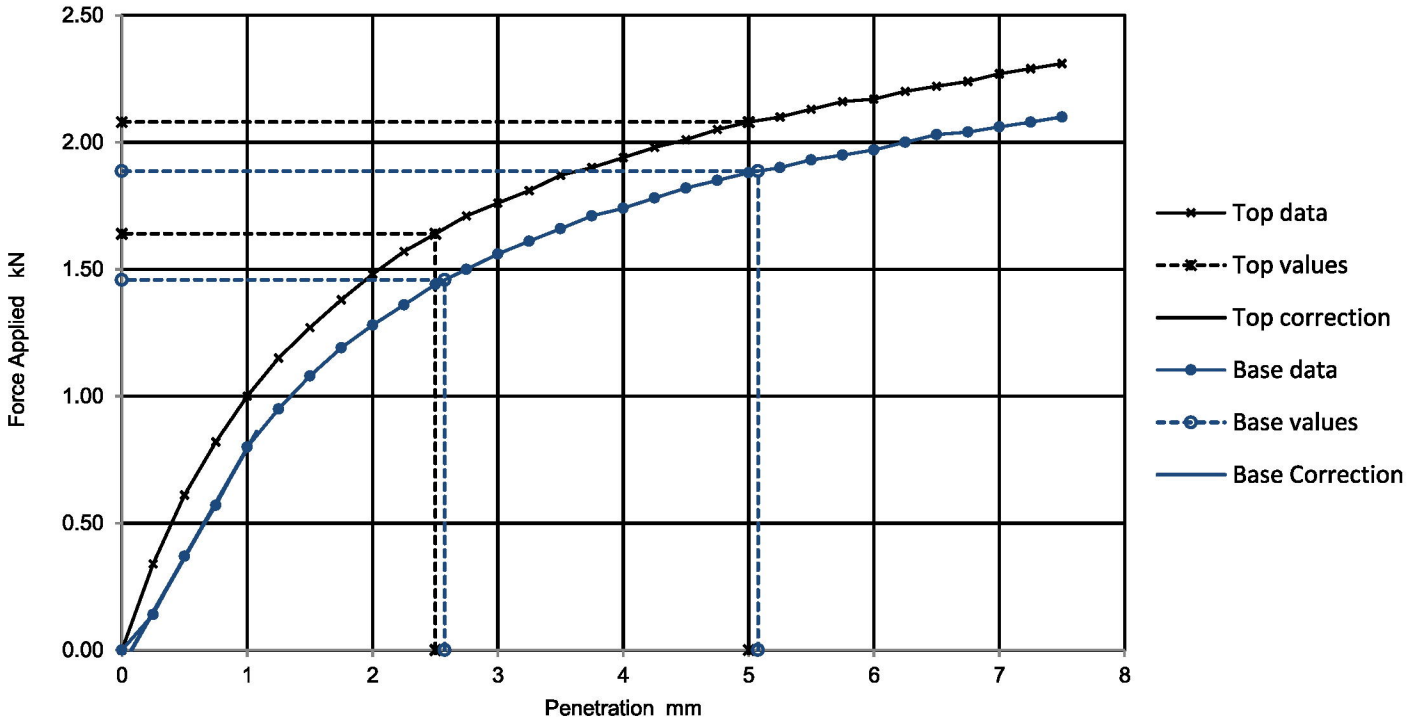
Laboratory Reference:	2726329	Depth Top [m]:	1.00
Hole No.:	TP40	Depth Base [m]:	Not Given
Sample Reference:	B1	Sample Type:	B
Sample Description:	Light brown CLAY		

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	0 %	Dry density after soaking	Mg/m3

Initial Specimen details	Bulk density	2.06	Mg/m3	Surcharge applied	8 kg
	Dry density	1.75	Mg/m3		4.8 kPa
	Moisture content	18	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	12	10	12	12	17
BASE	Yes	11	9.4	11		19

Remarks:

Test/ Specimen specific remarks:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 108.17

TEST CERTIFICATE

DETERMINATION OF UNDRAINED SHEAR STRENGTH AT EACH COMPACTION POINT USING HAND VANE APPARATUS

Tested in Accordance with: Guideline for Hand Shear Vane Test*

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

Environmental Science

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	06/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723069	Depth Top [m]:	1.50
Hole No.:	TP01	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Soil Description:	Yellowish brown slightly gravelly CLAY		

Moisture Content	Shear Vane Reading					
	1	2	3	4	Average	Tv
%	kPa	kPa	kPa	kPa	kPa	kPa
6.5	UTP	UTP	UTP	UTP	UTP	
8.4	UTP	UTP	UTP	UTP	UTP	
10	UTP	UTP	UTP	UTP	UTP	
12	24	26	22	24	24	
15	8	12	6	8	9	

Note: UTP - Unable To Penetrate; * - Guideline for Hand Held Shear Vane Test, New Zealand Geotechnical Society INC, August 2001

Remarks: Compacted by: Light Compaction 2.5kg (BS1377:Part 4:1990).

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 275.12

TEST CERTIFICATE

DETERMINATION OF UNDRAINED SHEAR STRENGTH AT EACH COMPACTION POINT USING HAND VANE APPARATUS

Tested in Accordance with: Guideline for Hand Shear Vane Test*

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

Environmental Science

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2723082	Depth Top [m]:	1.20
Hole No.:	TP20	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	LB
Soil Description:	Yellowish brown gravelly sandy CLAY		

Moisture Content	Shear Vane Reading					
	1	2	3	4	Average	Tv
%	kPa	kPa	kPa	kPa	kPa	kPa
9.4	UTP	UTP	UTP	UTP	UTP	
12	UTP	UTP	UTP	UTP	UTP	
14	UTP	UTP	UTP	UTP	UTP	
16	UTP	UTP	UTP	UTP	UTP	
19	54	52	46	54	52	

Note: UTP - Unable To Penetrate; * - Guideline for Hand Held Shear Vane Test, New Zealand Geotechnical Society INC, August 2001

Remarks: Compacted by: Light Compaction 2.5kg (BS1377:Part 4:1990).

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 275.12

TEST CERTIFICATE

DETERMINATION OF UNDRAINED SHEAR STRENGTH AT EACH COMPACTION POINT USING HAND VANE APPARATUS

Tested in Accordance with: Guideline for Hand Shear Vane Test*

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

Environmental Science

Client:	Hydrock Consultants Ltd	Client Reference:	27141
Client Address:	2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD	Job Number:	23-40788-2
		Date Sampled:	12/06/2023
		Date Received:	21/06/2023
Contact:	Jamie Moore	Date Tested:	14/07/2023
Site Address:	Himley Village Main Site	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	2726326	Depth Top [m]:	0.90
Hole No.:	TP30	Depth Base [m]:	Not Given
Sample Reference:	LB1	Sample Type:	B
Soil Description:	Brownish grey CLAY with fragments of chalk		

Moisture Content	Shear Vane Reading					
	1	2	3	4	Average	Tv
%	kPa	kPa	kPa	kPa	kPa	kPa
14	UTP	UTP	UTP	UTP	UTP	
16	UTP	UTP	UTP	UTP	UTP	
19	UTP	UTP	UTP	UTP	UTP	
20	UTP	UTP	UTP	UTP	UTP	
23	70	52	46	54	56	

Note: UTP - Unable To Penetrate; * - Guideline for Hand Held Shear Vane Test, New Zealand Geotechnical Society INC, August 2001

Remarks: Compacted by: Light Compaction 2.5kg (BS1377:Part 4:1990).

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

GF 275.12

SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: 15/06/2023
Date Received: 21/06/2023
Date Tested: 03/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa
2723054	RC01	C1	2.08	Not Given	C	Yellowish brown LIMESTONE	WC = 4.1%	1	A	U	YES	-	89.0	30.0	25.0	2.2	53.2	0.76	0.78
2723055	RC01	C2	2.30	Not Given	C	Yellowish brown LIMESTONE	WC = 3.2%	1	A	U	YES	-	90.7	43.0	35.0	8.9	63.6	2.20	2.45
2723056	RC01	C3	2.58	Not Given	C	Yellowish brown LIMESTONE	WC = 1.6%	1	I	U	YES	44.4	70.7	58.0	51.0	7.3	67.7	1.58	1.81
2723057	RC01	C4	2.92	Not Given	C	Yellowish brown LIMESTONE	WC = 2.5%	1	I	U	YES	48.5	88.9	66.0	65.0	1.1	85.8	0.14	0.18
2723058	RC01	C5	3.21	Not Given	C	Light brown LIMESTONE	WC = 1.6%	1	A	U	YES	-	88.9	60.0	40.0	11.6	67.3	2.55	2.92
2723059	RC01	C6	3.30	Not Given	C	Light brown LIMESTONE	WC = 2.4%	1	D	U	YES	56.8	89.5	90.0	77.0	6.9	83.0	0.99	1.25
2723060	RC01	C7	3.71	Not Given	C	Light grey LIMESTONE	WC = 4.6%	1	D	U	YES	85.9	89.0	90.0	83.0	9.0	85.9	1.21	1.55
2723061	RC01	C8	3.98	Not Given	C	Light grey LIMESTONE	WC = 1.3%	1	D	U	YES	78.8	89.0	90.0	83.0	13.6	85.9	1.84	2.35
2723062	RC01	C9	4.10	Not Given	C	Light grey LIMESTONE	WC = 1.1%	1	D	U	YES	73.5	89.1	90.0	88.0	11.0	88.6	1.40	1.81
2723063	RC01	C10	8.35	Not Given	C	Light grey LIMESTONE	WC = 0.5%	1	D	U	YES	64.9	89.1	90.0	85.0	4.3	87.0	0.56	0.72

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen seperation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Equipment No.: i2 4341 Calibration Date: 14/03/2023 - 14/03/2024

Comments:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: 15/06/2023
Date Received: 21/06/2023
Date Tested: 03/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top	Depth Base	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)
			m	m								mm	mm	mm	mm	kN	mm	MPa	MPa
2723064	RC01	C11	8.60	Not Given	C	Light grey LIMESTONE	WC = 0.3%	1	D	U	YES	81.5	89.0	61.0	56.0	11.0	70.6	2.21	2.58
2723065	RC01	C12	8.60	Not Given	C	Light grey LIMESTONE	WC = 0.9%	1	D	U	YES	81.9	88.8	90.0	85.0	9.4	86.9	1.25	1.60
2723066	RC01	C13	9.00	Not Given	C	Light grey LIMESTONE	WC = 1.0%	1	D	U	YES	90.0	89.0	90.0	79.0	14.4	83.9	2.05	2.58
2723067	RC01	C14	9.22	Not Given	C	Light grey LIMESTONE	WC = 2.7%	1	D	U	YES	177.3	89.0	90.0	72.0	7.5	80.0	1.17	1.45

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random; Dimensions: Dps - Distance between platens (platen seperation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P; Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Equipment No.: i2 4341 Calibration Date: 14/03/2023 - 14/03/2024

Comments:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

SUMMARY REPORT

DETERMINATION OF UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Tested in Accordance with: ISRM, 2007, p153, part 1

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

4041

Client: Hydrock Consultants Ltd

Client Address: 2-4 Hawthorne Park, Holdenby Road, Spratton, Northamptonshire, NN6 8LD

Contact: Jamie Moore

Site Address: Himley Village Main Site

Client Reference: 27141
Job Number: 23-40788-2
Date Sampled: 15/06/2023
Date Received: 21/06/2023
Date Tested: 03/07/2023
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Specimen Dimensions (2)				Bulk density (2)	Water Content (1)	Uniaxial Compression (3)			
		Reference	Depth Top	Depth Base	Type			Diameter	Length	H/D	Orientation of sample			Condition	Stress Rate	Mode of failure	UCS
			m	m				mm	mm			Mg/m3	%		Mpa/s		Mpa
2723068	RC01	C15	9.72	Not Given	C	Grey to light grey LIMESTONE		88.4	230.0	2.6	Vertical	2.44	1.8	as received	0.0814	S + AC	25.8

Note: 1 - ISRM p87 test 1, water content at 105 ± 3 °C - not accredited, specimen as tested for UCS, 2 - ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density, 3 - ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials, above notes apply unless annotated otherwise in the remarks. Compaction machine: VJ Tech AUTOCON - VJT 51-3011; Mode of failure legend: S - Single shear, MS - multiple shear, AC - Axial cleavage, F - Fragmented

Comments:

Signed: [redacted]

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/07/2023

Geotechnical plots

Hydrock

Client Cala Homes	
Project Himley Village, Bicester	Head Deposits
Job number 27141	

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	5	5	0
No. tests in 20% data set	1	1	
No. tests with suspected pyrite		0	
Maximum value	6.6	0.2	
Mean of highest two values	6	0	
Mean of highest 20%			
Characteristic Value	**6**	**0**	

	[no pyrite]	[pyrite suspected]
DS Class	**DS-1**	**DS-1**

If pyrite suspected, DS Class limited to **DS-1**

Is pyrite assumed to be present? No **Adopted DS Class =** **DS-1**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value (Maximum Level)	0	0
DS Class		

pH data

	Soil	Water
Number of tests	5	0
No. tests in 20% data set	1	
Lowest pH	7.9	
Mean of lowest 20%	7.9	
Characteristic value	**7.9**	
Design value	**7.9**	

Number of soil pH results less than 5.5: 0

DS Class design value

Based on higher of soil and water data **DS-1**

ACEC Class design value

Natural ground / Mobile groundwater **AC-1 ***

* increase to AC-2z in flowing water (pure or with >15mg/l carbon dioxide)

Hydrock

Client **Cala Homes**	
Project **Himley Village, Bicester**	Made Ground
Job number **27141**	

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	1	0	0
No. tests in 20% data set	0		
No. tests with suspected pyrite		0	
Maximum value	7.6		
Mean of highest two values	8		
Mean of highest 20%			
Characteristic Value	**7.6**		

	[no pyrite]	**[pyrite suspected]**
DS Class	**DS-1**	

If pyrite suspected, DS Class limited to

Is pyrite assumed to be present? **No** **Adopted DS Class =** **DS-1**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value **(Maximum Level)**	0	0

DS Class

pH data

	Soil	Water
Number of tests	1	0
No. tests in 20% data set	0	
Lowest pH	8.7	
Mean of lowest 20%		
Characteristic value	**8.7**	
Design value	**8.7**	

Number of soil pH results less than 5.5: 0

DS Class design value

Based on higher of soil and water data **DS-1**

ACEC Class design value

Natural ground

Mobile groundwater **AC-1 ***

* increase to AC-2z in flowing water (pure or with >15mg/l carbon dioxide)

Hydrock

Client Cala Homes	
Project Himley Village, Bicester	Cornbrash Formation
Job number 27141	

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	10	0	0
No. tests in 20% data set	2		
No. tests with suspected pyrite		0	
Maximum value	44		
Mean of highest two values	29		
Mean of highest 20%	29		
Characteristic Value	**29**		

	[no pyrite]	**[pyrite suspected]**
DS Class	**DS-1**	

If pyrite suspected, DS Class limited to

Is pyrite assumed to be present? No **Adopted DS Class =** **DS-1**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value **(Maximum Level)**	0	0

DS Class

pH data

	Soil	Water
Number of tests	9	0
No. tests in 20% data set	2	
Lowest pH	8.2	
Mean of lowest 20%	8.3	
Characteristic value	**8.3**	
Design value	**8.3**	

Number of soil pH results less than 5.5: 0

DS Class design value

Based on higher of soil and water data **DS-1**

ACEC Class design value

Natural ground

Mobile groundwater **AC-1 ***

* increase to AC-2z in flowing water (pure or with >15mg/l carbon dioxide)

Hydrock

Client Cala Homes	
Project Himley Village, Bicester	Forest Marble Formation
Job number 27141	

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	3	3	0
No. tests in 20% data set	1	1	
No. tests with suspected pyrite		1	
Maximum value	47.7	0.4	
Mean of highest two values	42	0	
Mean of highest 20%			
Characteristic Value	**47.7**	**0.4**	

	[no pyrite]	**[pyrite suspected]**
DS Class	**DS-1**	**DS-2**

If pyrite suspected, DS Class limited to **DS-2**

Is pyrite assumed to be present? No **Adopted DS Class =** **DS-1**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value **(Maximum Level)**	0	0

DS Class

pH data

	Soil	Water
Number of tests	3	0
No. tests in 20% data set	1	
Lowest pH	7.6	
Mean of lowest 20%	7.6	
Characteristic value	**7.6**	
Design value	**7.6**	

Number of soil pH results less than 5.5 0

DS Class design value

Based on higher of soil and water data **DS-1**

ACEC Class design value

Natural ground

Mobile groundwater **AC-1 ***

* increase to AC-2z in flowing water (pure or with >15mg/l carbon dioxide)

Appendix D Site monitoring data and ground gas risk assessment

Site monitoring data

Gas Monitoring Record

Hydrock

Site: Himley Village Bicester
Job number: 27141
Client: Cala Homes Cotswolds and Legal &
Gas analyser: Model: GA5000 Serial No: G5071
Equipment check OK: OK (Field Check/Calibration 28/
Service in date: 24/07/2023
Calibration check OK: OK (Factory Calibration 24/01/20
Name of person monitoring: David Webster

Notes on general site conditions during time of monitoring:
Thick cloud and a gentle breeze - 21C
High weeded meadow. Slightly rutted - access fully available

Monitoring round		Borehole details						Pressure and flow							Concentrations											GSV		Local conditions
Date	Time	Borehole	Single or dual gas tap	Depth to water (or NAPL) (or base of well if dry) (m)	Depth to base of response zone (m)	"D" denotes dry hole	Volume of headspace in well (litres)	Atmospheric pressure (hPa)	Atm pressure falling / rising / steady	Relative BH pressure (hPa)	Gas flow (l/hr) Initial	Gas flow (l/hr) Steady	"<" denotes flow less than LOD	Gas flow* (absolute value) (L/hr)	CH_4 (%v/v) Initial	CH_4 (%v/v) Steady	CH_4 (%LEL) Initial	CH_4 (%LEL) Steady	CO_2 (%v/v) Initial	CO_2 (%v/v) Steady	O_2 (%v/v) Initial	O_2 (%v/v) Steady	Other gases CO (ppm)	Other gases H_2S (ppm)	VOC PID (ppm)	Gas Screening Value (CH_4) (L/hr)	Gas Screening Value (CO_2) (L/hr)	Notes on condition of borehole (including any leak test), condition of surrounding ground, and operation of monitoring instrument (as applicable)
				Readings taken from top of Standpipe.				Max. individual values:						0.1	0.0		0.0		3.6		19.8					0	0.0027	Summary statistics for this monitoring period*.
								Min. individual values:						0.0	0.0		0.0		0.4		18.1					0	0	[* Not applicable if wells are screened in different strata or zones]
				Height of Standpipe in row AF				Worst-case GSVs based on max. individual flow and max. individual conc. over the duration of this table:																		0	0.0036	
Start adding data here															0													
28/06/23	12:33	R01	S	2.03	5.71		0.00000	1008		0.07	0.0	0.0		0.0	0	0	0	0	0.6	0.6	19.8	19.8	0.0	0.0		0	0	SILT ANTS
28/06/23	12:13	R02	S	2.04	5.55		0.00000	1008		0.30	0.0	0.0		0.0	0	0	0	0	1.7	1.7	18.1	18.1	0.0	0.0		0	0	SILT
28/06/23	12:04	R03	S	2.04	4.59		0.00000	1008		0.04	0.0	0.0		0.0	0	0	0	0	1.6	1.6	19.7	19.5	0.0	0.0		0	0	SILT
28/06/23	12:45	R04	S	1.79	3.94		0.00000	1008		0.09	0.0	0.0		0.0	0	0	0	0	1.5	1.5	18.2	18.2	0.0	0.0		0	0	OK
28/06/23	11:28	R05	S	2.31	5.31		0.00000	1008		-0.19	0.0	0.0		0.0	0	0	0	0	3.6	3.6	18.4	18.3	0.0	0.0		0	0	SILT
28/06/23	13:21	R06	S	1.86	5.55		0.00000	1009		0.04	0.0	0.0		0.0	0	0	0	0	0.3	0.4	20.4	19.8	1.0	0.0		0	0	SILT
28/06/23	13:13	R07	S	2.29	5.26		0.00000	1008		0.02	0.1	0.1		0.1	0	0	0	0	2.7	2.7	18.4	18.4	1.0	0.0		0	0.0027	OK
28/06/23	12:57	R08	S	1.47	3.47		0.00000	1009		0.00	0.0	0.0		0.0	0	0	0	0	3.4	3.4	18.3	18.3	0.0	0.0		0	0	OK
28/06/23	00:00	R001	S	1.84	2.73																							OK
28/06/23	00:00	R002	S	1.23	1.5																							OK
28/06/23	00:00	R003	S	1.83	2.24																							OK
28/06/23	00:00	R004	S	1.54	1.99																							OK
28/06/23	00:00	RC01	S	2.06	4.05																							OK
																	0	0										
																	0	0										
																	0	0										
																	0	0										
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Gas Monitoring Record

Hydrock

Site: Himley Village Bicester
Job number: 27141
Client: Cala Homes Cotswolds and Legal &
Gas analyser: Model: GA5000 Serial No: G5071
Equipment check OK: OK (Field Check/Calibration 16/(
Service in date: 24/07/2023
Calibration check OK: OK (Factory Calibration 24/01/20
Name of person monitoring: David Webster

Notes on general site conditions during time of monitoring:
Hot & Sunny 25C
High weeded meadow. Slightly rutted - access fully available

Monitoring round		Borehole details						Pressure and flow							Concentrations											GSV		Local conditions
Date	Time	Borehole	Single or dual gas tap	Depth to water (or NAPL) (or base of well if dry) (m)	Depth to base of response zone (m)	"D" denotes dry hole	Volume of headspace in well (litres)	Atmospheric pressure (hPa)	Atm pressure falling / rising / steady	Relative BH pressure (hPa)	Gas flow (l/hr) Initial	Gas flow (l/hr) Steady	"<" denotes flow less than LOD	Gas flow* (absolute value) (L/hr)	CH_4 (%v/v) Initial	CH_4 (%v/v) Steady	CH_4 (%LEL) Initial	CH_4 (%LEL) Steady	CO_2 (%v/v) Initial	CO_2 (%v/v) Steady	O_2 (%v/v) Initial	O_2 (%v/v) Steady	Other gases CO (ppm)	Other gases H_2S (ppm)	VOC PID (ppm)	Gas Screening Value (CH_4) (L/hr)	Gas Screening Value (CO_2) (L/hr)	Notes on condition of borehole (including any leak test), condition of surrounding ground, and operation of monitoring instrument (as applicable)
Readings taken from top of Standpipe.								Max. individual values:						0.8	0.0		0.0		3.6		19.2					0	0.0016	Summary statistics for this monitoring period*.
								Min. individual values:						0.0	0.0		0.0		0.2		16.9					0	0	[* Not applicable if wells are screened in different strata or zones]
Height of Standpipe in row AF								Worst-case GSVs based on max. individual flow and max. individual conc. over the duration of this table:																		0	0.0288	
Start adding data here															0													
16/06/23	12:43	R01	S	1.93	5.68		0.00000	1011		-0.02	0.1	0.0		0.0	0	0	0	0	0.6	0.6	19.5	19.0	0.0	1.0		0	0	SILT 7CM
16/06/23	12:31	R02	S	1.99	5.57		0.00000	1011		0.04	0.0	0.0		0.0	0	0	0	0	2.3	2.3	16.9	16.9	1.0	1.0		0	0	SILT 7CM
16/06/23	12:18	R03	S	2.03	4.52		0.00000	1011		0.04	0.0	0.0		0.0	0	0	0	0	1.6	1.6	18.7	18.7	0.0	1.0		0	0	SILT 8CM
16/06/23	13:10	R04	S	1.72	3.85		0.00000	1011		-29.67	-10.6	-0.8		0.8	0	0	0	0	0.2	0.2	19.2	19.2	1.0	1.0		0	0.0016	OK
16/06/23	13:25	R05	S	2.22	5.38		0.00000	1012		-0.09	0.0	0.0		0.0	0	0	0	0	3.0	3.0	17.2	17.0	2.0	1.0		0	0	SILT 8CM
16/06/23	13:58	R06	S	1.78	5.55		0.00000	1011		0.05	0.0	0.0		0.0	0	0	0	0	0.5	0.6	20.3	19.2	2.0	0.0		0	0	SILT 6CM
16/06/23	13:47	R07	S	2.17	5.4		0.00000	1012		0.04	0.1	0.0		0.0	0	0	0	0	3.6	3.6	17.1	17.1	2.0	0.0		0	0	OK
16/06/23	13:36	R08	S	1.43	3.44		0.00000	1012		0.04	0.0	0.0		0.0	0	0	0	0	3.4	3.4	17.8	17.8	2.0	0.0		0	0	OK - BAGGED COVER
16/06/23	00:00	R001	S	1.79	2.72																							PIEZO
16/06/23	00:00	R002	S	1.22	1.5																							PIEZO
16/06/23	00:00	R003	S	1.9	2.44																							PIEZO
16/06/23	00:00	R004	S	1.59	1.99																							PIEZO
16/06/23	00:00	RC01	S	1.59	1.99																							PIEZO
																	0	0										
																	0	0										
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Gas Monitoring Record

Hydrock

Site:	**Himley Village Bicester**
Job number:	**27141**
Client:	**Cala Homes Cotswolds and Legal &**
Gas analyser:	Model: GA5000 Serial No: G5071
Equipment check OK:	OK (Field Check/Calibration 22/
Service in date:	24/07/2023
Calibration check OK:	OK (Factory Calibration 24/01/20
Name of person monitoring:	David Webster

Notes on general site conditions during time of monitoring:

Sunny, light rain showers and light winds - 21C

High weeded meadow. Slightly rutted - access fully available

Monitoring round		Borehole details						Pressure and flow							Concentrations											GSV		Local conditions
Date	Time	Borehole	Single or dual gas tap	Depth to water (or NAPL) (or base of well if dry) (m)	Depth to base of response zone (m)	"D" denotes dry hole	Volume of headspace in well (litres)	Atmospheric pressure (hPa)	Atm pressure falling / rising / steady	Relative BH pressure (hPa)	Gas flow (l/hr) Initial	Gas flow (l/hr) Steady	"<" denotes flow less than LOD	Gas flow* (absolute value) (L/hr)	CH_4 (%v/v) Initial	CH_4 (%v/v) Steady	CH_4 (%LEL) Initial	CH_4 (%LEL) Steady	CO_2 (%v/v) Initial	CO_2 (%v/v) Steady	O_2 (%v/v) Initial	O_2 (%v/v) Steady	Other gases CO (ppm)	Other gases H_2S (ppm)	VOC PID (ppm)	Gas Screening Value (CH_4) (L/hr)	Gas Screening Value (CO_2) (L/hr)	Notes on condition of borehole (including any leak test), condition of surrounding ground, and operation of monitoring instrument (as applicable)
				Readings taken from top of Standpipe. Height of Standpipe in row AF				Max. individual values:						0.2	0.0		0.0		3.3		19.0					0	0.0018	Summary statistics for this monitoring period*.
								Min. individual values:						0.0	0.0		0.0		0.6		16.7					0	0	[* Not applicable if wells are screened in different strata or zones]
								Worst-case GSVs based on max. individual flow and max. individual conc. over the duration of this table:																		0	0.0066	
Start adding data here															0													
22/06/23	12:34	R01	S	1.95	5.7			1010		0.23	0.0	0.0		0.0	0	0	0	0	0.6	0.6	19.2	18.9	1.0	1.0		0	0	SILT
22/06/23	12:24	R02	S	1.97	5.53			1010		-1.20	0.0	0.0		0.0	0	0	0	0	1.9	1.9	17.3	17.3	1.0	1.0		0	0	SILT
22/06/23	12:03	R03	S	2.01	4.54			1010		-0.07	0.1	0.1		0.1	0	0	0	0	1.7	1.7	18.6	18.4	0.0	1.0		0	0.0017	SILT AND ROOTS-
22/06/23	12:47	R04	S	1.73	3.88			1011		2.10	0.2	0.2		0.2	0	0	0	0	0.9	0.9	16.7	16.7	1.0	1.0		0	0.0018	OK
22/06/23	11:53	R05	S	2.15	5.28			1010		-0.02	0.0	0.0		0.0	0	0	0	0	3.3	3.3	16.7	16.7	0.0	0.0		0	0	SILT
22/06/23	13:49	R06	S	1.78	5.55			1011		0.04	0.0	0.0		0.0	0	0	0	0	0.2	1.1	20.8	19.0	1.0	0.0		0	0	SILT
22/06/23	13:36	R07	S	2.16	5.37			1011		0.02	0.0	0.0		0.0	0	0	0	0	3.0	3.0	17.0	17.0	1.0	0.0		0	0	OK
22/06/23	13:19	R08	S	1.4	3.46			1012		0.04	0.0	0.0		0.0	0	0	0	0	2.9	2.9	17.4	17.2	1.0	0.0		0	0	OK
22/06/23	00:00	R001	S	1.75	2.73																							OK - PIEZO
22/06/23	00:00	R002	S	1.15	1.5																							OK - PIEZO
22/06/23	00:00	R003	S	1.79	2.44																							OK - PIEZO
22/06/23	00:00	R004	S	1.54	1.99																							OK - PIEZO
22/06/23	00:00	RC01	S	2.01	4.05																							OK - PIEZO
																	0	0										
																	0	0										
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Ground gas risk assessment

Appendix E Contamination test results and GQRA

Ground Gas Risk Assessment

Hydrock

Job Number	27141
Job Name	Himley Village
Client	Cala Homes

Data All Data

Max CH4	Max Co2	Worst Case Flow	Worst Case GSV Methane	Worst Case GSV CO_2
0.0	3.6	0.2	0.0000	0.0072

Number of Readings	3
Number of Monitoring Rounds	3
Number of Readings with Flow Rate	24

NHBC Assessment

	Methane		Carbon Dioxide	
	Max Value	GSV	Max Value	GSV
Green	24	24	24	24
Amber 1	0	0	0	0
Amber 2	0	0	0	0
Red	0	0	0	0

CIRIA C665 Assessment

	Methane		Carbon Dioxide	
	Max Value	GSV	Max Value	GSV
CS1	24	24	24	24
CS2	0	0	0	0
CS3	N/A	0	N/A	0
CS4	N/A	0	N/A	0
CS5	N/A	0	N/A	0
CS6	N/A	0	N/A	0

Location	Pressure Trend	Date	Relative Pressure (mb)	Flow Rate (L/hr)	Atmos. Pressure (m.bar)	CH_4 (% vol)		(%LEL)		CO_2 (% vol)		O_2 (% vol)		GSV – CH4	GSV – CO_2
						Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady		
R01	Falling	16/06/23	-0.02	0.0	1019.1	0.0	0.0	0.0	0.0	0.6	0.6	19.5	19.0	0.0000	0.0000
R01	Falling	22/06/23	0.23	0.0	1018.5	0.0	0.0	0.0	0.0	0.6	0.6	19.2	18.9	0.0000	0.0000
R01	Falling	28/06/23	0.07	0.0	1016.8	0.0	0.0	0.0	0.0	0.6	0.6	19.8	19.8	0.0000	0.0000
R02	Falling	16/06/23	0.04	0.0	1019.1	0.0	0.0	0.0	0.0	2.3	2.3	16.9	16.9	0.0000	0.0000
R02	Falling	22/06/23	-1.20	0.0	1018.5	0.0	0.0	0.0	0.0	1.9	1.9	17.3	17.3	0.0000	0.0000
R02	Falling	28/06/23	0.30	0.0	1016.8	0.0	0.0	0.0	0.0	1.7	1.7	18.1	18.1	0.0000	0.0000
R03	Falling	16/06/23	0.04	0.0	1019.1	0.0	0.0	0.0	0.0	1.6	1.6	18.7	18.7	0.0000	0.0000
R03	Falling	22/06/23	-0.07	0.1	1018.5	0.0	0.0	0.0	0.0	1.7	1.7	18.6	18.4	0.0000	0.0017
R03	Falling	28/06/23	0.04	0.0	1016.8	0.0	0.0	0.0	0.0	1.6	1.6	19.7	19.5	0.0000	0.0000
R04	Falling	16/06/23	-29.67	-0.8	1019.1	0.0	0.0	0.0	0.0	0.2	0.2	19.2	19.2	0.0000	-0.0016
R04	Falling	22/06/23	2.10	0.2	1018.5	0.0	0.0	0.0	0.0	0.9	0.9	16.7	16.7	0.0000	0.0018
R04	Falling	28/06/23	0.09	0.0	1016.8	0.0	0.0	0.0	0.0	1.5	1.5	18.2	18.2	0.0000	0.0000
R05	Falling	16/06/23	-0.09	0.0	1019.1	0.0	0.0	0.0	0.0	3.0	3.0	17.2	17.0	0.0000	0.0000
R05	Falling	22/06/23	-0.02	0.0	1018.5	0.0	0.0	0.0	0.0	3.3	3.3	16.7	16.7	0.0000	0.0000
R05	Falling	28/06/23	-0.19	0.0	1016.8	0.0	0.0	0.0	0.0	3.6	3.6	18.4	18.3	0.0000	0.0000
R06	Falling	16/06/23	0.05	0.0	1019.1	0.0	0.0	0.0	0.0	0.5	0.6	20.3	19.2	0.0000	0.0000
R06	Falling	22/06/23	0.04	0.0	1018.5	0.0	0.0	0.0	0.0	0.2	1.1	20.8	19.0	0.0000	0.0000
R06	Falling	28/06/23	0.04	0.0	1016.8	0.0	0.0	0.0	0.0	0.3	0.4	20.4	19.8	0.0000	0.0000
R07	Falling	16/06/23	0.04	0.0	1019.1	0.0	0.0	0.0	0.0	3.6	3.6	17.1	17.1	0.0000	0.0000
R07	Falling	22/06/23	0.02	0.0	1018.5	0.0	0.0	0.0	0.0	3.0	3.0	17.0	17.0	0.0000	0.0000
R07	Falling	28/06/23	0.02	0.1	1016.8	0.0	0.0	0.0	0.0	2.7	2.7	18.4	18.4	0.0000	0.0027
R08	Falling	16/06/23	0.04	0.0	1019.1	0.0	0.0	0.0	0.0	3.4	3.4	17.8	17.8	0.0000	0.0000
R08	Falling	22/06/23	0.04	0.0	1018.5	0.0	0.0	0.0	0.0	2.9	2.9	17.4	17.2	0.0000	0.0000
R08	Falling	28/06/23	0.00	0.0	1016.8	0.0	0.0	0.0	0.0	3.4	3.4	18.3	18.3	0.0000	0.0000

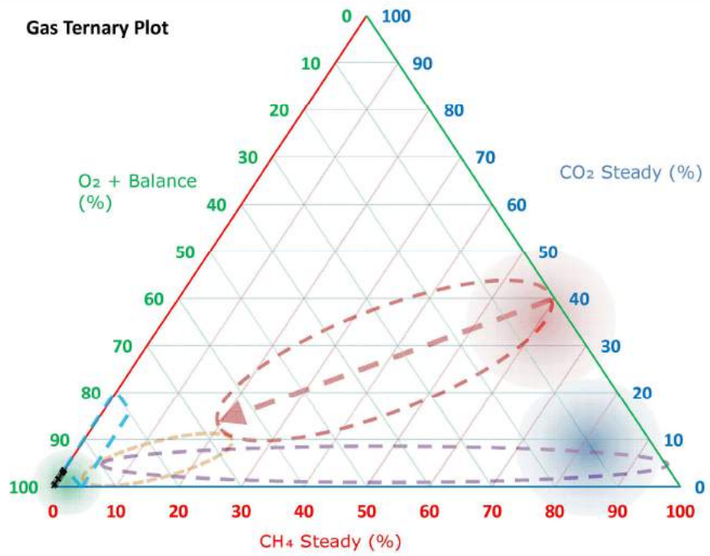
Hydrock Bulk Gases Ternary Plot Analysis

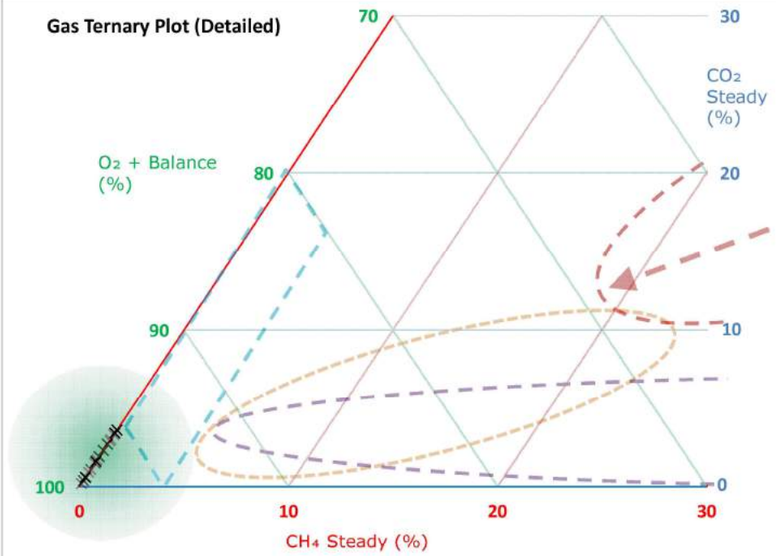
Client:	Cala Homes
Site Name:	Himley Village
Contract Number:	27141
Assessment Date:	12/07/2023

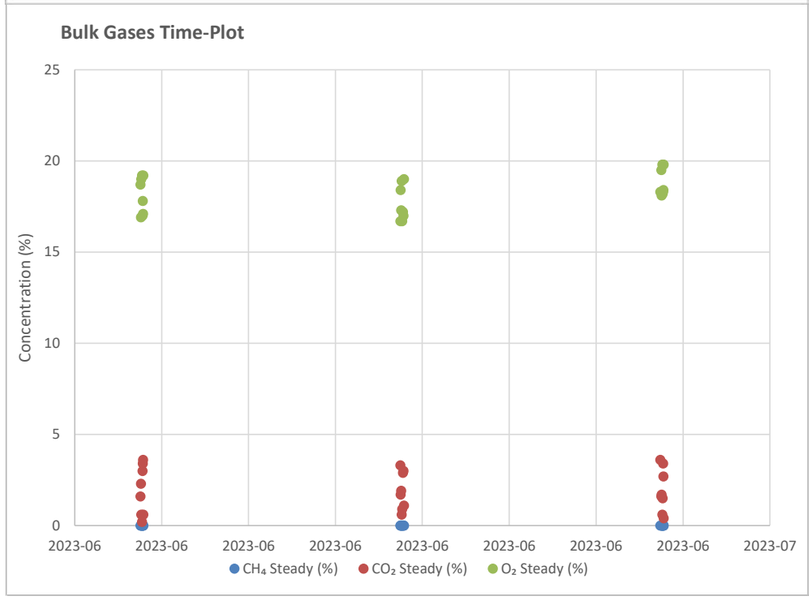
Screened Strata:	Cornbrash Formation/Forest Marble Formation
Site Zone:	Main Site

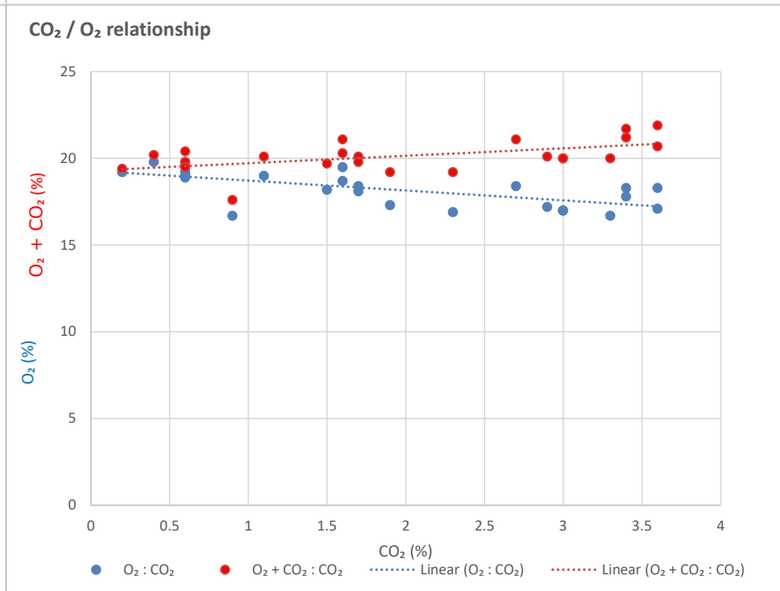
Locations

R01 | R02 | R03 | R04 | R05 | R06 | R07 | R08 | (blank)









Key:	
	Indicative of landfill gas migration (assuming source composition 60% methane / 40% carbon dioxide) as it displaces air from the ground. Assumes no chemical changes. Below 20% methane and 13% carbon dioxide relationship for landfill gas migration unclear. Arrow shows direction of dilution with fresh air
	Microbial respiration of organic material in soil. Zero methane and low flow. (Direct consumption of oxygen to produce carbon dioxide)
	Potentially indicative of methane outgassing from groundwater to borehole headspace (Hydrock dataset).
	Potentially indicative of microbial degradation of LNAPL vapours in unsaturated zone. (Hydrock dataset)
	Indicative of a landfill gas source (e.g 60% CH_4 / 40% CO_2)
	Indicative of geogenic gas (e.g mine-workings)
	Fresh air

Additional Notes

A direct linear downwards relationship between CO_2 and O_2 indicates depletion of oxygen to produce carbon dioxide via microbial respiration using the following equation: $CH_2O + O_2 \rightarrow CO_2 + H_2O$ In this scenerio $CO_2 + O_2$ should be around 21% (i.e. the O_2 concentration in the atmosphere)

There may also be trace amounts of methane up to about 3% caused by anaerobic decomposition in small anaerobic hotspots or the reduction of carbon dioxide by methanogens. Oxygen concentrations may be depleted but in this scenario oxygen deficient air is not likely to be emitted quickly from the ground and it does not pose a risk.

After: Wilson et al, 2018. Ground Gas Information Sheet No. 1
Hydrock datasets (methane outgassing / LNAPL vapour degradation)

Version: 1 09/07/2019

Contamination test results

UKAS TESTING
4041

Environmental Science

Jamie Moore
Hydrock Consultants Ltd
2-4 Hawthorne Park
Holdenby Road
Spratton
Northamptonshire
NN6 8LD

t: 01604842888
f: 01604842666
e: jamiemoore@hydrock.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

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

Analytical Report Number : 23-44921

Project / Site name:	Himley Village	**Samples received on:**	13/07/2023
Your job number:	27141	**Samples instructed on/ Analysis started on:**	13/07/2023
Your order number:	PO27316	**Analysis completed by:**	20/07/2023
Report Issue Number:	1	**Report issued on:**	20/07/2023
Samples Analysed:	5 water samples		

Signed: [redacted]

Joanna Szwagrzak
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 23-44921
Project / Site name: Himley Village

Your Order No: PO27316

Lab Sample Number				2747824	2747825	2747826	2747827	2747828
Sample Reference				R02	R01	R05	R06	R07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.00	3.00	4.50	4.00	3.50
Date Sampled				12/07/2023	12/07/2023	12/07/2023	12/07/2023	12/07/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH (L099)	pH Units	N/A	ISO 17025	7.4	7.4	7.1	7.5	7.4
Electrical Conductivity at 20 °C (L031B)	µS/cm	10	ISO 17025	550	520	610	480	550
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sulphate as SO4	µg/l	45	ISO 17025	20500	70700	34200	31000	29500
Chloride	mg/l	0.15	ISO 17025	10	6.6	3.7	6.8	6.7
Fluoride	µg/l	50	ISO 17025	160	200	630	320	160
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	52	110	49	62	40
Ammoniacal Nitrogen as NH3	µg/l	15	ISO 17025	63	140	60	75	49
Ammoniacal Nitrogen as NH4	µg/l	15	ISO 17025	67	150	63	79	52
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	2.48	2.73	2.95	2.07	96.1
Nitrate as N	mg/l	0.01	ISO 17025	18.1	12.4	1.01	0.33	4.73
Nitrate as NO3	mg/l	0.05	ISO 17025	80.2	55.1	4.47	1.46	21
Nitrite as N	µg/l	1	ISO 17025	5.6	12	10	< 1.0	5.8
Nitrite as NO2	µg/l	5	ISO 17025	18	40	33	< 5.0	19
Hardness - Total	mgCaCO3/l	1	ISO 17025	354	365	355	308	318
Bromate by IC	mg/l	0.002	ISO 17025	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Total Phenols								
Total Phenols (monohydric)	µg/l	1	ISO 17025	9.3	1.7	< 1.0	3.4	< 1.0
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Analytical Report Number: 23-44921
Project / Site name: Himley Village

Your Order No: PO27316

Lab Sample Number				2747824	2747825	2747826	2747827	2747828
Sample Reference				R02	R01	R05	R06	R07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.00	3.00	4.50	4.00	3.50
Date Sampled				12/07/2023	12/07/2023	12/07/2023	12/07/2023	12/07/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
PAH Sums								
Sum of Benzo(b)fluoranthene & Benzo(k)fluoranthene	µg/l	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Sum of Benzo(ghi)perylene & Indeno(1,2,3-cd)pyrene	µg/l	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Sum of Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(ghi)perylene & Indeno(1,2,3-cd)pyrene	µg/l	0.04	NONE	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040
Total PAH								
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Heavy Metals / Metalloids								
Boron (dissolved)	µg/l	10	ISO 17025	37	30	45	28	39
Calcium (dissolved)	mg/l	0.012	ISO 17025	140	140	140	120	120
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.029	0.024	0.023	0.009	0.017
Iron (dissolved)	µg/l	4	ISO 17025	29	24	23	8.8	17
Magnesium (dissolved)	mg/l	0.005	ISO 17025	2.8	4.4	3.6	2.5	2.4
Sodium (dissolved)	mg/l	0.01	ISO 17025	6.5	5.4	5.5	5	5.4
Aluminium (dissolved)	µg/l	1	ISO 17025	4.8	3.3	3.3	720	4.1
Antimony (dissolved)	µg/l	0.4	ISO 17025	0.6	< 0.4	0.7	0.5	0.4
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.47	< 0.15	0.24	0.22	< 0.15
Barium (dissolved)	µg/l	0.06	ISO 17025	28	9	19	15	9
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.02	< 0.02	< 0.02	< 0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.6	< 0.2	< 0.2	0.9	0.3
Cobalt (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	2.7	1.2	1.1	1.1	0.7
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	0.85	1.1	8.3	1.5	2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.3	1.3	2.3	1.3	0.7
Selenium (dissolved)	µg/l	0.6	ISO 17025	1	< 0.6	< 0.6	< 0.6	0.6
Silver (dissolved)	µg/l	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Tin (dissolved)	µg/l	0.2	ISO 17025	< 0.20	< 0.20	< 0.20	0.55	0.32
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.8	< 0.2	< 0.2	1.1	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	5.1	4.3	1.5	1.8	2.5

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

UKAS TESTING
4041

Analytical i2 Environmental Science

Analytical Report Number : 23-44921
Project / Site name: Himley Village

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Electrical conductivity at 20oC of water	Determination of electrical conductivity in water by electrometric measurement. Accredited Matrices SW, GW, PW	In-house method	L031-PL	W	ISO 17025
Fluoride in water	Determination of fluoride in water by 1:1 ratio with a buffer solution followed by Ion Selective Electrode. Accredited matrices: SW, PW, GW.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water - LOW LEVEL 1 ug/l	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry).Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Ammonia as NH3 in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW, FSE, LL.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW, FSE, LL.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Ammonium as NH4 in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrite as N in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry). Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025

Analytical Report Number : 23-44921
Project / Site name: Himley Village

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Cr (III) in water	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Free cyanide (low level) in water	Determination of free cyanide by distillation followed by colorimetry.Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Bromate in Water	Determination of bromate in waters based on ion chromatography. Accredited matrices GW, PW, SW.	In house method based on Standard Methods for the Analysis of Water and Waste Water, method 4500	L008-PL	W	ISO 17025
Specific PAH sums in water	Determination of PAH compounds in water by extraction in hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L070-PL	W	NONE
Chloride in water	Determination of Chloride (diissolved) colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Jamie Moore
Hydrock
22 Long Acre
London
WC2E 9LY

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-08116

Site Reference:	Himley Village Main Site
Project / Job Ref:	27141
Order No:	PO26807
Sample Receipt Date:	22/06/2023
Sample Scheduled Date:	22/06/2023
Report Issue Number:	1
Reporting Date:	30/06/2023

Authorised by:

[redacted]

Kevin Old
Operations Director

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-08116	**Date Sampled**	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	HP01	HP02	HP03	HP04	HP05
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.05	0.25	0.10	0.20	0.03
Reporting Date: 30/06/2023	**DETS Sample No**	659164	659165	659166	659167	659168

Determinand	**Unit**	**RL**	**Accreditation**	(n)	(n)	(n)	(n)	
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	**MCERTS**	8.2	8.3	8.2	8.3	7.7
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Fraction Organic Carbon (FOC)	Units	< 0.001	**MCERTS**	0.033	0.034	0.014	0.012	0.038
Arsenic (As)	mg/kg	< 2	**MCERTS**	11	6	2	2	7
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (III)	mg/kg	< 2	NONE	7	5	< 2	< 2	8
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	**MCERTS**	13	11	< 4	< 4	11
Lead (Pb)	mg/kg	< 3	**MCERTS**	8	9	3	< 3	8
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	**MCERTS**	5	4	< 3	< 3	6
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	**MCERTS**	29	19	6	4	21
Zinc (Zn)	mg/kg	< 3	**MCERTS**	27	14	6	4	34
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-08116	**Date Sampled**	09/06/23	05/06/23	06/06/23	07/06/23	06/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	HP05	RC01	TP02	TP05	TP06
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.30	0.10	0.10	0.10	0.10
Reporting Date: 30/06/2023	**DETS Sample No**	659169	659170	659171	659172	659173

Determinand	**Unit**	**RL**	**Accreditation**	(n)				
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected		Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	**MCERTS**	8.3		7.9	8.0	
Free Cyanide	mg/kg	< 1	NONE	< 1		< 1	< 1	
Fraction Organic Carbon (FOC)	Units	< 0.001	**MCERTS**	0.059		0.027	0.027	
Arsenic (As)	mg/kg	< 2	**MCERTS**	7		16	15	
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	< 0.5		1.2	1	
W/S Boron	mg/kg	< 1	NONE	< 1		< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2		< 0.2	< 0.2	
Chromium (III)	mg/kg	< 2	NONE	5		23	19	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2	
Copper (Cu)	mg/kg	< 4	**MCERTS**	9		15	15	
Lead (Pb)	mg/kg	< 3	**MCERTS**	7		17	15	
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1		< 1	< 1	
Nickel (Ni)	mg/kg	< 3	**MCERTS**	4		19	16	
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2		< 2	< 2	
Vanadium (V)	mg/kg	< 1	**MCERTS**	19		49	43	
Zinc (Zn)	mg/kg	< 3	**MCERTS**	14		55	41	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		< 2	< 2	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Maidstone
Kent ME17 2JN
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Soil Analysis Certificate						
DETS Report No: 23-08116	**Date Sampled**	06/06/23	07/06/23	07/06/23	07/06/23	07/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	TP07	TP08	TP09	TP10	TP12
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.50	0.10	0.10	0.10	0.10
Reporting Date: 30/06/2023	**DETS Sample No**	659174	659175	659176	659177	659178

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected		Not Detected	Not Detected	
pH	pH Units	N/a	**MCERTS**	8.1		8.0	8.0	
Free Cyanide	mg/kg	< 1	NONE	< 1		< 1	< 1	
Fraction Organic Carbon (FOC)	Units	< 0.001	**MCERTS**	0.011		0.027	0.027	
Arsenic (As)	mg/kg	< 2	**MCERTS**	9		16	15	
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	1.3		1.2	1.1	
W/S Boron	mg/kg	< 1	NONE	< 1		< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2		< 0.2	< 0.2	
Chromium (III)	mg/kg	< 2	NONE	21		26	24	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2	
Copper (Cu)	mg/kg	< 4	**MCERTS**	14		16	19	
Lead (Pb)	mg/kg	< 3	**MCERTS**	7		17	16	
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1		< 1	< 1	
Nickel (Ni)	mg/kg	< 3	**MCERTS**	16		20	18	
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2		< 2	< 2	
Vanadium (V)	mg/kg	< 1	**MCERTS**	35		55	51	
Zinc (Zn)	mg/kg	< 3	**MCERTS**	27		60	63	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		2.2	2.4	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 23-08116	**Date Sampled**	07/06/23	13/06/23	12/06/23	13/06/23	
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Himley Village Main Site	**TP / BH No**	TP13	TP17	TP19	TP21	
Project / Job Ref: 27141	**Additional Refs**	ES1	ES2	ES1	ES1	
Order No: PO26807	**Depth (m)**	0.20	2.30	0.20	0.20	
Reporting Date: 30/06/2023	**DETS Sample No**	659179	659180	659181	659182	

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Not Detected	Not Detected	
pH	pH Units	N/a	**MCERTS**	7.4	8.1	7.8	7.8	
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Fraction Organic Carbon (FOC)	Units	< 0.001	**MCERTS**	0.021	0.010	0.028	0.025	
Arsenic (As)	mg/kg	< 2	**MCERTS**	9	15	15	14	
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	0.6	0.7	1.1	0.9	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (III)	mg/kg	< 2	NONE	13	15	22	18	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	**MCERTS**	13	14	13	11	
Lead (Pb)	mg/kg	< 3	**MCERTS**	12	10	25	19	
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	**MCERTS**	9	19	16	14	
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	
Vanadium (V)	mg/kg	< 1	**MCERTS**	27	20	49	41	
Zinc (Zn)	mg/kg	< 3	**MCERTS**	45	20	46	37	
Total Phenols (monohydric)	mg/kg	< 2	NONE	3	< 2	< 2	< 2	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-08116	**Date Sampled**	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	HP01	HP02	HP03	HP04	HP05
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.05	0.25	0.10	0.20	0.03
Reporting Date: 30/06/2023	**DETS Sample No**	659164	659165	659166	659167	659168

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	
Naphthalene	mg/kg	< 0.1	MCERTS	1.97	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.42	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	17.90	< 0.1	0.13	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	13.20	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	104	0.63	0.93	0.40	0.68
Anthracene	mg/kg	< 0.1	MCERTS	19.30	0.20	0.41	0.11	0.19
Fluoranthene	mg/kg	< 0.1	MCERTS	102	4.45	5.53	1.35	3.50
Pyrene	mg/kg	< 0.1	MCERTS	81.40	5.03	5.53	1.29	3.70
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	34	3.49	3.22	0.80	2.38
Chrysene	mg/kg	< 0.1	MCERTS	33.70	2.94	2.72	0.77	2.24
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	32.60	5.82	4.67	1.05	4.45
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	13.30	1.70	1.31	0.40	1.28
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	28.90	5.02	3.93	0.94	3.53
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	16.50	3.34	2.59	0.72	2.67
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	3.45	0.54	0.38	0.12	0.41
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	13.40	3.02	2.26	0.65	2.39
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	516	36.2	33.6	8.6	27.4

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DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-08116	**Date Sampled**	09/06/23	06/06/23	07/06/23	06/06/23	07/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	HP05	TP02	TP05	TP07	TP09
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.30	0.10	0.10	0.50	0.10
Reporting Date: 30/06/2023	**DETS Sample No**	659169	659171	659172	659174	659176

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	MCERTS	1.05	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.66	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	4.53	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	4.39	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	51.50	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	12.50	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	65.60	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	54.30	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	27.60	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	22.40	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	26.20	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	6.83	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	21.90	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	12.80	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	2.29	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	10.40	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	325	< 1.6	< 1.6	< 1.6	< 1.6

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-08116	**Date Sampled**	07/06/23	07/06/23	13/06/23	12/06/23	13/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	TP10	TP13	TP17	TP19	TP21
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES2	ES1	ES1
Order No: PO26807	**Depth (m)**	0.10	0.20	2.30	0.20	0.20
Reporting Date: 30/06/2023	**DETS Sample No**	659177	659179	659180	659181	659182

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH LQM Banded						
DETS Report No: 23-08116	**Date Sampled**	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	HP01	HP02	HP03	HP04	HP05
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.05	0.25	0.10	0.20	0.30
Reporting Date: 30/06/2023	**DETS Sample No**	659164	659165	659166	659167	659169

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	(n)
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	3	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	66	5	4	< 3	42
Aliphatic >C16 - C35	mg/kg	< 10	MCERTS	782	189	145	33	702
Aliphatic >C35 - C44	mg/kg	< 10	NONE	56	< 10	< 10	< 10	37
Aliphatic (C5 - C44)	mg/kg	< 30	NONE	906	194	149	33	781
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	29	< 2	< 2	< 2	2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	171	< 3	6	< 3	28
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	270	15	43	< 10	59
Aromatic >C35 - C44	mg/kg	< 10	NONE	39	< 10	< 10	< 10	< 10
Aromatic (>C5 - C44)	mg/kg	< 30	NONE	508	< 30	49	< 30	89
Total >C5 - C44	mg/kg	< 60	NONE	1414	209	197	< 60	870

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DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-08116	**Date Sampled**	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	HP01	HP02	HP03	HP04	HP05
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.05	0.25	0.10	0.20	0.30
Reporting Date: 30/06/2023	**DETS Sample No**	659164	659165	659166	659167	659169

Determinand	**Unit**	**RL**	**Accreditation**	(n)	(n)	(n)	(n)	(n)
Benzene	ug/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	**MCERTS**	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	**MCERTS**	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	**MCERTS**	< 5	< 5	< 5	< 5	< 5

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DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Organochlorine Pesticides						
DETS Report No: 23-08116	**Date Sampled**	05/06/23	07/06/23	07/06/23	12/06/23	13/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	RC01	TP08	TP12	TP19	TP21
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.10	0.10	0.10	0.20	0.20
Reporting Date: 30/06/2023	**DETS Sample No**	659170	659175	659178	659181	659182

Determinand	**Unit**	**RL**	**Accreditation**					
Aldrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
alpha-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
beta-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
cis-chlordane	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
delta-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Dieldrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Endosulfan A	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Endosulfan B	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Endrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
gamma-HCH (Lindane)	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Heptachlor	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Heptachlor epoxide	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Hexachlorobenzene (HCB)	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Isodrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Methoxychlor	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
o,p' - DDD	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
o,p' - DDE	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
o,p' - DDT	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
p,p' - DDD	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
p,p' - DDE	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
p,p' - DDT	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
trans-chlordane	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Trifluralin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Organophosphorus Pesticides						
DETS Report No: 23-08116	**Date Sampled**	05/06/23	07/06/23	07/06/23	12/06/23	13/06/23
Hydrock	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Himley Village Main Site	**TP / BH No**	RC01	TP08	TP12	TP19	TP21
Project / Job Ref: 27141	**Additional Refs**	ES1	ES1	ES1	ES1	ES1
Order No: PO26807	**Depth (m)**	0.10	0.10	0.10	0.20	0.20
Reporting Date: 30/06/2023	**DETS Sample No**	659170	659175	659178	659181	659182

Determinand	**Unit**	**RL**	**Accreditation**					
Azinphos-methyl	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlorfenvinphos, alpha	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlorfenvinphos, beta	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlorpyriphos-methyl	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diazinon	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlorvos	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethoate	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fenitrothion	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fenthion	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mevinphos, (E)	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mevinphos, (Z)	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Parathion-ethyl	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Parathion-methyl	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phorate	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions
DETS Report No: 23-08116
Hydrock
Site Reference: Himley Village Main Site
Project / Job Ref: 27141
Order No: PO26807
Reporting Date: 30/06/2023

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 659164	HP01	ES1	0.05	0.5	Brown sandy gravel with stones and tar
$ 659165	HP02	ES1	0.25	2.3	Brown sandy gravel with stones
$ 659166	HP03	ES1	0.10	1	Brown sandy gravel with stones and concrete
$ 659167	HP04	ES1	0.20	1.3	Brown concrete
&$ 659168	HP05	ES1	0.03	1	Brown loamy sand with stones and vegetation
$ 659169	HP05	ES1	0.30	2	Brown sandy gravel with stones and concrete
&$ 659170	RC01	ES1	0.10	12.3	Brown sandy clay with stones and vegetation
&$ 659171	TP02	ES1	0.10	11.7	Brown sandy clay with stones
&$ 659172	TP05	ES1	0.10	11.2	Brown sandy clay with stones and vegetation
&$ 659174	TP07	ES1	0.50	15.1	Brown sandy clay with stones
&$ 659175	TP08	ES1	0.10	9	Brown sandy clay with stones
&$ 659176	TP09	ES1	0.10	11.1	Brown sandy clay with stones
&$ 659177	TP10	ES1	0.10	10.8	Brown sandy clay with stones
&$ 659178	TP12	ES1	0.10	10.6	Brown sandy clay with stones and vegetation
&$ 659179	TP13	ES1	0.20	7.8	Brown sandy clay with stones and vegetation
& 659180	TP17	ES2	2.30	17.1	Brown sandy clay
& 659181	TP19	ES1	0.20	6.7	Brown sandy clay with stones and vegetation
& 659182	TP21	ES1	0.20	7.7	Brown sandy clay with stones and vegetation

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
& samples received in inappropriate containers for hydrocarbon analysis

$ samples exceeded recommended holding times

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-08116

Hydrock

Site Reference: Himley Village Main Site

Project / Job Ref: 27141

Order No: PO26807

Reporting Date: 30/06/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

GAC derivation

Background

Initially, the Hydrock GAC were derived following the publishing of soil guideline values (SGV), toxicological (TOX) reports and associated publications by the Environment Agency (EA) in 2009 referenced under Science Report SC050021 (EA, 2009a, b, c, d). The Hydrock GAC have then been periodically updated following publication of new information on toxicological, physico-chemical, land use or receptor parameters, namely:

- LQM/CIEH, 2009. LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment, second edition. Nathanial, C. P., McCaffrey, C., Ashmore, M., Cheng, Y., Gillet, A. G., Ogden, R. C. and Scott, D.
- CL:AIRE, 2010. 'The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment'. Environmental Industries Commission, The Association of Geotechnical and Geoenvironmental Specialists and Contaminated Land: Applications in Real Environment.
- CL:AIRE, 2014. 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination', Revision 2, DEFRA research project SP1010. Contaminated Land: Applications in Real Environment.
- LQM/CIEH, 2015. 'The LQM/CIEH S4ULs for Human Health Risk Assessment'. Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C. and Nathanial, J. F.
- CL:AIRE, 2021. 'C4SL Phase 2 Technical Reports'. Contaminated Land: Applications in Real Environment.

Land use scenarios

Hydrock has derived generic assessment criteria (GAC) for human health based on the six exposure scenarios defined in CL:AIRE (2014) using generic default assumptions from published guidance. GAC for each exposure scenario have been derived for three soil organic matter (SOM) contents, 1%, 2.5% and 6%.

All GAC have been rounded to two significant figures.

Exposure parameters

The exposure parameters used for the Hydrock GAC are the default parameters stated in SR3, unless updated in CL:AIRE (2014) where the CL:AIRE (2014) values have been adopted.

Approach to consumption rates

Hydrock have adopted the 90th percentile consumption rates from Table 3.4 of CL:AIRE (2014) for all produce types. This is noted to be more conservative than the "top two" approach taken in the derivation of C4SLs.

Approach to plant uptake for GAC omitted in CL:AIRE (2010)

Plant uptake factors were not identified in CL:AIRE (2010) for antimony, barium and molybdenum. Hydrock has sourced the required parameter values from ORNL (1984) in order to derive GAC that are inclusive of the homegrown produce exposure pathway.

Chemical and toxicity parameters

The chemical and toxicity parameters have been adopted based on the following documents:

- IRIS, 2016. 'Toxicological Review of Trimethylbenzenes'. Integrated Risk Information System, National Centre for Environmental Assessment, office of Research and Development, U.S. Environmental Protection Agency.
- LQM/CIEH, 2015.

- ORNL, 1984. 'ORNL-5786. A Review and Analysis of Parameters for Assessing Transport of Environmentally released Radionuclides through Agriculture'. Oak Ridge National Laboratory.
- CL:AIRE, 2010.
- RIVM, 2001. RIVM Report 711701 025 'HCV Re-evaluation of human-toxicological maximum-permissible risk levels'. National Institute of Public Health and the Environment.
- LQM/CIEH, 2009.
- EA, 2009a.

Approach to Cyanide GAC

The Hydrock GAC for free cyanide have been derived based on ingestion of a bolus of contaminated soil. The GAC are derived for acute exposure of a child (0-6 years old) for all land uses except commercial, where the GAC are derived for acute exposure of an adult (16-65 years old). For the purpose of GQRA, the child value may be adopted for all land use scenarios.

For complex cyanide, the GAC have been derived based on chronic exposure, using the default exposure scenarios but excluding the consumption of homegrown produce, soil attached to homegrown produce, indoor vapour and outdoor vapour pathways. The chronic health criteria value (HCV) for complex cyanide is based on the EA (2009a) HCV for free cyanide and the ratio of toxicity between free and complex cyanide proposed by RIVM (2001).

Approach to Phenol GAC

In accordance with the EA Science Report SC050021 / Phenol SGV, a $GAC_{ing/inh}$ has been derived for ingested and inhaled phenol using the CLEA model, with a GAC_{derm} derived for dermal contact using Equation 5.7 within SR3. The lower of the $GAC_{ing/inh}$ and GAC_{derm} has been adopted as the final GAC.

Approach to PCB GAC

GAC for assessing the non-dioxin-like risk from PCBs have been based on the "Dutch 7". As the TDI used by the authors of the Dutch guidance is for the sum of the 7 individual congeners, the TDI has been divided by 7 to create a TDI for each congener. The non-dioxin-like risk from PCBs is therefore assessed using a Hazard Index approach as for total petroleum hydrocarbons (TPH).

Sub-surface soil to indoor air correction factors

Reflecting the approach taken by the Environment Agency in the development of revised SGV in 2009 for BTEX, a sub-surface soil to indoor air correction factor of 10 has been applied for petroleum hydrocarbons in order to account for over-prediction of vapour intrusion into building using the Johnson and Ettinger approach.

The correction factor of 10 has been applied to the following petroleum hydrocarbons (it makes negligible difference to less volatile TPH and PAH compounds):

- TPHCWG fractions, namely aliphatic EC>5-44 and aromatic EC>6-44;
- PAHs (acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene), benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h,)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, pyrene);
- BTEX;
- Isopropylbenzene;
- Propylbenzene;
- 1,2,4- and 1,3,5-trimethylbenzene; and
- Styrene.

Approach to saturation limits

The CLEA model includes a traffic light colour system to highlight when saturated soil conditions have potentially been exceeded for the vapour pathways during calculation of assessment criteria. The colours represent:

- Green: the assessment criteria do not exceed the saturated soil concentration.
- Amber: the assessment criteria exceed the saturated soil concentration but the contribution of the indoor and outdoor vapour pathway to total exposure is less than 10% and will not significantly affect the assessment criteria.
- Red: the assessment criteria exceed the saturated soil concentration and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10% and will significantly affect the assessment criteria.

Hydrock have not applied any further calculations or assessment in relation to saturation limits during GAC derivation, with the CLEA-modelled GAC being presented as the GAC. Consideration of saturation limits is undertaken during the data assessment stage.

References

CL:AIRE, 2010. 'The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment'. Environmental Industries Commission, The Association of Geotechnical and Geoenvironmental Specialists and Contaminated Land: Applications in Real Environment.

CL:AIRE, 2014. 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination', Revision 2, DEFRA research project SP1010. Contaminated Land: Applications in Real Environment

CL:AIRE, 2021. C4SL Phase 2 Technical Reports for tetrachloroethene, trichloroethene and vinyl chloride. Contaminated Land: Applications in Real Environment.

EA, 2009a. 'Science Reports SC050021 – SGV and TOX reports for: benzene, toluene, ethylbenzene, xylene, arsenic, nickel, mercury, selenium, cadmium, inorganic cyanide, phenol, dioxins, furans and dioxin-like PCBs'; 'Supplementary information for the derivation of SGV for: benzene, toluene, ethylbenzene, xylene, arsenic, nickel, mercury, selenium, cadmium, inorganic cyanide, phenol, dioxins, furans and dioxin-like PCBs', and 'Contaminants in soil: updated collation of toxicological data and intake values for humans: benzene, toluene, ethylbenzene, xylene, arsenic, nickel, mercury, selenium, cadmium, inorganic cyanide, phenol, dioxins, furans and dioxin-like PCBs'. Environment Agency.

EA, 2009b. 'Science Report – SC050021/SR2. Human health toxicological assessment of contaminants in soil'. Environment Agency.

EA, 2009c. 'Science Report – SC050021/SR3. Updated technical background to the CLEA model'. Environment Agency.

EA, 2009d. 'Science Report – SC050021/SR4. CLEA Software (version 1.05) Handbook'. Environment Agency.

IRIS, 2016. 'Toxicological Review of Trimethylbenzenes'. Integrated Risk Information System, National Centre for Environmental Assessment, office of Research and Development, U.S. Environmental Protection Agency.

LQM/CIEH, 2009. LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment, second edition. Nathanial, C. P., McCaffrey, C., Ashmore, M., Cheng, Y., Gillet, A. G., Ogden, R. C. and Scott, D.

LQM/CIEH, 2015. 'The LQM/CIEH S4ULs for Human Health Risk Assessment'. Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C. and Nathanial, J. F.

ORNL, 1984. 'ORNL-5786. A Review and Analysis of Parameters for Assessing Transport of Environmentally released Radionuclides through Agriculture'. Oak Ridge National Laboratory.

RIVM, 2001. RIVM Report 711701 025 'HCV Re-evaluation of human-toxicological maximum-permissible risk levels'. National Institute of Public Health and the Environment.

Human health GQRA

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter:	Default - Human Health - residential with home-grown produce (2.5%SOM)
Client:	Cala Homes
Site:	Himley Village Main Site
Job no.:	27141
Lab. report no(s).:	23-08116.1

Data Filters

Zone	All
Strata	ALL
Depth Min (m bgl)	0.03
Depth Max (m bgl)	2.3
Dataset mean SOM%	4.52
Scenario SOM%	2.5

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source	Date	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	05/06/23	06/06/23	07/06/23	06/06/23	06/06/23	07/06/23	07/06/23	07/06/23
														Zone														
														Location	HP01	HP02	HP03	HP04	HP05	HP05	RC01	TP02	TP05	TP06	TP07	TP08	TP09	TP10
														Depth (m bgl)	0.05	0.25	0.1	0.2	0.03	0.3	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0.1
														Strata	MG	MG	MG	MG	MG	MG	TS	MG	TS	MG	HD	MG	TS	MG
-	**Asbestos**																											
P1020	Asbestos Identified	text	Y/N	16	-	-	-	-	No. of detects:	0	-	-	-		N	N	N	N	N	N		N	N	N	N		N	N
0	**Hydrock Default Suite - FOC / SOM / pH**										-																	
P1085	FOC (dimensionless)	||	0.001	15	0.010	0.059	0.026	0.027	0.01		-	-	-		0.033	0.034	0.014	0.012	0.038	0.059		0.027	0.027		0.011		0.027	0.027
-	SOM (calculated)	%	0.1724	15	1.72	10.17	4.52	4.65	2.16		-	-	-		5.6892	5.8616	2.4136	2.0688	6.5512	10.1716		4.6548	4.6548		1.8964		4.6548	4.6548
P1334	pH (su)	pH Units	0.1	15	7.40	8.30	8.01	8.00	0.25		-	-	-		8.2	8.3	8.2	8.3	7.7	8.3		7.9	8		8.1		8	8
-	**Hydrock Default Suite - Metals & PAH**																											
7440-38-2	Arsenic	mg/kg	< 2	15	2.00	16.00	10.60	11.00	4.98	0	NR	37	C4SL - CL:AIRE 2014		11	6	2	<2	7	7		16	15		9		16	15
7440-41-7	Beryllium	mg/kg	< 0.5	15	0.50	1.30	0.81	0.70	0.32	0	NR	1.7	Hydrock Derived		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		1.2	1		1.3		1.2	1.1
7440-42-8	Boron	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	300	Hydrock Derived		<1	<1	<1	<1	<1	<1		<1	<1		<1		<1	<1
7440-43-9	Cadmium	mg/kg	< 0.2	15	0.20	0.20	0.20	0.20	0.00	0	NR	22	C4SL - CL:AIRE 2014		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2		<0.2		<0.2	<0.2
16065-83-1	Chromium (III)	mg/kg	< 2	15	2.00	26.00	14.00	15.00	8.52	0	NR	890	Hydrock Derived		7	5	2	2	8	5		23	19		21		26	24
18540-29-9	Chromium (VI)	mg/kg	< 2	15	2.00	2.00	2.00	2.00	0.00	0	NR	21	C4SL - CL:AIRE 2014		<2	<2	<2	<2	<2	<2		<2	<2		<2		<2	<2
7440-50-8	Copper	mg/kg	< 4	15	4.00	19.00	12.13	13.00	4.09	0	NR	2500	Hydrock Derived		13	11	4	4	11	9		15	15		14		16	19
7439-92-1	Lead	mg/kg	< 3	13	3.00	25.00	12.23	12.00	6.61	0	NR	200	C4SL - CL:AIRE 2014				3	3	8	7		17	15		7		17	16
7439-97-6	Mercury, inorganic	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	40	Hydrock Derived		<1	<1	<1	<1	<1	<1		<1	<1		<1		<1	<1
7440-02-0	Nickel	mg/kg	< 3	15	3.00	20.00	11.47	14.00	6.71	0	NR	130	Hydrock Derived		5	4	<3	<3	6	4		19	16		16		20	18
7782-49-2	Selenium	mg/kg	< 2	15	2.00	2.00	2.00	2.00	0.00	0	NR	260	Hydrock Derived		<2	<2	<2	<2	<2	<2		<2	<2		<2		<2	<2
7440-62-2	Vanadium	mg/kg	< 1	15	4.00	55.00	31.20	29.00	16.40	0	NR	410	Hydrock Derived		29	19	6	4	21	19		49	43		35		55	51
7440-66-6	Zinc	mg/kg	< 3	15	4.00	63.00	32.87	34.00	18.97	0	NR	3900	Hydrock Derived		27	14	6	4	34	14		55	41		27		60	63
P1095	Cyanide (free)	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	24	Acute Risk - SoBRA 2020		1	<1	<1	<1	<1	<1		<1	<1		<1		<1	<1
P1186	Total Phenols (Monohydric)	mg/kg	< 2	15	2.00	3.00	2.11	2.00	0.27	0	38058	210	Hydrock Derived		<2	<2	<2	<2	<2	<2		<2	<2		<2		2.2	2.4
83-32-9	Acenaphthene	mg/kg	< 0.1	15	0.10	17.90	1.58	0.10	4.66	0	141	540	Hydrock Derived		17.9	<0.1	0.13	<0.1	<0.1	4.53		<0.1	<0.1		<0.1		<0.1	<0.1
208-96-8	Acenaphthylene	mg/kg	< 0.1	15	0.10	0.66	0.16	0.10	0.16	0	212	440	Hydrock Derived		0.42	<0.1	<0.1	<0.1	<0.1	0.66		<0.1	<0.1		<0.1		<0.1	<0.1
120-12-7	Anthracene	mg/kg	< 0.1	15	0.10	19.30	2.24	0.10	5.69	0	2.91	5500	Hydrock Derived		19.3	0.2	0.41	0.11	0.19	12.5		<0.1	<0.1		<0.1		<0.1	<0.1
56-55-3	Benz(a)anthracene	mg/kg	< 0.1	15	0.10	**34.00**	4.83	0.10	10.68	**2**	4.28	12	Hydrock Derived		34	3.49	3.22	0.8	2.38	27.6		<0.1	<0.1		<0.1		<0.1	<0.1
50-32-8	Benzo(a)pyrene	mg/kg	< 0.1	15	0.10	**28.90**	4.34	0.10	8.81	**3**	2.28	5	C4SL - CL:AIRE 2014		28.9	5.02	3.93	0.94	3.53	21.9		<0.1	<0.1		<0.1		<0.1	<0.1
205-99-2	Benzo(b)fluoranthene	mg/kg	< 0.1	15	0.10	**32.60**	**5.05**	0.10	10.16	**5**	3.04	3.3	Hydrock Derived		32.6	5.82	4.67	1.05	4.45	26.2		<0.1	<0.1		<0.1		<0.1	<0.1
191-24-2	Benzo(ghi)perylene	mg/kg	< 0.1	15	0.10	13.40	2.20	0.10	4.10	0	0.04	340	Hydrock Derived		13.4	3.02	2.26	0.65	2.39	10.4		<0.1	<0.1		<0.1		<0.1	<0.1
207-08-9	Benzo(k)fluoranthene	mg/kg	< 0.1	15	0.10	13.30	1.71	0.10	3.64	0	1.72	93	Hydrock Derived		13.3	1.7	1.31	0.4	1.28	6.83		<0.1	<0.1		<0.1		<0.1	<0.1
218-01-9	Chrysene	mg/kg	< 0.1	15	0.10	**33.70**	4.38	0.10	9.90	**2**	1.10	22	Hydrock Derived		33.7	2.94	2.72	0.77	2.24	22.4		<0.1	<0.1		<0.1		<0.1	<0.1
53-70-3	Dibenz(ah)anthracene	mg/kg	< 0.1	15	0.10	**3.45**	**0.54**	0.10	0.98	**5**	0.010	0.29	Hydrock Derived		3.45	0.54	0.38	0.12	0.41	2.29		<0.1	<0.1		<0.1		<0.1	<0.1
206-44-0	Fluoranthene	mg/kg	< 0.1	15	0.10	102.00	12.22	0.10	29.92	0	47	560	Hydrock Derived		102	4.45	5.53	1.35	3.5	65.6		<0.1	<0.1		<0.1		<0.1	<0.1
86-73-7	Fluorene	mg/kg	< 0.1	15	0.10	13.20	1.26	0.10	3.48	0	77	420	Hydrock Derived		13.2	<0.1	<0.1	<0.1	<0.1	4.39		<0.1	<0.1		<0.1		<0.1	<0.1
193-39-5	Indeno(123cd)pyrene	mg/kg	< 0.1	15	0.10	16.50	2.63	0.10	5.05	0	0.15	36	Hydrock Derived		16.5	3.34	2.59	0.72	2.67	12.8		<0.1	<0.1		<0.1		<0.1	<0.1
91-20-3	Naphthalene	mg/kg	< 0.1	15	0.10	1.97	0.29	0.10	0.53	0	183	30	Hydrock Derived		1.97	<0.1	<0.1	<0.1	<0.1	1.05		<0.1	<0.1		<0.1		<0.1	<0.1
85-01-8	Phenanthrene	mg/kg	< 0.1	15	0.10	104.00	10.60	0.10	29.01	0	90	220	Hydrock Derived		104	0.63	0.93	0.4	0.68	51.5		<0.1	<0.1		<0.1		<0.1	<0.1
129-00-0	Pyrene	mg/kg	< 0.1	15	0.10	81.40	10.14	0.10	24.06	0	5.5	1200	Hydrock Derived		81.4	5.03	5.53	1.29	3.7	54.3		<0.1	<0.1		<0.1		<0.1	<0.1
P1310	PAH 16 Total	mg/kg	< 1.6	15	1.60	516.00	64.08	1.60	149.66			-			516	36.2	33.6	8.6	27.4	325		<1.6	<1.6		<1.6		<1.6	<1.6
0	**TPH fractions**																											
P1407	TPH ali EC05-EC06	mg/kg	< 0.01	5	0.01	0.01	0.01	0.01	0.000	0	558	78	Hydrock Derived		<0.01	<0.01	<0.01	<0.01		<0.01								
P1408	TPH ali >EC06-EC08	mg/kg	< 0.05	5	0.05	0.05	0.05	0.05	0.000	0	322	230	Hydrock Derived		<0.05	<0.05	<0.05	<0.05		<0.05								
P1409	TPH ali >EC08-EC10	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.000	0	190	65	Hydrock Derived		<2	<2	<2	<2		<2								
P1410	TPH ali >EC10-EC12	mg/kg	< 2	5	2.00	3.00	2.20	2.00	0.45	0	118	330	Hydrock Derived		3	<2	<2	<2		<2								
P1411	TPH ali >EC12-EC16	mg/kg	< 3	5	3.00	66.00	24.00	5.00	28.68	0	59	2400	Hydrock Derived		66	5	4	<3		42								
P1938	TPH ali >EC16-EC35	mg/kg	< 10	5	33.00	782.00	370.20	189.00	345.30	0	21	92000	Hydrock Derived		782	189	145	33		702								
P1415	TPH ali >EC35-EC44	mg/kg	< 10	5	10.00	56.00	24.60	10.00	21.09	0	21	92000	Hydrock Derived		56	<10	<10	<10		37								
P1420	TPH ali >EC5-EC44	mg/kg	< 30	5	33.00	906.00	412.60	194.00	400.17			-			906	194	149	33		781								
P1441	TPH aro EC05-EC07	mg/kg	< 0.01	5	0.01	0.01	0.01	0.01	0.00	0	2265	150	Hydrock Derived		<0.01	<0.01	<0.01	<0.01		<0.01								
P1355	TPH aro >EC07-EC08	mg/kg	< 0.05	5	0.05	0.05	0.05	0.05	0.00	0	1916	300	Hydrock Derived		<0.05	<0.05	<0.05	<0.05		<0.05								
P1356	TPH aro >EC08-EC10	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.00	0	1503	84	Hydrock Derived		<2	<2	<2	<2		<2								

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter:	Default - Human Health - residential with home-grown produce (2.5%SOM)
Client:	Cala Homes
Site:	Himley Village Main Site
Job no.:	27141
Lab. report no(s).:	23-08116.1

Data Filters

Zone	All
Strata	ALL
Depth Min (m bgl)	0.03
Depth Max (m bgl)	2.3
Dataset mean SOM%	4.52
Scenario SOM%	2.5

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source	Date	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	05/06/23	06/06/23	07/06/23	06/06/23	06/06/23	07/06/23	07/06/23	07/06/23
														Zone														
														Location	HP01	HP02	HP03	HP04	HP05	HP05	RC01	TP02	TP05	TP06	TP07	TP08	TP09	TP10
														Depth (m bgl)	0.05	0.25	0.1	0.2	0.03	0.3	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0.1
														Strata	MG	MG	MG	MG	MG	MG	TS	MG	TS	MG	HD	MG	TS	MG
P1357	TPH aro >EC10-EC12	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.00	0	899	180	Hydrock Derived		<2	<2	<2	<2		<2								
P1358	TPH aro >EC12-EC16	mg/kg	< 2	5	2.00	29.00	7.40	2.00	12.07	0	419	330	Hydrock Derived		29	<2	<2	<2		<2								
P1359	TPH aro >EC16-EC21	mg/kg	< 3	5	3.00	171.00	42.20	6.00	72.76	0	134	540	Hydrock Derived		171	<3	6	<3		28								
P1360	TPH aro >EC21-EC35	mg/kg	< 10	5	10.00	270.00	79.40	43.00	108.44	0	12	1500	Hydrock Derived		270	15	43	<10		59								
P1362	TPH aro >EC35-EC44	mg/kg	< 10	5	10.00	39.00	15.80	10.00	12.97	0	12	1500	Hydrock Derived		39	<10	<10	<10		<10								
P1941	TPH aro >EC5-EC44	mg/kg	< 30	5	30.00	508.00	141.20	49.00	206.46			-			508	30	49	30		89								
P1373	Total TPH >EC5-EC44	mg/kg	< 60	5	60.00	1414.00	550.00	209.00	576.60			-			1414	209	197	60		870								
o	**VOCs - BTEX & MTBE**																											
71-43-2	Benzene	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	2265	0.41	C4SL - CL:AIRE 2014		<0.002	<0.002	<0.002	<0.002		<0.002								
108-88-3	Toluene	mg/kg	< 5	5	0.01	0.01	0.01	0.01	0.00	0	1916	300	Hydrock Derived		<0.005	<0.005	<0.005	<0.005		<0.005								
100-41-4	Ethylbenzene	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1216	110	Hydrock Derived		<0.002	<0.002	<0.002	<0.002		<0.002								
95-47-6	Xylene, o-	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1120	140	Hydrock Derived		<0.002	<0.002	<0.002	<0.002		<0.002								
1330-20-7	Xylene, p- (or combined m & p)	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1353	130	Hydrock Derived		<0.002	<0.002	<0.002	<0.002		<0.002								
1634-04-4	MTBE	mg/kg	< 5	5	0.01	0.01	0.01	0.01	0.00	0	33075	110	Hydrock Derived		<0.005	<0.005	<0.005	<0.005		<0.005								
o	**Pesticides**																											
309-00-2	Aldrin	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	63	6.6	Hydrock Derived								<0.02					<0.02		
72-54-8	DDD	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	19.8	1100	Hydrock Derived								<0.02					<0.02		
75-55-9	DDE	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	88	1100	Hydrock Derived								<0.02					<0.02		
50-29-3	DDT	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	9.3	1000	Hydrock Derived								<0.02					<0.02		
62-73-7	Dichlorvos	mg/kg	< 0.1	5	**0.10**	**0.10**	**0.10**	**0.10**	0.00	0	20049	0.068	Hydrock Derived								<0.1					<0.1		
60-57-1	Dieldrin	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.37	2	Hydrock Derived								<0.02					<0.02		
959-98-8	Endosulfan - alpha	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.007	18	Hydrock Derived								<0.02					<0.02		
33213-65-9	Endosulfan - beta	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.00016	17	Hydrock Derived								<0.02					<0.02		
319-84-6	Hexachlorocyclohexanes - alpha (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	42	0.56	Hydrock Derived								<0.02					<0.02		
319-85-7	Hexachlorocyclohexanes - beta (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	5.0	0.21	Hydrock Derived								<0.02					<0.02		
58-89-9	Hexachlorocyclohexanes - gamma (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	126	0.15	Hydrock Derived								<0.02					<0.02		
	TPH Additivity Check			**HAZARD QUOTIENTS FOR EACH FRACTION**																									
													Aliphatics >EC5-EC6		0.000128205	0.000128205	0.000128205	0.000128205		0.000128205								
													Aliphatics >EC6-EC8		0.000217391	0.000217391	0.000217391	0.000217391		0.000217391								
												Considered additive	Aliphatics >EC8-EC10		0.030769231	0.030769231	0.030769231	0.030769231		0.030769231								
												Considered additive	Aliphatics >EC10-EC12		0.009090909	0.006060606	0.006060606	0.006060606		0.006060606								
												Considered additive	Aliphatics >EC12-EC16		0.0275	0.002083333	0.001666667	0.00125		0.0175								
													Aliphatics >EC16-EC35		0.0085	0.002054348	0.001576087	0.000358696		0.007630435								
													Aliphatics >EC35-EC44		0.000608696	0.000108696	0.000108696	0.000108696		0.000402174								
													Aromatics EC5-EC7		6.66667E-05	6.66667E-05	6.66667E-05	6.66667E-05		6.66667E-05								
													Aromatics >EC7-EC8		0.000166667	0.000166667	0.000166667	0.000166667		0.000166667								
												Considered additive	Aromatics >EC8-EC10		0.023809524	0.023809524	0.023809524	0.023809524		0.023809524								
												Considered additive	Aromatics >EC10-EC12		0.011111111	0.011111111	0.011111111	0.011111111		0.011111111								
												Considered additive	Aromatics >EC12-EC16		0.087878788	0.006060606	0.006060606	0.006060606		0.006060606								
												Considered additive	Aromatics >EC16-EC21		0.316666667	0.005555556	0.011111111	0.005555556		0.051851852								
												Considered additive	Aromatics >EC21-EC35		0.18	0.01	0.028666667	0.006666667		0.039333333								
													Aromatics >EC35-EC44		0.026	0.006666667	0.006666667	0.006666667		0.006666667								
												Hazard Index table - HI or HQ greater than 1 highlighted with orange shading.	**Hazard Index for ali>C8-C16**		**0.06736014**	**0.03891317**	**0.038496503**	**0.038079837**		**0.054329837**								
												Hazard Index table - HI or HQ greater than 1 highlighted with orange shading.	**Hazard Index for aro>C8-C16**		**0.122799423**	**0.040981241**	**0.040981241**	**0.040981241**		**0.040981241**								
												Hazard Index table - HI or HQ greater than 1 highlighted with orange shading.	**Hazard Index for aro>C16-C35**		**0.496666667**	**0.015555556**	**0.039777778**	**0.012222222**		**0.091185185**								

Legend:

MG	Made Ground
TS	Topsoil
HD	Head Deposits
FM	Forest Marble

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
'<10	Value excluded from statistical analysis
Y	Text result

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter: Default - Human Health - residential with home-grown produce (2.5%SOM)
Client: Cala Homes
Site: Himley Village Main Site
Job no.: 27141
Lab. report no(s).: 23-08116.1

/kg unless otherwise stated

Data Filters
Zone: All
Strata: ALL
Depth Min (m bgl): 0.03
Depth Max (m bgl): 2.3
Dataset mean SOM%: 4.52
Scenario SOM%: 2.5

Hydrock

Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source	07/06/23 TP12 0.1 TS	07/06/23 TP13 0.2 MG	13/06/23 TP17 2.3 FM	12/06/23 TP19 0.2 TS	13/06/23 TP21 0.2 TS
Asbestos																	
Asbestos Identified	text	Y/N	16	-	-	-	-	No. of detects:	0	-	-	-		N	N	N	N
Hydrock Default Suite - FOC / SOM / pH										-							
FOC (dimensionless)	[]	0.001	15	0.010	0.059	0.026	0.027	0.01		-	-	-		0.021	0.01	0.028	0.025
SOM (calculated)	%	0.1724	15	1.72	10.17	4.52	4.65	2.16		-	-	-		3.6204	1.724	4.8272	4.31
pH (su)	pH Units	0.1	15	7.40	8.30	8.01	8.00	0.25		-	-	-		7.4	8.1	7.8	7.8
Hydrock Default Suite - Metals & PAH																	
Arsenic	mg/kg	< 2	15	2.00	16.00	10.60	11.00	4.98	0	NR	37	C4SL - CL:AIRE 2014		9	15	15	14
Beryllium	mg/kg	< 0.5	15	0.50	1.30	0.81	0.70	0.32	0	NR	1.7	Hydrock Derived		0.6	0.7	1.1	0.9
Boron	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	300	Hydrock Derived		<1	<1	<1	<1
Cadmium	mg/kg	< 0.2	15	0.20	0.20	0.20	0.20	0.00	0	NR	22	C4SL - CL:AIRE 2014		<0.2	<0.2	<0.2	<0.2
Chromium (III)	mg/kg	< 2	15	2.00	26.00	14.00	15.00	8.52	0	NR	890	Hydrock Derived		13	15	22	18
Chromium (VI)	mg/kg	< 2	15	2.00	2.00	2.00	2.00	0.00	0	NR	21	C4SL - CL:AIRE 2014		<2	<2	<2	<2
Copper	mg/kg	< 4	15	4.00	19.00	12.13	13.00	4.09	0	NR	2500	Hydrock Derived		13	14	13	11
Lead	mg/kg	< 3	13	3.00	25.00	12.23	12.00	6.61	0	NR	200	C4SL - CL:AIRE 2014		12	10	25	19
Mercury, inorganic	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	40	Hydrock Derived		<1	<1	<1	<1
Nickel	mg/kg	< 3	15	3.00	20.00	11.47	14.00	6.71	0	NR	130	Hydrock Derived		9	19	16	14
Selenium	mg/kg	< 2	15	2.00	2.00	2.00	2.00	0.00	0	NR	260	Hydrock Derived		<2	<2	<2	<2
Vanadium	mg/kg	< 1	15	4.00	55.00	31.20	29.00	16.40	0	NR	410	Hydrock Derived		27	20	49	41
Zinc	mg/kg	< 3	15	4.00	63.00	32.87	34.00	18.97	0	NR	3900	Hydrock Derived		45	20	46	37
Cyanide (free)	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	24	Acute Risk - SoBRA 2020		<1	<1	<1	<1
Total Phenols (Monohydric)	mg/kg	< 2	15	2.00	3.00	2.11	2.00	0.27	0	38058	210	Hydrock Derived		3	<2	<2	<2
Acenaphthene	mg/kg	< 0.1	15	0.10	17.90	1.58	0.10	4.66	0	141	540	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	< 0.1	15	0.10	0.66	0.16	0.10	0.16	0	212	440	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	< 0.1	15	0.10	19.30	2.24	0.10	5.69	0	2.91	5500	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	mg/kg	< 0.1	15	0.10	34.00	4.83	0.10	10.68	2	4.28	12	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	< 0.1	15	0.10	28.90	4.34	0.10	8.81	3	2.28	5	C4SL - CL:AIRE 2014		<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	15	0.10	32.60	5.05	0.10	10.16	5	3.04	3.3	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	< 0.1	15	0.10	13.40	2.20	0.10	4.10	0	0.04	340	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	15	0.10	13.30	1.71	0.10	3.64	0	1.72	93	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	< 0.1	15	0.10	33.70	4.38	0.10	9.90	2	1.10	22	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	mg/kg	< 0.1	15	0.10	3.45	0.54	0.10	0.98	5	0.010	0.29	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	< 0.1	15	0.10	102.00	12.22	0.10	29.92	0	47	560	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	< 0.1	15	0.10	13.20	1.26	0.10	3.48	0	77	420	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	mg/kg	< 0.1	15	0.10	16.50	2.63	0.10	5.05	0	0.15	36	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Naphthalene	mg/kg	< 0.1	15	0.10	1.97	0.29	0.10	0.53	0	183	30	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	< 0.1	15	0.10	104.00	10.60	0.10	29.01	0	90	220	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	< 0.1	15	0.10	81.40	10.14	0.10	24.06	0	5.5	1200	Hydrock Derived		<0.1	<0.1	<0.1	<0.1
PAH 16 Total	mg/kg	< 1.6	15	1.60	516.00	64.08	1.60	149.66			-			<1.6	<1.6	<1.6	<1.6
TPH fractions																	
TPH ali EC05-EC06	mg/kg	< 0.01	5	0.01	0.01	0.01	0.01	0.000	0	558	78	Hydrock Derived					
TPH ali >EC06-EC08	mg/kg	< 0.05	5	0.05	0.05	0.05	0.05	0.000	0	322	230	Hydrock Derived					
TPH ali >EC08-EC10	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.000	0	190	65	Hydrock Derived					
TPH ali >EC10-EC12	mg/kg	< 2	5	2.00	3.00	2.20	2.00	0.45	0	118	330	Hydrock Derived					
TPH ali >EC12-EC16	mg/kg	< 3	5	3.00	66.00	24.00	5.00	28.68	0	59	2400	Hydrock Derived					
TPH ali >EC16-EC35	mg/kg	< 10	5	33.00	782.00	370.20	189.00	345.30	0	21	92000	Hydrock Derived					
TPH ali >EC35-EC44	mg/kg	< 10	5	10.00	56.00	24.60	10.00	21.09	0	21	92000	Hydrock Derived					
TPH ali >EC5-EC44	mg/kg	< 30	5	33.00	906.00	412.60	194.00	400.17			-						
TPH aro EC05-EC07	mg/kg	< 0.01	5	0.01	0.01	0.01	0.01	0.00	0	2265	150	Hydrock Derived					
TPH aro >EC07-EC08	mg/kg	< 0.05	5	0.05	0.05	0.05	0.05	0.00	0	1916	300	Hydrock Derived					
TPH aro >EC08-EC10	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.00	0	1503	84	Hydrock Derived					

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter:	Default - Human Health - residential with home-grown produce (2.5%SOM)
Client:	Cala Homes
Site:	Himley Village Main Site
Job no.:	27141
Lab. report no(s).:	23-08116.1

Data Filters

Zone	All
Strata	ALL
Depth Min (m bgl)	0.03
Depth Max (m bgl)	2.3
Dataset mean SOM%	4.52
Scenario SOM%	2.5

Hydrock

/kg unless otherwise stated

Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source	07/06/23	07/06/23	13/06/23	12/06/23	13/06/23
													TP12	TP13	TP17	TP19	TP21
													0.1	0.2	2.3	0.2	0.2
													TS	MG	FM	TS	TS
TPH aro >EC10-EC12	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.00	0	899	180	Hydrock Derived					
TPH aro >EC12-EC16	mg/kg	< 2	5	2.00	29.00	7.40	2.00	12.07	0	419	330	Hydrock Derived					
TPH aro >EC16-EC21	mg/kg	< 3	5	3.00	171.00	42.20	6.00	72.76	0	134	540	Hydrock Derived					
TPH aro >EC21-EC35	mg/kg	< 10	5	10.00	270.00	79.40	43.00	108.44	0	12	1500	Hydrock Derived					
TPH aro >EC35-EC44	mg/kg	< 10	5	10.00	39.00	15.80	10.00	12.97	0	12	1500	Hydrock Derived					
TPH aro >EC5-EC44	mg/kg	< 30	5	30.00	508.00	141.20	49.00	206.46			-						
Total TPH >EC5-EC44	mg/kg	< 60	5	60.00	1414.00	550.00	209.00	576.60			-						
VOCs - BTEX & MTBE																	
Benzene	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	2265	0.41	C4SL - CL:AIRE 2014					
Toluene	mg/kg	< 5	5	0.01	0.01	0.01	0.01	0.00	0	1916	300	Hydrock Derived					
Ethylbenzene	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1216	110	Hydrock Derived					
Xylene, o-	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1120	140	Hydrock Derived					
Xylene, p- (or combined m & p)	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1353	130	Hydrock Derived					
MTBE	mg/kg	< 5	5	0.01	0.01	0.01	0.01	0.00	0	33075	110	Hydrock Derived					
Pesticides																	
Aldrin	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	63	6.6	Hydrock Derived	<0.02			<0.02	<0.02
DDD	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	19.8	1100	Hydrock Derived	<0.02			<0.02	<0.02
DDE	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	88	1100	Hydrock Derived	<0.02			<0.02	<0.02
DDT	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	9.3	1000	Hydrock Derived	<0.02			<0.02	<0.02
Dichlorvos	mg/kg	< 0.1	5	**0.10**	**0.10**	**0.10**	**0.10**	0.00	0	20049	0.068	Hydrock Derived	<0.1			<0.1	<0.1
Dieldrin	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.37	2	Hydrock Derived	<0.02			<0.02	<0.02
Endosulfan - alpha	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.007	18	Hydrock Derived	<0.02			<0.02	<0.02
Endosulfan - beta	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.00016	17	Hydrock Derived	<0.02			<0.02	<0.02
Hexachlorocyclohexanes - alpha (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	42	0.56	Hydrock Derived	<0.02			<0.02	<0.02
Hexachlorocyclohexanes - beta (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	5.0	0.21	Hydrock Derived	<0.02			<0.02	<0.02
Hexachlorocyclohexanes - gamma (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	126	0.15	Hydrock Derived	<0.02			<0.02	<0.02
TPH Additivity Check			**HAZARD QUOTIENTS FOR EACH FRACTION**														
												Aliph					
												Aliph					
												Aliph					
												Aliph					
												Aliph					
												Aliphat					
												Aliphat					
												Aro					
												Arom					
												Aroma					
												Aroma					
												Aroma					
												Aroma					
												Aroma					
												Aromat					
												Hazard Index					
												Hazard Index					
												Hazard Index f					

Considered additive

Considered additive

Considered additive

Hazard Index table - HI or HQ greater than 1 highlighted with orange shading.

Legend:

MG	Made Ground
TS	Topsoil
HD	Head Deposits
FM	Forest Marble

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
<10	Value excluded from statistical analysis
Y	Text result

Risk parameter:	**Default - Human Health - residential with home-grown produce (2.5%SOM)**
Client:	Cala Homes
Site:	Himley Village Main Site
Job no.:	27141
Lab. report no(s).:	23-08116.1

Data Filters

Zone	**All**
Strata	**ALL**
Depth Min (m bgl)	**0.03**
Depth Max (m bgl)	**2.3**
Dataset mean SOM%	**4.52**
Scenario SOM%	**2.5**

/kg unless otherwise stated

Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source
Asbestos												
Asbestos Identified	text	Y/N	16	-	-	-	-	No. of detects:	0	-	-	-
Hydrock Default Suite - FOC / SOM / pH										-		
FOC (dimensionless)	[]	0.001	15	0.010	0.059	0.026	0.027	0.01		-	-	-
SOM (calculated)	%	0.1724	15	1.72	10.17	4.52	4.65	2.16		-	-	-
pH (su)	pH Units	0.1	15	7.40	8.30	8.01	8.00	0.25		-	-	-
Hydrock Default Suite - Metals & PAH												
Arsenic	mg/kg	< 2	15	2.00	16.00	10.60	11.00	4.98	0	NR	37	C4SL - CL:AIRE 2014
Beryllium	mg/kg	< 0.5	15	0.50	1.30	0.81	0.70	0.32	0	NR	1.7	Hydrock Derived
Boron	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	300	Hydrock Derived
Cadmium	mg/kg	< 0.2	15	0.20	0.20	0.20	0.20	0.00	0	NR	22	C4SL - CL:AIRE 2014
Chromium (III)	mg/kg	< 2	15	2.00	26.00	14.00	15.00	8.52	0	NR	890	Hydrock Derived
Chromium (VI)	mg/kg	< 2	15	2.00	2.00	2.00	2.00	0.00	0	NR	21	C4SL - CL:AIRE 2014
Copper	mg/kg	< 4	15	4.00	19.00	12.13	13.00	4.09	0	NR	2500	Hydrock Derived
Lead	mg/kg	< 3	13	3.00	25.00	12.23	12.00	6.61	0	NR	200	C4SL - CL:AIRE 2014
Mercury, inorganic	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	40	Hydrock Derived
Nickel	mg/kg	< 3	15	3.00	20.00	11.47	14.00	6.71	0	NR	130	Hydrock Derived
Selenium	mg/kg	< 2	15	2.00	2.00	2.00	2.00	0.00	0	NR	260	Hydrock Derived
Vanadium	mg/kg	< 1	15	4.00	55.00	31.20	29.00	16.40	0	NR	410	Hydrock Derived
Zinc	mg/kg	< 3	15	4.00	63.00	32.87	34.00	18.97	0	NR	3900	Hydrock Derived
Cyanide (free)	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	NR	24	Acute Risk - SoBRA 2020
Total Phenols (Monohydric)	mg/kg	< 2	15	2.00	3.00	2.11	2.00	0.27	0	38058	210	Hydrock Derived
Acenaphthene	mg/kg	< 0.1	15	0.10	17.90	1.58	0.10	4.66	0	141	540	Hydrock Derived
Acenaphthylene	mg/kg	< 0.1	15	0.10	0.66	0.16	0.10	0.16	0	212	440	Hydrock Derived
Anthracene	mg/kg	< 0.1	15	0.10	19.30	2.24	0.10	5.69	0	2.91	5500	Hydrock Derived
Benz(a)anthracene	mg/kg	< 0.1	15	0.10	**34.00**	4.83	0.10	10.68	**2**	4.28	12	Hydrock Derived
Benzo(a)pyrene	mg/kg	< 0.1	15	0.10	**28.90**	4.34	0.10	8.81	**3**	2.28	5	C4SL - CL:AIRE 2014
Benzo(b)fluoranthene	mg/kg	< 0.1	15	0.10	**32.60**	**5.05**	0.10	10.16	**5**	3.04	3.3	Hydrock Derived
Benzo(ghi)perylene	mg/kg	< 0.1	15	0.10	13.40	2.20	0.10	4.10	0	0.04	340	Hydrock Derived
Benzo(k)fluoranthene	mg/kg	< 0.1	15	0.10	13.30	1.71	0.10	3.64	0	1.72	93	Hydrock Derived
Chrysene	mg/kg	< 0.1	15	0.10	**33.70**	4.38	0.10	9.90	**2**	1.10	22	Hydrock Derived
Dibenz(ah)anthracene	mg/kg	< 0.1	15	0.10	**3.45**	**0.54**	0.10	0.98	**5**	0.010	0.29	Hydrock Derived
Fluoranthene	mg/kg	< 0.1	15	0.10	102.00	12.22	0.10	29.92	0	47	560	Hydrock Derived
Fluorene	mg/kg	< 0.1	15	0.10	13.20	1.26	0.10	3.48	0	77	420	Hydrock Derived
Indeno(123cd)pyrene	mg/kg	< 0.1	15	0.10	16.50	2.63	0.10	5.05	0	0.15	36	Hydrock Derived
Naphthalene	mg/kg	< 0.1	15	0.10	1.97	0.29	0.10	0.53	0	183	30	Hydrock Derived
Phenanthrene	mg/kg	< 0.1	15	0.10	104.00	10.60	0.10	29.01	0	90	220	Hydrock Derived
Pyrene	mg/kg	< 0.1	15	0.10	81.40	10.14	0.10	24.06	0	5.5	1200	Hydrock Derived
PAH 16 Total	mg/kg	< 1.6	15	1.60	516.00	64.08	1.60	149.66			-	
TPH fractions												
TPH ali EC05-EC06	mg/kg	< 0.01	5	0.01	0.01	0.01	0.01	0.000	0	558	78	Hydrock Derived
TPH ali >EC06-EC08	mg/kg	< 0.05	5	0.05	0.05	0.05	0.05	0.000	0	322	230	Hydrock Derived
TPH ali >EC08-EC10	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.000	0	190	65	Hydrock Derived
TPH ali >EC10-EC12	mg/kg	< 2	5	2.00	3.00	2.20	2.00	0.45	0	118	330	Hydrock Derived
TPH ali >EC12-EC16	mg/kg	< 3	5	3.00	66.00	24.00	5.00	28.68	0	59	2400	Hydrock Derived
TPH ali >EC16-EC35	mg/kg	< 10	5	33.00	782.00	370.20	189.00	345.30	0	21	92000	Hydrock Derived
TPH ali >EC35-EC44	mg/kg	< 10	5	10.00	56.00	24.60	10.00	21.09	0	21	92000	Hydrock Derived
TPH ali >EC5-EC44	mg/kg	< 30	5	33.00	906.00	412.60	194.00	400.17			-	
TPH aro EC05-EC07	mg/kg	< 0.01	5	0.01	0.01	0.01	0.01	0.00	0	2265	150	Hydrock Derived
TPH aro >EC07-EC08	mg/kg	< 0.05	5	0.05	0.05	0.05	0.05	0.00	0	1916	300	Hydrock Derived
TPH aro >EC08-EC10	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.00	0	1503	84	Hydrock Derived

Risk parameter:	**Default - Human Health - residential with home-grown produce (2.5%SOM)**
Client:	Cala Homes
Site:	Himley Village Main Site
Job no.:	27141
Lab. report no(s).:	23-08116.1

Data Filters

Zone	**All**
Strata	**ALL**
Depth Min (m bgl)	**0.03**
Depth Max (m bgl)	**2.3**
Dataset mean SOM%	**4.52**
Scenario SOM%	**2.5**

Hydrock

/kg unless otherwise stated

Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source
TPH aro >EC10-EC12	mg/kg	< 2	5	2.00	2.00	2.00	2.00	0.00	0	899	180	Hydrock Derived
TPH aro >EC12-EC16	mg/kg	< 2	5	2.00	29.00	7.40	2.00	12.07	0	419	330	Hydrock Derived
TPH aro >EC16-EC21	mg/kg	< 3	5	3.00	171.00	42.20	6.00	72.76	0	134	540	Hydrock Derived
TPH aro >EC21-EC35	mg/kg	< 10	5	10.00	270.00	79.40	43.00	108.44	0	12	1500	Hydrock Derived
TPH aro >EC35-EC44	mg/kg	< 10	5	10.00	39.00	15.80	10.00	12.97	0	12	1500	Hydrock Derived
TPH aro >EC5-EC44	mg/kg	< 30	5	30.00	508.00	141.20	49.00	206.46			-	
Total TPH >EC5-EC44	mg/kg	< 60	5	60.00	1414.00	550.00	209.00	576.60			-	
VOCs - BTEX & MTBE												
Benzene	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	2265	0.41	C4SL - CL:AIRE 2014
Toluene	mg/kg	< 5	5	0.01	0.01	0.01	0.01	0.00	0	1916	300	Hydrock Derived
Ethylbenzene	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1216	110	Hydrock Derived
Xylene, o-	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1120	140	Hydrock Derived
Xylene, p- (or combined m & p)	mg/kg	< 2	5	0.00	0.00	0.00	0.00	0.00	0	1353	130	Hydrock Derived
MTBE	mg/kg	< 5	5	0.01	0.01	0.01	0.01	0.00	0	33075	110	Hydrock Derived
Pesticides												
Aldrin	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	63	6.6	Hydrock Derived
DDD	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	19.8	1100	Hydrock Derived
DDE	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	88	1100	Hydrock Derived
DDT	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	9.3	1000	Hydrock Derived
Dichlorvos	mg/kg	< 0.1	5	**0.10**	**0.10**	**0.10**	**0.10**	0.00	0	20049	0.068	Hydrock Derived
Dieldrin	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.37	2	Hydrock Derived
Endosulfan - alpha	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.007	18	Hydrock Derived
Endosulfan - beta	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	0.00016	17	Hydrock Derived
Hexachlorocyclohexanes - alpha (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	42	0.56	Hydrock Derived
Hexachlorocyclohexanes - beta (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	5.0	0.21	Hydrock Derived
Hexachlorocyclohexanes - gamma (inc. Lindane)	mg/kg	< 0.02	5	0.02	0.02	0.02	0.02	0.00	0	126	0.15	Hydrock Derived
TPH Additivity Check			**HAZARD QUOTIENTS FOR EACH FRACTION**									

Considered additive

Considered additive

Considered additive

Hazard Index table - HI or HQ greater than 1 highlighted with orange shading.

Legend:

MG	Made Ground
TS	Topsoil
HD	Head Deposits
FM	Forest Marble

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
<10	Value excluded from statistical analysis
Y	Text result

Phytotoxic GQRA

Assessment of Chemicals of Potential Concern to Plant Life

Risk parameter: Phytotoxic pH >7
Client: Cala Homes
Site: Himley Village Main Site
Job no.: 27141
Lab. report no(s).: 23-08116.1

Data Filters
Zone: All
Strata: All
Depth Min (m bgl): 0.03
Depth Max (m bgl): 2.3

Dataset mean pH: 8.01
Scenario pH: >7

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	GAC	GAC Source	Strata	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	05/06/23	06/06/23	07/06/23	06/06/23	06/06/23	07/06/23	07/06/23	07/06/23	07/06/23	07/06/23	13/06/23	12/06/23	13/06/23	
Date														09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	09/06/23	05/06/23	06/06/23	07/06/23	06/06/23	06/06/23	07/06/23	07/06/23	07/06/23	07/06/23	07/06/23	13/06/23	12/06/23	13/06/23	
Zone																																
Location														HP01	HP02	HP03	HP04	HP05	HP05	RC01	TP02	TP05	TP06	TP07	TP08	TP09	TP10	TP12	TP13	TP17	TP19	TP21
Depth (m bgl)														0.05	0.25	0.1	0.2	0.03	0.3	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0.1	0.1	0.2	2.3	0.2	0.2
0	**Hydrock Default Suite - FOC / SOM / pH**																															
P1334	pH (su)	pH Units	0.1	15	7.40	8.30	8.01	8.00	0.25		-	-		8.2	8.3	8.2	8.3	7.7	8.3		7.9	8		8.1		8	8		7.4	8.1	7.8	7.8
-	**Hydrock Default Suite - Metals & PAH**																															
7440-38-2	Arsenic	mg/kg	< 2	15	2.00	16.00	10.60	11.00	4.98	0	250	MAFF 1998		11	6	2	<2	7	7		16	15		9		16	15		9	15	15	14
7440-42-8	Boron	mg/kg	< 1	15	1.00	1.00	1.00	1.00	0.00	0	5	Nable, et al. 1997		<1	<1	<1	<1	<1	<1		<1	<1		<1		<1	<1		<1	<1	<1	<1
16065-83-1	Chromium (III)	mg/kg	< 2	15	2.00	26.00	14.00	15.00	8.52	0	400	MAFF 1998 (Cr(T))		7	5	2	2	8	5		23	19		21		26	24		13	15	22	18
18540-29-9	Chromium (VI)	mg/kg	< 2	15	2.00	2.00	2.00	2.00	0.00	0	25	ICRCL 70/90 1990		<2	<2	<2	<2	<2	<2		<2	<2		<2		<2	<2		<2	<2	<2	<2
7440-50-8	Copper	mg/kg	< 4	15	4.00	19.00	12.13	13.00	4.09	0	200	BS3882 2015		13	11	4	4	11	9		15	15		14		16	19		13	14	13	11
7440-02-0	Nickel	mg/kg	< 3	15	3.00	20.00	11.47	14.00	6.71	0	110	BS3882 2015		5	4	<3	<3	6	4		19	16		16		20	18		9	19	16	14
7440-66-6	Zinc	mg/kg	< 3	15	4.00	63.00	32.87	34.00	18.97	0	300	BS3882 2015		27	14	6	4	34	14		55	41		27		60	63		45	20	46	37

Legend:

MG	Made Ground
TS	Topsoil
HD	Head Deposits
FM	Forest Marble

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
64.00	Value exceed saturation limit and substance is liquid or solid at ambient temperature
***<10**	Value excluded from statistical analysis
y	Text result
-	Represents a determinand that was not tested.
•	represents a data point that is not included in the current filter settings

Template Version:
1.05: 11/04/23

Assessment of Chemicals of Potential Concern to Plant Life

Risk parameter:	**Phytotoxic pH >7**
Client:	Cala Homes
Site:	Himley Village Additional Works
Job no.:	27141
Lab. report no(s).:	23-08115.1

Data Filters

Zone	**All**
Strata	**All**
Depth Min (m bgl)	**0.1**
Depth Max (m bgl)	**2.4**
Dataset mean pH	**7.94**
Scenario pH	**>7**

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	GAC	GAC Source	Date	08/06/23	08/06/23	08/06/23	07/06/23	09/06/23	09/06/23	12/06/23	09/06/23	09/06/23	12/06/23
													Zone										
													Location	TP23	TP26	TP29	TP32	TP34	TP35	TP36	TP39	TP41	TP45
													Depth (m bgl)	0.1	0.2	0.2	0.2	0.2	2.4	0.2	0.2	0.1	0.2
													Strata	TS	MG	MG	MG	TS	CB	MG	TS	MG	TS
0	**Hydrock Default Suite - FOC / SOM / pH**																						
P1334	pH (su)	pH Units	0.1	10	7.70	8.20	7.94	7.95	0.13		-	-		7.8	7.7	7.9	7.9	8.2	8	8	7.9	8	8
-	**Hydrock Default Suite - Metals & PAH**																						
7440-38-2	Arsenic	mg/kg	< 2	10	7.00	16.00	13.00	15.00	3.46	0	250	MAFF 1998		16	16	16	15	7	9	15	15	9	12
7440-42-8	Boron	mg/kg	< 1	10	1.00	1.10	1.01	1.00	0.03	0	5	Nable, et al. 1997		<1	1.1	<1	<1	<1	<1	<1	<1	<1	<1
16065-83-1	Chromium (III)	mg/kg	< 2	10	10.00	23.00	18.10	20.00	4.82	0	400	MAFF 1998 (Cr(T))		23	21	20	20	10	12	23	22	13	17
18540-29-9	Chromium (VI)	mg/kg	< 2	10	2.00	2.00	2.00	2.00	0.00	0	25	ICRCL 70/90 1990		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
7440-50-8	Copper	mg/kg	< 4	10	8.00	29.00	18.90	19.00	7.40	0	200	BS3882 2015		22	27	22	26	8	15	15	16	9	29
7440-02-0	Nickel	mg/kg	< 3	10	7.00	19.00	14.20	15.50	3.74	0	110	BS3882 2015		19	16	16	15	7	15	17	16	9	12
7440-66-6	Zinc	mg/kg	< 3	10	19.00	88.00	55.30	54.00	25.19	0	300	BS3882 2015		82	88	76	79	25	19	55	53	31	45

Legend:

MG	Made Ground
TS	Topsoil
CB	Cornbrash Formation

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
64.00	Value exceed saturation limit and substance is liquid or solid at ambient temperature
***<10**	Value excluded from statistical analysis
y	Text result
-	Represents a determinand that was not tested.
*	represents a data point that is not included in the current filter settings

Template Version:
1.05: 11/04/23

Controlled waters GQRA

Remedial Targets Methodology Data Table

Hydrock

Hydrock Scenario: Scenario D - DWS & EQS (inland)

RTM Level: RTM Level 2 - Groundwater Beneath Source Assessment - groundwater samples

Water body receptor(s): Groundwater and surface water
Secondary receptor(s): Human health (abstraction)
Data set: Groundwater
Client: Cala Homes
Site: Himley Village, Bicester
Job no: 27141
Test Certificates(s): 23-44921-1
Dataset ALL ZONES

PNEC calculated (inland EQS)

123* Exceeds solubility value
<1 Grey text and "<" sign if value <= LoD
999 Red text if value > DWS
Red fill if value > Inland Waters EQS

Surface Water Representative Hardness as mg/l $CaCO_3$ 10

CAS / AGS Number	Chemical of Potential Concern (µg/l)	WFD Designation	Hazardous Substance Status	Solubility Limit (µg/l)	No. of samples	Limit of Detection	DWS	Inland Waters EQS	R02	R01	R05	R06	R07
	Strata / Zone								CBF	FMF	FMF	FMF	FMF
	Date sampled:								11/07/2023	11/07/2023	11/07/2023	11/07/2023	11/07/2023
7440-22-4	Silver (Ag) (dissolved)				5	0.05	n/a	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
7429-90-5	Aluminium (Al) (dissolved)				0		200	n/a					
7440-38-2	Arsenic (As) (dissolved)	SP	H		5	0.15	10	50	0.47	<0.15	0.24	0.22	<0.15
7440-42-8	Boron (B) (dissolved)		NP		5	10	1000	2000	37	30	45	28	39
7440-39-3	Barium (Ba) (dissolved)				5	0.06	1300	n/a	28	9	19	15	9
7440-43-9	Cadmium (Cd) (dissolved)	PH	NP		5	0.02	5	0.08	<0.02	<0.02	<0.02	<0.02	<0.02
7440-48-4	Cobalt (Co) (dissolved)		NP		5	0.2	n/a	3	<0.2	<0.2	<0.2	<0.2	<0.2
18540-29-9	Chromium (VI) (Cr) (dissolved)	SP	H		5	5	n/a	3.4	<0.5	<0.5	<0.5	<0.5	<0.5
16065-83-1	Chromium (III) (Cr) (dissolved)	SP			5	5	n/a	4.7	<5	<5	<5	<5	<5
7440-47-3	Chromium (Cr) (total) (dissolved)				5	0.2	50	n/a	0.6	<0.2	<0.2	0.9	0.3
7440-50-8	Copper (Cu) (dissolved)	SP	NP		5	0.5	2000	1	2.7	1.2	1.1	1.1	0.7
7439-89-6	Iron (Fe) (dissolved)	SP			5	0.004	200	1000	0.029	0.024	0.023	0.009	0.017
7439-97-6	Mercury (Hg) (dissolved)	PH	H		0		1	0.07					
P1286	Manganese (Mn) (dissolved)	SP			5	0.05	50	123	0.85	1.1	8.3	1.5	2
7440-23-5	Sodium (Na) (dissolved)				0		200000	n/a					
7440-02-0	Nickel (Ni) (dissolved)	P	NP		5	0.01	20	4	6.5	5.4	5.5	5	5.4
7439-92-1	Lead (Pb) (dissolved)	P	H		5	0.5	10	1.2	2.3	1.3	2.3	1.3	0.7
7440-36-0	Antimony (Sb) (dissolved)		NP		5	0.2	5	n/a	<0.2	<0.2	<0.2	<0.2	<0.2
7782-49-2	Selenium (Se) (dissolved)		NP		5	0.4	10	n/a	0.6	<0.4	0.7	0.5	<0.4
7440-31-5	Tin (Sn) (dissolved)				5	0.6	n/a	25	1	<0.6	<0.6	<0.6	<0.6
7440-62-2	Vanadium (V) (dissolved)				4	0.2	n/a	20		<0.02	<0.02	0.55	0.32
7440-66-6	Zinc (Zn) (dissolved)	SP	NP		5	0.2	n/a	12.3	0.8	<0.2	<0.2	1.1	<0.2
P1095	Cyanide (free) (hydrogen cyanide)	SP	NP		5	0.5	n/a	1	5.1	4.3	1.5	1.8	2.5
57-12-5	Cyanide (total)				0		50	n/a					
P1140	Ammonium (NH_4^+)		NP		0		500	n/a					
P1238	Ammnoniacal Nitrogen (as N)		NP		0		n/a	300					
P1720	Ammonia (unionised) (NH_3 as N) {free ammonia}	SP	NP		5	15	n/a	n/a	67	150	63	79	52
15541-45-4	Bromate (BrO_3)				5	0.002	10	n/a	<0.002	<0.002	<0.002	<0.002	<0.002
16887-00-6	Chloride (Cl^-)				5	0.15	250000	250000	10	6.6	3.7	6.8	6.7
16984-48-8	Fluoride (F^-)				5	50	1500	1000	160	200	630	320	160
P1348	Nitrate (NO_3^-)				5	0.05	50000	n/a	80.2	55.1	4.47	1.46	21
P1349	Nitrite (NO_2^-)				5	5	500	n/a	18	40	33	<5	19
14808-79-8	Sulfate (SO_4^{2-})				5	45	250000	400000	20500	70700	34200	31000	29500
P1134	pH (min.) (su)				5	0	6.5	6	7.4	7.4	7.1	7.5	7.4
P1134	pH (max.) (su)				5	0	9.5	9	7.4	7.4	7.1	7.5	7.4
P1287	Electrical conductivity (µS/cm)				5	10	2500	n/a	550	520	610	480	550
120-12-7	Anthracene	PH	H	56	5	0.01	n/a	0.1	<0.01	<0.01	<0.01	<0.01	<0.01
50-32-8	Benzo(a)pyrene	PH	H	3.8	5	0.01	0.01	0.00017	<0.01	<0.01	<0.01	<0.01	<0.01
206-44-0	Fluoranthene	P	H	230	0		n/a	0.0063					
91-20-3	Naphthalene	P	NP	19000	0		n/a	2					
GRP01	PAHs = sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene	P	H		5	0	0.1	n/a	0.01	0.01	0.01	0.01	0.01
P1877	Phenol	SP	NP	84100000	5	0	n/a	7.7	0.01	0.01	0.01	0.01	0.01

Appendix F Preliminary geotechnical risk register

Geotechnical Hazard Identification – Following Ground Investigation

The preliminary Geotechnical Risk Register following Ground Investigation is set out in Table J.3.

The probability and impact of a hazard have been judged on a qualitative scale as set out in Table J.2. The degree of risk (R) is determined by combining tan assessment of the probability (P) of the hazard occurring with an assessment of the impact (I) of the hazard and associated mitigation it will require if it occurs (R = P x I).

Table J.2: Qualitative assessment of hazards and risks

P = Probability		I = Impact		R = Risk Rating (P x I)	
1	Very unlikely (VU)	1	Very Low	1 – 4	None / negligible
2	Unlikely (U)	2	Low	5 – 9	Minor
3	Plausible (P)	3	Medium	10 – 14	Moderate
4	Likely (Lk)	4	High	15 – 19	Substantial
5	Very Likely (VLk)	5	Very High	20 - 25	Severe

Table J.3: Preliminary geotechnical risk register

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
Soft / loose compressible ground (low strength and high settlement potential).	The shallow soils of the Head Deposits and Cornbrash Formation are typically firm (or better) clays, gravels and limestone (Cornbrash Formation). Therefore widespread compressible ground is not anticipated, however local softened areas were recorded.	Residential Dwellings.	Foundation bearing capacity failure, settlement (total and differential).	3	4	12	Design foundations to found below any loose relative density gravel or soft clay.
			Floor slab failure.	3	4	12	Design floor slab as suspended.
		Roads and Pavements.	Settlement (total and differential), of roads and pavements.	3	3	9	Design roads and pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate. If anticipated settlements are significant, and cannot be mitigated by design, over-excavate and replace soft soils.
		Services.	Settlement (differential), causing damage to services.	2	3	6	Ground levels are remaining at approximately current levels. Settlements are not anticipated to be significant. No additional design requirements envisaged.
		Gardens.	Settlement (differential), in gardens.	1	3	1	
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	3	3	9	Where soft spots encountered, over-excavate and replace with suitable fill. Design working platform to suit the ground conditions.

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
							Outline design of working platform to include geo-grid if necessary. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Shrinkage / swelling of the clay fraction of soils under the influence of vegetation.	The clays of the Cornbrash Formation and Forest Marble Formation are medium heave potential.	Foundations.	Shrinkage or heave of soils and associated damage to foundations.	4	3	12	Design foundations in accordance with NHBC standards. Deepen foundations due to trees as appropriate. Consider use of piles where foundation depths are >2.50m
		Floor slabs.	Floor slab failure.	4	4	16	Design floor slabs in accordance with NHBC standards. Design floor slab as suspended with a void, unless the warranty provider is satisfied the soil is not desiccated, or slabs are constructed when soils are not seasonally desiccated (i.e. during winter and spring).
Variable lateral and vertical changes in ground conditions.	Head Deposits have been recorded sporadically across the site and varying	Residential Dwellings.	Foundation bearing capacity failure, settlement (total and differential).	4	4	16	Design foundations to found below any loose relative density gravel or

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
	bands of clay and limestone were recorded in both the Cornbrash Formation and Forest Marble Formation.						soft clay, and to take into account tree influence.
			Floor slab failure.	4	4	16	Design floor slab as suspended.
		Roads and Pavements.	Settlement (total and differential), of roads and pavements.	3	3	9	Design roads and pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate. If anticipated settlements are significant, and cannot be mitigated by design, over-excavate and replace unsuitable soils.
		Services.	Settlement (differential), causing damage to services.	2	3	6	Settlements are not anticipated to be significant with regard to services. No additional design requirements envisaged.
		Gardens.	Settlement (differential), in gardens.	1	3	3	It is unlikely that settlements will be significant with respect to gardens.
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	3	3	9	Where soft spots encountered, over-excavate and replace with suitable fill. Design working platform to suit the ground conditions.

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
							Outline design of working platform to include geo-grid if necessary. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Sulfates present in the soils.	The ground investigation has proven that there is the potential for expansive sulfate bearing soils to be present in the Forest Marble Formation	Attack of buried concrete.	Damage to concrete and reduction in strength.	4	4	16	Classify concrete in accordance with BRE SD1 and design concrete accordingly.
Obstructions.	Shallow limestone beds have been proven during the investigation.	Construction staff, vehicles and plant operators.	Risk of collapse of excavation as obstructions are pulled out.	4	3	12	Allow for a breaker to be present during construction to allow excavation through the limestone beds.
		Roads and Pavements.	Hard spots in externals and roads / pavements.	4	2	8	
		Residential Dwellings.	Impact on piling, resulting in additional piles / columns and re-design of foundations.	4	3	12	
Cont…							

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
Shallow groundwater.	Monitoring during the ground investigations has proven a shallow groundwater table	Construction staff, vehicles and plant operators.	Difficulty with excavation. Limit state failure, excessive deformation, trafficking of site plant, inability to place and compact fill.	5	2	10	Contractor to appoint competent Temporary Works Designer to design temporary works, in accordance with BS 5975:2008+A1:2011. Temporary Works Designer to consider in their analysis the impact of, and requirements for, de-watering of excavations. Any water that collects at the base of excavations to be removed as soon as practicable.
		Slopes and Retaining.	Serviceability issues.	4	2	8	Contractor to appoint competent Temporary Works Designer to design temporary works, as required in accordance with BS 5975:2008+A1:2011. The shallow groundwater is to be taken into account during geotechnical design of the permanent works.
Changing groundwater conditions.	Groundwater has been monitored at shallow depths but has the potential to vary seasonally.	Construction staff, vehicles and plant operators.	Difficulty with excavation. Limit state failure, excessive deformation,	4	2	8	Contractor to appoint competent Temporary Works Designer to design temporary works as required, in accordance

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
			trafficking of site plant, inability to place and compact fill.				with BS 5975:2008+A1:2011. Temporary Works Designer to consider in their analysis the impact of a variable water table.
		Slopes and Retaining.	Serviceability issues.	4	2	8	Contractor to appoint competent Temporary Works Designer to design temporary works, as required in accordance with BS 5975:2008+A1:2011. Design drainage for retaining walls to account for fluctuating groundwater levels. The shallow groundwater is to be taken into account during geotechnical design of the permanent works.
Solution features in the limestone.	Unlikely but possible in the limestone. Not encountered during investigations.	Residential Dwellings	Reduction of lateral support potentially affecting stability of the structure.	1	4	8	Watching brief during construction by contractor Treatment of loose and voided ground if encountered. If treatment (compaction grouting) is required, this will need to be designed
			Floor slab failure.	1	4	4	
		Roads and Pavements	Serviceability affected.	1	3	3	
		Services.	Damage to services. Leaking drainage	1	3	3	

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
			causing inundation and further collapse.				and undertaken by a specialist.
		Gardens.	Depression or void forming at the surface.	1	3	3	
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	1	3	3	
Cont….							
Cavities in the Superficial Deposits, due to solution features.	Unlikely but possible in the limestone. Not encountered during investigations.	Residential Dwellings.	Reduction of lateral support potentially affecting stability of the structure.	1	5	5	Watching brief during construction by contractor Treatment of loose and voided ground if encountered. If treatment (compaction grouting) is required, this will need to be designed
			Floor slab failure.	1	5	5	
		Roads and Pavements.	Serviceability affected.	1	3	3	
		Services.	Damage to services. Leaking drainage	1	3	3	

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
			causing inundation and further collapse.				and undertaken by a specialist.
		Gardens.	Depression or void forming at the surface.	1	3	3	
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	1	3	3	
Unforeseen ground conditions - risk associated with limited data.	Ground investigation has been undertaken. However, additional information will be obtained during construction. Ground conditions are only defined at exploratory hole locations.	All aspects of the development		3	4	12	Designers to be contacted if conditions encountered are different to those identified during investigation. Regular inspections of excavations and earthworks for evidence of stability. Adequate investigation required to characterise the site and understand the potential risks.

Whilst the probability and impact of the hazard occurring can be reduced to a minimum by geotechnical design, the impact cannot be reduced below very low. The risk register will need to be up-dated, as necessary, to reflect design, additional information, data and experience as it is gained through the construction process.

Impacts of the design with regard to health and Safety considerations will need to be included by the designer at design stage.

Appendix G Plausible source-pathway-receptor contaminant linkages

Summary of potential contaminant linkages

Table K.2 lists the plausible contaminant linkages which have been identified. These are considered as potentially unacceptable risks in line with guidelines published in LCRM (2019) and additional risk assessment is required.

Source – Pathway – Receptor Linkages have been assessed in general accordance with guidance in CIRIA Report C552 (Rudland *et al* 2001) but modified to add a 'no linkage' category and to remove low/moderate risk (See Table K.1).

It should be noted that whilst the risk assessment process undertaken in this report may identify potential risks to site demolition and redevelopment workers, consideration of occupational health and safety issues is beyond the scope of this report and need to be considered separately in the Construction Phase Health and Safety Plan.

Table K.1: Consequence versus probability assessment.

		Consequence			
Probability		Severe	Medium	Mild	Minor
	High Likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Very low risk
	Low Likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Very low risk	Very low risk	Very low risk
	No Linkage	No risk			

Table K.2: Exposure model – final source-pathway-receptor contaminant linkages

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
Pesticides and herbicides from agricultural practices both on and off-site (S1 & S7).	Ingestion or direct contact	Site users.	Low likelihood	Medium	Low	Pesticides and herbicides were not recorded at concentrations above their GAC's during any of the laboratory testing.
	Inhalation of fugitive dust.	Site users, Neighbours.	Low likelihood	Medium	Low	
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Low likelihood	Medium	Low	
	Surface run-off.	Aquatic ecosystems.	Low likelihood	Medium	Low	
	Base flow from contaminated groundwater.		Low likelihood	Medium	Low	
Hydrocarbon vapours from potential VOC and petroleum hydrocarbon spillages/leaks associated with farm machinery on site and off-site (S2 & S8)	Ingestion or direct contact.	Site users.	Low likelihood	Medium	Low	No visual or olfactory evidence of petroleum hydrocarbon leakages were identified during investigations. Petroleum hydrocarbons were not recorded in exceedance of their GAC during any of the laboratory testing.
	Inhalation of fugitive dust	Site users, Neighbours.	Low likelihood	Medium	Low	
	Inhalation of vapours.	Site users, Neighbours.	Low likelihood	Medium	Low	
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Low likelihood	Medium	Low	

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
	Surface run-off	Aquatic ecosystems, surface water and possible abstractions	Low likelihood	Medium	Low	
	Base flow from contaminated groundwater.		Low likelihood	Medium	Low	
PAH from on-site and off-site burning (identified as an activity undertaken very close to the site, and is likely to have occurred on site) (S3 &S9).	Ingestion or direct contact.	Site users.	Likely	Medium	Moderate	There is Made Ground associated with the track in the centre of the site, and there are PAH at levels in excess of the GAC. Mitigation measures will be required to break the SPR linkage. Apart from the Made Ground material associated with the track,
	Inhalation of fugitive dust	Site users, Neighbours.	Low likelihood	Medium	Low	
	Inhalation of vapours.	Site users, Neighbours.	Unlikely	Medium	Very low	However, this material may be suitable for use underneath hard standing.
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Low likelihood	Medium	Low	Testing indicates low leachability of contaminants.
	Surface run-off	Aquatic ecosystems, surface water and possible abstractions	Low likelihood	Medium	Low	
	Base flow from contaminated groundwater.		Low likelihood	Medium	Low	No elevated concentrations of metals, metalloids and PAH in groundwater samples, when compared to the WQT.
	Root uptake.	Landscape planting	Unlikely	Mild	Very Low	Screening of results against GAC for plant life did not indicate any exceedances.

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
						Made Ground is unlikely to be a suitable growing material.
	Direct Contact	Water Supply Pipes	Likely	Minor	Very Low	There are elevated concentrations of contaminants with regard to potable water supply pipes, within this Made Ground material. Therefore, barrier pipes are required for water pipelines installed in this material, subject to agreement with the water supply company.
Spreading waste on agricultural land (identified as an activity undertaken very close to the site and is likely to have occurred on site) (S4 & S10)	Ingestion or direct contact.	Site users.	Low likelihood	Medium	Low	No CoPC's were in exceedance of their GAC's in the agricultural land across the site.
	Inhalation of fugitive dust	Site users, Neighbours.	Low likelihood	Medium	Low	
	Inhalation of vapours.	Site users, Neighbours.	Low likelihood	Medium	Low	
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Low likelihood	Medium	Low	
	Surface run-off	Aquatic ecosystems, surface water and possible abstractions	Low likelihood	Medium	Low	
	Base flow from contaminated groundwater.		Low likelihood	Medium	Low	
Use of waste in construction: asbestos waste was	Inhalation of fibres.	Site users.	Unlikely	Severe	Low	Asbestos was not identified in the laboratory testing of soil samples.
		Neighbours.	Unlikely	Severe	Low	

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
historically commonly used to reinforce/repair site entrances (identified as an activity undertaken close to the site, and likely to have occurred on site) (S6 & S11)						
Made Ground associated with the track in the centre of the site (S12)	Ingestion, inhalation or direct contact.	Site users.	Likely	Medium	Moderate	There is Made Ground associated with the track in the centre of the site, and there are PAH at levels in excess of the GAC. Mitigation measures will be required to break the SPR linkage. However, this material may be suitable for use underneath hard standing.
	Inhalation of fugitive dust.	Neighbours.	Low likelihood	Medium	Low	
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Low likelihood	Medium	Low	Testing indicates low leachability of contaminants. No elevated concentrations of metals, metalloids and PAH in groundwater samples, when compared to the WQT.
	Surface run-off.	Aquatic ecosystems.	Low likelihood	Medium	Low	

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
	Base flow from contaminated groundwater.	Surface water and possible abstractors.	Low likelihood	Medium	Low	No elevated concentrations of metals, metalloids and PAH in groundwater samples, when compared to the WQT.
	Root uptake.	Landscape planting	Likely	Minor	Very Low	Concentrations of metals are not significantly elevated with regard to plant growth in this material.
	Direct Contact	Water Supply Pipes	High likelihood	Mild	Moderate	There are elevated concentrations of contaminants with regard to potable water supply pipes, within this Made Ground material. Therefore, barrier pipes are required for water pipelines installed in this material, subject to agreement with the water supply company.
General Made Ground across the main site and additional works areas (S8)	Ingestion, inhalation or direct contact.	Site users.	Low likelihood	Medium	Low	No CoPC's were in exceedance of their GAC's in the 'general' Made Ground across the site.
	Inhalation of fugitive dust.	Neighbours.	Low likelihood	Medium	Low	

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
	Leaching through unsaturated zone.	Groundwater and possible abstractors.	Low likelihood	Medium	Low	
	Surface run-off.	Aquatic ecosystems.	Low likelihood	Medium	Low	
	Base flow from contaminated groundwater.	Surface water and possible abstractors.	Low likelihood	Medium	Low	
	Root uptake.	Landscape planting	Unlikely	Medium	Very low	Concentrations of metals are not significantly elevated with regard to plant growth in this material.
	Direct Contact	Water Supply Pipes	Unlikely	Medium	Very low	No CoPC's in relation to water supply pipes were in exceedance of the UKWIR limits.

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
Ground gases (carbon dioxide and methane) across the site	Migration, build up and asphyxiation.	Site users. Neighbours.	Low likelihood	Medium to Severe Medium	Low risk Moderate	Ground gas monitoring has indicated no concentrations of methane above the detection limits of the analytical apparatus. CS1 conditions and no mitigation required for methane.
Radon	Inhalation.	Site users.	Unlikely	Severe	Low	BR211 indicates the site is in a low radon area and no radon protection is required.