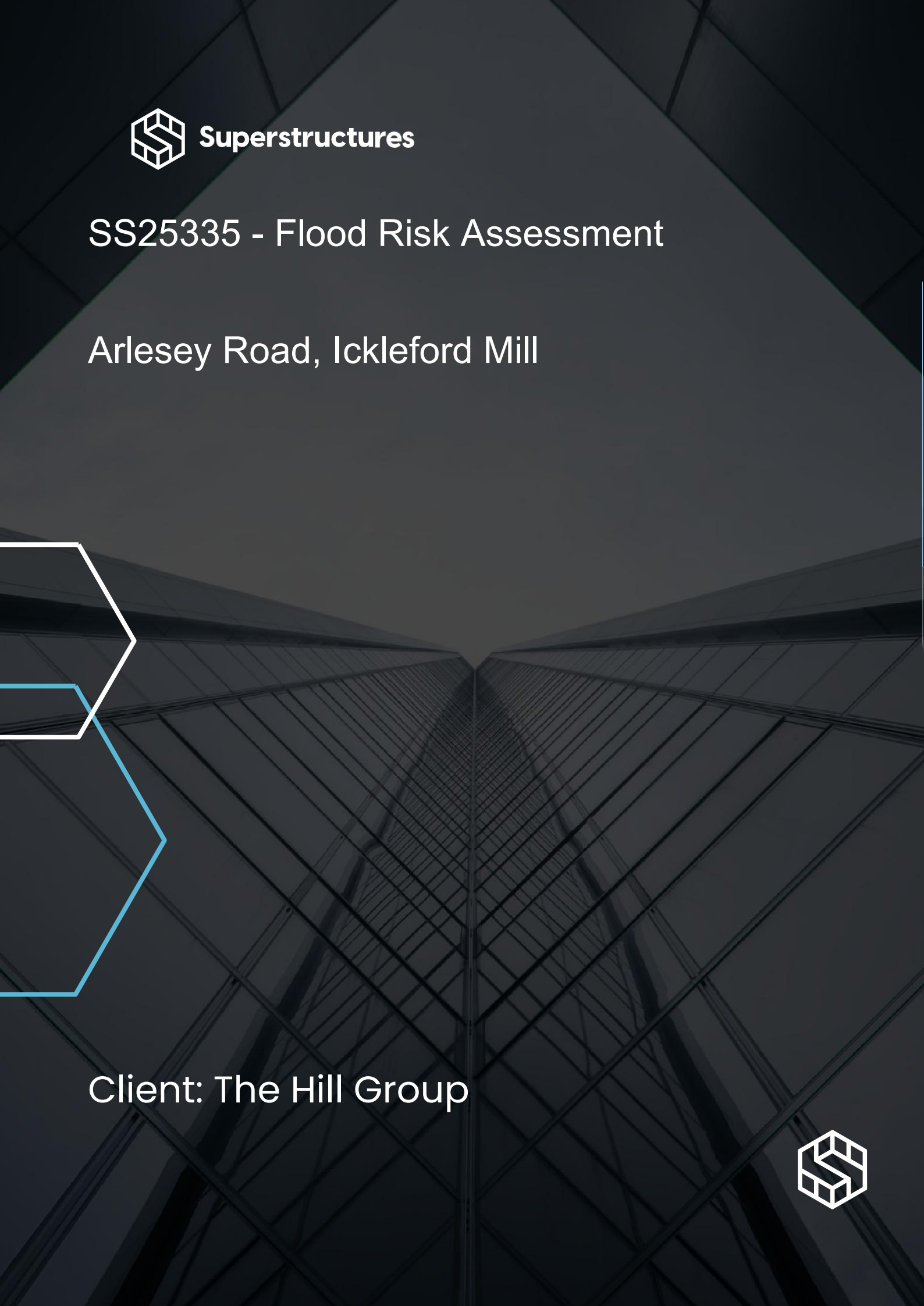


Superstructures

SS25335 - Flood Risk Assessment

Arlesey Road, Ickleford Mill

Client: The Hill Group

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Report No.: SUS-ZZ-XX-T-C-00001

Client: The Hill Group

Site: Arlesey Road, Ickleford Mill

Date: 05th March 2026

Title: Flood Risk Assessment

Status: Preliminary

Author Luke Lockyer

Technical Approver George Westgarth

Signature 

Signature 

Issue No	Version/ Details	Date Issued	Author	Reviewed by	Approved by
01	First Issue	20.02.2026	GW	LL	GW
02	Updated to suit client comments	27.02.2026	GW	LL	GW
03	Latest drainage layout included	05.03.2026	LL	LL	GW

1. Introduction

1.1. Superstructures has been appointed by The Hill Group to undertake a Flood Risk Assessment and prepare the accompanying surface and foul water strategies for a new residential development proposed at Ickleford Mill, North Hertfordshire.

1.2. This report has been prepared to support a reserved matters planning application to re-develop the existing industrial site and erect 55 new homes, including new vehicular and other modes access to Arlesey Road.

1.3. Outline planning permission 17/01955/1 was granted on 11 March 2024 for "Outline Planning application for up to 71 dwellings and associated access, car parking, garages, landscaping and open space including demolition and removal of all existing structures, buildings and hardstanding (all matters reserved except means of access).

1.4. The principle of the proposed development is therefore established.

1.5. This report seeks to address conditions 20 and 22 of Outline Planning Permission 17/01955/1, which are:

1.6. *20.* No development (other than demolition works) approved by this planning permission shall take place until a detailed surface water drainage scheme has been submitted to, and approved in writing by, the local planning authority. The surface water drainage system will be based on the submitted Flood risk Assessment carried out by Wormald Burrows Partnership Limited reference E3631-frareport-0917-Rev1 dated July 2017. The surface water drainage scheme should include;

(i) Implementing the appropriate drainage strategy based on attenuation and discharge into the River Oughton, using appropriate above ground SuDS measures.

(ii) Limiting the surface water run-off generated by the 1 in 100 year + 40% for climate change critical storm to greenfield runoff rates. Alternatively undertake modelling of the scheme to ensure there are no impacts from the unrestricted proposed discharge rate.

(iii) Providing attenuation to ensure no increase in surface water run-off volumes for all rainfall events up to and including the 1 in 100 year + climate change event (iv) Detailed engineered drawings of the proposed SuDS features including their, location, size, volume, depth and any inlet and outlet features including any connecting pipe runs and all corresponding calculations/modelling to ensure the scheme caters for all rainfall events up to and including the 1 in 100 year + 40% allowance climate change event. The plan should show any pipe 'node numbers' that have been referred to in network calculations and it should also show invert and cover levels of manholes.

1.7. *22.* No development (other than demolition works) shall commence until a foul water strategy has been submitted to and approved in writing by the Local Planning Authority. No dwellings shall be occupied until the works have been carried out in accordance with the foul water strategy so approved unless otherwise approved in writing by the Local Planning Authority.

1.8. The site is situated entirely within Flood Zone 1, and the development area is approximately 3.6ha. As the development area is over 1ha, a formal site-specific flood risk assessment is required. Therefore this report will be following the principles outlined within the National Planning Policy Framework (NPPF), National Standards for Sustainable Drainage Systems (NSSuDS) and accompanying web-based planning policy guidance to support the application.

1.9. The NPPF was first published in March 2012 and has later been updated in February 2025 by the Department for Communities & Local Government (now referred to as the Ministry of Housing, Communities and Local Government) and is now considered the standard for Flood Risk and Surface Water Management Statements alongside the NSSuDS (published July 2025).

1.10. This report aims to demonstrate to the Local Planning Authority and Statutory Consultees that the existing site can be successfully developed whilst adhering to the requirements of the NPPF and NSSuDS. Supporting evidence will be presented in the following sections of this report to allow the planning application to be considered in terms of flood risk and surface and foul water disposal.

1.11. This report seeks to set out an intended scheme for the disposal of surface and foul water from the proposed development. However, it is anticipated compliance with the suggested scheme and any further detail such as relating to management will be subject to conditions.

2. Existing Site Parameters

Site Location

2.1. The proposed development lies to the east of Arlesey Road. The nearest postcode is SG3 3UR, grid reference TL 18204 31293.



Figure 1 - Site Location

2.2. The site is bound by agricultural/greenfield land to the north and west, the River Oughton to the south and Arlesey Road to the east. The application site boundary comprises an area of approximately 3.6ha. The site comprises mostly of developed brownfield land which served as the former mill and associated silos, warehouses and yard areas. There is an area of undeveloped greenfield land south of the River Oughton, as shown by the below figure:



Figure 2 - Aerial Site Imagery

Site Topography

2.3. A detailed topographical survey of the existing site was undertaken by Terrain Surveys Ltd in November 2016. All finished ground levels are related to Ordnance Survey datum. The topographical survey confirms the site is developed brownfield and greenfield land. The survey indicates the site is generally flat with levels sloping towards the east of the site at a gradient of approximately 1:90. A copy of the detailed topographical survey has been provided within **Appendix A** of this report for further reference.



FIGURE 3 – TOPOGRAPHICAL SURVEY EXTRACT

SITE GEOLOGY

2.4. The British Geological Survey map records held for the local area indicate the site is underlain by Gault Formation Mudstone, along with superficial deposits of Glaciofluvial deposits, as shown by Figure 4. This is supported from data provided from a ground investigation report provided by Enzygo, this report can be seen in **Appendix G**.

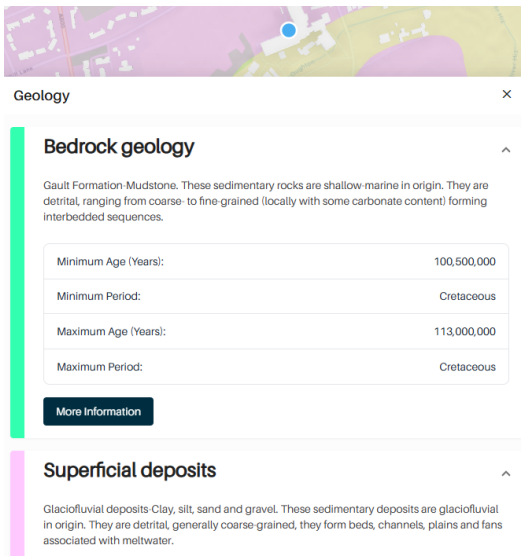


FIGURE 4 – BRITISH GEOLOGICAL SURVEY MAP EXTRACT

INFILTRATION FEASIBILITY

2.5. Adopting the national SuDS hierarchy, the use of infiltration techniques as a method of surface water disposal should be considered in the first instance. If infiltration can be successfully utilised, the required post-development surface water run-off attenuation provision could be reduced and would also help to replicate existing, pre-development surface water drainage conditions.

2.6. A Site Investigation was undertaken by Enzygo, and a report issued August 2024. The report concludes infiltration would not likely be feasible due to widespread presence of impermeable clay deposits, made ground and shallow groundwater beneath the site.

2.7. The site is not designated to be within any Source Protection Zone, however all proposed positive SuDS features within the scheme will be lined with impermeable membrane to ensure no surface water infiltrates to ground prior to the final discharge locations. This can be seen in Appendix D.

HYDROLOGY

2.8. Adopting the national SuDS hierarchy, if infiltration was not suitable, the next preferred option for disposal of surface water from a development would be to an available nearby watercourse. As the River Oughton is located within the site boundary, this proves a feasible location to discharge surface water.

EXISTING PUBLIC SEWER ASSETS

2.9. The public sewer asset record plans obtained for the local area from Anglian Water confirm there are no sewers traversing the site. Therefore, no diversionary works anticipated for their assets as a result of the scheme's implementation.

2.10. The record plans also show there are two potential foul connections available to the site, one within Arlesey Road to the east, and another located south of the site - approximately 200m away. Anglian Water had previously been consulted on the feasibility of connecting to the nearest sewer and advised there are currently flooding issues within the foul system. It has been recommended to have a foul water pumped scheme to discharge to the southern point of connection.

2.11. A copy of the public sewer asset record plans has been included within **Appendix B** of this report for further reference.

3. Flood Risk Assessment

Tidal & Fluvial Flooding

3.1. The Environment Agency's indicative flood plain mapping indicates the site's developable area is not deemed to be situated within the undefended flood plain. Although nearby an ordinary watercourse, the associated flood risk is kept within the watercourses boundaries, as illustrated in Figure 5 below:

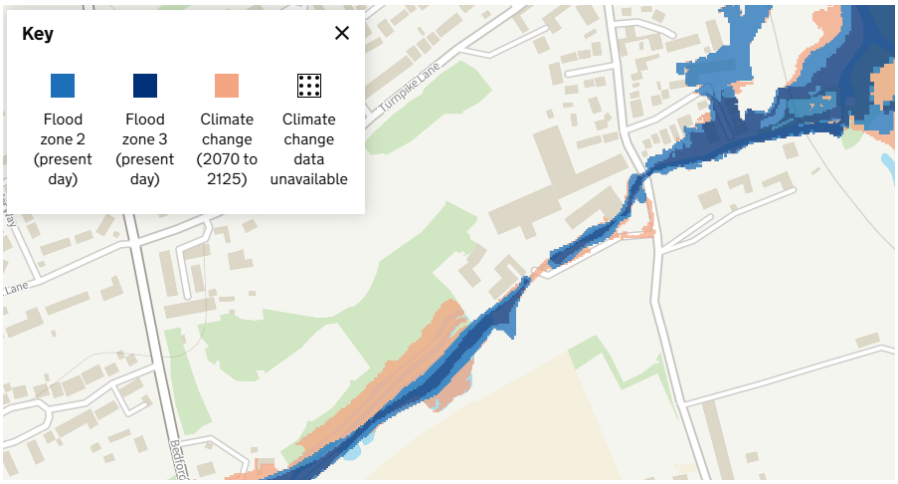


Figure 5 – Environment Agency Flood Map

3.2. The site is therefore classified as being within Flood Zone 1, which is defined as land having a low probability of tidal or fluvial flooding (less than 0.1% annual probability).

3.3. The NPPF's Planning Practice Guidance (Annex 3: Flood Risk Vulnerability Classification), classifies residential dwelling schemes as a 'more vulnerable' land-class usage in terms of flood risk. Therefore, in accordance with NPPF Annex 3: Flood Risk Vulnerability Classification, the site is considered appropriate for the development due to its location situated in Flood Zone 1.

Other Potential Sources of Flooding

3.4. A further review of Environment Agency indicative flood map records confirms the site is not shown to be at risk of pluvial/surface water flooding for the low (1:1000-year scenario) or medium risk (1:100-year scenario). Although the flood maps indicate there some localised areas of surface water flood, after reviewing topographical data this appears to be a low point within concrete hardstanding. It is proposed for this to be removed and to extinguish all risks of surface water flooding in this area. The surface water flooding extents can be seen illustrated by Figure 6:

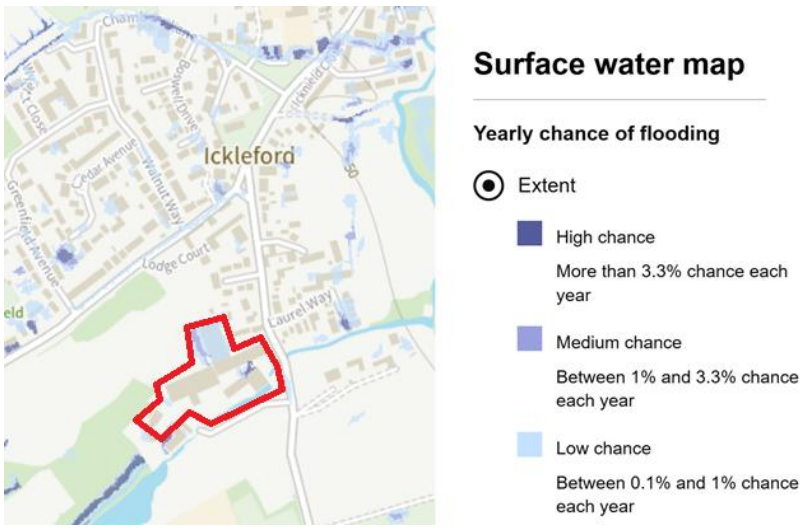


FIGURE 6 – LOCALISED PLUVIAL/SURFACE WATER FLOODING

3.5. Proposed finished floor levels of dwellings should adhere to normal good practice and be raised above existing ground levels, with external finishes designed to fall away from buildings. This should minimise the risk of minor localised ponding or overland surface flows from encroaching into proposed buildings.

3.6. Environment Agency records also confirm the site is not shown to be affected by flooding as a result of a breach of a nearby reservoir.

3.7. In view of this assessment, it is concluded the development site is at low risk of flooding from any source of fluvial, tidal, pluvial, surface water, groundwater or reservoir breach.

4. Surface Water Drainage Strategy

Development Proposals

4.1. A layout for the proposed site has been prepared by Hill which can be seen illustrated in Figure 7 below:



Figure 7 – Development Site Layout

4.2. A detailed version of the proposed site layout plan has been provided within **Appendix C** of this report for further reference.

Pre-Development Discharge Rates

4.3. According to the topographical survey, the application comprises of a mixture of brownfield and greenfield areas which comprises an area of 3.6ha which is calculated to generate a peak surface water greenfield run-off rate of 7.2 litres /sec for the 1:1-year rainfall event, as illustrated in Figure 8:

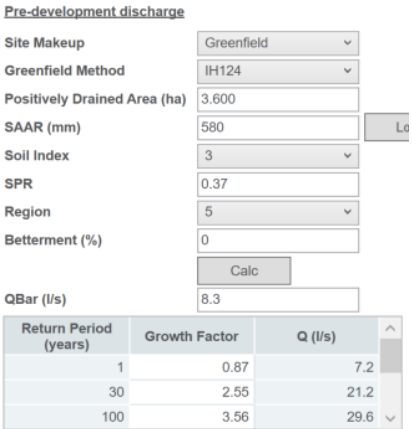


Figure 8 – Pre-Development Greenfield Run-off Rate

4.4. It is therefore concluded for the proposed development; a discharge rate of 7.2 litres/sec should be used as the limit for all proposed rainfall events.

Post-Development Catchment Areas & Run-off Rates

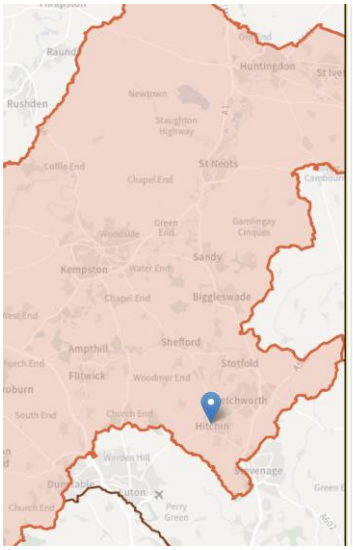
4.5. A total post-development impermeable area of 5,020m^2 has been calculated based on the proposed site layout, comprising roof areas, access roads and parking provisions, with the remainder of the site being permeable or soft landscaping.

4.6. However, for the purpose of quantifying the impact of future urban creep, an additional 10% factor of safety has been applied to the total proposed house roofs, increasing the total by 403m^2 to account for any potential construction of domestic extensions or additional hardstanding. Consequently, a total impermeable area of 5,423m^2 will be considered within the hydraulic modelling of the proposed surface water drainage scheme.

Attenuation Provision

4.7. The surface water drainage strategy for the development will adopt appropriate forms of sustainable drainage systems (SuDS) to comply with the requirements of the NPPF and to ensure post-development surface water flood volumes are managed on-site in a sustainable manner.

4.8. Attenuation will be provided within the application site to manage the calculated peak run-off volumes required during rainfall events up to and including the 1:100-year (1% AEP) event inclusive of a 40% climate change allowance in accordance with the Environment Agency's peak rainfall allowance guidance for sites within the Upper and Bedford Ouse Management Catchment, as shown by Figure 9:



Upper and Bedford Ouse Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	35%
2070s	25%	35%

1% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	40%
2070s	25%	40%

Figure 9 – Peak Rainfall Climate Change Allowance

Surface Water Drainage Strategy

4.9. A Surface Water Drainage Strategy incorporating sustainable drainage systems (SuDS), has been prepared for the purposes of this assessment and to demonstrate how surface water run-off from the proposed development will be effectively managed and disposed of whilst simultaneously reducing the risk of flooding.

4.10. The key principles of the proposed surface water drainage strategy for the development are summarised as follows:

- Due to the levels of the site, the surface water drainage networks will be split into two locations (east and west) prior to separately discharging into the local ordinary watercourse.
- The eastern catchment will utilise permeable pacing where feasible to capture surface water as close to the source as possible. Due to levels and location, this catchment will require the use of a downstream defender to capture any remaining pollutants prior to discharging into the river at a restricted rate of 1.2l/s
- The western catchment will also utilise permeable paving where feasible. The surface water will then be conveyed west to a detention basin, which will be utilised for further pollutant mitigation and storage. Surface water will then discharge into the watercourse at a rate of 6l/s.
- The combined discharge rate for the site will be 7.2l/s, as per the greenfield runoff rate.
- Hydraulic modelling of the network demonstrates the strategic network can withstand the 1:100-year (1% AEP) peak rainfall event, inclusive of an additional 40% climate change allowance without flooding.

4.11. The surface water drainage strategy drawing **25355-SUS-XX-XX-DR-C-00010** has been included within **Appendix D**. As shown on the drainage strategy, the surface water network is split into two separate catchments / networks. As such, they have been hydraulically modelled separately. The corresponding detailed network hydraulic simulation results for the 'east' and 'west' networks have been provided within **Appendix E** and **Appendix F** respectively, for reference.

Water Quality Treatment Assessment

4.12. The following series of tables outline the water quality assessment in accordance with CIRIA SuDS Manual 753. As the scheme would fall within the 'property drives, residential car parks and low traffic roads' land use, it would fall within the 'low' pollution hazard indices, as outlined in table 26.2, Chapter 26 of the CIRIA SuDS Manual 753.

Land-use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul-de-sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day	**Low**	**0.5**	**0.4**	**0.4**
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways	High	0.8	0.8	0.9

Table 1: Pollution Hazard Indices for Different Land-use Classifications

Type of SuDS component	Mitigation indices		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bio retention system	0.8	0.8	0.8
Permeable pavement	**0.7**	**0.6**	**0.7**
Detention Basin	**0.5**	**0.5**	**0.6**
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Downstream Defender (Proprietary Treatment System*)	**0.5**	**0.4**	**0.8**
*Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1-year return period event, for inflow concentrations relevant to the contributing drainage area.		

TABLE 2: INDICATIVE SUDS MITIGATION INDICES

Individual property driveways, residential car parks, low traffic roads (e.g., cul-de-sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., < 300 traffic movements/day			
	Required mitigation indices		
Source	**TSS**	**Metals**	**Hydro-carbons**
Low	0.5	0.4	0.4
Mitigation Indices			
Permeable Pavement *(Mitigation index$_1$)*	0.7	0.6	0.7
Basin *(Mitigation index$_2$)*	0.25 (0.5 x 0.5)	0.25 (0.5 x 0.5)	0.3 (0.6 x 0.5)
Downstream Defender *(Mitigation index$_2$)*	0.25 (0.5 x 0.5)	0.20 (0.4 x 0.5)	0.4 (0.8 x 0.5)
Total Performance	≥1.0	≥1.0	≥1.0
Check	**Criteria Exceeded**	**Criteria Exceeded**	**Criteria Exceeded**

Total SuDS mitigation index = mitigation index$_1$ + (0.5 x mitigation index$_2$) +

TABLE 3: INDICATIVE SUDS MITIGATION CRITERIA ASSESSMENT

4.13. The above tables 1-3 conclude the proposed SuDS features provided in the drainage strategy satisfy the water quality treatment criteria for the type and size of the application site in accordance with CIRIA SuDS Manual 753.

MAINTENANCE REGIME

4.14. To ensure the system is regularly and appropriately managed and maintained, it is anticipated the external drainage systems will be placed under a formal agreement with an independent maintenance company to carry out periodic inspections and any necessary remediation/maintenance works; thus safeguarding the long-term operational performance of the proposed drainage system and SuDS components within the development. A maintenance strategy has been provided within **Appendix H**.

5. Foul Water Drainage Strategy

5.1. Public sewer records for the local area have been obtained from the Statutory Sewerage Undertaker for the region (Anglian Water) which indicate there are existing foul water sewer networks present around the proposed site. From previous consultations it has been known the most direct connection within Arlesey Road is prone to flooding. Therefore it has been recommended to privately pump the foul water south approximately 200m to a more viable connection to the existing sewer system.

6. Conclusion

6.1. Superstructures has been appointed by The Hill Group to undertake a Flood Risk Assessment for a new 55-unit residential scheme and associated infrastructure, situated at Ickleford Mill.

6.2. The site is bound by agricultural/greenfield land to the north and west, the River Oughton to the south and Arlesey Road to the east. The application site boundary comprises an area of approximately 3.6ha.

6.3. The topographical survey confirms the site is a mix of both brownfield and greenfield land. The site is generally flat with levels falling towards the east at an approximate gradient of 1:90.

6.4. The discharge rate for the site should be restricted to 7.2l/s to match existing greenfield runoff rates.

6.5. The surface water strategy will incorporate SuDS features including permeable paving, attenuation basins and downstream defenders to provide adequate storage and for surface water. Sufficient storage prior to infiltration will be effective for all storm events up to 1 in 100 + 40% climate change.

6.6. Overland surface water run-off will be collected in a series of permeable paving areas, high-level conveyance swales and attenuation basin, reducing the risk of flooding within the site.

6.7. The foul water strategy will be designed to pump privately and discharge via gravity to the existing water authorities foul water sewers assets within the vicinity of the site.

6.8. The LLFA were engaged during the design process for a pre-app meeting to review the scheme proposals. The post-meeting response provided by the LLFA can be seen in Appendix I.

Appendix A – Topographical Survey

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North

This survey is related to OSGB36(15) coordinate system by GPS 'rapid static' methods. No scale factor has been applied to the survey information. All horizontal distances taken from this drawing are ground distances.

Survey Note:
Previous survey TS16–421 has been left as a block and greyscaled. No verification has taken place on the existing survey except for re-surveyed information on the road.

Co-ordinate Table			
Station	Easting	Northing	Level
C1	518285.110	231440.116	52.031
C2	518287.306	231356.168	51.509
C3	518318.963	231312.526	51.826
C4	518319.501	231246.418	52.016
C20	518298.073	231377.411	51.471
C40	518204.891	231218.586	53.267
C200	518204.890	231218.589	53.269
C400	518120.479	231198.395	54.278
C4000	518095.417	231244.087	56.198
C4001	518114.374	231240.066	56.537

KEY

Survey control station
Gate (single)
Gate (double)
Tree Spread and Girth shown to scale
Step Up
Banking
Foliage Line
Drainage run, direction of flow and pipe size
Approximate Position
Ramp Up

ABBREVIATIONS

Air Handling Unit	AHU	Water Meter	WM
Bellsha Beacon	BB	Eaves Level	EL
Bollard	BD	Ridge Level	RL
Borehole	BH	Roof Level	RFL
BT Inspection Cover	BT	Soffit Level	SFL
Cable Television Cover	CTV	Threshold Level	THL
Drainage Channel	DC	Parapet Wall Level	PWL
Electricity Cover	EC	Finished Floor Level	FFL
Electricity Pole	EP	Head Level	HL
Earth Rod	ER	Sill Level	SL
Fire Hydrant	FH	Cover Level	CL
Gas Valve	GV	Invert Level	IL
Gate Post	GP	No Visible Pipes	NVP
Gully	GY	Unable to Lift	UTL
Inspection Cover	IC	Foul Water	FW
Junction Box	JB	Sump Level	SUL
Kerb Outlet	KO	Surface Water	SW
Lamp Post	LP	Brick Paviors	BP
Manhole	MH	Concrete	CON
Marker Post	MK	Concrete Paving Slabs	CPS
Post	P	Flower Bed	FIB
Post Box	PB	Shrub Bed	SIB
Pipe	PE	Tactile Paving	TAC
Road Sign	RS	Unsurfaced	UNS
Rodding Eye	RE	Brick Wall	BW
Marker Post	MK	Retaining Wall	RW
Sign Post	SP	Chainlink Fence	CLF
Stop Valve	SV	Chestnut Paling Fence	CPF
Stop Tap	ST	Iron Railing Fence	IRF
Telegraph Pole	TP	Metal Security Fence	MSF
Traffic Light	TL	Post and Chain Fence	PCF
Vent Pipe	VP	Post and Wire Fence	PWF
Post and Rail Fence	PRF	Rain Water Pipe	RWP
Wooden Panel Fence	WPF	Soil Vent Pipe	SVP

Client
HILL GROUP

Project
ICKLEFORD MILL
ARLESEY ROAD
ICKLEFORD

Title
TOPOGRAPHICAL SURVEY

Drawing Number
TS25-797-1

Revision	Description	Rev. By	Date

Scale 1:200@A0 | Sheet 1 of 3

Drawn by	Checked by	Date of Survey
RM	JS	NOV 2025

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SSIP Registered Member
Acclaim Accreditation



Survey Note:
Previous survey TS16-421 has been left as a block and greyscaled. No verification has taken place on the existing survey except for re-surveyed information on the road.

SCALE BAR
2 0 10 metres

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C20	518298.073	231377.411	51.471
C40	518204.891	231218.586	53.267
C200	518204.890	231218.589	53.269
C400	518120.479	231198.395	54.278
C4000	518093.417	231246.087	56.198
C4001	518114.374	231240.066	56.537

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KEY

Survey control station
Gate (single)
Gate (double)
Tree Spread and Girth shown to scale
Step Up
Banking
Foliage Line
Drainage run, direction of flow and pipe size
Approximate Position
Ramp Up

ABBREVIATIONS

Air Handling Unit	AHU	Water Meter	WM
Belisha Beacon	BB	Eaves Level	EL
Bollard	BD	Ridge Level	RL
Borehole	BH	Roof Level	RFL
BT Inspection Cover	BT	Soffit Level	SFL
Cable Television Cover	CTV	Threshold Level	THL
Drainage Channel	DC	Parapet Wall Level	PWL
Electricity Cover	EC	Finished Floor Level	FFL
Electricity Pole	EP	Head Level	HL
Earth Rod	ER	Sill Level	SL
Fire Hydrant	FH	Cover Level	CL
Gas Valve	GV	Invert Level	IL
Gate Post	GP	No Visible Pipes	NVP
Gully	GY	Unable to Lift	UTL
Inspection Cover	IC	Foul Water	FW
Junction Box	JB	Sump Level	SUL
Kerb Outlet	KO	Surface Water	SW
Lamp Post	LP	Brick Paviors	BP
Manhole	MH	Concrete	CON
Marker Post	MK	Concrete Paving Slabs	CPS
Post	P	Flower Bed	F/B
Post Box	PB	Shrub Bed	S/B
Pipe	PE	Tactile Paving	TAC
Road Sign	RS	Unsurfaced	UNS
Rodding Eye	RE	Brick Wall	BW
Marker Post	MK	Retaining Wall	RW
Sign Post	SP	Chainlink Fence	CLF
Stop Valve	SV	Chestnut Paling Fence	CPF
Stop Tap	ST	Iron Railing Fence	IRF
Telegraph Pole	TP	Metal Security Fence	MSF
Traffic Light	TL	Post and Chain Fence	PCF
Vent Pipe	VP	Post and Wire Fence	PWF
Post and Rail Fence	PRF	Rain Water Pipe	RWP
Wooden Panel Fence	WPF	Soil Vent Pipe	SVP

Client
HILL GROUP

Project
ICKLEFORD MILL
ARLESEY ROAD
ICKLEFORD

Title
TOPOGRAPHICAL SURVEY

Drawing Number
TS25-797-2

Revision	Description	Rev. By	Date

Scale 1:200@A0 Sheet 2 of 3

Drawn by	Checked by	Date of Survey
RM	JS	NOV 2025

TERRAIN SURVEYS
Tel: 01438 841300
www.terrainsurveys.co.uk
enquiries@terrainsurveys.co.uk

Accreditations:
chartered ices
THE SURVEY ASSOCIATION
Certificate Number 1798
Constructionline Gold Member
SSIP Registered Member
Acclaim Accreditation

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North

This survey is related to OSGB36(15) coordinate system by GPS 'rapid static' methods. No scale factor has been applied to the survey information. All horizontal distances taken from this drawing are ground distances.

Survey Note:
Previous survey TS16–421 has been left as a block and greyscaled. No verification has taken place on the existing survey except for re–surveyed information on the road.

Co-ordinate Table			
Station	Easting	Northing	Level
C1	518285.110	231440.116	52.031
C2	518287.306	231356.168	51.509
C3	518318.963	231312.526	51.826
C4	518319.501	231246.418	52.016
C20	518298.073	231377.411	51.471
C40	518204.891	231218.586	53.267
C200	518204.890	231218.589	53.269
C400	518120.479	231198.395	54.278
C4000	518093.417	231244.087	56.198
C4001	518114.374	231240.066	56.537

KEY

Survey control station △ 5
Gate (single)
Gate (double)
Tree Spread and Girth shown to scale
Step Up
Banking
Foliage Line
Drainage run, direction of flow and pipe size 100
Approximate Position
Ramp Up ramp

ABBREVIATIONS

Air Handling Unit	AHU	Water Meter
Belisha Beacon	BB	Eaves Level
Bollard	BD	Ridge Level
Borehole	BH	Roof Level
BT Inspection Cover	BT	Soffit Level
Cable Television Cover	CTV	Threshold Level
Drainage Channel	DC	Parapet Wall Level
Electricity Cover	EC	Finished Floor Level
Electricity Pole	EP	Head Level
Earth Rod	ER	Sill Level
Fire Hydrant	FH	Cover Level
Gas Valve	GV	Invert Level
Gate Post	GP	No Visible Pipes
Gully	GY	Unable to Lift
Inspection Cover	IC	Foul Water
Junction Box	JB	Sump Level
Kerb Outlet	KO	Surface Water
Lamp Post	LP	Brick Paviors
Manhole	MH	Concrete
Marker Post	MK	Concrete Paving Slabs
Post	P	Flower Bed
Post Box	PB	Shrub Bed
Pipe	PE	Tactile Paving
Road Sign	RS	Unsurfaced
Rodding Eye	RE	Brick Wall
Market Post	MK	Retaining Wall
Sign Post	SP	Chainlink Fence
Stop Valve	SV	Chestnut Paling Fence
Stop Tap	ST	Iron Railing Fence
Telegraph Pole	TP	Metal Security Fence
Traffic Light	TL	Post and Chain Fence
Vent Pipe	VP	Post and Wire Fence
Post and Rail Fence	PRF	Rain Water Pipe
Wooden Panel Fence	WPF	Soil Vent Pipe

WM	Water Meter
EL	Eaves Level
RL	Ridge Level
RFL	Roof Level
SFL	Soffit Level
THL	Threshold Level
PWL	Parapet Wall Level
FFL	Finished Floor Level
HL	Head Level
SL	Sill Level
CL	Cover Level
IL	Invert Level
NVP	No Visible Pipes
UTL	Unable to Lift
FW	Foul Water
SUL	Sump Level
SW	Surface Water
BP	Brick Paviors
CON	Concrete
CPS	Concrete Paving Slabs
F/B	Flower Bed
S/B	Shrub Bed
TAC	Tactile Paving
UNS	Unsurfaced
BW	Brick Wall
RW	Retaining Wall
CLF	Chainlink Fence
CPF	Chestnut Paling Fence
IRF	Iron Railing Fence
MSF	Metal Security Fence
PCF	Post and Chain Fence
PWF	Post and Wire Fence
RWP	Rain Water Pipe
SVP	Soil Vent Pipe

Client
HILL GROUP

Project
ICKLEFORD MILL
ARLESEY ROAD
ICKLEFORD

Title
TOPOGRAPHICAL SURVEY

Drawing Number
TS25-797-3

Revision	Description	Rev. By	Date

Scale 1:200@A0 Sheet 3 of 3

Drawn by	Checked by	Date of Survey
RM	JS	NOV 2025

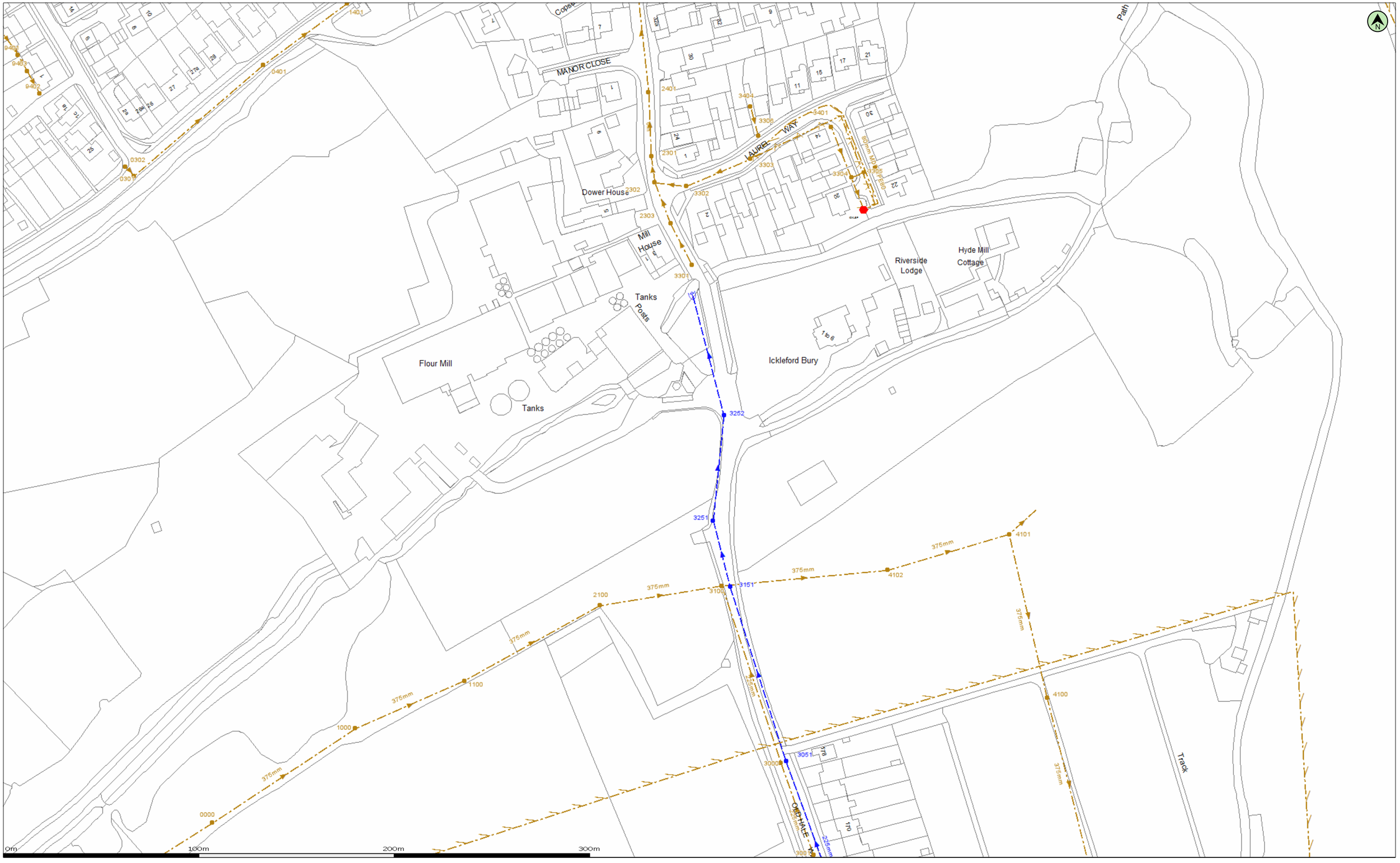
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Accreditations:
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Certificate Number 7798
Constructionline Gold Member
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Acclaim Accreditation

2 0 10 metres
SCALE BAR

518300E
518100E
231300N
231250N
231200N

Appendix B – Existing Public Sewer Asset Record Plans



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Date: 10/04/17

Scale: 1:1250

Map Centre: 518308,231249

Data updated: 28/02/17

Our Ref: 219224 - 1

Wastewater Plan A2

This plan is provided by Anglian Water pursuant its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2017 Ordnance Survey 100022432.This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

- Foul Sewer
- Surface Sewer
- Combined Sewer
- Final Effluent
- Rising Main (Colour denotes effluent type)
- Private Sewer (Colour denotes effluent type)
- Decommissioned Sewer (Colour denotes effluent type)
- Outfall (Colour denotes effluent type)
- Inlet (Colour denotes effluent type)
- Manhole (Colour denotes effluent type)
- Sewage Treatment Works
- Pumping Station

twilson@wormburp.com

E3631 - Arlesey Road

love every drop anglianwater

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0000	F	54.371	52.421	1.95
0301	F	58.198	56.108	2.09
0302	F	-	-	-
0401	F	56.442	54.532	1.91
1000	F	54.437	52.132	2.305
1100	F	54.735	51.925	2.81
1401	F	55.143	53.663	1.48
2100	F	54.352	51.712	2.64
2301	F	51.663	49.813	1.85
2302	F	-	-	-
2303	F	51.436	50.036	1.4
2401	F	51.774	49.634	2.14
3000	F	54.607	52.417	2.19
3001	F	55.208	52.833	2.375
3100	F	53.252	51.537	1.715
3301	F	51.441	50.201	1.24
3302	F	-	-	-
3303	F	-	-	-
3304	F	-	-	-
3305	F	-	-	-
3306	F	-	-	-
3401	F	-	-	-
3404	F	-	-	-
4100	F	52.683	50.828	1.855
4101	F	52.713	51.078	1.635
4102	F	53.047	51.317	1.73
9400	F	-	-	-
9401	F	-	-	-
9402	F	-	-	-
9403	F	-	-	-
3051	S	54.607	-	-
3151	S	53.252	-	-
3251	S	-	-	-
3252	S	-	-	-

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Appendix C – Proposed Development Site Layout

Rev. No.	Date.	Amendment.	Initial.



Hill
Created for Living

Client:
Hill Residential Limited
The Courtyard, Abbey Barns,
Ickleton, CB10 1SX

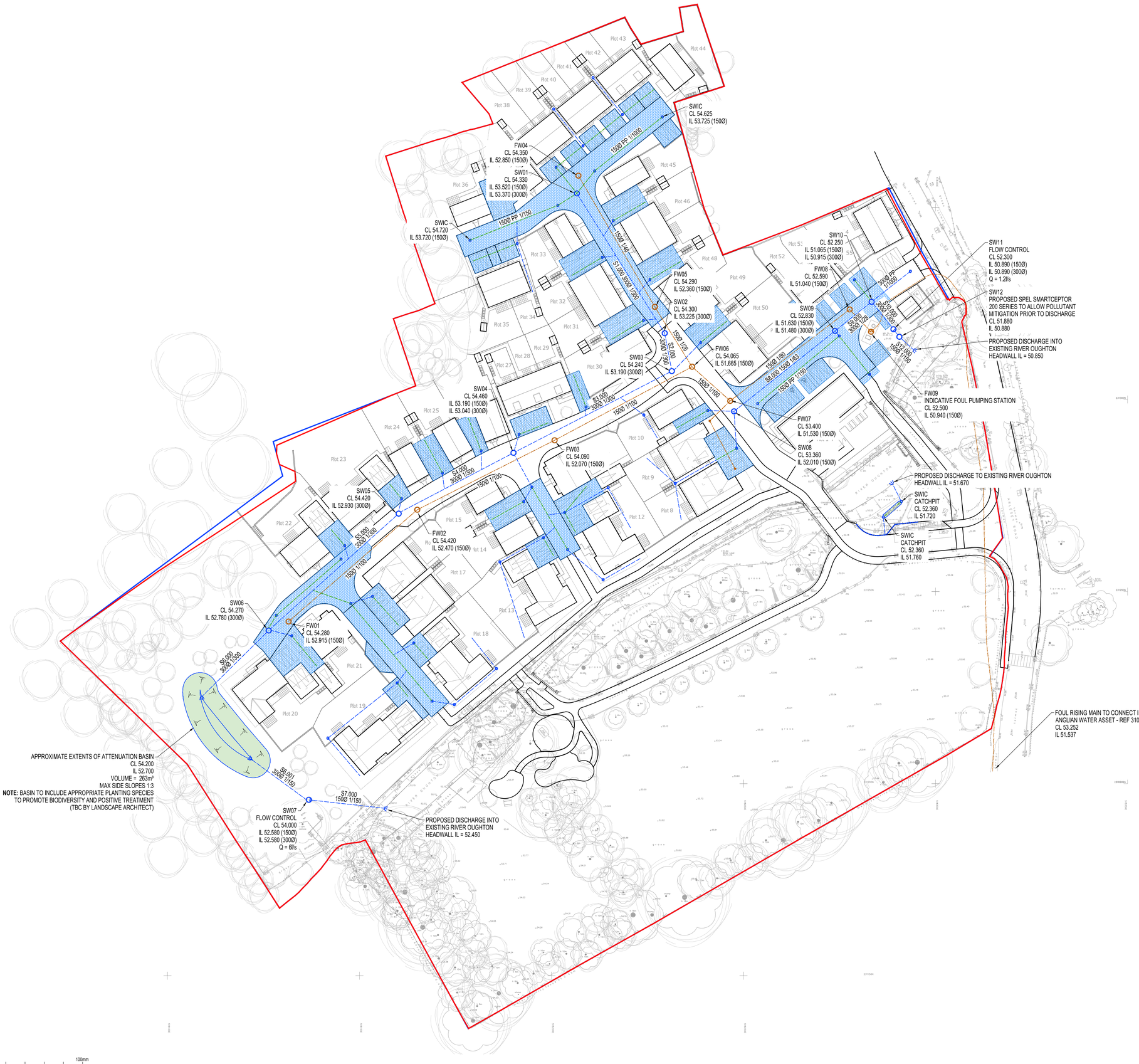
Project:
Ickleford Mill
Ickleford, Hitchin
Hertfordshire

Drawing:
Proposed Site Layout

Scale:		Date:	
1:500@A1		June 2025	
Drawn By:	Checked By:	Drawing No:	Rev. No:
CK	PD	185-PA-103	N
CAD Ref:			

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All dimensions to be checked on site or in the workshop before work commences.
Only figured dimensions to be worked to. Any discrepancies to be reported to the Architect.

Appendix D – Drainage Strategy Plan



GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND ANY ASSOCIATED SPECIFICATION. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORKS.
2. DO NOT SCALE THIS DRAWING. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PRIOR PERMISSION FROM THE ENGINEER.
4. ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
5. THE CONTRACTOR SHALL, BEFORE COMMENCING THE WORKS, VERIFY ALL SITE AND SETTING OUT DIMENSIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRUE AND PROPER SETTING OUT OF THE WORKS AND FOR THE CORRECTNESS OF THE POSITION, LEVELS, DIMENSIONS, AND ALIGNMENT OF ALL PARTS OF THE WORKS.
6. THE CONTRACTOR SHALL UNDERTAKE SUCH MATERIALS TESTING AS INDICATED IN THE SPECIFICATIONS AND SHALL INCLUDE THE COST OF TESTING IN THE TENDER.
7. ALL EXCAVATED MATERIAL WHERE NOT SUITABLE FOR REUSE SHALL BE DISPOSED OF AT AN APPROVED TIP OFF-SITE.
8. THIS DRAWING IS FOR THE PRIVATE AND CONFIDENTIAL USE OF THE CLIENT FOR WHOM IT WAS UNDERTAKEN AND IT SHOULD NOT BE REPRODUCED IN WHOLE OR IN PART OR RELIED UPON BY THIRD PARTIES FOR ANY USE WITHOUT THE EXPRESS WRITTEN AUTHORITY OF SUPERSTRUCTURES.
9. ARCHITECTURAL / SITE LAYOUT BASED ON HILL DRAWING '185-PA-101' RECEIVED 04.02.2026.
10. TOPOGRAPHICAL SURVEY INFORMATION BASED ON TERRAIN SURVEYS LTD DRAWING 'TS16-421L' DATED NOVEMBER 2016.

CDM NOTES

THE ATTENTION OF THE CLIENT, PRINCIPAL DESIGNER, PRINCIPAL CONTRACTOR, DESIGNERS AND CONTRACTORS IS DRAWN TO THE FOLLOWING POTENTIAL RISKS IN CONJUNCTION WITH THE PROPOSED ON-SITE AND OFF-SITE WORKS AS DESIGNED FOR THIS PROJECT:

1. WORKS IN THE VICINITY OF LIVE SERVICES INCLUDING GAS, ELECTRICITY AND BT WILL BE NECESSARY AND THE ADVICE OF ALL STATUTORY SERVICE COMPANIES MUST BE SOUGHT BEFORE ANY WORKS COMMENCE.
2. WORKS WITHIN AND ABUTTING THE EXISTING HIGHWAY WILL ENTAIL TRAFFIC HAZARDS AND ALL APPROPRIATE SAFETY MEASURES INCLUDING BARRIERS, SIGNS AND LIGHTING MUST BE UNDERTAKEN TO THE APPROVAL OF THE LOCAL AUTHORITY, THE HIGHWAY AUTHORITY AND THE POLICE DEPARTMENT.
3. HAZARDOUS MATERIALS INCLUDING CEMENT AND BITUMINOUS MATERIALS ARE SPECIFIED AND THE MANUFACTURERS ADVICE ON SAFE HANDLING PROCEDURES MUST BE OBTAINED AND MADE CLEAR TO ALL OPERATIVES.
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES WITHIN THE VICINITY OF THE WORKS HAND DUG AND ENSURE THESE ARE PROTECTED THROUGHOUT THE DURATION OF THE WORKS. ALL UTILITY PLANT SHOULD BE CLEARLY MARKED ON THE GROUND PRIOR TO COMMENCEMENT OF THE WORKS.
5. THE CONTRACTOR MUST ENSURE ALL WORKING AREAS ARE FULLY SECURE.

DRAINAGE STRATEGY KEY

- SITE BOUNDARY
- LAND OWNERSHIP BOUNDARY
- PRIVATE SURFACE WATER SEWER
- PRIVATE SURFACE WATER PERFORATED PIPE
- PRIVATE SURFACE WATER MANHOLE
- PRIVATE PERMEABLE BLOCK PAVING EXTENTS
- PRIVATE SURFACE WATER HEADWALL (INLET / OUTLET)
- SuDS FEATURE - ATTENUATION BASIN
- APPROXIMATE EXTENTS OF ACO KERB DRAIN
- SuDS FEATURE - GRAVEL FILTER TRENCH w/ PERFORATED PIPE
- PRIVATE FOUL WATER SEWER
- PRIVATE FOUL WATER MANHOLE
- PRIVATE FOUL WATER PUMP CHAMBER (SUBJECT TO SPECIALIST DESIGN)
- PRIVATE FOUL WATER RISING MAIN (SUBJECT TO SPECIALIST DESIGN)

PRELIMINARY | ISSUED FOR INFORMATION

REV	DESCRIPTION	DRN	CHK	APP	DATE
P02	DEVELOPMENT BOUNDARY REMOVED TO SUIT CLIENT COMMENTS	LL	LL	GW	05.03.2026
P01	FORMAL ISSUE TO SUIT FIXED SITE PLAN	LL	LL	GW	20.02.2026

Superstructures
Clydesdale House, 1-5 Queen Street, Ipswich IP1 1SW
Tel: 01473 217959 Email: info@super-structures.co.uk
www.super-structures.co.uk

CLIENT
HILL RESIDENTIAL LTD

PROJECT
ICKLEFORD MILL

DRAWING TITLE
PRELIMINARY DRAINAGE STRATEGY

DRAWING SCALE	SHEET SIZE	SUPERSTRUCTURES REF.
1:500	A1	SS25355

ORIGINAL DRAWN	ORIGINAL CHECKED	ORIGINAL APPROVED	ORIGINAL ISSUE DATE
LL	LL	GW	20.02.2026

PROJECT	ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER
25355	SUS	XX	XX	DR	C	00010

DRAWING STATUS	REVISION
PRELIMINARY	P02

Appendix E – Surface Water Drainage Simulation Outputs (East)

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SW08	0.027	5.00	53.360	1200	518247.530	231296.909	1.350	52.010
Carpark 1	0.013	5.00	53.360		518244.166	231294.398	0.400	52.960
SW11 (HB)	0.005	5.00	52.300	1200	518289.039	231318.281	1.410	50.890
East Discharge			52.000	1200	518294.328	231312.887	1.150	50.850
SW09	0.037	5.00	52.830	1200	518273.837	231317.845	1.350	51.480
SW10	0.021	5.00	52.250	1200	518283.360	231325.418	1.335	50.915
SW12			52.000	1200	518290.580	231316.313	1.120	50.880
Carpark 2	0.037	5.00	52.830		518276.865	231314.090	0.800	52.030
Carpark 3	0.040	5.00	52.250		518288.766	231329.591	0.800	51.450

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
S12.000	SW12	East Discharge	5.078	0.600	50.880	50.850	0.030	169.3	150	5.89	50.0
S9.000	SW09	SW10	12.167	0.600	51.480	51.065	0.415	29.3	300	5.53	50.0
S10.000	SW10	SW11 (HB)	9.121	0.600	50.915	50.890	0.025	364.8	300	5.71	50.0
S8.000	SW08	SW09	33.621	0.600	52.010	51.480	0.530	63.4	150	5.46	50.0
S11.000	SW11 (HB)	SW12	2.500	0.600	50.890	50.880	0.010	250.0	150	5.78	50.0
3.000	Carpark 3	SW10	6.829	0.600	51.450	51.065	0.385	17.7	150	5.05	50.0
2.000	Carpark 2	SW09	4.824	0.600	52.030	51.480	0.550	8.8	300	5.02	50.0
1.000	Carpark 1	SW08	4.198	0.600	52.960	52.010	0.950	4.4	150	5.01	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S12.000	0.769	13.6	45.5	0.970	1.000	0.180	0.0	150	0.784
S9.000	2.914	206.0	28.8	1.050	0.885	0.114	0.0	75	2.074
S10.000	0.817	57.8	44.3	1.035	1.110	0.175	0.0	197	0.898
S8.000	1.265	22.3	10.1	1.200	1.200	0.040	0.0	71	1.232
S11.000	0.631	11.2	45.5	1.260	0.970	0.180	0.0	150	0.643
3.000	2.403	42.5	10.1	0.650	1.035	0.040	0.0	50	1.971
2.000	5.339	377.4	9.4	0.500	1.050	0.037	0.0	32	2.281
1.000	4.827	85.3	3.3	0.250	1.200	0.013	0.0	20	2.346

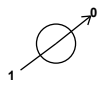
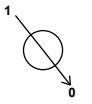
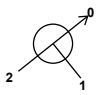
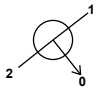
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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
S12.000	5.078	169.3	150	Circular	52.000	50.880	0.970	52.000	50.850	1.000
S9.000	12.167	29.3	300	Circular	52.830	51.480	1.050	52.250	51.065	0.885
S10.000	9.121	364.8	300	Circular	52.250	50.915	1.035	52.300	50.890	1.110
S8.000	33.621	63.4	150	Circular	53.360	52.010	1.200	52.830	51.480	1.200
S11.000	2.500	250.0	150	Circular	52.300	50.890	1.260	52.000	50.880	0.970
3.000	6.829	17.7	150	Circular	52.250	51.450	0.650	52.250	51.065	1.035
2.000	4.824	8.8	300	Circular	52.830	52.030	0.500	52.830	51.480	1.050
1.000	4.198	4.4	150	Circular	53.360	52.960	0.250	53.360	52.010	1.200

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S12.000	SW12	1200	Manhole	Adoptable	East Discharge	1200	Manhole	Adoptable
S9.000	SW09	1200	Manhole	Adoptable	SW10	1200	Manhole	Adoptable
S10.000	SW10	1200	Manhole	Adoptable	SW11 (HB)	1200	Manhole	Adoptable
S8.000	SW08	1200	Manhole	Adoptable	SW09	1200	Manhole	Adoptable
S11.000	SW11 (HB)	1200	Manhole	Adoptable	SW12	1200	Manhole	Adoptable
3.000	Carpark 3		Junction		SW10	1200	Manhole	Adoptable
2.000	Carpark 2		Junction		SW09	1200	Manhole	Adoptable
1.000	Carpark 1		Junction		SW08	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW08	518247.530	231296.909	53.360	1.350	1200	 1	1.000	52.010	150
						0	S8.000	52.010	150
Carpark 1	518244.166	231294.398	53.360	0.400		 0	1.000	52.960	150
SW11 (HB)	518289.039	231318.281	52.300	1.410	1200	 1	S10.000	50.890	300
						0	S11.000	50.890	150
East Discharge	518294.328	231312.887	52.000	1.150	1200	 1	S12.000	50.850	150
SW09	518273.837	231317.845	52.830	1.350	1200	 1	2.000	51.480	300
						2	S8.000	51.480	150
						0	S9.000	51.480	300
SW10	518283.360	231325.418	52.250	1.335	1200	 1	3.000	51.065	150
						2	S9.000	51.065	300
						0	S10.000	50.915	300

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
SW12	518290.580	231316.313	52.000	1.120	1200		1	S11.000	50.880	150
							0	S12.000	50.880	150
Carpark 2	518276.865	231314.090	52.830	0.800			0	2.000	52.030	300
Carpark 3	518288.766	231329.591	52.250	0.800			0	3.000	51.450	150

Simulation Settings

Rainfall Methodology	FEH-13	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.900	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	0.900	Additional Storage (m³/ha)	20.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node SW11 (HB) Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	S11.000	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0059-1200-0500-1200
Invert Level (m)	50.890	Min Outlet Diameter (m)	0.075
Design Depth (m)	0.500	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.2		

Node Carpark 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	52.030	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.800
Safety Factor	2.0	Width (m)	31.900	Inf Depth (m)	
Porosity	0.35	Length (m)	10.000		

Node Carpark 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	51.450	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	856	Depth (m)	0.800
Safety Factor	2.0	Width (m)	31.900	Inf Depth (m)	
Porosity	0.35	Length (m)	10.000		

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Node Carpark 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	52.960	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.500
Safety Factor	2.0	Width (m)	12.400	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

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Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW08	11	52.053	0.043	4.2	0.0665	0.0000	OK
15 minute summer	Carpark 1	11	52.973	0.013	1.4	0.0733	0.0000	OK
240 minute summer	SW11 (HB)	172	51.562	0.672	1.9	0.8076	0.0000	SURCHARGED
240 minute summer	East Discharge	172	50.882	0.032	1.3	0.0000	0.0000	OK
240 minute summer	SW09	172	51.562	0.082	4.5	0.1375	0.0000	OK
240 minute summer	SW10	172	51.562	0.647	5.1	0.9354	0.0000	SURCHARGED
240 minute summer	SW12	172	50.913	0.033	1.3	0.0375	0.0000	OK
15 minute summer	Carpark 2	12	52.050	0.020	3.9	0.4601	0.0000	OK
240 minute summer	Carpark 3	172	51.562	0.112	5.4	9.8170	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW08	S8.000	SW09	4.1	0.921	0.183	0.2007	
15 minute summer	Carpark 1	1.000	SW08	1.3	0.578	0.016	0.0104	
240 minute summer	SW11 (HB)	S11.000	SW12	1.3	0.427	0.120	0.0078	
240 minute summer	SW09	S9.000	SW10	4.3	0.798	0.021	0.5230	
240 minute summer	SW10	S10.000	SW11 (HB)	1.8	0.289	0.032	0.6423	
240 minute summer	SW12	S12.000	East Discharge	1.3	0.479	0.098	0.0142	26.8
15 minute summer	Carpark 2	2.000	SW09	3.2	0.723	0.009	0.0347	
240 minute summer	Carpark 3	3.000	SW10	-3.8	0.750	-0.090	0.1082	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW08	12	52.220	0.210	15.7	0.3216	0.0000	SURCHARGED
15 minute summer	Carpark 1	11	52.985	0.025	5.2	0.2440	0.0000	OK
15 minute summer	SW11 (HB)	12	52.016	1.126	7.6	1.3533	0.0000	FLOOD RISK
15 minute summer	East Discharge	13	50.886	0.036	1.7	0.0000	0.0000	OK
15 minute summer	SW09	12	52.035	0.555	39.6	0.9317	0.0000	SURCHARGED
15 minute summer	SW10	12	52.016	1.101	44.9	1.5917	0.0000	FLOOD RISK
15 minute summer	SW12	13	50.918	0.038	1.7	0.0425	0.0000	OK
15 minute summer	Carpark 2	12	52.067	0.037	14.8	1.5846	0.0000	OK
240 minute winter	Carpark 3	236	51.915	0.465	10.8	49.5758	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW08	S8.000	SW09	13.9	1.030	0.624	0.5919	
15 minute summer	Carpark 1	1.000	SW08	5.0	0.740	0.059	0.0407	
15 minute summer	SW11 (HB)	S11.000	SW12	1.7	0.575	0.153	0.0094	
15 minute summer	SW09	S9.000	SW10	36.9	1.325	0.179	0.8568	
15 minute summer	SW10	S10.000	SW11 (HB)	6.6	0.385	0.114	0.6423	
15 minute summer	SW12	S12.000	East Discharge	1.7	0.512	0.125	0.0169	31.1
15 minute summer	Carpark 2	2.000	SW09	12.5	0.701	0.033	0.1819	
240 minute winter	Carpark 3	3.000	SW10	-7.9	0.773	-0.185	0.1202	

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Results for 100 year Critical Storm Duration. Lowest mass balance: 99.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW08	12	52.482	0.472	20.2	0.7233	0.0000	SURCHARGED
15 minute summer	Carpark 1	11	52.988	0.028	6.7	0.3088	0.0000	OK
30 minute summer	SW11 (HB)	23	52.094	1.204	4.9	1.4467	0.0000	FLOOD RISK
15 minute summer	East Discharge	15	50.886	0.036	1.8	0.0000	0.0000	OK
15 minute summer	SW09	15	52.116	0.636	46.4	1.0676	0.0000	SURCHARGED
15 minute summer	SW10	14	52.085	1.170	52.3	1.6925	0.0000	FLOOD RISK
15 minute summer	SW12	15	50.918	0.038	1.8	0.0432	0.0000	OK
15 minute summer	Carpark 2	13	52.095	0.065	21.4	4.5658	0.0000	OK
240 minute winter	Carpark 3	236	52.078	0.628	14.8	67.9774	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW08	S8.000	SW09	17.9	1.019	0.802	0.5919	
15 minute summer	Carpark 1	1.000	SW08	6.5	0.711	0.076	0.0417	
30 minute summer	SW11 (HB)	S11.000	SW12	1.8	0.590	0.157	0.0096	
15 minute summer	SW09	S9.000	SW10	41.4	1.261	0.201	0.8568	
15 minute summer	SW10	S10.000	SW11 (HB)	6.8	0.390	0.118	0.6423	
15 minute summer	SW12	S12.000	East Discharge	1.8	0.516	0.129	0.0173	40.4
15 minute summer	Carpark 2	2.000	SW09	22.7	0.675	0.060	0.1971	
240 minute winter	Carpark 3	3.000	SW10	-11.0	0.781	-0.258	0.1202	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW08	12	52.916	0.906	28.3	1.3872	0.0000	SURCHARGED
15 minute summer	Carpark 1	11	52.993	0.033	9.4	0.4271	0.0000	OK
360 minute winter	SW11 (HB)	352	52.248	1.358	1.9	1.6323	0.0000	FLOOD RISK
360 minute winter	East Discharge	352	50.887	0.037	1.9	0.0000	0.0000	OK
360 minute winter	SW09	352	52.248	0.768	11.1	1.2896	0.0000	SURCHARGED
360 minute winter	SW10	352	52.248	1.333	12.7	1.9276	0.0000	FLOOD RISK
360 minute winter	SW12	352	50.919	0.039	1.9	0.0445	0.0000	OK
360 minute winter	Carpark 2	352	52.248	0.218	6.3	21.7624	0.0000	OK
360 minute winter	Carpark 3	352	52.248	0.798	15.1	87.1187	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW08	S8.000	SW09	25.0	1.419	1.118	0.5919	
15 minute summer	Carpark 1	1.000	SW08	9.1	0.736	0.106	0.0429	
360 minute winter	SW11 (HB)	S11.000	SW12	1.9	0.465	0.167	0.0100	
360 minute winter	SW09	S9.000	SW10	10.6	0.848	0.052	0.8568	
360 minute winter	SW10	S10.000	SW11 (HB)	1.9	0.093	0.032	0.6423	
360 minute winter	SW12	S12.000	East Discharge	1.9	0.524	0.137	0.0180	150.5
360 minute winter	Carpark 2	2.000	SW09	3.6	0.471	0.009	0.3022	
360 minute winter	Carpark 3	3.000	SW10	-11.2	0.784	-0.263	0.1202	

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Appendix F – Surface Water Drainage Simulation Outputs (West)

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	40	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SW03	0.100	5.00	54.240	1200	518231.334	231307.379	1.050	53.190
SW01			54.330	1200	518206.607	231353.641	0.960	53.370
SW02			54.300	1200	518229.478	231317.418	1.075	53.225
SW04			54.460	1200	518190.095	231286.105	1.420	53.040
SW05	0.000	5.00	54.420	1200	518160.202	231270.281	1.490	52.930
SW06	0.053	5.00	54.270	1200	518126.383	231239.839	1.490	52.780
Basin	0.250	5.00	54.200		518114.461	231213.687	1.500	52.700
SW07 (HB)			54.000	1200	518136.813	231195.776	1.420	52.580
West Discharge			53.840	1200	518156.521	231193.552	1.390	52.450
Carpark 1	0.176	15.00	54.550		518207.228	231362.162	0.250	54.300
Carpark 3	0.053	15.00	54.500		518186.684	231294.255	0.500	54.000
Carpark 4	0.121	15.00	54.260		518167.634	231264.661	0.360	53.900

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
S1.000	SW01	SW02	42.839	0.600	53.370	53.225	0.145	295.4	300	15.83	50.0
S3.000	SW03	SW04	46.403	0.600	53.190	53.040	0.150	309.4	300	16.89	50.0
S2.000	SW02	SW03	10.209	0.600	53.225	53.190	0.035	291.7	300	16.02	50.0
S4.000	SW04	SW05	33.823	0.600	53.040	52.930	0.110	307.5	300	17.52	50.0
1.005	SW05	SW06	45.502	0.600	52.930	52.780	0.150	303.3	300	18.37	50.0
S6.000	SW06	Basin	28.741	0.600	52.780	52.700	0.080	359.3	300	18.95	50.0
S6.001	Basin	SW07 (HB)	28.643	0.600	52.700	52.580	0.120	238.7	300	19.42	50.0
S7.000	SW07 (HB)	West Discharge	19.833	0.600	52.580	52.450	0.130	152.6	150	19.83	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S1.000	0.909	64.3	44.5	0.660	0.775	0.176	0.0	184	0.980
S3.000	0.888	62.8	69.8	0.750	1.120	0.276	0.0	300	0.900
S2.000	0.915	64.7	44.5	0.775	0.750	0.176	0.0	183	0.984
S4.000	0.891	63.0	83.2	1.120	1.190	0.329	0.0	300	0.903
1.005	0.897	63.4	113.8	1.190	1.190	0.450	0.0	300	0.909
S6.000	0.823	58.2	127.2	1.190	1.200	0.503	0.0	300	0.834
S6.001	1.013	71.6	190.5	1.200	1.120	0.753	0.0	300	1.026
S7.000	0.811	14.3	190.5	1.270	1.240	0.753	0.0	150	0.826

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Carpark 1	SW01	8.544	0.600	54.300	53.520	0.780	11.0	150	15.05	50.0
2.000	Carpark 3	SW04	8.835	0.600	54.000	53.240	0.760	11.6	100	15.06	50.0
3.000	Carpark 4	SW05	9.318	0.600	53.900	53.130	0.770	12.1	100	15.07	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.061	54.1	44.5	0.100	0.660	0.176	0.0	104	3.410
2.000	2.279	17.9	13.4	0.400	1.120	0.053	0.0	64	2.496
3.000	2.233	17.5	30.6	0.260	1.190	0.121	0.0	100	2.293

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
S1.000	42.839	295.4	300	Circular	54.330	53.370	0.660	54.300	53.225	0.775
S3.000	46.403	309.4	300	Circular	54.240	53.190	0.750	54.460	53.040	1.120
S2.000	10.209	291.7	300	Circular	54.300	53.225	0.775	54.240	53.190	0.750
S4.000	33.823	307.5	300	Circular	54.460	53.040	1.120	54.420	52.930	1.190
1.005	45.502	303.3	300	Circular	54.420	52.930	1.190	54.270	52.780	1.190
S6.000	28.741	359.3	300	Circular	54.270	52.780	1.190	54.200	52.700	1.200
S6.001	28.643	238.7	300	Circular	54.200	52.700	1.200	54.000	52.580	1.120
S7.000	19.833	152.6	150	Circular	54.000	52.580	1.270	53.840	52.450	1.240
1.000	8.544	11.0	150	Circular	54.550	54.300	0.100	54.330	53.520	0.660
2.000	8.835	11.6	100	Circular	54.500	54.000	0.400	54.460	53.240	1.120
3.000	9.318	12.1	100	Circular	54.260	53.900	0.260	54.420	53.130	1.190

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S1.000	SW01	1200	Manhole	Adoptable	SW02	1200	Manhole	Adoptable
S3.000	SW03	1200	Manhole	Adoptable	SW04	1200	Manhole	Adoptable
S2.000	SW02	1200	Manhole	Adoptable	SW03	1200	Manhole	Adoptable
S4.000	SW04	1200	Manhole	Adoptable	SW05	1200	Manhole	Adoptable
1.005	SW05	1200	Manhole	Adoptable	SW06	1200	Manhole	Adoptable
S6.000	SW06	1200	Manhole	Adoptable	Basin		Junction	
S6.001	Basin		Junction		SW07 (HB)	1200	Manhole	Adoptable
S7.000	SW07 (HB)	1200	Manhole	Adoptable	West Discharge	1200	Manhole	Adoptable
1.000	Carpark 1		Junction		SW01	1200	Manhole	Adoptable
2.000	Carpark 3		Junction		SW04	1200	Manhole	Adoptable
3.000	Carpark 4		Junction		SW05	1200	Manhole	Adoptable

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW03	518231.334	231307.379	54.240	1.050	1200	1	S2.000	53.190	300
						0	S3.000	53.190	300
SW01	518206.607	231353.641	54.330	0.960	1200	1	1.000	53.520	150
						0	S1.000	53.370	300
SW02	518229.478	231317.418	54.300	1.075	1200	1	S1.000	53.225	300
						0	S2.000	53.225	300
SW04	518190.095	231286.105	54.460	1.420	1200	1	2.000	53.240	100
						2	S3.000	53.040	300
						0	S4.000	53.040	300
SW05	518160.202	231270.281	54.420	1.490	1200	1	3.000	53.130	100
						2	S4.000	52.930	300
						0	1.005	52.930	300
SW06	518126.383	231239.839	54.270	1.490	1200	1	1.005	52.780	300
						0	S6.000	52.780	300
Basin	518114.461	231213.687	54.200	1.500		1	S6.000	52.700	300
						0	S6.001	52.700	300
SW07 (HB)	518136.813	231195.776	54.000	1.420	1200	1	S6.001	52.580	300
						0	S7.000	52.580	150
West Discharge	518156.521	231193.552	53.840	1.390	1200	1	S7.000	52.450	150
Carpark 1	518207.228	231362.162	54.550	0.250		0	1.000	54.300	150
Carpark 3	518186.684	231294.255	54.500	0.500		0	2.000	54.000	100
Carpark 4	518167.634	231264.661	54.260	0.360		0	3.000	53.900	100

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Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	1440
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node SW07 (HB) Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	S7.000	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0114-6000-1071-6000
Invert Level (m)	52.580	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.071	Min Node Diameter (mm)	1200
Design Flow (l/s)	6.0		

Node Carpark 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	54.000	Diameter (m)	0.037
Downstream Link	2.000	Design Depth (m)	0.400	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	2.0		

Node Carpark 4 Online Orifice Control

Flap Valve	x	Invert Level (m)	53.900	Diameter (m)	0.037
Downstream Link	3.000	Design Depth (m)	0.400	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	2.0		

Node Basin Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	52.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	712

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	98.0	98.0	1.200	372.0	378.9

Node Carpark 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	54.300	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.400
Safety Factor	2.0	Width (m)	123.100	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

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Node Carpark 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	54.000	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	200	Depth (m)	0.400
Safety Factor	2.0	Width (m)	53.300	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node Carpark 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	53.900	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	1024	Depth (m)	0.500
Safety Factor	2.0	Width (m)	67.572	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

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Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW03	11	53.293	0.103	15.6	0.1162	0.0000	OK
30 minute winter	SW01	30	53.444	0.074	8.7	0.0841	0.0000	OK
30 minute winter	SW02	31	53.305	0.080	8.7	0.0900	0.0000	OK
15 minute winter	SW04	12	53.144	0.104	15.5	0.1172	0.0000	OK
15 minute winter	SW05	13	53.029	0.099	15.7	0.1124	0.0000	OK
120 minute winter	SW06	118	53.020	0.240	13.2	0.2711	0.0000	OK
120 minute winter	Basin	118	53.019	0.319	23.0	42.9503	0.0000	SURCHARGED
120 minute winter	SW07 (HB)	118	53.018	0.438	7.1	0.4959	0.0000	SURCHARGED
60 minute winter	West Discharge	94	52.517	0.067	6.0	0.0000	0.0000	OK
30 minute winter	Carpark 1	30	54.342	0.042	13.2	6.4985	0.0000	OK
120 minute winter	Carpark 3	102	54.055	0.055	2.3	4.7773	0.0000	OK
240 minute winter	Carpark 4	192	53.990	0.090	3.4	13.2413	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW03	S3.000	SW04	15.3	0.731	0.243	0.9843	
30 minute winter	SW01	S1.000	SW02	8.7	0.614	0.136	0.6106	
30 minute winter	SW02	S2.000	SW03	8.7	0.596	0.135	0.1624	
15 minute winter	SW04	S4.000	SW05	15.4	0.747	0.244	0.6990	
15 minute winter	SW05	1.005	SW06	15.4	0.655	0.243	1.0772	
120 minute winter	SW06	S6.000	Basin	12.0	0.499	0.207	1.8792	
120 minute winter	Basin	S6.001	SW07 (HB)	7.1	0.242	0.099	2.0170	
120 minute winter	SW07 (HB)	S7.000	West Discharge	6.0	0.765	0.418	0.1554	100.1
30 minute winter	Carpark 1	1.000	SW01	8.7	2.215	0.162	0.0337	
120 minute winter	Carpark 3	2.000	SW04	0.5	1.017	0.030	0.0047	
240 minute winter	Carpark 4	3.000	SW05	0.8	1.111	0.044	0.0064	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	SW03	240	53.475	0.285	16.2	0.3220	0.0000	OK
30 minute winter	SW01	30	53.490	0.120	21.4	0.1353	0.0000	OK
240 minute winter	SW02	240	53.475	0.250	10.4	0.2824	0.0000	OK
240 minute winter	SW04	240	53.475	0.435	16.9	0.4915	0.0000	SURCHARGED
240 minute winter	SW05	240	53.474	0.544	16.3	0.6156	0.0000	SURCHARGED
240 minute winter	SW06	240	53.474	0.694	18.8	0.7844	0.0000	SURCHARGED
240 minute winter	Basin	240	53.473	0.773	34.1	144.0028	0.0000	SURCHARGED
240 minute winter	SW07 (HB)	240	53.472	0.892	6.3	1.0093	0.0000	SURCHARGED
15 minute summer	West Discharge	11	52.517	0.067	6.0	0.0000	0.0000	OK
30 minute winter	Carpark 1	30	54.369	0.069	32.3	16.1435	0.0000	OK
120 minute winter	Carpark 3	120	54.104	0.104	5.5	12.6729	0.0000	SURCHARGED
240 minute winter	Carpark 4	232	54.092	0.192	7.7	33.7575	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SW03	S3.000	SW04	16.2	0.728	0.258	3.2369	
30 minute winter	SW01	S1.000	SW02	21.4	0.761	0.332	1.2037	
240 minute winter	SW02	S2.000	SW03	10.4	0.539	0.161	0.6726	
240 minute winter	SW04	S4.000	SW05	15.5	0.695	0.245	2.3818	
240 minute winter	SW05	1.005	SW06	15.9	0.545	0.251	3.2042	
240 minute winter	SW06	S6.000	Basin	18.7	0.495	0.321	2.0239	
240 minute winter	Basin	S6.001	SW07 (HB)	6.3	0.242	0.088	2.0170	
240 minute winter	SW07 (HB)	S7.000	West Discharge	6.0	0.765	0.418	0.1554	277.8
30 minute winter	Carpark 1	1.000	SW01	21.4	2.801	0.395	0.0652	
120 minute winter	Carpark 3	2.000	SW04	0.8	1.092	0.047	0.0377	
240 minute winter	Carpark 4	3.000	SW05	1.2	1.155	0.068	0.0408	

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Results for 100 year Critical Storm Duration. Lowest mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	SW03	352	53.679	0.489	15.7	0.5525	0.0000	SURCHARGED
360 minute winter	SW01	352	53.679	0.309	10.3	0.3490	0.0000	SURCHARGED
360 minute winter	SW02	352	53.679	0.454	10.3	0.5130	0.0000	SURCHARGED
360 minute winter	SW04	352	53.678	0.638	16.4	0.7220	0.0000	SURCHARGED
360 minute winter	SW05	352	53.678	0.748	15.8	0.8461	0.0000	SURCHARGED
360 minute winter	SW06	352	53.677	0.897	18.8	1.0148	0.0000	SURCHARGED
360 minute winter	Basin	352	53.677	0.977	34.0	204.6204	0.0000	SURCHARGED
360 minute winter	SW07 (HB)	352	53.676	1.096	6.2	1.2393	0.0000	SURCHARGED
30 minute winter	West Discharge	16	52.517	0.067	6.0	0.0000	0.0000	OK
30 minute winter	Carpark 1	30	54.382	0.082	42.3	20.9713	0.0000	OK
180 minute winter	Carpark 3	168	54.133	0.133	5.4	17.3425	0.0000	SURCHARGED
240 minute winter	Carpark 4	236	54.150	0.250	10.0	45.5312	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	SW03	S3.000	SW04	15.6	0.685	0.249	3.2677	
360 minute winter	SW01	S1.000	SW02	10.3	0.621	0.160	3.0167	
360 minute winter	SW02	S2.000	SW03	9.6	0.514	0.148	0.7189	
360 minute winter	SW04	S4.000	SW05	14.8	0.641	0.235	2.3818	
360 minute winter	SW05	1.005	SW06	15.5	0.518	0.244	3.2042	
360 minute winter	SW06	S6.000	Basin	18.6	0.472	0.320	2.0239	
360 minute winter	Basin	S6.001	SW07 (HB)	6.2	0.213	0.087	2.0170	
360 minute winter	SW07 (HB)	S7.000	West Discharge	6.0	0.765	0.418	0.1554	395.2
30 minute winter	Carpark 1	1.000	SW01	28.4	2.995	0.524	0.0809	
180 minute winter	Carpark 3	2.000	SW04	1.0	1.093	0.054	0.0381	
240 minute winter	Carpark 4	3.000	SW05	1.4	1.152	0.078	0.0413	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	SW03	352	54.000	0.810	22.3	0.9157	0.0000	FLOOD RISK
360 minute winter	SW01	352	54.000	0.630	14.9	0.7124	0.0000	SURCHARGED
360 minute winter	SW02	352	54.000	0.775	14.5	0.8762	0.0000	SURCHARGED
360 minute winter	SW04	352	53.999	0.959	23.1	1.0849	0.0000	SURCHARGED
360 minute winter	SW05	352	53.999	1.069	24.3	1.2087	0.0000	SURCHARGED
480 minute winter	SW06	472	53.998	1.218	23.2	1.3773	0.0000	FLOOD RISK
480 minute winter	Basin	472	53.997	1.297	39.6	318.1259	0.0000	FLOOD RISK
480 minute winter	SW07 (HB)	472	53.996	1.416	6.7	1.6014	0.0000	FLOOD RISK
480 minute winter	West Discharge	472	52.522	0.071	6.7	0.0000	0.0000	OK
30 minute winter	Carpark 1	30	54.405	0.105	59.2	29.5232	0.0000	OK
180 minute winter	Carpark 3	176	54.185	0.185	7.6	25.5274	0.0000	SURCHARGED
360 minute winter	Carpark 4	352	54.254	0.354	10.3	66.6997	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	SW03	S3.000	SW04	22.2	0.700	0.353	3.2677	
360 minute winter	SW01	S1.000	SW02	14.5	0.625	0.226	3.0167	
360 minute winter	SW02	S2.000	SW03	14.4	0.505	0.222	0.7189	
360 minute winter	SW04	S4.000	SW05	22.9	0.645	0.364	2.3818	
360 minute winter	SW05	1.005	SW06	24.1	0.507	0.380	3.2042	
480 minute winter	SW06	S6.000	Basin	23.1	0.471	0.396	2.0239	
480 minute winter	Basin	S6.001	SW07 (HB)	6.7	0.215	0.093	2.0170	
480 minute winter	SW07 (HB)	S7.000	West Discharge	6.7	0.785	0.465	0.1682	587.1
30 minute winter	Carpark 1	1.000	SW01	37.8	2.752	0.698	0.1314	
180 minute winter	Carpark 3	2.000	SW04	1.2	1.084	0.065	0.0386	
360 minute winter	Carpark 4	3.000	SW05	1.6	1.152	0.091	0.0729	

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Appendix G – Site Investigation

enzygo
geo environmental



Geoenvironmental Report

Ickleford Mill, Ickleford SG5 3UN

For Hill

CRM.1027.189.GE.R.001.A

'Experience and expertise working in union'

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Geoenvironmental Report

Project:	Ickleford Mill, Ickleford SG5 3UN
For:	Hill
Ref:	CRM.1027.189.GE.R.001.!
Status:	Revision A
Date:	August 2024
Author:	Richard Hamilton BSc (hon) MSc FGS Director of Geoenvironmental
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Disclaimer:

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We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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Enzygo Limited Registered in England No. 06525159 at Gresham House, 5-7 St. Pauls Street, Leeds, England, LS1 2JG

Executive Summary

Proposed Development

The proposed scheme comprises a residential development at Ickleford Mill, Ickleford SG5 3UN

Investigation

Site works were undertaken by Enzygo Geoenvironmental Ltd. In July and August 2024.

Ground Conditions

Ground conditions comprise Made Ground over Alluvium and glacio fluvial materials over Lowestoft Formation (Clays). Groundwater was recorded at depths of between 0.38 and 1.27m bgl.

Contamination

Contamination has been identified and remediation is proposed.

Foundations

Piled foundations are recommended.

Pavement Construction

An equilibrium CBR value of 1% is recommended.

Ground Gas

No Radon has been identified.

Ground gas has been identified at the site and further analysis is recommended and if present gas protection measures are proposed.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Enzygo Geoenvironmental Limited has been commissioned to prepare a Geo-Environmental Report for a proposed development at Ickleford Mill, Ickleford SG5 3UN.

1.2 Proposed Development

1.2.1 The proposed development comprises residential use consisting of houses and apartments. The proposed development layout is incorporated into the site plan presented as Drawing CRM.1027.189.GE.D.001.

1.3 Objectives

1.3.1 The objectives of the study are to:

- Review existing ground investigation reports which include a summary of the previous desk study undertaken by WSP in 2016;
- Undertake a targeted supplementary ground investigation;
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors;
- Provide a factual and interpretative report relating to the desk study and site investigations. Provide a revised conceptual model and recommendations on any potential development issues and mitigation measures, where appropriate.

1.4 Risk Classification

1.4.1 Enzygo Geoenvironmental has utilised the available information, together with our experience to assess the likely risks to development from land quality issues. Definitions of the risk terms used are provided on the following table.

Table 1.4.1 Risk Classification

Risk	Description
Dismissed	No contamination risk has been identified which is likely to affect development.
Very Low	No significant contaminated land risks have been encountered affecting development and a low risk that remediation will be required.
Low-Moderate	There are unlikely to be significant contaminated land issue associated with the site which will adversely affect its re-development. However, minor or localised contamination may be present requiring remediation. Remediation should be possible under a discovery strategy and with a call out service.
Moderate	Some potential contaminated land risks have been encountered or identified which may affect re- development. The risks identified are unlikely to affect the entire site or preclude development. Remediation is considered feasible as part of the development process and no further investigation is considered necessary.
Moderate-High	Some potentially significant contaminated land risks have been identified at the property that requires remediation. It is recommended that a separate remedial methodology is prepared supported by a site-specific risk assessment
High	Significant potential contaminated land risks have been identified and remediation is required supported by further intrusive ground investigation, risk assessment and remedial design.

1.4.2 Where adverse risks from ground instability are identified these are discussed within the report.

2.0 SITE SETTING

Table 2.0 Site Description

Item	Description
Site Address	Ickleford Mill, Ickleford SG5 3UN
National Grid Reference	518218, 231295

2.1 Current Site Description

2.1.1 The following site description has been compiled from the site inspection undertaken by Enzygo Geoenvironmental Ltd, together with current maps, aerial photographs.

2.1.2 At the time of the investigation the site comprised an area of disused mill buildings, former offices, former plant rooms, former warehouses and former underground tanks and former tank bases, disused flour silos and a number of disused interceptors.

2.1.3 Access is via an access gate with a through lift up bar within the east of the site from

2.1.4 The southern part of the site comprised open grass land.

2.1.5 The river Oughton flows south west to north east across the site and is crossed by bridge in two locations to gain access to the southern part of the site.

2.1.6 A discharge point into the river was noted from the site and this contained bagging in the river to catch any spillages into the river.

2.1.7 A former mill race and pond are located to the south west of the site.

2.1.8 The majority of the site is covered in hardstanding however there are small pockets of overgrown landscaping around the perimeters of the site.

2.1.9 Scattered trees are noted around the perimeters of the river and site and around the north west of the site.

2.1.10 No significant spillages were noted on the overgrown concrete surfacing.

2.2 Surrounding Area

2.2.1 Land uses surrounding the site are summarised as follows:

Table 2.2.1 Land Use Surrounding the Area

Direction	Land Use
North	Field, Turnpike road and Residential development
West	Fields with scattered properties and Bedford road and fields beyond.
South	Open fields and allotments with residential estate beyond
East	Arlesey Road with residential house and new pound farm beyond.

2.2.2 No evidence of significant potential contamination sources were noted on or adjacent to the site.

3.0 PREVIOUS DESK STUDY INFORMATION

3.1 General

3.1.1 A Phase I Desk Study was undertaken by WSP and then summarised in the Phase II Ground Investigation undertaken by Groundtech. A copy of the Groundtech report is included in Appendix 1. A copy of the WSP report was not available.

3.1.2 Pertinent aspects are reported below:

3.2 Historical Maps

3.2.1 The previous Groundtech- report confirms that the site has been a mill since 1881 and no significant changes since then.

3.3 Ground Conditions

3.3.1 The British Geological Survey (BGS) indicates that the site is underlain by the following geological sequence:

Table 3.3.1 Geological Sequence

Geological	Type	Descriptions	Aquifer Classification
Drift (path of river)	Alluvium.	Silt, Sand, Clay and Gravel	Secondary A
Drift (Northern part of the site)	Glaciofluvial Deposits	Silt, Sand, Clay and Gravel	Secondary A
Deeper Drift materials	Lowestoft Formation	Chalky Glacial Till	Undifferentiated Secondary Aquifer
Solid	Gualt formation	Mudstone	Unproductive

3.3.2 Made Ground (Artificial deposits) are not identified by the BGS on the site, however historical land use age of the site indicates that there will be Made Ground across the site associated with the former usage as a Mill.

3.3.3 BGS borehole records close to the site show soft organic clay, consistent with Alluvium over yellow brown clayey sand and gravel. Superficial deposits are underlain by firm to stiff grey clay consistent with the Weymouth Formation.

3.4 Hydrogeology

3.4.1 The site is not located within a Source Protection Zone.

3.4.2 There are no potable groundwater abstraction points within 500m of the site.

3.4.3 There are no discharge consents within 250m of the site.

3.5 Mining and Cavities

3.5.1 No mining or natural cavities are identified close to the site.

3.6 Hydrology

3.6.1 The nearest surface water course is the river Oughton flows south which flows west to north east across the site.

3.7 Sensitive Designations

3.7.1 Iffley Meadows, which is a Site of Special Scientific Interest (SSSI) is located to the east of the Weirs Mill Stream. It is considered that the water course will act as a barrier to prevent migration of potential contaminants from the site to the SSSI.

3.8 Radon Risk Potential

3.8.1 The desk study report indicates that the site is not situated within an area where radon protection measures are required. Based on the radon UK map between 1% and 3% homes and in a radon zone and therefore further investigation is required to confirm radon for site address. This can be address in the remediation strategy.

3.9 Environmental Data

3.9.1 No fuel stations are recorded within 250m of the site.

3.9.2 A Pollution incident on site comprised crude sewage discharge in the River Oughton (1996) minor incident.

3.9.3 A further pollution incident occurred 120m north east of the site (organic waste and suspended solids) into the River Oughton (Significant incident).

3.10 Landfill Sites

3.10.1There are no landfills within 250m of the site.

3.11 Conceptual model outlined in the previous desk study

Potential Sources

3.11.1The contamination sources outlined in the previous desk study are as follows:

- Made Ground associated with the infilling of the pond and mill race and the construction of the existing buildings on the site.
- Contamination sources associated with the historical land use as mill including workshops, boiler rooms, vehicle cleaning station, refuelling areas, and maintenance areas.
- Other contamination sources include the hazardous materials associated with the significant thickness of Made Ground including the infilled gravel pit 80m south of the site.

3.11.2The potential contaminants of concerns associated with the above sources include: Heavy metals, PAHs, VOCs PCBs and Asbestos

3.11.3The potential receptors have been identified previous in the desk study information and are given below:

Potential Receptors

- Development workers (dermal contact, inhalation, ingestion of soils and dusts).
- Future residential site users (dermal contact, inhalation, ingestion of soils and dust, consumption of produce from gardens).
- Off-site human health receptors and building structures/services (lateral migration of groundwater and ground gas).
- Controlled water receptors – groundwater (vertical migration to Secondary A Aquifer) and surface water (lateral migration of groundwater).
- Future building structures and services (direct contact with contaminated soils, ingress of ground gases into buildings, notably carbon dioxide, via voids and service entries).

3.11.4 The potential receptors have been identified previous in the desk study information and are given below:

Risk Assessment

- Direct contact/ingestion/inhalation of soil-bound contaminants and asbestos by construction workers, neighbouring site users, future site users and future maintenance workers. These are likely to be the dominant potentially complete pollutant linkages driving risks to human health from soil bound contamination in a future residential development.
- Inhalation of vapours associated with soil and/or groundwater contamination by construction workers, future residents and future maintenance workers.
- Inhalation and accumulation of hazardous ground gases associated with possible in-filled areas by construction workers, future residents and future maintenance workers.
- Migration of contaminants into surface water and underlying aquifers (including preferential pathways associated with on-site structures and services).
- Direct contact between contamination in soil / groundwater and future below ground services and structures.

3.12 Client Information

3.12.1 Information was provided to Enzygo Geoenvironmental Ltd in the form of one ground investigation report, a supplementary gas risk assessment and foundation plan and supplementary investigation. Copies of these reports are given in the Appendix 1.

3.12.2 Desk study information was supplied in the initial report and from a previously reviewed WSP report referenced (70027704-10579(1) and dated 2016. A copy of this report has not been supplied however pertinent information from the subsequent ground investigation report is given above.

3.12.3 The previous reports are summarised in Section 4.0:

4.0 PRELIMINARY GROUND INVESTIGATIONS

4.1 General

4.1.1 A preliminary ground investigation was undertaken by Groundtech during January 2020 which included a review of the unseen WSP desk study. A gas risk assessment and foundations assessment were also taken in January and March 2020 by the same company. A secondary spillage investigation was undertaken by Xplore in March 2024. Pertinent information for each investigation is provided in the sections below:

4.2 Site Works

4.2.1 The preliminary ground investigation was undertaken in January 2020th and comprised:

- 13 window sample boreholes and
- 9 Trial Pits;
- Installation of monitoring wells in 10 window sampler boreholes;
- Groundwater sampling visit. Gas monitoring is reported in the subsequent gas risk assessment.

4.2.2 Some areas of the site were not accessible at the time of the investigation.

4.2.3 Locations of the exploratory holes advanced by Xplore and Groundtech are included on the Site Plan presented as Drawing CRM.1027.189.GE.D.001.

4.3 Laboratory Testing.

4.3.1 Twenty five samples were tested for standard contamination suite.

4.3.2 Six groundwater/leachate samples were tested.

4.3.3 Geotechnical testing was undertaken.

4.4 Ground and Groundwater Conditions

4.4.1 Ground conditions encountered during the preliminary investigation by Xplore and Groundtech are summarised on the table below:

Table 4.4.1 Ground and Groundwater Conditions

Strata	Summary Description	Depth range (m)
Made Ground	Concrete (reinforced and hard) 0.15 to 0.2m thick	0.15 to 0.2
	Brown clayey topsoil with brick and rare ash from Ground Level to 0.90m bgl (WS01, WS21, WS23, WS24, TP01, TP02 and TP03).	0.0 to 0.9
	Light brown gravelly sand with brick from 0.15m to 1.2m bgl (WS02 to WS08, WS10, WS12 to WS15, WS18 to WS20, WS25 to WS30).	0.15 to 1.2
	Dark brown/black sand and gravel with ash from 0.18m to 1.75m bgl (WS02, WS11, WS16 and WS18).	0.18 to 1.75
	Soft to firm grey brown clay with brick from 0.2m to 1.4m bgl (WS03, WS05, WS09, WS14 and WS23).	0.2 to 1.4
Alluvium	Soft to firm Clay, interbedded with soft Silt and loose to medium dense Sand.	0.2 to 4.45
Glacial Fluvial materials	Medium dense to dense Sand and Gravel	0.6 to 2.45
Lowestoft Formation	firm to stiff Clay with gravel of chalk.	0.35 to 5.45
Groundwater.	Seepages from 1.00mbgl to 3.45mbgl	

4.5 Visual and Olfactory Evidence of Contamination

4.5.1 Ash was noted as a minor constituent of the Made Ground in eleven locations across the site. Furthermore a moderate hydrocarbon odour was noted within WS09, WS10 and WS11 in the vicinity of a former diesel Underground Storage Tank (UST).

4.6 Contamination Testing

4.6.1 Results of the soil testing were compared with GAC values for residential use with plant up-take. These showed exceedances of GAC values for Asbestos in 5 samples with a maximum quantification of 0.002%, various PAHs and TPH in 4 samples 25 samples tested.

4.6.2 Results of the ground water analysis were compared to freshwater EQS as the receptor is considered to be the adjacent River Oughton. Exceedances were recorded for Benzo(a)pyrene and TPH ($_{C8}$-C_{35} Aromatic and aliphatic) in a maximum of 2 samples (former WS09, and WS17).Further analysis of these samples indicates that the source of the TPH is the degraded diesel and although the source has been removed the likely source is the previous UST based on the original plume from this former UST. The remaining minor exceedances hare attributed to the ash within the Made Ground soils. The previous investigation for VOCs has been undertaken and the latest set of testing included VOCs and PCBS

4.6.3 Given the recorded TPH plume in WS09 close to the river surface water samples were recommended to be collected.

4.6.4 Given that TPHs and PAHs have been recorded an additional window sampling exercise was undertaken around the previous source (removed UST). Chemical analysis was undertaken from the soils and groundwater and from 5 boreholes surrounding the former tank positions. Faint hydrocarbons were noted between 0.5mbgl and 1.50mbgl. No soil exceedances were encountered and no WHO guideline exceedances were encountered for the groundwater. In additional no vapour exceedances were encountered. Based on the above no further risk to human health, surface water and controlled waters was encountered. The results of this exercise are documented in the Xplore supplementary report given in Appendix 1.

4.6.5 Ground gas monitoring identified from the limited testing (one round) has concluded that no gas protection measures are required and no radon protection measures are required. As part

of an additional gas risk assessment including 6 rounds of monitoring were undertaken with a maximum contraction of Carbon Dioxide of 1.8% vol. land no Methane recorded and no recorded significant flows which are not considered to be outliers associated with the groundwater suction. Based on the above the GSV has been calculated less than 0.07 and therefore no gas protection measures a required.

4.6.6 Ground gas results are consistent with what would be expected for natural Alluvium.

4.7 Foundation Assessment

As part of the investigation and geotechnical insitu testing and geotechnical testing a foundation options included traditional foundations across the northern part of the site and piled foundations around the river and the southern part of the site. Similarly, given the thickness of the Made Ground suspended floor slabs were recommended and the sulphate classification for the concrete should be designed in accordance with ACEC-2 and DS2.

5.0 PRELIMINARY ASSESSMENT

5.1 Preliminary Conceptual Model

5.1.1 Based on the information obtained the following Preliminary Conceptual Model has been prepared:

Table 5.1.1 Preliminary Conceptual Model

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
PAH and hydrocarbons. And VOCs and PCBS	Made Ground	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal construction practices and PPE will address risk.
			Site users.	Low	Contamination identified and remediation can be incorporated into the development NO VOC or PCB encountered previously.
			Off-site receptors	Dismissed	No significant mobile contaminants identified which may impact off-site users.
Asbestos, metals and hydrocarbons.	Unforeseen Contamination.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal construction practices and PPE will address risk.
			Site users.	Very Low.	Significant unforeseen contamination unlikely and remediation can easily be incorporated into the development.
			Off-site receptors	Dismissed	No significant mobile contaminants identified which may impact off-site users.
Asbestos	Identified asbestos below ground	Ingestion dermal and inhalation	Construction Workers.	Low	Quantification analysis has been undertaken for waste classification and appropriate control measures will mitigate risk to construction workers in these areas.
			Site users.	Dismissed	Areas not remediated and validated will be covered with 600m of clean cover or hardstanding which will break the pollutant linkage and therefore mitigating risk.
	Known asbestos above ground	Ingestion dermal and inhalation	Construction Workers.	Dismissed.	Further detailed assessment has identified all the above ground asbestos, and this has been registered and will require controlled removal.
			Site users.	Dismissed	Final development will remove any above ground asbestos via validation or cover therefore mitigating risk.
TPH (around the former tank)	Fuel spillages and plume	Ingestion dermal and inhalation	Construction Workers.	Dismissed.	Appropriate PPE to be worn within the TPH plume area around the former UST. Further detailed assessment has dismissed risk to construction workers.
			Site users.	Dismissed.	Further detailed assessment has dismissed risk.
Hydrocarbon and metals.	Migration from off-site sources.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No significant additional sources identified.
			Site users.		
Ground Gas.	Landfill.	Inhalation & Explosive.	Construction Workers.	Dismissed	No source
			Site users.	Dismissed	
			Off-site receptors	Very Low	
	Made Ground.	Inhalation & Explosive.	Construction Workers.	Dismissed	No confined space entry anticipated.
			Site users.	Dismissed	CS1 conditions identified no gas protection measures required.
			Off-site receptors	Very Low	Low permeability clay soils below landfill a shallow groundwater.

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Radon	Ground conditions	Inhalation & Explosive.	Site users.	Dismissed	No radon protection required based on previous desk study however recent records from the UK radon maps indicate between 1% and 3% of properties required radon protection meases which will result in Basic radon protection measures required. To be clarified in Remediation strategy.
Groundwater					
Hydrocarbon	Plume from former tanks	Vertical Migration	Groundwater.	Dismissed	Additional investigation dismissed risk to ground water and surface water from the UST plume
Hydrocarbon and metals.	Made Ground across the site.	Vertical Migration.	Groundwater.	Dismissed.	Secondary A aquifer in connectively with river. (No exceedances encountered above EQS guidelines apart form localised ash and the identified plume which has been dismissed previously
Hydrocarbon and metals.	Natural soils.	Vertical Migration.	Groundwater.	Very low	No deep water anticipated to be in contact with the Made ground and therefore limited risk. Further investigation and deep boreholes installations should be monitored to confirm.
Surface Water					
Hydrocarbon and metals.	Unforeseen Contamination.	Horizontal Migration.	River Network.	Low.	Elevated contaminants in Groundwater next and soils next to the river associated with plume could impact water course. Alluvium is considered a pathway rather than a receptor.
Environmental Receptors					
Asbestos, metals and hydrocarbons and ground gas		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	None present.
		Phytotoxic.	Woodland.	Very Low.	Some trees are present on site.
		Phytotoxic.	Crops.	Dismissed.	None present.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	No receptor.
Building Services					
On site contaminants		Direct.	Historic Buildings.	Dismissed.	No receptors.
		Direct.	Proposed Buildings.	Very High	Proposed buildings
		Permeate into pipework.	Water Pipes.	Very Low.	Requirements of Water Authority to be followed.

6.0 SUPPLEMENTARY SITE INVESTIGATION

6.1 General

6.1.1 A supplementary site investigation was undertaken by Enzygo Geoenvironmental Limited between 18th July and 24th July 2024 and comprised fifteen window sample boreholes (WS101 to WS115) and four cable percussive boreholes (BH1 to BH4) to depths of between 20m

6.1.2 Locations of exploratory holes advanced by Enzygo Geoenvironmental Limited are presented on Drawing CRM.1027.189.GE.D.001. Locations were designed to provide coverage of the site and also supplement to the previous ground investigation locations and confirm the foundations requirements in relation to the extent of traditional footings and piled foundations.

6.1.3 Locations of each of the exploratory holes was scanned for services prior to drilling.

6.2 Site Works

6.2.1 Representative soil samples were collected for chemical and geotechnical testing. Soil samples destined for chemical analysis were collected in appropriate containers provided by the analytical laboratory. Samples were stored in cool boxes prior to dispatch to the laboratory for analysis. All samples were collected using appropriate sampling equipment that was cleaned at each sampling location.

6.2.2 Generally, soil samples were collected from Made Ground which is likely to be the source of potential contamination. In addition, any soils showing visual or olfactory evidence of contamination were sampled for laboratory testing.

6.2.3 Groundwater samples were collected form the standpipe s and using slow flow techniques.

6.2.4 Surface water samples were collected from the river.

6.3 Laboratory Testing

6.3.1 Soil samples for chemical analysis were sent to I2 ltd who are UKAS and MCERTS accredited. Samples were tested for the CLEA metal suite, pH, sulphate, cyanide, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAH), organic carbon, Total Petroleum Hydrocarbon (TPH), VOC analysis and PCB analysis and asbestos.

6.3.2 Groundwater samples were also sent to I2 Ltd who are UKAS and MCERTS accredited. Samples were tested for the EQS suite together with attenuation properties analysis and alkalinity.

6.3.3 Two stage Waste Acceptance Criteria (WAC) tests were undertaken to assist with waste classification.

6.3.4 Result of the chemical testing is included in Appendix 3 and discussed in Section 8.

6.3.5 Geotechnical samples were sent to the laboratories of I2 ltd who are UKAS and MCERTS accredited and were tested for:

- Laboratory California Bearing Ratio (CBR) testing;
- Plasticity testing;
- Particle size distribution Tests (PSD)

- Particle Density
- pH and sulphate.

6.4 Monitoring

6.4.1 Groundwater monitoring installations were placed within the cable percussive boreholes and window sample boreholes (10 number in total). The response zone was installed within the sand and gravel which underlies the Made Ground. A solid section of pipe was installed through the Made Ground and this was sealed using a cement/bentonite seal at the top of the gravels, extending into the overlying clay soils. The boreholes were installed to prevent the gravel pack forming a potential preferential pathway and also to allow discrete groundwater samples to be collected from the sand and gravel. In additional some of the installations were installed specifically in the Made ground and sealed when in the natural materials to specifically target any flume within the Made ground.

6.4.2 Groundwater and gas monitoring wells were installed within the window sampler holes and cable percussion boreholes. Monitoring wells were installed within the Made Ground and the natural materials. Where the window sampler boreholes were advanced into the underlying natural soils the lower 1m was sealed using a concrete/bentonite seal.

6.4.3 Groundwater and ground gas monitoring was undertaken. Groundwater samples were collected using low flow sampling methods.

6.4.4 During one of the visits potential Volatile Organic Compounds (VOC) were measured from window sampler installations using a Photo Ionization Detector (PID). The potential for Light Non-Aqueous Phase Liquid (LNAPL) was measured using a bailer. No sheens were encountered.

7.0 GROUND AND GROUNDWATER CONDITIONS

7.1 Summary of Ground and Groundwater Conditions

7.1.1 Ground and groundwater conditions have been assessed by Enzygo Geoenvironmental Limited from the various site investigations. The investigation undertaken identify the following strata:

Table 7.1.1 Ground and Groundwater Conditions

Strata	Summary Description	Thickness (m)
Made Ground	Concrete (0.14m to 0.48m thick) or Macadam (0.05m thick) locally over ballast/type one/crushed brick and concrete (subbase materials) (0.15 to 0.40m thick)	0.15 to 0.8
	Brown clayey gravelly SAND. Gravel is angular to rounded fine to coarse flint and concrete. Or firm brown slightly gravelly sandy CLAY. Gravel is subangular to rounded fine to coarse brick and concrete.	0.15 to 0.30
Deeper Made Ground	Brown slightly gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint. Or soft brown sandy gravelly CLAY.	1.75 to 2.25
Made Ground - Soft landscaping areas.	Grass over brown slightly gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint	2.00
Alluvium	Very soft greyish brown clayey gravelly SILT (WS109)	+6.0
	Very soft and soft locally firm with depth dark grey and brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular and rounded fine to coarse flint.	1.1 to 5.0
	Medium dense locally dense with depth orange brown clayey gravelly SAND. Gravel is angular and rounded fine to coarse flint.	0.4 to 1.2
Glacio Fluvial materials (WS110, WS112, 114, WS115)	Medium dense to dense orange brown clayey sandy GRAVEL. Sand is medium to coarse. Gravel is angular and rounded fine to coarse flint.	0.7 to +1.0
Lowestoft formation	Firm becoming stiff and very stiff dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular and subrounded fine to coarse chalk and flint.	>23
Groundwater.	Shallow Seepages.	1.4mbgl to 3.0m bgl
	Deep seepage	13.5m bgl to 14.1mbgl

7.1.2 The above ground conditions are consistent with the previous investigations.

7.1.3 Details of the ground and groundwater conditions encountered are given on the exploratory hole records included in Appendix 2 and are summarised in the sections below:

7.2 Made Ground

7.2.1 Across most of the site was a layer of Made Ground either in soft landscaping areas of concrete hardstanding.

7.2.2 Within soft landscaping the Made Ground comprised grass over brown slightly gravelly clayey medium sand. Gravel is angular to subangular concrete and flint. Generally this was between 0.6m and 2.0m thick, but was locally absent in areas of hardstanding which covers the majority of the site.

7.2.3 Within hard landscaping the Made Ground generally comprised a layer of either concrete (reinforced locally) or macadam 0.14m to 0.48m thick. These materials were general underlain

by ballast/type one/crushed brick and concrete (subbase materials) which were generally 0.15m to 0.40m thick.

7.2.4 Below the sub base materials general Made Ground was encountered and this comprised brown clayey gravelly sand. Gravel is angular to rounded fine to coarse flint and concrete. This was locally replaced by firm brown slightly gravelly sandy clay. Gravel is subangular to rounded fine to coarse brick and concrete. These materials were noted to range in thickness from 0.1m to 0.30m thick.

7.2.5 Within Boreholes WS106, WS107 and BH04 deeper Made Ground was encountered to a maximum depth of 2.75mbgl in BH04. Thes materials generally comprised brown slightly gravelly clayey medium sand. Gravel is angular to subangular concrete and flint. Or soft brown sandy gravelly clay.

7.2.6 No fuel related odours were noted during drilling.

7.2.7 Based on the above deeper Made Ground was noted in the south west of the development site close to the river.

7.2.8 The deep Made Ground/backfill materials for the pond and the mill race to the west of the site have been proved in in Boreholes WS106, WS107 and WS108 and are backfilled with deep Made Ground up to 2.80m thick. In Boreholes WS109 the deep Made Ground has been replaced with silt to in excess of 6.00mbgl. Other areas of Deep Made Ground are located in Borehole BH04 adjacent to the river (2.75m thick).

7.3 Alluvium

7.3.1 Generally the Alluvium comprised 2 layers of materials, however when the underlying materials are cohesive with no interbedded glacio fluvial materials the base of the Alluvium grades into the Lowestoft Formation with only a slight variation on colour to make any noticeable change (orange and brown to grey and dark grey).

7.3.2 Where disguisable from the underlying Lowestoft Formation the cohesive Alluvium comprised very soft and soft locally firm with depth orange brown and dark grey and brown slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Gravel is angular and rounded fine to coarse flint. And very soft orangish greyish brown clayey gravelly silt (Borehole WS109). These materials were generally between 1.00m and 6.00m thick.

7.3.3 The granular alluvium comprised medium dense locally dense with depth orange brown clayey gravelly sand. Gravel is angular and rounded fine to coarse flint and were generally 0.4 to1.2m thick.

7.4 Glacio Fluvial Materials

7.4.1 The Glacio Fluvial Materials generally comprised medium dense to dense orange brown clayey sandy gravel. Sand is medium to coarse. Gravel is angular and rounded fine to coarse flint and were in excess of 1.00m thick.

7.5 Lowestoft Formation

7.5.1 The Lowestoft Formation materials generally comprised firm becoming stiff and very stiff dark grey slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Gravel is angular to subangular and subrounded fine to coarse chalk and flint and were in excess of 22m thick.

7.6 Soil Strength

7.6.1 Undrained shear strength of cohesive soils were calculated using the correlations of Stroud and Butler. These show the undrained shear strength values of the Alluvium to vary from 4kN/m^2 to 103kN/m^2 with a lower quartile value of 27kN/m^2.

7.6.2 The granular Alluvium is loose to medium dense with SPT values carrying from 4 to 11.

7.6.3 The granular Glacio fluvial Materials are very dense with SPT n values in excess of 50.

7.6.4 Undrained shear strength of the Lowestoft Formation increases from 35kN/m^2 at 4m bgl to over 490kN/m^2 at 20m bgl with lower quartile value of 100kN/m^2.

7.6.5 Made Ground is shown to be soft and loose to medium dense.

7.6.6 A shear strength verses depth plot is given in Appendix 2.

7.7 Visual and Olfactory Evidence of Contamination

7.7.1 No significant visual or olfactory evidence of contamination was encountered in this investigation, however previous investigations have identified faint hydrocarbons odours around the former tanks position, however these have been further analysed and the risk to human health, controlled waters and surface waters has been dismissed.

7.8 Groundwater

7.8.1 Groundwater was encountered as seepages at depth of between 1.4 to 3.00mbgl and 13.5 to 14.1mbgl. The depth to groundwater measured during the monitoring visit is summarised in the table below:

Table 7.8.1 Groundwater Depths

Exploratory Hole	Installation depth	Seepage depth drilling	Response zone		Depth (mbgl)		
		M bgl	Within materials	Depth (mbgl)	31.07.24	06.08.24	13.08.24
WS101	Shallow	3	Alluvium	2-5	1.22	1.15	1.3
WS103	Shallow	3	Alluvium	2-5	0.45	0.38	0.48
WS105	Shallow	3	Alluvium	2-5	0.66	0.58	0.76
WS107	Shallow	3	Made Ground	2-3	0.51	0.69	0.92
WS109	Shallow	3	(silt, backfilled pond, mill race)	2-4	1.17	1.1	1.28
WS110	Shallow	3	Alluvium	2-4	0.9	0.9	1.1
WS111	Shallow	3	Alluvium	2-4	0.71	0.6	0.94
BH01	Deep	13.5	Lowestoft clay	14-17m	1.4	1.2	1.43
BH03	Deep	2.2	Lowestoft clay	17-20m	0.7	1.09	0.85
BH04	deep	15	Lowestoft clay	17-20m	1.31	0.7	1.37

7.8.2 No LNAPL was detected during the monitoring.

7.8.3 Groundwater flow and hydraulic gradient have been assessed from the groundwater monitoring undertaken. The general pattern for the groundwater is flow to the south and towards the river.

7.8.4 Rising head permeability tests were not undertaken as the groundwater levels are very high, however as part of the DQRA assessment the permeability tests should be undertaken as constant head tests from the installations.

7.9 Ground Gas

7.9.1 Ground gas was monitored during the return visit to monitor groundwater levels and the results are summarised on the table below:

Table 7.9.1 Gas Monitoring Results

Exploratory Hole	Atmos pressure (Mb)	Flow (l/hr)	CH4		CO2		O2
			Concentration (%)	GSV (l/hr)	Concentration (%)	GSV (l/hr)	Concentration (%)
31.07.24							
WS101	1008 (F)	<0.1	<0.1	<0.0001	<0.2	<0.0002	19.3
WS103	1007 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.4
WS105	1007 (F)	<0.1	<0.1	<0.0001	<0.2	<0.0002	19.2
WS107	1003 (F)	<0.1	<0.1	<0.0001	4.5	<0.0046	18.9
WS109	1004 (F)	<0.1	<0.1	<0.0001	<0.3	<0.0003	18.3
WS110	1004 (F)	<0.1	<0.1	<0.0001	<0.4	<0.0004	19.5
WS111	1004 (F)	<0.1	<0.1	<0.0001	<0.2	<0.0002	19.1
BH01	1006 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.3
BH03	1004 (F)	<0.1	1.5	<0.0015	<0.8	<0.0008	15.5
BH04	1004 (F)	<0.1	<0.1	<0.0001	<0.2	<0.0002	18.4
06.08.24							
WS101	1001 (R)	<0.1	<0.1	<0.0001	<0.1	<0.0001	20.7
WS103	1001 (R)	<0.1	<0.2	<0.0002	<0.1	<0.0001	20.6
WS105	1001 (R)	<0.1	<0.1	<0.0001	<0.1	<0.0001	20.8
WS107	1001 (R)	<0.1	<0.1	<0.0001	4.2	<0.0046	17.3
WS109	1002 (R)	<0.1	<0.1	<0.0001	4.6	<0.0046	16.9
WS110	1001 (R)	<0.1	<0.1	<0.0001	<0.4	<0.0004	17.6
WS111	1001 (R)	<0.1	<0.1	<0.0001	<0.1	<0.0001	20.9
BH01	1000 (R)	<0.1	<0.1	<0.0001	<0.1	<0.0001	20.7
BH03	1002 (R)	<0.1	<0.1	<0.0001	<0.1	<0.0001	20.9
BH04	1001 (R)	<0.1	<0.1	<0.0001	<0.1	<0.0001	20.9
13.08.24							
WS101	1000 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.4
WS103	1000 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.4
WS105	999 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.4
WS107	997 (F)	<0.1	14.0	0.0014	<0.2	0.0002	15.7
WS109	997 (F)	<0.1	<0.1	<0.0001	<1.9	<0.0019	18.0
WS110	998 (F)	<0.1	<0.1	<0.0001	<0.5	<0.0005	19.1
WS111	996 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.8
BH01	1000 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.3
BH03	1000 (F)	<0.1	<0.1	<0.0001	<0.1	<0.0001	19.4
BH04	1004 (F)	<0.1	<0.1	<0.0001	<0.3	<0.0003	19.1

8.0 CONTAMINATION ASSESSMENT

8.1 General

8.1.1 A Tier I risk assessment has been undertaken using available and current screening values for a residential end use. The risk assessment is undertaken based on the findings of the ground investigation undertaken by Enzygo Geoenvironmental Ltd and Groundtech and Xplore. Based on the contamination testing and Tier I assessment a Conceptual Model has been prepared, which is presented later in this section.

8.1.2 Where significant risks are identified remedial measures are recommended.

8.2 Human Health

8.2.1 Assessment of the risks to human health has been undertaken by comparing the soil quality data with reference values obtained from the Contaminated Land Exposure Assessment (CLEA), Soil Guideline Values (SGV) and General Acceptance Criteria (GAC) published by LQM/CIEH. The LQM/CIEH S4ULs values are used and summary tables of the reference values are included in Appendix 5.

8.2.2 Where an exceedance is identified the risk is assessed by considering the sensitivity of the proposed development and the potential pathway. The proposed development is for residential use and therefore the GAC values for Residential Use with plant uptake are considered suitable for an initial screening assessment.

8.2.3 Results of the chemical testing from the Enzygo Geoenvironmental Ltd investigation are included in Appendix 3.

8.2.4 Results of the chemical testing undertaken show exceedance of GAC values in samples of Made Ground across the site from Asbestos, PAH, TPH. Exceedances were recorded in recorded in the Made Ground and deep Made Ground in the vicinity of Borehole WS107 0.40m bgl and , 0.65m bgl and 1.90m bgl.

8.2.5 The exceedances are tabulated below.

Exploratory Hole	Determinant	Concentration (mg/kg)	
		Soil	GAC
WS107 (0.65mbgl)	TPH (c10-c12)	130	74
WS107 (0.65mbgl)	TPH (c12-c16)	550	140
WS107 (0.65mbgl)	TPH (c16-c21)	1500	250
WS107 (1.90mbgl)	Asbestos (amosite fibres)	confirmed	presence
WS103 (0.40mbgl)	Dibenz(a,h)anthracene	0.29	0.24
WS103A (0.70mbgl)	Dibenz(a,h)anthracene	0.26	0.24
BH01 (0.3-0.7mbgl)	Benzo(a)pyrene	14	2.2
BH01 (0.3-0.7mbgl)	Benzo(b)fluoranthene	19	2.6
BH01 (0.3-0.7mbgl)	Benzo(a)anthracene	16	7.2
BH01 (0.3-0.7mbgl)	Chrysene	17	15
BH04 (0.3-0.5mbgl)	TPH (c16-C21)	440	260

8.2.6 Asbestos was identified in one sample from Borehole WS107 at 1.90m bgl within the Made Ground which ranged in thickness from 1.60m to 2.80mbgl at this location.

8.2.7 An assessment of the TPH and PAH results has not identified any concentrations exceeding the threshold for indoor inhalation pathway only.

8.3 Controlled Waters

8.3.1 Where groundwater samples have been analysed the results are compared against reference values. These reference values are summarised in Appendix 5 and are taken from Fresh Water Environmental Quality Standards (EQS), UK Drinking Water Standards and World Health Organisation (WHO) values for Drinking Water. Where the controlled waters receptor is a surface water course then the EQS are used as the primary reference value. Drinking Water Standards and WHO values are used where EQS values are not available. An assessment of likely risk is then made based on a source-pathway-receptor model. Where the receptor is potable groundwater resources the Drinking Water Standards and WHO values are used.

8.3.2 It is considered that the receptor is the river ? in the centre of the site. It is considered that the alluvial materials present beneath the site are providing a pathway to the surface water receptor.

8.3.3 Groundwater analysis has therefore been compared against Freshwater EQS values and the following exceedances were recorded:

Table 8.3.3 EQS Exceedances

Exploratory Hole	Determinant	Concentration (ug/l)	
		Groundwater	EQS
WS107 (1.72mbgl)	Flouranthene	0.67	0.02

8.3.4 Exceedances are similar to those identified by previous report. This indicates that the local materials round the former mill pond (which have been infilled with Made ground to a depth of 2.80mbgl) are in hydraulic continuity with the surrounding materials and potentially the river. Based on the results it would appear that the TPH recorded in the same location is not fully leaching out into the river however is partially contained within this area. The same conclusions were drawn from the previous spillage report which indicated that the fuel related materials were confined in close proximity of the former tanks which is located to the north east of boreholes WS107.

8.3.5 In order to confirm the above conclusions it is recommended that a Detailed Quantitative Risk Assessment (DQRA) is undertaken to assess potential impacts on the Weirs Mill Stream.

8.4 Ground Gas

8.4.1 For the assessment of risk from ground gas reference has been made to CIRIA C665 and British Standard BS8485 Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. Where significant potential risk from ground gas is identified from the Initial Conceptual Model and the ground gas monitoring is undertaken and the results of the monitoring are compared against the Gas Screening Values given in CIRIA Report 665. From this the Characteristic Situation is identified and remedial measures proposed.

8.4.2 When assessing the risk and type of remedial measures appropriate consideration is given to the likely construction of the development, the nature of the gas posing a risk and the nature of the likely source. The use of engineering judgement when determining risk from ground gas is consistent with the recommendations given in CIRIA C665 using a pollutant linkage model.

8.4.3 Gas monitoring was undertaken during return visits which has recorded elevated concentrations of Methane and Carbon dioxide and high flows however this was recorded were the pump failed due the water suction into the monitoring instrument. As a result this is not considered representative of the gas regime of the site. Based on this and the previous

investigation recommendations Gas Screening Value falls within Characteristic Situation 1 (CS1) which requires no gas protection measures.

8.5 Conceptual Model

8.5.1 A Conceptual Model is presented below based on the findings of the ground investigation.

Table 8.5.1 Conceptual Model

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
PCB	Made Ground	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No exceedances.
			Site users and off-site Receptors		
VOC	Made Ground	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No exceedances.
			Site users and off-site Receptors		
PAH and hydrocarbons.	Made Ground	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal construction practices and PPE will address risk.
			Site users.	Low	Contamination identified. GAC exceedance remediation recommended can be incorporated into the development.
			Off-site receptors	Dismissed	No significant mobile contaminants identified which may impact off-site users. DQRA recommended to provide remediation criteria.
Metals and hydrocarbons.	Unforeseen Contamination.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal construction practices and PPE will address risk.
			Site users.	Very Low.	Significant unforeseen contamination unlikely and remediation can easily be incorporated into the development.
			Off-site receptors	Dismissed	No significant mobile contaminants identified which may impact off-site users.
Asbestos	Identified asbestos below ground	Ingestion dermal and inhalation	Construction Workers.	Low	Quantification analysis has been undertaken for waste classification and appropriate control measures will mitigate risk to construction workers in these areas.
			Site users.	Dismissed	Areas not remediated and validated will be covered with 600mm of clean cover or hardstanding which will break the pollutant linkage and therefore mitigating risk.
	Known asbestos above ground	Ingestion dermal and inhalation	Construction Workers.	Dismissed.	Further detailed assessment has identified all the above ground asbestos, and this has been registered and will require controlled removal prior to development.
			Site users.	Dismissed	Final development will remove any above ground asbestos via validation or cover therefore mitigating risk.
TPH (around the former tank)	Fuel spillages and plume	Ingestion dermal and inhalation	Construction Workers.	Dismissed.	Dismissed the risk previously.
			Site users.	Dismissed.	Further detailed assessment has dismissed risk.
Made Ground with backfilled Mill race and Mill Pond	Made Ground - Metal, asbestos and Hydrocarbons	Ingestion dermal and inhalation	Construction Workers.	Dismissed.	Appropriate PPE to be worn when accessing materials below 0.60m depth as these materials are covered with clean inert materials 0.60m thick. Potential pathway generated with pile installation. Pile risk assessment recommended.
			Site users.	Dismissed.	Materials will be covered by 600m of clean cover no future access to these materials. Potential pathway generated with pile installation. Pile risk assessment recommended
Hydrocarbon and metals.	Migration from off-site sources.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No significant additional sources identified.
			Site users.		
Ground Gas.	Made Ground/Landfill.	Inhalation & Explosive.	Construction Workers.	Dismissed	No confined space entry anticipated.
			Site users.	Dismissed	CS1 conditions identified no gas protection measures required.

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
			Off-site receptors	Very Low	Low permeability clay soils.
	Made Ground with backfilled Former Mill race and Pond	Inhalation & Explosive.	Construction Workers.	Low	Potential gas encountered. Gas bag analysis should be undertaken to clarify. In addition, a Pathway will be generated from pile installation therefore creating gas pathways through backfill materials. Pile risk assessment recommended.
			Site users.	Very Low	Potential gas generating materials CS2 conditions identified no gas protection measures required. Furthe gas bag analysis required for clarification.
			Off-site receptors	Very Low	Low permeability clay soils, however potential pathway to river through previous Mill race.
Radon	Ground conditions	Inhalation & Explosive.	Site users.	Very Low	As recommended in the previous desk study information no radon protection required, however 1% to 3% affected by radon based on the UK radon map. Further clarification recommended.
Groundwater					
Hydrocarbon	Plume from former tanks	Vertical Migration	Groundwater.	Low	Additional previous investigation dismissed risk to ground water and surface water from the UST plume. DQRA recommended to provide remediation criteria and confirm degradation over distance from the source to the receptor.
Hydrocarbon and metals.	Made Ground across the site.	Vertical Migration.	Groundwater.	Low	Secondary A aquifer in connectively with river. (One EQS exceedance in groundwater) localised ash and the identified plume which has been dismissed previously however DQRA recommended to provide remediation criteria and confirm degradation over distance from the source to the receptor.
Hydrocarbon and metals.	Natural soils.	Vertical Migration.	Groundwater.	Very low	No deep water anticipated to be in contact with the Made ground and therefore limited risk. DQRA recommended to confirm risk model.
Surface Water					
Hydrocarbon and metals.	Unforeseen Contamination.	Horizontal Migration.	River Network.	Low.	EQS exceedances in Groundwater next to river associated with plume and or backfilled Made ground within former pond and mill race. Mill race and Alluvium is considered a pathway and source. DQRA recommended.
Environmental Receptors					
Asbestos, metals and hydrocarbons and ground gas		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	None present.
		Phytotoxic.	Woodland.	Very Low.	Some trees are present on site.
		Phytotoxic.	Crops.	Dismissed.	None present.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	No receptor.
Building Services					
On site contaminants		Direct.	Historic Buildings.	Dismissed.	No receptors.
		Direct.	Proposed Buildings.	Very High	Proposed buildings
		Permeate into pipework.	Water Pipes.	Very Low.	Requirements of Water Authority to be followed.

8.6 Assessment and Remediation

Proposed Development

8.6.1 The proposed development comprises residential use consisting of houses and apartments.

Contamination

8.6.2 Gross contamination has not been encountered however contamination has been identified within the general Made Ground and specially within the former backfilled pond and mill race. The Made ground is not considered suitable for re-use within soft landscape areas. Therefore remediation is proposed as part of the landscape works within soft landscape areas comprising 600mm of clean cover soils in domestic gardens and 400mm in communal gardens and areas of open space placed over a geotextile no dig barrier. The clean cover is to be validated.

8.6.3 Additional remediation is proposed to address the ground gas risk which is discussed in following section.

8.6.4 If unforeseen contamination is encountered during construction works such as localised spillage outside the areas investigated an Environmental consultant will be available on a 'call out' basis to undertake an assessment of risk. If 'unforeseen contamination' is encountered such as hydrocarbon contamination or solvent odours the discovery strategy will be to remove the source as it is likely to be very limited in extent or encapsulate it on site as appropriate and the Local Planning Authority advised.

8.6.5 A remediation method statement, detailing the remediation strategy that must be adopted will be required. The document should also detail requirements for verification to provide confirmation that suitable remediation has been undertaken that breaks all identified exposure pathways.

Management Procedures

8.6.6 Asbestos contaminated materials have been previously identified during the previous ground investigation and also confirmed in the supplementary investigation. It is therefore possible that further material could be encountered during construction works.

8.6.7 In addition, asbestos has also been encountered above ground within the buildings to be demolished and an approved register provided confirming that remediation and appropriate removal will be required prior to construction.

8.6.8 Buried asbestos has been encountered currently below 600mm of clean cover and therefore is currently protected from current site users. This does not apply to construction activities below the surface capping of 600mm.

8.6.9 Measures should be incorporated in to the Contractors Construction Stage Health and Safety Plan as required under the Construction Design and Management (CDM) Regulations to mitigate risk to construction works. Measures may include:

- Designing temporary works to minimise disturbance of the Back fill material;
- Separating material and disposal of soils containing asbestos;
- Wetting down during excavation;
- Sheeting of stockpiles where asbestos is suspected;
- Testing of soils and off-site disposal of any soils found or suspected of containing asbestos;
- Preventing access to the construction site by members of the public;
- Use of good hygiene measures, including washing down of plant; and

- Use of appropriate PPE, including face masks.

Ground Gas

8.6.10 Ground gas monitoring has identified that the site falls within CS1 condition with the exception of one elevated reading which is categorised as CS2 condition. It is recommended that gas bag analysis is undertaken as part of the remediation strategy and DQRA to confirm the methane and carbon dioxide from the Made Ground without being affected by groundwater suction.

8.6.11 The remaining current results and the previous set of gas monitoring (total 9 visits) have confirmed CS1 conditions which required no gas protection measures are required to be installed.

8.6.12 As a precaution, however, and after gas bag analysis or further assessment via a window sampling is undertaken to clarify the actual gas within the infilled Mill Race and pond (WS107,) it is recommended that within this area the characteristic situation is increased to CS2.

8.6.13 As detailed in BS8485 residential properties within this area and for CS2 conditions should achieve a minimum gas protection score of 3.5. It is proposed that gas protection measures are incorporated into the proposed structures comprising:

- Suspended floor slabs are used including a gas membrane sealed around service entry points and to the cavity tray; and
- Underfloor passive ventilation to suspended floor slabs achieving very good performance.
- All gas protection measures should be installed by a competent qualified contractor. Verification of the installation should also be undertaken

8.6.14 The CS2 conditions and gas protection measures are only recommended in the area of the former mill race and mill pond. Further detailed recommendations in relation to plot numbers will be recommended once a proposed layout has been finalised and this will be included in the remediation strategy.

8.6.15 No remediation of the ground water is expected however this will need to be confirmed by the DQRA. In addition, the DQRA will provide remediation criteria which can be used to validate any remediation areas.

8.7 Waste Classification

8.7.1 It is considered that the Made Ground will generally be classified as Stable Non-Reactive waste based on the chemical and WAC testing undertaken.

8.7.2 Final assessment will be undertaken by the receiving landfill based on the requirements of their permit.

9.0 GEOTECHNICAL ASSESSMENT

9.1 Proposed Development

9.1.1 The proposed development comprises residential use consisting of houses and apartments.

9.2 Ground Conditions

9.2.1 Ground conditions comprise Made Ground over soft and very soft alluvium clays and medium dense sands over glacio fluvial dense sand and gravels to the north of the site over Lowestoft Formaiton (Firm to stiff clays). Groundwater was recorded as two seepages (shallow seepage) between depths of between 1.4mbgl and 3.0mbgl and as a (deep seepage) at 15.00mbgl. Groundwater levels from the installations ranged from 0.38mbgl to 1.22mbgl for the shallow installations and 0.7mbgl to 1.43mbgl for the deep installations. There was no connectivity between the two seepages.

9.3 Preparation

9.3.1 The site is underlain by Made Ground including backfilling materials and is vegetated with trees and scrub vegetation together with concrete surfacing. During site preparation works the following should be undertaken:

- Removal or exiting vegetation and any root balls associated with existing trees should be grubbed out;
- Removal of the above ground asbestos within the buildings before these buildings are demolished using an appropriate licenced asbestos contractor and asbestos landfill.
- Removal of any obstructions identified including where appropriate concrete hardstanding and
- Removal of any redundant services.

9.4 Foundations

9.4.1 Traditional foundations are likely to be appropriate for the north of the site in the area of Boreholes WS113, WS114, WS115 and WS101 and BH01. At these locations the materials comprise either medium dense and dense sands or firm clays with an allowable bearing pressure of 100kN/m^2 and settlements less than 25mm. Given the potential variation in formation differential settlement may be expected and therefore reinforcement will be required. A foundation plan will be prepared as part of the remediation strategy.

9.4.2 In addition, if the formation is cohesive blinding will be required to protect the formation from strain softening. Should soft pockets be encountered at formation level during foundation excavation these should be removed and replaced with granular materials and proof rolled to differential settlement.

9.4.3 Trees have been encountered and the materials have been classified with a Plasticity index ranging from 20% to 22%, however once these have been modified to take account of the granular percentage within these materials the modified plasticity index ranges from 8% to 17%. An assessment of the soils modified plasticity index confirms that the Alluvium is either non plastic (medium dense sands) or of low volume change potential, depending on the clay content. It is therefore recommended that a Low volume change potential is used for all

foundations and all foundations are designed in accordance with Chapter 4.2 of NHBC Standards and specific with relation to the existing or proposed trees within this area.

9.4.4 For the remainder of the site and given the thickness of the Made Ground (backfilled pond and mill race materials) and soft alluvium and glacial fluvial materials piled foundations are recommended. For preliminary purposes and an initial pile assessment has been undertaken using the following assumptions:

- Upper 5 m is ignored due to the presence of Made Ground and soft clay.
- Soil properties have been taken from the ground investigation and laboratory testing.
- A global factor of safety of 3 has been used, together with factors of 1.5 on shaft resistance and 3 on base resistance.

9.4.5 The following preliminary pile working loads have been calculated:

Table 9.4.2 Preliminary Pile Loads

Pile depth (m bgl)	Working Load kN					
	200mm	250mm	300mm	350mm	450mm	600mm
10	75	100	120	150	215	320
15	200	270	330	400	550	750
20	380	500	600	700	1000	1300

9.4.6 Final design should be undertaken by a specialist piling contractor who can use case studies to negotiate more economic pile designs.

9.4.7 Given the nature of the site and the risk of foundations creating new pathways for gas and groundwater it is recommended that Continuous Flight Auger piling is used where possible. A detailed piling risk assessment is likely to be required.

9.4.8 An assessment of the soils modified plasticity index has been undertaken. This identifies that the Alluvium has a low to medium volume change potential. This identifies that the Lowestoft Clay has a low to medium volume change potential.

9.4.9 It is therefore recommended that a medium volume change potential is used for piled foundations in accordance with Chapter 4.2 of NHBC Standards.

9.4.10 Given the upper 5.00mbgl is being ignored due to soft and variable ground conditions any heave protection is considered to be minimal however consideration will need to be given to negative skin friction from the soft alluvial materials with SPT N values of 1 or less.

9.5 Floor Slab

9.5.1 Given the depth of Made Ground it is recommended that suspended floor slabs are used. Potential Gas protective measures are recommended in the area of the former mill race and pond. This will be clarified with further gas bag chemical analysis from the installations involves (WS107, WS108 and WS109) to confirm the presence of methane and carbon dioxide. Should gas protection measures these are outlined above in section 8.6.10 to 8.6.15 and will be confirmed in the remediation strategy.

9.6 Pavement Construction

9.6.1 It is recommended that an equilibrium CBR of 1% is used. Due to the potential for collapse and long term stability of the backfill materials (west of site -Boreholes WS107, WS108, WS109) it is likely that some form of ground improvement will be needed below areas of hardstanding.

9.7 Drainage

9.7.1 Soakaway drainage is not considered feasible due to the high groundwater levels and cohesive nature of the materials to the south of the site.

9.7.2 The report should be submitted to the Water Authority. Due to an elevated TPH value it is likely that barrier pipe may be needed.

9.8 Aggressive Soils

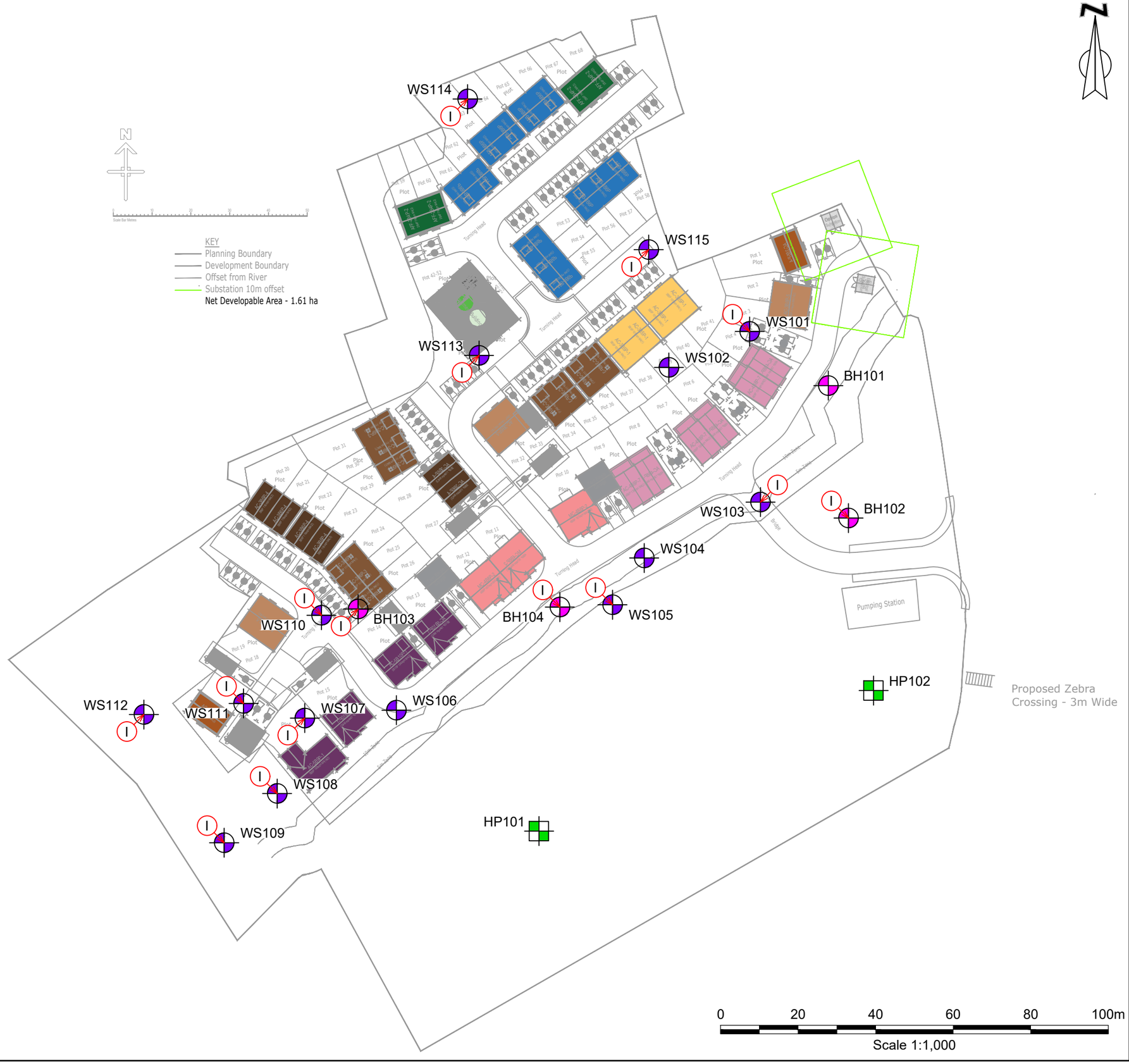
9.8.1 It is considered that buried concrete may be designed in accordance with ACEC Class AC-2s.

9.9 Excavation

9.9.1 Based on the various site observations it is considered that excavations should be feasible with normal plant. Assistance from a breaker will be required for excavation of obstructions encountered and previous foundations, tank bases and surface concrete. Potential backfilled interceptors have been encountered which will alos require removal and validation.

9.9.2 Excavations where access is required should be supported in accordance with CIRIA RR97. Additional measures will also be required due to the risk from ground gas and asbestos which should be considered by the Principal Contractor.

9.9.3 Significant dewatering is unlikely to be required.



KEY:

- Site Boundary
- Window Sampler Borehole (WS01 - WS30)
- Window Sampler Borehole (TP01 - TP03)
- Window Sampler Borehole (WS101 - WS115)
- Rotary Borehole (BH101 - BH104)
- Trial Pit (TP101 - TP103)
- Borehole Installation (WS111, 112, 113, 114, 115) 6m (WS101, 103, 105, 107, 108, 109, 110) 4-6m

NOTES:

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ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND DOCUMENTS ASSOCIATED WITH THIS PROJECT.

ALL EXISTING AND PROPOSED DIMENSIONS, LEVELS AND LOCATIONS TO BE CHECKED AND VERIFIED BY THE MAIN CONTRACTOR ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY ANOMALIES REPORTED TO THE ENGINEER.

Rev	Date	Description	DRA	CHK	APP
P02	16.07.24	Proposed Boreholes Added	LB	RH	RH
P01	16.07.24	Issued for comment / approval	LB	RH	RH

Project
Ickleford Mill

Client
Hill Partnership Ltd

Drawing Title
Proposed - Borehole Location Plan - Site Layou

Scale	Date	Status
1:1,000 @ A3	16.07.24	Preliminary

DWG No. CRM1027189-ENZ-XX-XX-DR-G-0001.1 **Revision** P02

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KEY:

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- Window Sampler Borehole (TP01 - TP03)
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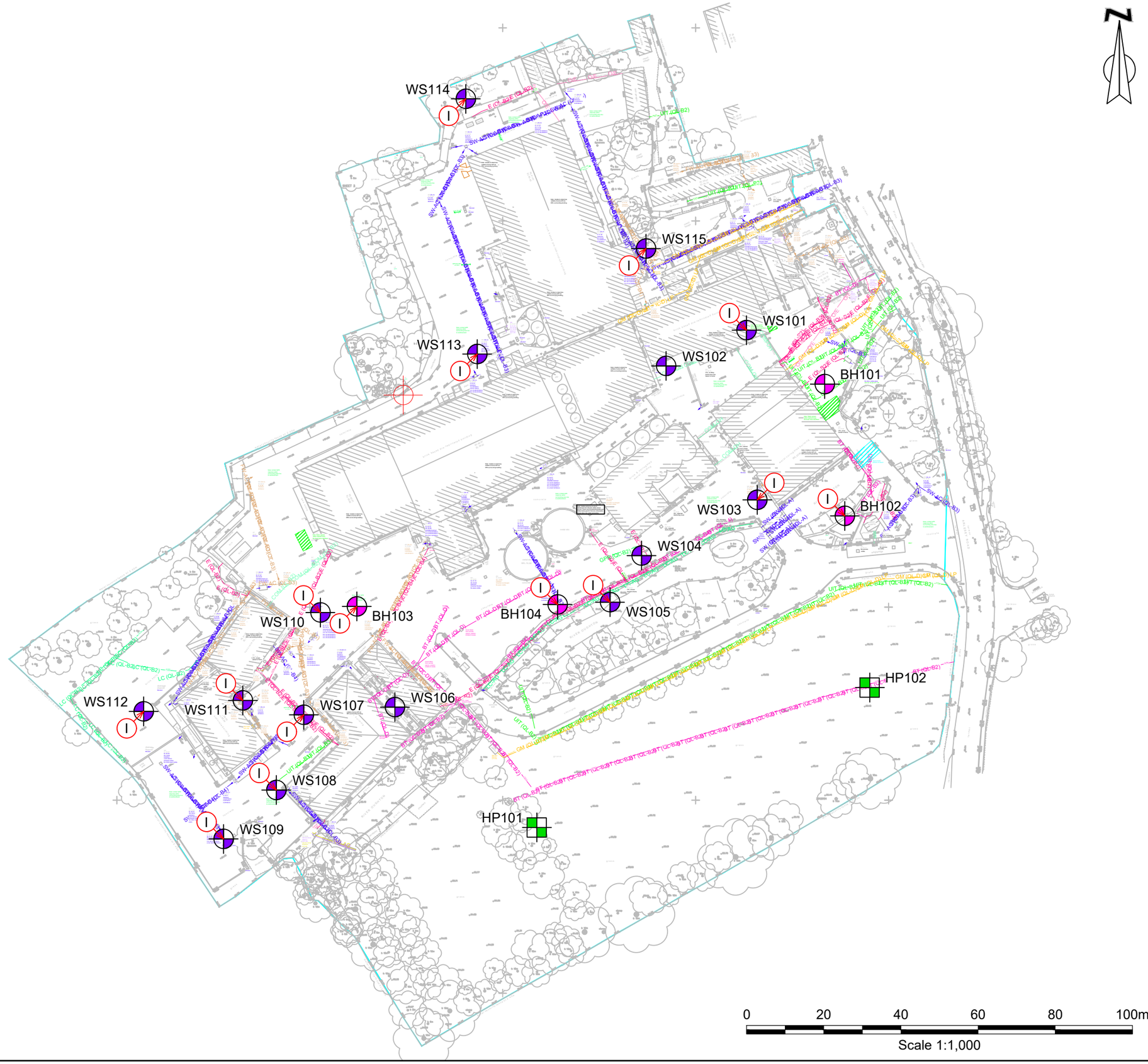
Drawing Title
Existing - Borehole Location Plan - Site Layout

Scale	Date	Status
1:1,000 @ A3	16.07.24	Preliminary

DWG No. CRM1027189-ENZ-XX-XX-DR-G-0001.2 **Revision** P02

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KEY:

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- Window Sampler Borehole (TP01 - TP03)

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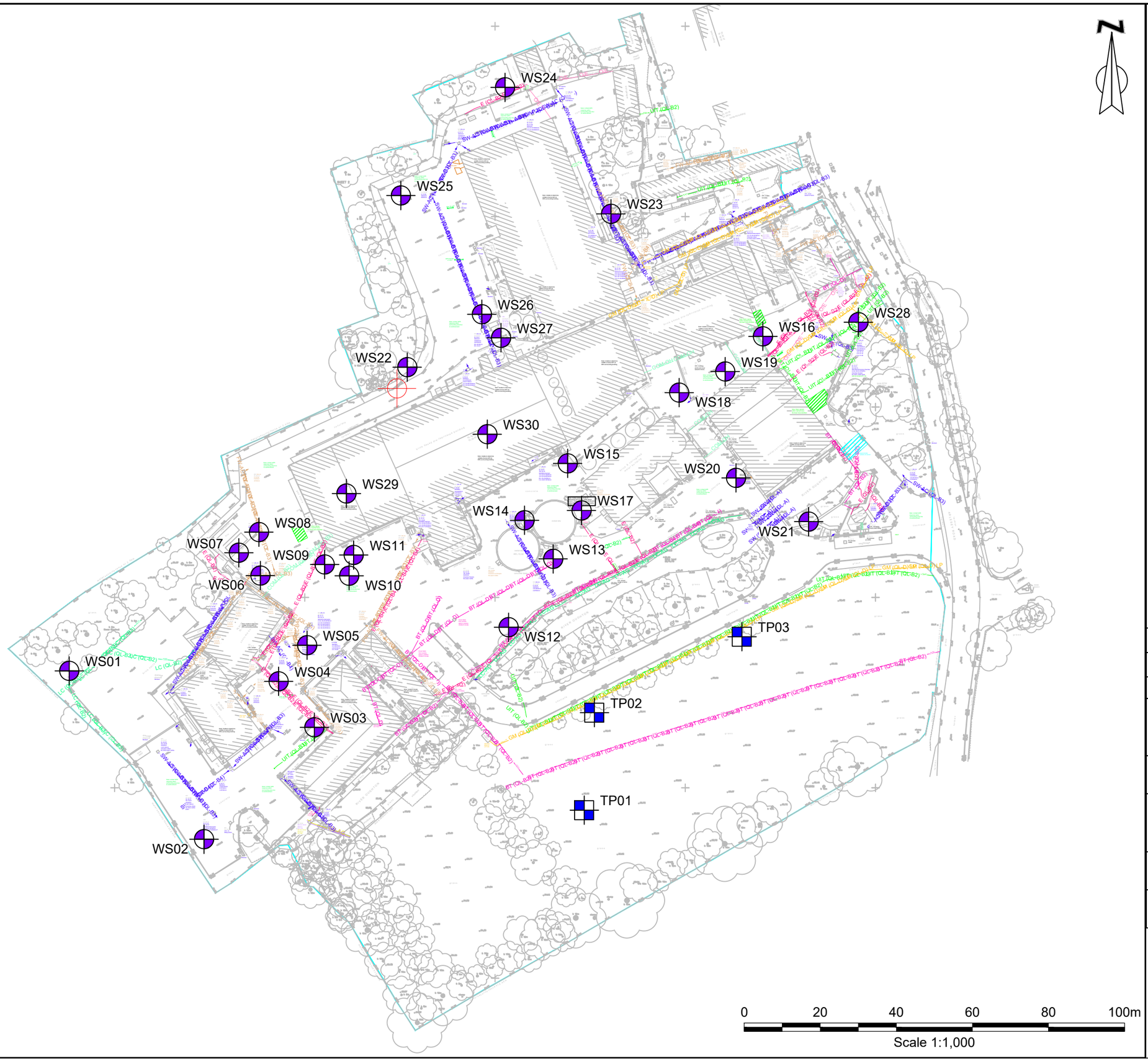
Drawing Title
Proposed - Borehole Location Plan - Topo

Scale	Date	Status
1:1,000 @ A3	16.07.24	Preliminary

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Scale	Date	Status
1:1,000 @ A3	16.07.24	Preliminary

DWG No. CRM1027189-ENZ-XX-XX-DR-G-0002.2 **Revision** P02

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GROUNDTECH
CONSULTING

Job title:	Bowman's Mill, Ickleford
Report type:	Ground Gas Risk Assessment
Prepared for:	Bowman's Ingredients Ltd
Date:	March 2020

Document Control Form	
PROJECT	*BOWMAN'S MILL, ICKLEFORD*
REPORT NAME	*GROUND GAS RISK ASSESSMENT*
REPORT REFERENCE	*19271/1341*
STATUS	*FINAL*
ISSUE DATE	*12 MARCH 2020*
REVISION	
CLIENT	*BOWMAN'S INGREDIENTS LIMITED*
CLIENT CONTACT	*ALEX MASIH*

For and Behalf of Groundtech Consulting	
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AUTHOR	Sam Flaherty BSc (Hons) FGS
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REVIEWED	James Doyle BSc (Hons) CGeol FGS

Introduction

We are pleased to present our findings following the completion of the gas monitoring programme undertaken at the above site for the proposed residential development.

Preliminary Risk Assessment Information

A Geo-Environmental Appraisal was carried out by Groundtech Consulting referenced 19271/1209, dated 06 January 2020.

No significant on-site sources of ground gas were identified during the Ground Investigation, deep Made Ground was generally not encountered across the site and no putrescible material was observed within the soils.

An infilled pond and mill race were identified by the Preliminary Risk Assessment undertaken by WSP Parsons Brinkerhoff (Report Ref: 70027704-10670(1)) in addition to an infilled gravel pit c.80m south of the site. Furthermore, a historic underground storage tank (UST) was present near the centre of the site.

The risk to site end users was considered to be moderate to low based on the PRA and Ground Investigation information.

Ground Model

Made Ground was encountered across the site to a maximum depth of 2.2m bgl but was generally less than 1.0m thick.

The Made Ground was generally granular containing ash and brick, however cohesive Made Ground was encountered in WS03, WS05, WS09, WS14 and WS23 to a maximum depth of 1.4m bgl.

Locally in the vicinity of WS09, WS10 and WS11, the Made Ground and natural strata had a hydrocarbon odour, these locations were drilled in the vicinity of the former UST. The Made Ground in the vicinity of WS11 was encountered to 2.2m bgl.

Made Ground was also locally deeper than 1.0m in the vicinity of WS02, WS03, WS05 and WS06 where the former pond and mill race was identified on the historic maps.

The natural strata were highly variable, comprising interbedded soft to firm Clay, soft Silt and loose Sand deposits. This was underlain by firm to stiff Clay.

Perched groundwater strikes were observed in most locations across the site from 1.0m to 3.45m bgl.

The exploratory hole positions are shown on the Exploratory Hole Location Plan 19271 03 and the logs are in Appendix 1.

Gas Monitoring

During the Ground Investigation works, monitoring standpipes were installed in the following holes and a summary of the installations is provided in the table below.

Location	Depth (m)	Response Zone (m bgl)	Targeted Strata	Reason
WS02	1.50	1.00 – 1.50	Made Ground	Ground Gas/ Groundwater
WS06	4.00	1.00 – 4.00	Sand, Silt and Clay	Ground Gas/ Groundwater
WS09	3.00	1.00 – 3.00	Made Ground, Sand and Clay	Ground Gas/ Groundwater
WS12	4.00	1.00 – 4.00	Clay	Ground Gas/ Groundwater

WS17	4.00	1.00 – 4.00	Clay	Ground Gas/ Groundwater
WS18	5.00	1.00 – 5.00	Clay	Ground Gas/ Groundwater
WS23	3.00	1.00 – 3.00	Sand and Clay	Ground Gas/ Groundwater
WS25	3.00	1.00 – 3.00	Clay	Ground Gas/ Groundwater
WS28	2.00	1.00 – 2.00	Sand and Clay	Ground Gas/ Groundwater
WS29	3.00	1.00 – 3.00	Silt and Clay	Ground Gas/ Groundwater

The standpipes consisted of polyvinyl chloride (pvc) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe.

Six ground gas monitoring visits have been completed between 23rd December 2019 and 2nd March 2020. Monitoring of the weather conditions and predicted atmospheric pressures (Met Office Surface Pressure Charts) was carried out up to 72 hours in advance of proposed monitoring visits in order that a reasonable period of data was obtained to determine atmospheric trends, and also to target the 'worst case' scenario.

Permanent gas and flow rate monitoring was carried out using a GFM436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- Oxygen (O_2), carbon dioxide (CO_2) and methane (CH_4) as the percentage volume in air (%v/v).
- Hydrogen sulphide (H_2S) and carbon monoxide (CO) as the percentage volume in air (%v/v).
- Lower Explosive Limit (% LEL) of methane.
- Atmospheric and borehole pressure, including pressure trend.
- Flow measurements (l/hr).
- Weather and ground surface conditions.

Both peak and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes.

Permanent gas and groundwater monitoring results are presented in Appendix 2.

Gas Monitoring Results

During the monitoring period, no concentrations of methane (CH_4) have been recorded within the standpipes. However, detectable levels of carbon dioxide (CO_2) were recorded within the standpipes, up to a maximum level of 1.7% v/v together with associated depleted oxygen (O_2) concentrations (minimum 15.0% v/v).

In addition, a maximum flow rate of 17.5 l/hr was recorded in WS17 however, high flows were only encountered in this location during one monitoring visit (visit 4). High flows of 7.1l/hr in WS18 and 16.7l/hr in WS06 were also recorded during visits 3 and 5 respectively. These results are considered to be outliers likely related to localised high-pressure environments created within the boreholes as a result of local changes in groundwater regime stemming from heavy downpours in recent months and gases being trapped above the response zone. The general range of flow results observe is <0.1l/hr to 2.7l/hr, therefore a maximum flow of 2.7l/hr will be used when calculating the GSV.

High groundwater levels were recorded within the standpipes ranging from ground level to 2.83m bgl during the monitoring period and groundwater was generally above the response zone of the standpipes. This appears to be characteristic of the site as groundwater was encountered at depths of between 1.00m and 3.45m bgl across the site during the Ground Investigation.

The atmospheric pressure ranged between 988mb and 1017mb during the monitoring period and was carried out during periods of steady, rising and falling barometric pressure.

Characterisation of the Gas Screening Value (GSV)

In accordance with CIRIA Report C665, November 2007 it is felt that an adequate risk assessment can be undertaken based on the following limiting factors:

- The proposed development has been considered as **high sensitivity** based on the site being developed with residential dwellings (Table 5.5 – Typical/Idealised frequency and period of monitoring, after Wilson et al, 2005).
- The risk associated with the generation potential of a source is considered as **low**, (assessment based on the environmental setting) as well as observations noted during the fieldworks.
- Relatively low flow rates have been recorded (Table 8.5 – Modified Wilson & Card classification) and the high anomalous positive flow rates are likely to be associated with groundwater being within the response zone. For this site, three of the monitoring visits were targeted to correlate with a falling atmospheric pressure trend. As a comparison, monitoring has also been undertaken during steady and rising atmospheric pressure trend.

Based upon the results recorded, in accordance with CIRIA Report C665, the risk to the site from ground gases has been assessed by converting the results to gas screening values (GSVs), calculated by multiplying the typical maximum gas concentrations with the recorded maximum positive flow rates. In addition, individual "hazardous gas flow rates" (Qhg) have been derived for each monitoring point. As no levels of methane have been recorded a GSV for carbon dioxide only has been calculated.

GSV (l/hr) = max borehole flow rate (l/hr) x max gas concentration (%)

For this assessment, the maximum recorded concentration of carbon dioxide of 1.7%v/v has been used together with the maximum flow rate of 2.7l/hr to calculate the GSV.

Carbon Dioxide GSV = 0.017 (1.7%) x 2.7 = 0.0459 l/hr

Methane GSV = 0.0 l/hr

Assessment

Ground gas monitoring was carried out as potential on-site and off-site sources of ground gas were identified.

No methane has been detected and a maximum concentration of carbon dioxide of 1.7% v/v has been recorded.

Groundwater has been encountered within the response zone in a number of the boreholes and is likely to be high as a result of the recent poor weather which has resulted in higher groundwater levels. However, the groundwater seems to be characteristic of the site as similar levels were encountered during the Ground Investigation. A positive borehole pressure was noted in WS17 and WS18 which is likely to have caused the flow of gas.

In order to assess the ground gas regime beneath the site and the need to incorporate ground gas precautions, guidance was taken from CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings'.

Based on the site being developed with low-rise housing, the Boyle and Witherington, 2006 method has been used to carry out the assessment. This is a risk-based approach that is designed to allow an identification of gas protection for a low-rise housing development by comparing the measured gas emission rates to generic 'traffic lights' scenarios. The traffic lights include 'typical maximum concentrations' and are provided for initial

screening purposes and risk-based gas screening values for consideration in situations where the typical maximum concentrations are exceeded.

When considering the results, in accordance with CIRIA C665 (Situation B – Low-rise housing with a ventilated underfloor void (min 150mm) and Table 8.7 – NHBC Traffic light system for 150mm void) it can be seen that the GSV value for carbon dioxide is below the assessment GSV of <0.78l/hr and falls within the Green traffic light zone.

NHBC - Green Traffic Light

An extract of the table is presented below.

Traffic Light Classification	Methane [1]		Carbon Dioxide [1]	
	Typical Maximum Concentration [3] (%v/v)	Gas Screening Value [2,4] (l/hr)	Typical Maximum Concentration [3] (%v/v)	Gas Screening Value [2,4] (l/hr)
Green	1	**0.16**	5	**0.78**
Amber 1	5	**0.63**	10	**1.56**
Amber 2	20	**1.56**	30	**3.10**
Red				

Notes:

1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter will be the decider as to what Traffic Light is allocated;
2. Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, as defined in Wilson and Card (1999), which is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentrations can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

In addition, based on the site being developed with residential homes with potential for ground bearing floor slabs, an assessment in accordance with the Wilson and Card method has also been carried out.

When considering the results, in accordance with CIRIA C665 (Section A Development and Table 8.5 – Modified Wilson and Card Classification) it can be seen that the GSV value for carbon dioxide is below the assessment GSV of <0.07l/hr and falls within Characteristic Situation 1 resulting in no gas protection measures being required.

Characteristic Situation 1

An extract of the table is presented below.

Modified Wilson and Card classification

	Characteristic situation (CIRIA R149)	Comparable classification in DETR *et al* (1999)	Risk classification	Gas screening value (GSV) (CH_4 or CO_2) (l/hr)[1] Threshold	Additional factors	Typical source of generation
	1	A	Very low risk	<0.07	Typically methane <1 % and/or carbon dioxide <5 %. Otherwise consider increase to Situation 2	Natural soils with low organic content "Typical" made ground
	2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/organic content. "Typical" made ground
	3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
	4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking – susceptible to flooding, completed landfill (WMP 26B criteria)
	5	E	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
	6	F	Very high risk	>70		Recent landfill site

Radon Gas

In accordance with BRE 211 'Radon Guidance on Protective Measures for New Buildings' 2015 and UKRadon the site falls in an area where <1% of homes are affected by radon gas, therefore no radon precautions are required within the proposed dwellings.

Conclusions

No gas protection measures are required within the proposed houses at the site.

No radon precautions are necessary.

It is recommended that confirmation of these findings is made with the Local Authority prior to any irrevocable action being taken.

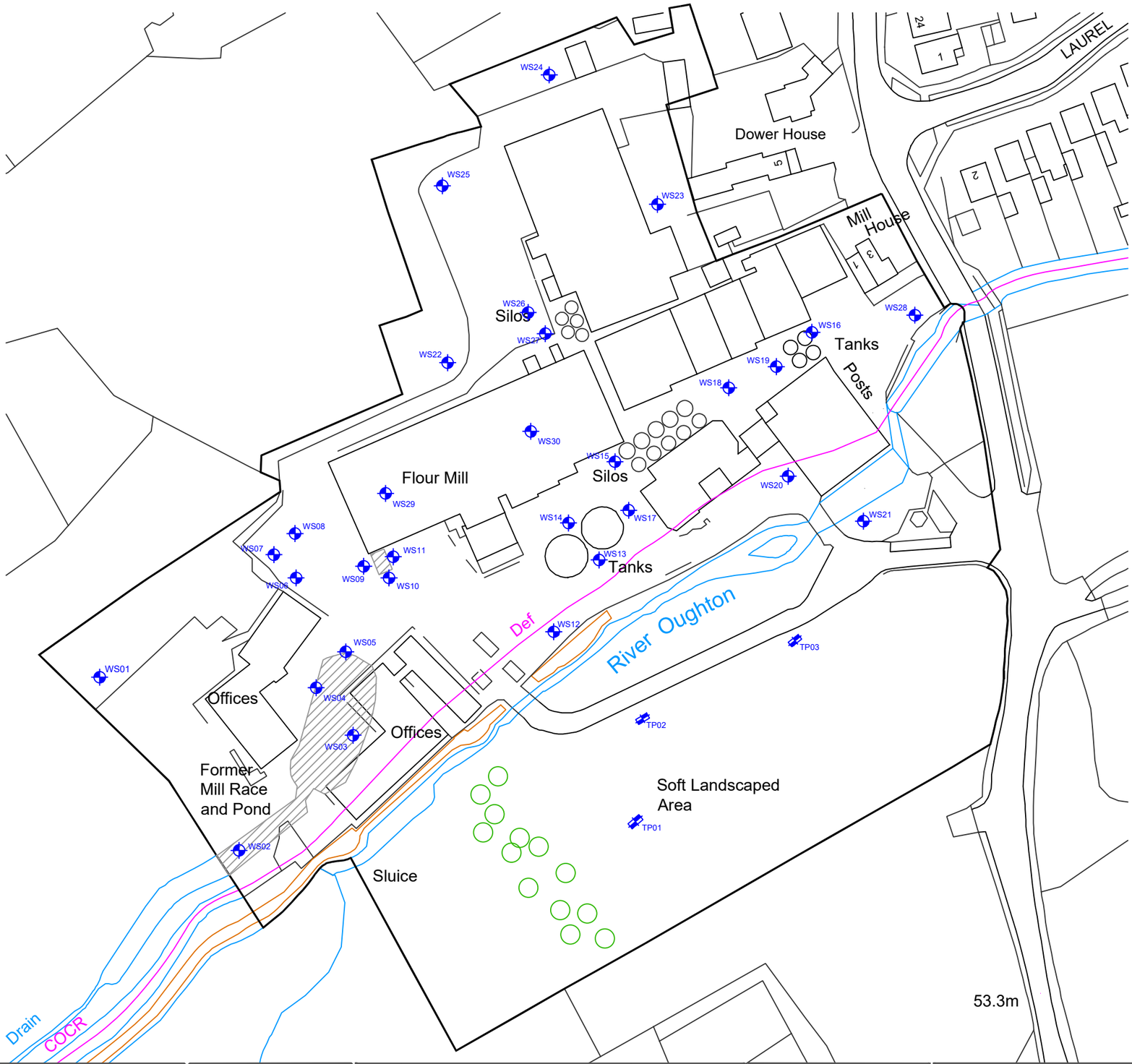
PLANS



GROUNDTECH CONSULTING	CLIENT	DATE				Status	
	BOWMAN'S INGREDIENTS LTD	JANUARY 2020				Preliminary	
	PROJECT TITLE	SCALE				Draft	
	BOWMANS MILL, ICKLEFORD	NTS				Issued	●
	PLAN TITLE	PLAN NUMBER				For Comment	
	PROJECT LOCATION PLAN	19271 01	Rev.	Details	Date	Approved	

Notes

○ Location of the Site



GROUNDTECH CONSULTING

CLIENT	BOWMAN'S INGREDIENTS LTD
PROJECT TITLE	BOWMAN'S MILL, ICKLEFORD
PLAN TITLE	EXPLORATORY HOLE LOCATION PLAN
DATE	JANUARY 2020
SCALE	NTS
PLAN NUMBER	19271 03

Rev.	Details	Date

Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes

Window Sample Borehole Locations

Trial Pit Locations

-

EXPLORATORY HOLE LOGS

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.50	ES					MADE GROUND: Brown slightly sandy slightly gravelly clayey topsoil. Gravel is angular to subrounded fine to medium of mixed lithology including brick and rare ash.
		1.00	ES		0.90			Medium dense grey slightly clayey slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		1.20		N=17 (4,4/5,4,4,4)				
		2.00		N=2 (3,2/1,0,0,1)	1.50			Loose yellow brown slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
	▼				2.30			Firm grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine of mixed lithology.
		3.00		N=6 (1,1/1,1,2,2)				
		4.00		N=14 (1,2/3,3,3,5)	3.70			Dark brown slightly sandy SILT.
					4.45			End of borehole at 4.45 m

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 2.45m bgl. 3. Hole collapsed to 2.10m. 4. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS02** Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.23			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.55			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
					0.75			MADE GROUND: Dark brown slightly sandy angular fine to coarse gravel of mixed lithology including ash.
		1.00	ES					MADE GROUND: Dark brown slightly gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including ash.
		1.20		N=37 (6,9/9,8,10,10)				
		1.50	ES					
		1.70		50 (25 for 0mm/50 for 5mm)	1.70			End of borehole at 1.70 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Obstruction encountered at 1.50m bgl. 5. Standpipe installed to 1.50m bgl: 1.00m plain pipe, 0.50m slotted pipe.

Borehole Log

GROUNDTECH CONSULTING

Borehole No. **WS03**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.18			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.50			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.10	ES		1.00			MADE GROUND: Soft grey slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.20	D					Very soft dark brown slightly sandy silty CLAY.
		1.20		N=0 (0,0/0,0,0,0)				
					1.50			Firm dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
	▼	2.00		N=9 (1,2/3,2,2,2)	1.90			Soft to firm light brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
								Gravel band encountered at 2.30m to 2.35m bgl.
		2.50	D					*Becoming firm to stiff at 2.50m bgl.*
		3.00		N=0 (0,0/0,0,0,0)				*Very Soft at 3.00m bgl.*
		4.00		N=9 (1,1/2,2,3,2)	4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.00m bgl. 4. Hole collapsed to 2.00m. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grey reinforced concrete.
					0.26			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		0.50	ES					
					0.65			Soft grey brown silty CLAY.
					0.80			Firm light brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		1.00	ES					
		1.20		N=7 (1,1/1,1,2,3)				
		1.50	D					
	▼							
		2.00	D		2.00			Soft grey brown silty CLAY.
		2.00		N=4 (0,0/0,1,1,2)				
		3.00	D		3.00			Soft grey clayey SILT.
		3.00		N=1 (1,0/0,1,0,0)				
								End of borehole at 3.45 m
		4.00		N=0 (0,0/0,0,0,0)				
					4.45			

1
2
3
4
5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.70m bgl. 4. Hole collapsed to 2.80m. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.25			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.60			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.00	ES		1.10			MADE GROUND: Soft grey slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse of mixed lithology including brick and ash.
	▼	1.20 1.20	D	N=27 (2,3/6,11,7,3)	1.40			Soft grey slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
					1.60			Medium dense yellow brown fine to coarse SAND and angular to rounded fine to coarse GRAVEL of mixed lithology including chert.
		2.00 2.00	D	N=0 (0,0/0,0,0,0)				Very soft dark brown slightly sandy silty CLAY.
		3.00		N=7 (2,1/2,2,1,2)				*Soft to firm at 3.00m bgl.*
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.40m bgl. 4. Hole collapsed to 1.50m. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.00	ES					
		1.20		N=1 (1,2/1,0,0,0)	1.20			Very loose to loose orange brown slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse of mixed lithology including chert.
		1.50	D					
		2.00		N=4 (1,1/1,1,1,1)				
					2.50			Soft dark brown clayey SILT.
		3.00		N=9 (1,1/2,2,2,3)	3.00			Soft to firm lightly grey sandy SILT.
		3.10	D					
	▼				3.50			Firm dark brown silty CLAY.
		3.60	D					
		4.00		N=14 (2,2/2,3,4,5)				
					4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 3.45m bgl. 4. Hole collapsed to 3.00m. 5. Standpipe installed to 4.00m bgl: 1.00m plain pipe, 3.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS07**

Sheet 1 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Grey reinforced concrete.	
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.	
		0.80	ES						
		1.00	D		0.90			Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.	1
		1.20		N=11 (1,2/2,3,3,3)				*Becoming stiff at 1.50m bgl.*	
		2.00	D						2
		2.00		N=7 (2,2/2,1,2,2)					
		2.50 - 2.95	U					*Very high strength at 2.50m bgl.*	
		3.00		N=23 (2,3/4,6,6,7)				*Stiff at 3.00m bgl.*	3
		4.00		N=21 (2,3/4,4,6,7)					4
		5.00		N=23 (3,3/4,6,6,7)					5
								Continued on next sheet	

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS07**

Sheet 2 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					5.45			End of borehole at 5.45 m

6

7

8

9

10

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

Borehole Log

GROUNDTECH CONSULTING

Borehole No. **WS08**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
					0.60			Firm light brown mottled grey slightly gravelly sandy CLAY. Gravel is subangular to rounded fine of mixed lithology.
		1.00	ES		1.00			Soft yellow sandy SILT.
		1.20		N=0 (0,0/0,0,0,0)				
	▼	1.50	D		1.40			Loose light yellow silty fine SAND.
		2.00		N=6 (0,1/1,2,1,2)				
					2.20			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		2.50	D					
		3.00		N=9 (1,2/2,3,2,2)				
		4.00		N=14 (3,2/3,3,4,4)				
					4.45			End of borehole at 4.45 m

1
2
3
4
5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.50m bgl. 4. Hole collapsed to 2.00m. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS09**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Soft grey slightly sandy slightly gravelly clay with moderate hydrocarbon odour. Gravel is angular to subangular fine to coarse of mixed lithology.
		1.00	ES					
		1.20		N=9 (8,4/1,3,3,2)				
		1.50	ES		1.40			Loose yellow brown silty fine SAND with moderate hydrocarbon odour.
		2.00		N=3 (0,0/0,1,1,1)				
		2.50	ES		2.30			Firm to stiff grey slightly sandy slightly gravelly CLAY with slight hydrocarbon odour. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
					3.45			End of borehole at 3.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.00m bgl. 4. Hole collapsed to 1.30m. 5. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.25			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand with slight hydrocarbon odour. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
					0.65			Firm yellow brown slightly gravelly sandy CLAY with sli hydrocarbon odour. Gravel is angular subrounded fine to medium of mixed lithology including chert.
	▼	1.00	D					
		1.00	ES		1.10			Very ense yellow brown fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL of mixed lithology including chert.
		1.20		N=50 (6,11/50 for 230mm)				
					1.65			End of borehole at 1.65 m

1
2
3
4
5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.10m bgl. 4. Hole terminated at 1.65m bgl due to SPT refusal. 5. No standpipe installed.

Borehole Log

GROUNDTECH CONSULTING

Borehole No. **WS11**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.18			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Black gravelly fine to coarse sand with moderate hydrocarbon odour. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.00	ES					
	▼	1.20		N=50 (8,12/50 for 225mm)				
		1.50	ES					
		1.65		50 (12,13/50 for 170mm)				
					2.10			End of borehole at 2.10 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.20m bgl. 4. Obstruction encountered at 2.10m bgl. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS12**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grey reinforced concrete.
		0.30	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		0.50	ES		0.40			Soft grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		1.00	D					
		1.20		N=0 (0,0/0,0,0,0)				
	▼	2.00	D					
		2.00		N=4 (1,0/0,1,1,2)				
		3.00		N=2 (1,0/0,1,0,1)				
		4.00		N=6 (4,2/1,1,2,2)				
					4.45			End of borehole at 4.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.30m bgl. 4. Hole collapsed to 2.50m. 5. Standpipe installed to 4.00m bgl: 1.00m plain, 3.00m slotted.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS13**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.23			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
					0.60			Soft grey silty CLAY.
		1.00	D					
		1.00	ES					
		1.20		N=0 (0,0/0,0,0,0)				
	▼	2.00		N=3 (0,0/0,1,1,1)				
					2.30			Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		2.50	D					
		3.00		N=9 (0,1/2,2,3,2)				
		4.00		N=6 (1,2/1,1,2,2)				
					4.45			End of borehole at 4.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.00m bgl. 4. Hole collapsed to 2.20m. 5. No standpipe installed.

Borehole Log

GROUNDTECH CONSULTING

Borehole No. **WS14**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.23			MADE GROUND: Grey reinforced concrete.
		0.30	ES		0.40			MADE GROUND: Soft to firm orange brown slightly sandy gravelly clay. Gravel is angular fine to coarse of mixed lithology including brick.
		0.50	ES					MADE GROUND: Yellow brown gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick and chert.
	▼				0.90			Soft grey silty CLAY.
		1.20		N=1 (0,0/0,0,0,1)				
		1.50	D					
		2.00		N=8 (0,1/2,1,2,3)				
					2.30			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		2.50 - 2.95	U					
		3.00		N=15 (3,3/4,4,3,4)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.00m bgl. 4. Hole collapsed to 1.50m. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS15**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.17			MADE GROUND: Grey reinforced concrete.
		0.30	ES					MADE GROUND: Orange brown gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick.
					0.40			Dark brown slightly organic silty fine SAND.
					0.80			Soft grey brown sandy CLAY.
	▼	1.00	D					
	▼	1.00	ES					
	▼	1.20		N=25 (3,5/6,6,7,6)				
								Gravel band encountered at 1.40m to 1.45m bgl.
					1.50			Firm to stiff orange brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mixed lithology including chert.
		2.00	D					
		2.00		N=9 (1,2/2,3,2,2)				
		3.00		N=11 (1,2/3,3,2,3)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.10m bgl. 4. Hole collapsed to 2.00m. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS16**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Black tarmac.
					0.20			MADE GROUND: Grey reinforced concrete.
		0.40	ES		0.50			MADE GROUND: Black sandy angular fine to coarse gravel of mixed lithology including brick and bitumous gravel.
	▼	1.00	ES		1.00			Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		1.20		N=33 (8,14/14,9,7,3)				Dense orange brown fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL of mixed lithology including chert.
		1.50 - 1.95	U		1.50			Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		2.00	D					
		2.00		N=19 (2,2/4,4,5,6)				
					2.60			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		3.00		N=24 (6,6/5,6,6,7)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.00m bgl. 4. Hole collapsed to 1.00m bgl. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS17**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grey reinforced concrete.
		0.60	ES		0.56			Soft grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
		1.00	ES					
		1.20		N=0 (0,0/0,0,0,0)	1.30			Soft grey slightly sandy silty CLAY.
	▼	1.50	D					*Low strength at 1.50m bgl.*
		1.50 - 1.95	U					
		2.00		N=3 (0,0/0,0,1,2)	2.10			Firm grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		2.50	D					
		2.50 - 2.95	U					
		3.00		N=10 (1,2/2,3,2,3)				
		4.00		N=12 (3,3/3,2,4,3)				
					4.45			End of borehole at 4.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Soils saturated from 1.50m bgl. 4. Hole collapsed to 3.00m bgl. 5. Standpipe installed to 4.00m bgl: 1.00m plain pipe, 3.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS18**

Sheet 1 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.17			MADE GROUND: Grey reinforced concrete.	
		0.30 - 3.00	ES					MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.	
		0.50	ES		0.40			MADE GROUND: Black slightly sandy angular fine to coarse gravel of mixed lithology including ash.	
					0.70			Firm grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.	1
		1.00	D						
		1.20		N=1 (1,0/0,1,0,0)				*Becoming soft between 1.20m and 1.50m bgl.*	
		1.50 - 1.95	U		1.50			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.	
		2.00	D						2
		2.00		N=10 (1,1/1,3,3,3)					
	▼								
		2.50 - 2.95	U						
		3.00		N=12 (1,2/2,3,3,4)					3
		4.00		N=10 (1,1/1,2,3,4)					4
		5.00	D						5

Continued on next sheet

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.40m bgl. 4. Standpipe installed to 5.00m bgl: 1.00m plain pipe, 4.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS18**

Sheet 2 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		5.00		N=13 (1,1/2,3,4,4)	5.45			End of borehole at 5.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.40m bgl. 4. Standpipe installed to 5.00m bgl: 1.00m plain pipe, 4.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS19**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.60			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
	▼	1.00	D					Firm brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
		1.00	ES		1.10			
		1.20		N=22 (1,3/5,6,6,5)				Medium dense yellow slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		1.60	D		1.50			Firm brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
								Sand and gravel band at 1.80m bgl.
		2.00		N=11 (1,1/2,2,3,4)				
		2.50 - 2.95	U					
		3.00		N=19 (2,3/4,4,5,6)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.10m bgl. 4. Hole collapsed to 1.50m bgl. 5. No standpipe installed.

Borehole Log

GROUNDTECH CONSULTING

Borehole No. **WS20**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.26			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Yellow gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick.
					0.60			Firm grey silty CLAY.
		1.00	ES					*Becoming soft from 1.00m bgl.*
		1.20		N=0 (0,0/0,0,0,0)				
	▼	1.50	D					
					1.90			Soft grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		2.00		N=3 (0,0/0,1,1,1)				
		3.00	D					*Firm to stiff from 3.00m bgl.*
		3.00		N=18 (2,2/3,4,5,6)				
		4.00		N=24 (5,4/5,6,6,7)				
					4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.65m bgl. 4. Hole collapsed to 3.00m bgl. 5. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS21**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	ES		0.50			MADE GROUND: Brown slightly gravelly slightly sandy clayey topsoil. Gravel is angular to rounded fine to coarse of mixed lithology including brick.
		1.00	D					Soft grey brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		1.00	ES					
		1.20		N=18 (0,0/2,3,6,7)				
		1.50 - 1.95	U					*Low strength at 1.50m*
	▼	2.00		N=24 (2,2/4,7,6,7)				
					2.30			Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
					2.70			Firm to stiff grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
		3.00		N=24 (4,5/5,6,6,7)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 2.00m bgl. 3. Hole collapsed to 2.00m bgl. 4. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS22** Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	ES		0.35			MADE GROUND: Grey sandy angular fine to coarse gravel of limestone.
		1.00	D					Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk and chert.
		1.00	ES					*Becoming stiff from 1.00m bgl.*
		1.20		N=16 (2,2/3,4,4,5)				
		1.50 - 1.95	U					
		2.00	D					
		2.00		N=18 (3,2/3,5,5,5)				*Becoming grey from 2.10m bgl.*
		3.00		N=26 (3,5/5,6,7,8)				
		4.00		N=50 (5,7/9,14,13,14)				*Very stiff at 4.00m bgl*
					4.45			End of borehole at 4.45 m

Remarks
1. Hand dug inspection pit to 1.20m bgl. 2. No groundwater encountered. 3. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS23**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.20			MADE GROUND: Brown slightly gravelly slightly sandy clayey topsoil. Gravel is angular to rounded fine to coarse of mixed lithology including brick.
		0.40	ES		0.50			MADE GROUND: Firm light brown slightly gravelly sandy clay. Gravel is angular to subrounded fine to medium of mixed lithology including brick.
		1.20		N=8 (2,2/2,2,2,2)				Loose orange brown fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.60	D		1.50			Firm orange brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
	▼	2.00		N=20 (4,4/3,4,5,8)	2.00			Medium dense yellow slightly clayey slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		3.00		N=32 (5,6/8,7,8,9)	2.50			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 2.00m bgl. 3. Hole collapsed to 2.00m bgl. 4. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

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Borehole Log

Borehole No. **WS24**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40 - 4.00	ES		0.50			MADE GROUND: Brown slightly gravelly slightly sandy clayey topsoil. Gravel is angular to rounded fine to coarse of mixed lithology including brick.
		0.90	D		1.00			Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		1.20		N=35 (5,6/8,8,9,10)				Dense yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.50	D					
		2.00		N=50 (6,9/50 for 230mm)				*Very dense at 2.00m*
					2.45			End of borehole at 2.45 m

1
2
3
4
5

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. No groundwater encountered. 3. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS25**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grey reinforced concrete.
		0.40	ES		0.50			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
		1.00	D					Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		1.00	ES					
		1.20		N=19 (2,3/4,5,5,5)				*Becoming grey from 1.20m bgl.*
		1.50 - 1.95	U					*High strength at 1.50m bg*
		2.00	D					*Gravel becoming fine to coarse from 2.00m bgl.*
		2.00		N=21 (3,3/4,5,6,6)				
		3.00		N=50 (9,11/50 for 245mm)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS26**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.16			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
					0.60			Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
					0.90			Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		1.00	ES					
		1.20		N=14 (2,3/4,3,3,4)				
								Becoming grey from 1.50m bgl.
		2.00		N=24 (3,4/4,5,7,8)				
		3.00 3.00	D	N=50 (8,10/50 for 245mm)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS27**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.50	ES		0.21			MADE GROUND: Grey reinforced concrete.
					0.60			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
					0.80			MADE GROUND: Multicoloured angular to rounded medium gravel of mixed lithology.
								End of borehole at 0.80 m

1
2
3
4
5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 0.80m bgl, suspected service encountered. 3. No groundwater encountered.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS28**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Black tarmac.
		0.50	ES		0.60			MADE GROUND: Orange brown sandy angular fine to coarse gravel of mixed lithology including brick.
	▼	1.00	ES					Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.20		N=13 (5,7/5,3,3,2)	1.20			Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
		1.50 - 1.95	U					*Low strength at 1.50m*
								Becoming stiff from 1.70m bgl.
		2.00		N=13 (3,2/3,3,4,3)				
					2.45			End of borehole at 2.45 m

1 2 3 4 5

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 1.00m bgl. 3. Hole collapsed to 1.20m bgl. 4. Standpipe installed to 2.00m bgl: 1.00m plain pipe, 1.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS29**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 13/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.16			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
					0.60			Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.00	ES		1.00			Soft yellow brown clayey SILT.
		1.20		N=1 (0,0/0,0,0,1)				
		1.50	D					
	▼	2.00	D					
		2.00		N=2 (0,0/0,0,1,1)				
					2.20			Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		2.50 - 2.95	U					
		3.00		N=8 (1,2/2,2,2,2)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 2.20m bgl. 3. Groundwater encountered at 2.00m bgl. 4. Hole collapsed to 2.00m bgl. 5. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

GROUNDTECH CONSULTING

Borehole Log

Borehole No. **WS30**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 13/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15	ES		0.12			MADE GROUND: Grey reinforced concrete.
					0.20			MADE GROUND: Yellow gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick.
		0.50	ES					Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
					0.60			Yellow brown silty fine SAND.
					0.90			Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		1.00	D					
		1.20		N=2 (1,0/1,1,0,0)				
		1.50 - 1.95	U		1.50			Stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		2.00		N=13 (1,2/2,3,4,4)				
		3.00		N=38 (6,7/8,9,9,12)				
		3.70		N=50 (8,10/50 for 245mm)				
					4.15			End of borehole at 4.15 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

GROUND GAS MONITORING RESULTS

PERMANENT GROUND GAS MONITORING FORM

GROUNDTECH CONSULTING

SITE NAME:	*BOWMANS MILL, ICKLEFORD*	***ENGINEER:***	*Steffan Mullen*
CLIENT:	*SPAWFORTHS*	***DATE:***	*23/12/2019*
JOB NO:	*19271*		

Pressure Trend:	*Steady*	***Weather:***	*Overcast*	***Equipment:***	*GFM 436*

Ambient:	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	LEL	H_2S (ppm)	CO (ppm)
Start	19.9	0.0	0.0	0.0	0.0	0.0
Finish	19.9	0.0	0.0	0.0	0.0	0.0

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q_{hg} CO_2 (l/hr)	Q_{hg} CH_4 (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.4	19.7	19.4	0.0	0.0	0.0	-10.0	0.0004	0.0000	1003	-	N	NGW
WS06	0.0	1.0	0.00	0.0	0.0	0.0	0.4	0.4	19.7	19.7	0.0	0.0	0.0	0.0	0.0004	0.0000	1003	-	N	0.80
WS09	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.1	19.8	20.0	0.0	0.0	0.0	0.0	0.0003	0.0000	1003	-	N	0.36
WS12	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.1	20.1	0.0	0.0	0.0	0.0	0.0000	0.0000	1003	-	N	0.58
WS17	0.2	0.2	0.04	0.0	0.0	0.0	0.0	0.0	20.1	20.1	0.0	0.0	0.0	0.0	0.0000	0.0000	1002	-	N	0.29
WS18	0.2	0.0	0.04	0.0	0.0	0.0	0.1	0.1	20.1	20.1	0.0	0.0	0.0	0.0	0.0002	0.0000	1002	-	N	0.92
WS23	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.2	20.2	0.0	0.0	0.0	0.0	0.0000	0.0000	1001	-	N	2.60
WS25	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.0	19.0	19.9	0.0	0.0	0.0	0.0	0.0004	0.0000	1000	-	N	2.83
WS28	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	19.9	19.9	0.0	0.0	0.0	0.0	0.0000	0.0000	1001	-	N	1.20
WS29	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	18.6	18.6	0.0	0.0	0.0	0.0	0.0000	0.0000	1001	-	N	1.90

Notes:

PERMANENT GROUND GAS MONITORING FORM

GROUNDTECH CONSULTING

SITE NAME:	*BOWMANS MILL, ICKLEFORD*	***ENGINEER:***	*Steffan Mullen*
CLIENT:	*SPAWFORTHS*	***DATE:***	*24/01/2020*
JOB NO:	*19271*		

Pressure Trend:	*Falling*	***Weather:***	*Overcast*	***Equipment:***	*GFM 436*

Ambient:	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	LEL	H_2S (ppm)	CO (ppm)
Start	20.3	0.0	0.0	0.0	0.0	0.0
Finish	20.4	0.0	0.0	0.0	0.0	0.0

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q_{hg} CO_2 (l/hr)	Q_{hg} CH_4 (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N	N/A
WS06	0.2	0.2	0.03	0.0	0.0	0.0	1.6	0.8	17.2	19.3	0.0	0.0	0.0	0.0	0.0032	0.0000	1017	-	N	0.85
WS09	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	19.6	19.6	0.0	0.0	10.0	10.0	0.0001	0.0000	1017	-	N	0.60
WS12	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.3	20.1	20.0	0.0	0.0	0.0	0.0	0.0004	0.0000	1015	-	N	1.60
WS17	-0.7	0.0	-0.04	0.0	0.0	0.0	0.0	0.0	20.3	20.3	0.0	0.0	0.0	0.0	0.0000	0.0000	1015	-	N	0.26
WS18	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	20.1	20.1	0.0	0.0	0.0	0.0	0.0001	0.0000	1015	-	N	0.96
WS23	0.7	0.7	0.11	0.0	0.0	0.0	0.8	0.7	18.9	18.8	0.0	0.0	0.0	0.0	0.0056	0.0000	1014	-	N	0.49
WS25	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	20.3	20.3	0.0	0.0	0.0	0.0	0.0001	0.0000	1015	-	N	0.75
WS28	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.4	20.4	0.0	0.0	0.0	0.0	0.0000	0.0000	1014	-	N	2.00
WS29	0.0	0.0	0.00	0.0	0.0	0.0	1.4	1.4	19.1	19.1	0.0	0.0	0.0	0.0	0.0014	0.0000	1013	-	N	0.75

Notes: WS02 not monitored due to being obstructed by a car.

PERMANENT GROUND GAS MONITORING FORM

GROUNDTECH CONSULTING

SITE NAME:	*BOWMANS MILL, ICKLEFORD*	***ENGINEER:***	*Steffan Mullen*
CLIENT:	*SPAWFORTHS*	***DATE:***	*12/02/2020*
JOB NO:	*19271*		

Pressure Trend:	*Rising*	***Weather:***	*Overcast*	***Equipment:***	*GFM 436*

Ambient:	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	LEL	H_2S (ppm)	CO (ppm)
Start	19.9	0.0	0.0	0.0	0.0	0.0
Finish	19.7	0.0	0.0	0.0	0.0	0.0

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q_{hg} CO_2 (l/hr)	Q_{hg} CH_4 (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.5	19.2	19.2	0.0	0.0	0.0	0.0	0.0005	0.0000	1008	-	N	0.26
WS06	0.4	0.4	0.06	0.0	0.0	0.0	1.7	0.9	15.0	17.2	0.0	0.0	0.0	0.0	0.0068	0.0000	1009	-	N	0.62
WS09	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	19.0	19.3	0.0	0.0	0.0	0.0	0.0000	0.0000	1009	-	N	0.75
WS12	0.9	0.9	0.26	0.0	0.0	0.0	0.0	0.0	19.5	19.5	0.0	0.0	0.0	0.0	0.0000	0.0000	1008	-	N	0.81
WS17	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	19.7	19.7	0.0	0.0	0.0	0.0	0.0000	0.0000	1007	-	N	0.61
WS18	7.1	7.1	1.26	0.0	0.0	0.0	0.6	0.0	19.3	19.7	0.0	0.0	0.0	0.0	0.0426	0.0000	1008	-	N	1.10
WS23	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	19.1	19.1	0.0	0.0	0.0	0.0	0.0001	0.0000	1009	-	N	2.40
WS25	0.0	0.9	0.00	0.0	0.0	0.0	0.4	0.4	19.4	19.4	0.0	0.0	0.0	0.0	0.0004	0.0000	1009	-	N	0.34
WS28	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.2	19.7	19.2	0.0	0.0	0.0	0.0	0.0005	0.0000	1007	-	N	0.62
WS29	0.9	0.9	0.26	0.0	0.0	0.0	1.7	1.7	18.4	18.4	0.0	0.0	0.0	0.0	0.0153	0.0000	1008	-	N	1.10

Notes:

PERMANENT GROUND GAS MONITORING FORM

GROUNDTECH CONSULTING

SITE NAME:	*BOWMANS MILL, ICKLEFORD*	***ENGINEER:***	*Steffan Mullen*
CLIENT:	*SPAWFORTHS*	***DATE:***	*18/02/2020*
JOB NO:	*19271*		

Pressure Trend:	*Rising*	***Weather:***	*Overcast*	***Equipment:***	*GFM 436*

Ambient:	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	LEL	H_2S (ppm)	CO (ppm)
Start	20.5	0.0	0.0	0.0	0.0	0.0
Finish	20.5	0.0	0.0	0.0	0.0	0.0

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q_{hg} CO_2 (l/hr)	Q_{hg} CH_4 (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.2	20.0	20.4	0.0	0.0	0.0	0.0	0.0005	0.0000	1012	-	N	1.31
WS06	2.7	0.5	0.36	0.0	0.0	0.0	0.8	0.8	17.7	17.7	0.0	0.0	0.0	0.0	0.0216	0.0000	1010	-	N	0.42
WS09	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	19.9	19.9	0.0	0.0	10.0	10.0	0.0000	0.0000	1011	-	N	1.01
WS12	0.0	0.0	0.00	0.0	0.0	0.0	0.2	0.2	19.5	19.5	0.0	0.0	0.0	0.0	0.0002	0.0000	1009	-	N	0.70
WS17	17.4	17.5	2.33	0.0	0.0	0.0	0.0	0.0	19.9	19.9	0.0	0.0	0.0	0.0	0.0000	0.0000	1008	-	N	0.63
WS18	0.3	0.3	0.04	0.0	0.0	0.0	0.3	0.1	19.8	20.2	0.0	0.0	0.0	0.0	0.0009	0.0000	1009	-	N	0.78
WS23	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.0	20.1	20.3	0.0	0.0	10.0	0.0	0.0001	0.0000	1009	-	N	2.27
WS25	0.2	0.2	0.03	0.0	0.0	0.0	1.3	0.8	18.9	19.7	0.0	0.0	0.0	0.0	0.0026	0.0000	1008	-	N	0.38
WS28	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.4	20.4	0.0	0.0	0.0	0.0	0.0000	0.0000	1009	-	N	0.56
WS29	0.0	0.0	0.00	0.0	0.0	0.0	0.2	0.2	19.9	19.9	0.0	0.0	0.0	0.0	0.0002	0.0000	1007	-	N	1.03

Notes:

PERMANENT GROUND GAS MONITORING FORM

GROUNDTECH CONSULTING

SITE NAME:	*BOWMANS MILL, ICKLEFORD*	***ENGINEER:***	*Steffan Mullen*
CLIENT:	*SPAWFORTHS*	***DATE:***	*25/02/2020*
JOB NO:	*19271*		

Pressure Trend:	*Falling*	***Weather:***	*Overcast*	***Equipment:***	*GFM 436*

Ambient:	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	LEL	H_2S (ppm)	CO (ppm)
Start	20.3	0.0	0.0	0.0	0.0	0.0
Finish	20.3	0.0	0.0	0.0	0.0	0.0

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q_{hg} CO_2 (l/hr)	Q_{hg} CH_4 (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WS06	0.0	16.7	0.00	0.0	0.0	0.0	0.1	0.1	19.9	20.1	0.0	0.0	0.0	0.0	0.0001	0.0000	991	-	N	0.54
WS09	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.0	19.3	20.0	0.0	0.0	10.0	10.0	0.0003	0.0000	991	-	N	0.66
WS12	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.1	20.3	20.3	0.0	0.0	0.0	0.0	0.0000	0.0000	989	-	N	0.80
WS17	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	19.8	19.8	0.0	0.0	0.0	0.0	0.0001	0.0000	989	-	N	0.98
WS18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	GL
WS23	0.0	0.0	0.00	0.0	0.0	0.0	0.8	0.1	16.5	20.1	0.0	0.0	0.0	0.0	0.0008	0.0000	990	-	N	2.11
WS25	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.5	17.9	17.9	0.0	0.0	0.0	0.0	0.0005	0.0000	991	-	N	0.29
WS28	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.3	20.3	0.0	0.0	0.0	0.0	0.0000	0.0000	989	-	N	0.55
WS29	0.0	0.0	0.00	0.0	0.0	0.0	1.4	1.4	18.6	18.6	0.0	0.0	0.0	0.0	0.0014	0.0000	989	-	N	1.07

Notes: WS02 Unable to monitor due to a vehicle obstruction. WS18 Not monitored due to water at GL.

PERMANENT GROUND GAS MONITORING FORM

GROUNDTECH CONSULTING

SITE NAME:	*BOWMANS MILL, ICKLEFORD*	***ENGINEER:***	*Steffan Mullen*
CLIENT:	*SPAWFORTHS*	***DATE:***	*02/03/2020*
JOB NO:	*19271*		

Pressure Trend:	*Falling*	***Weather:***	*Overcast*	***Equipment:***	*GFM 436*

Ambient:	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	LEL	H_2S (ppm)	CO (ppm)
Start	20.3	0.0	0.0	0.0	0.0	0.0
Finish	20.2	0.0	0.0	0.0	0.0	0.0

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q_{hg} CO_2 (l/hr)	Q_{hg} CH_4 (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.3	19.8	19.8	0.0	0.0	0.0	0.0	0.0003	0.0000	989	-	N	1.05
WS06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	N/A	N/A	N/A	N/A	N	GL
WS09	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.2	20.2	0.0	0.0	0.0	0.0	0.0000	0.0000	989	-	N	0.65
WS12	-0.3	-0.4	-0.02	0.0	0.0	0.0	0.2	0.2	20.0	20.0	0.0	0.0	0.0	0.0	0.0002	0.0000	989	-	N	0.36
WS17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	GL
WS18	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.2	20.0	19.7	0.0	0.0	0.0	0.0	0.0003	0.0000	989	-	N	0.65
WS23	0.0	0.0	0.00	0.0	0.0	0.0	0.1	0.1	20.1	20.1	0.0	0.0	0.0	0.0	0.0001	0.0000	988	-	N	1.96
WS25	0.0	0.0	0.00	0.0	0.0	0.0	0.9	0.7	19.2	19.1	0.0	0.0	0.0	0.0	0.0009	0.0000	989	-	N	0.75
WS28	0.0	0.0	0.00	0.0	0.0	0.0	0.2	0.0	20.3	19.9	0.0	0.0	0.0	0.0	0.0002	0.0000	989	-	N	0.54
WS29	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.3	20.2	19.8	0.0	0.0	0.0	0.0	0.0003	0.0000	989	-	N	0.99

Notes:

LIMITATIONS

Limitations

This contract was completed by Groundtech Consulting on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with due skill and care, taking into consideration the project brief provided, project objectives, agreed scope of works, prevailing site conditions and budget allocation.

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The report was written in 2020, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change and should be investigated if there is any significant delay in acting on the findings of this report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions in this report should not be relied upon in the future without the written confirmation from Groundtech Consulting that it is safe to do so.

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Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable due to its heterogeneous properties and as investigation exploratory locations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. Geo-Environmental testing was carried out for a limited number of parameters [as stipulated in the contract] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawings provided in this report are not meant to be an accurate base plan, but are preliminary and used to present the general relative locations of features on, and surrounding, the site.

Ground Investigation & Contamination Assessment

Former Bowman's Mill, Arlesey Road, Ickleford

23030-XPL-XX-XX-T-GO-501

April 2024 Revision C01

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Revision History

Rev.	Date	Purpose	Prepared	Checked	Approved
C01	12.04.24	-	M Henderson	M King	M Henderson

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1 Executive Summary

Details	*Summary of Main Text*
Introduction	This Ground Investigation and Contamination Risk Assessment report has been prepared for Logie Property Co. Ltd. The report relates to two historic oil spill zones associated with (1) a mobile compressor unit in the west and (2) an electricity transformer compound in the east.
Site Description	The site comprised the former Bowman's mill on Arlesey Road, Ickleford, which at the time of the investigation was vacant and disused.
Geology and hydrogeology	Superficial deposits of Alluvium and Glaciofluvial Deposits are Secondary A aquifers and unconfined at this location. These are overlying the Lowestoft Formation and a bedrock of the Gault Formation, which are both unproductive strata. The site is not within an SPZ.
Hydrology	The River Oughton runs through the site and is directly downgradient of a transformer oil spill zone in the east.
Investigation findings	The investigation found no evidence of soil or groundwater contamination that could have come from either of the two historic oil spills. Although low concentrations of some hydrocarbon fractions were detected in made ground soils at a depth of 0.5m beside the mobile compressor unit (WS101) they were not of a type used in a compressor unit. In addition, concentrations did not exceed residential human health screening levels and were also not present in the deeper alluvial clay layer. PCBs were not detected in soil or groundwater. Hydrocarbons and PCBs were not present above controlled waters screening levels in soil or groundwater samples from the boreholes located downgradient of the transformer compound in Building 10 (WS102-WS105). No remediation of hydrocarbons or PCBs in soil or groundwater beneath the historic spill zones is required.
Recommendations	Contractors should remain vigilant during demolition for evidence of free phase oils, especially when removing foundations or lifting slabs.

2 Introduction

2.1 General

This Ground Investigation and Contamination Assessment report has been prepared by Xplor Environmental (Xplor) for Logie Property Co. Ltd.

2.2 Scope of Work

The terms of reference for the work were set out in the Xplor proposal 23030-XPL-XX-XX-T-GO-101-C01 dated 07 March 2024.

2.3 Purpose

The purpose of the investigation was to establish if two recent oil spills on site have caused contamination of either soil or groundwater. The two areas in question were as follows:

- A mobile compressor unit adjacent to Building 41 in the west, and;
- An electricity transformer compound in Building 10 in the east.

2.4 Technical Approach

The report has been prepared using data from a ground investigation, involving sampling from boreholes and chemical laboratory testing.

Competent persons have been involved in the preparation and checking of the report.

2.5 Future Development

The assessment is based on future residential land use.

3 Site Information and Setting

3.1 Site Location

The site is located on Arlesey Road, Ickleford, Hertfordshire SG5 3UN, approximately 2km north of Hitchin.

The National Grid Reference for the site is 518218, 231295. A location plan is presented as Figure 1.

3.2 Site Description

The 3.7 hectare site is in two parts, comprising the former Bowman's Mill in the north and a strip of managed grassland in the south. These two parts are separated by the channel of the River Oughton, which flows approximately from west to east.

At the time of the investigation the mill site contained numerous vacant buildings and large silos. Between these structures were site roads, parking zones and yards, most of which were surfaced with concrete.

3.2.1 Area 1 (Mobile Compressor Unit)

Area 1 was located adjacent to the southwest corner of Building 41 (a warehouse) and contained a disused mobile compressor unit. Staining of the ground and a residue of oily sand used as an absorbent were visible. The area was surfaced with concrete and a gulley drain was approximately 4m away downgradient.

3.2.2 Area 2 (Electricity Transformer Compound)

Area 2 comprised the yard located north and east of Buildings 8-10 and 12-13. Based on information provided by the site manager, Building 10 contained three redundant electricity transformers manufactured between 1969 and 2009 (PCB use in transformers was banned in the UK after 1981). The yard was surfaced with a mix of concrete and macadam and is directly adjacent the river.

3.3 Geology

The British Geological Survey (BGS) online geology viewer indicates the site is underlain by superficial Alluvium (clay, silt, sand and gravel) and Glaciofluvial Deposits (sand and gravel). The Lowestoft Formation (diamicton) may be present beneath these deposits.

The underlying bedrock is of the Gault Formation (mudstone).

3.4 Hydrogeology

The superficial Alluvium and Glaciofluvial Deposits are a Secondary A aquifer. The underlying Lowestoft Formation and bedrock Gault Formation are unproductive strata (non-aquifers).

The site is not within a groundwater Source Protection Zone (SPZ).

3.5 Hydrology

The River Oughton runs through the site, approximately from west to east.

3.6 Previous Reports

3.6.1 WSP Parsons Brinckerhoff

WSP PB prepared a Phase 1 preliminary risk assessment report in December 2016 (reference 70027704-10670-1) based on desktop data and a site walkover.

Their report confirmed the site had been in use as a mill prior to 1881 and up until recent times.

It identified several sources of potential contamination, mainly from the recent operation of a flour mill, including the storage and use of heating oil, diesel and degreasers, vehicle and mechanical maintenance and electrical sub-stations.

3.6.2 Groundtech Consulting

Groundtech Consulting carried out an extensive ground investigation across the mill site, mainly north of the river, in December 2019 and January 2020.

The site work comprised 30nr shallow boreholes and 3nr trial pits. Several boreholes were positioned across the two historic spill zones featured in this investigation.

Chemical laboratory testing was performed on soil and groundwater samples. The testing included analysis for petroleum hydrocarbons and polychlorinated biphenyls (PCBs), which are the contaminants of concern in this investigation. The testing, therefore, provides a baseline of conditions that were present prior to the spills.

Groundtech drilled 3nr boreholes close to the mobile compressor unit (WS09, WS10 and WS11) and 3nr boreholes (WS16, WS18 and WS19) in the yard close to the transformers.

WS09, WS10 and WS11 all encountered olfactory evidence of hydrocarbons in soil prior to the mobile compressor unit being placed at the location. The presence of hydrocarbons was confirmed by the test results. PCBs were below limits of detection (LOD) in groundwater, however soil samples were not tested for PCBs.

Olfactory or visual evidence of hydrocarbons were not present in WS16, WS18 and WS19 in the yard adjacent to the transformer compound. Hydrocarbons and PCBs were below limits of detection (LODs) in soil and groundwater samples.

4 Ground Investigation

4.1 Site Work

Site work was carried out on 20 and 21 March 2024 and was as described in table 4.1.

Table 4.1 Summary of Exploratory Holes

Type	*Reference*	*Depth*
Dynamic sampling boreholes	WS101 to WS105	3.0m

The exploratory holes were set out by an Xplor engineer in locations to maximise the available data, whilst operating within the constraints of the site and the investigation rationale.

The engineer's logs of the exploratory holes are presented in Appendix A.

The locations of exploratory holes are presented on Figures 2 and 3.

4.2 Investigation Rationale

The investigation targeted the sources of potential contamination as described in table 4.2.

Table 4.2 Investigation Rationale

Hole	*Target*	*Contaminants of concern*
WS101	Downgradient of mobile compressor unit.	Hydrocarbons and PCBs
WS102 to WS105	Downgradient of transformer compound.	Hydrocarbons and PCBs

4.3 Sampling

Soil samples were recovered from the exploratory holes and stored/transported in containers appropriate for the laboratory testing undertaken.

Sample types and depths are recorded on the relevant exploratory hole logs.

Following well development and purging, groundwater samples were obtained on 25 March 2024 from the wells installed in all boreholes using dedicated disposable bailers.

4.4 Installations

Permanent monitoring wells were installed in all the boreholes capable of sampling groundwater. Installations typically comprised a 50mm diameter sealed plain casing (0.5-1.0m depth) and, beneath this, a slotted casing and gravel pack to the base of the hole.

4.5 Chemical Laboratory Analysis

Table 4.3 lists the chemical laboratory that tests were scheduled on samples recovered from the exploratory holes.

Table 4.3 Chemical Analysis

Test	*Soil*	*Water*
TPHCWG aromatic/aliphatic petroleum hydrocarbons, benzene, toluene, ethylbenzene and xylenes (BTEX) and methyl tert-butyl ether (MTBE)	10	5
Polychlorinated biphenyls (PCBs, 7 congeners)	10	5

Chemical analysis was undertaken by a UKAS-accredited laboratory and the certificates of analysis are provided in Appendix B.

5 Ground and Groundwater Conditions

5.1 General

During the ground investigation, the following strata sequence was encountered in the exploratory holes. The strata generally matched the expected geology.

Table 5.1 Strata Sequence

Stratum	*Depth, mbgl*		*Thickness, m*
	Top	*Base*	
Made ground and surfacing	GL	0.6 – 1.4	0.6 – 1.4
Alluvium	1.0 – 1.4	1.9 – 2.84	0.5 – 1.84
Glaciofluvial Deposit	0.6 – 0.8	1.3 – 1.5	0.7 – 1.0
Lowestoft Formation	1.3 – 2.84	Base not proved	

Features, structures or certain ground conditions may be present between exploratory hole locations, which are different to those encountered during the investigation.

5.2 Made Ground and Surfacing

Made ground was present in all boreholes, beneath a surfacing of reinforced concrete (WS101-WS103) or macadam (WS104-WS105).

Beneath surfacing were mixed layers of clay, silt, sand and gravel with cobble-size brick pieces in WS101 and WS103. Fragments of cast iron pipe and wood were in WS103 and WS105, respectively. The broken faces of the pipe were not fresh and, therefore, does not indicate an underground services strike.

5.3 Alluvium

Very soft to firm layers of light grey and brown, silty, sandy clay and silty sand were beneath the made ground in WS101 and WS105.

5.4 Glaciofluvial Deposit

Underlying the made ground in WS102 to WS104 were layers of sandy gravelly clay, and sand and gravel in varying proportions.

5.5 Lowestoft Formation

Underlying the alluvium (in WS101 and WS105) and Glaciofluvial Deposit (in WS102-WS104) was a firm to stiff, light to dark grey and brown, silty, slightly gravelly clay (diamicton). The gravel component was of flint, mudstone and chalk. The base of this stratum was not proved.

5.6 Groundwater Conditions

Groundwater was struck in WS101 and WS105 during drilling and achieved levels between 0.8m and 2.46m depth on completion.

During the sampling visit, groundwater was encountered in all monitoring wells at depths between 0.72m and 2.36m.

5.7 Evidence of Contamination

Table 5.2 lists the indicators of potential contamination observed during drilling and monitoring.

Table 5.1 Evidence of Contamination

Observation	*Description*
Made ground	Beneath surfacing in all boreholes.
Odours	Faint hydrocarbon odour in WS101 between 1.0m and 1.5m (in Alluvium)
	Hydrocarbon odour in WS104 at 0.5m (in made ground)

6 Assessment of Soil Chemical Data

This section presents a human health generic risk assessment to identify potential sources of soil contamination requiring further evaluation. The assessment involves a comparison of chemical laboratory test results to screening levels that are considered to be appropriate to the site and its future use.

6.1 Selection of Assessment Criteria

The soil screening levels for petroleum hydrocarbons used in this assessment were drawn from the Suitable for Use Levels (S4ULs) published in 2015 by Land Quality Management Ltd and the Chartered Institute of Environmental Health. Soil Guideline Values published for dioxin-like PCBs published by the Environment Agency in 2009 were used for assessing PCBs. A full list of soil screening levels used is presented in Appendix C.

The future development will be residential with private gardens and for the purpose of this assessment the land use scenario is residential with homegrown produce (RwHP).

Screening levels were selected based on a soil organic matter (SOM) content of 1%.

6.2 Generic Screening for Human Health

All measured concentrations of petroleum hydrocarbons and PCBs were below the screening levels and, therefore, further assessment in relation to human health risks from these contaminants is not required.

7 Assessment of Groundwater Chemical Data

This section presents a generic assessment to identify potential sources of contamination that could impact on controlled waters (groundwater and surface water).

7.1 Selection of Assessment Criteria

Potential water-based receptors have been identified as follows:

- Groundwater: the most sensitive aquifers beneath the site are the superficial Alluvium and Glaciofluvial Deposit, a Secondary A aquifer. The aquifers are unconfined at this location.
- Surface water: the River Oughton runs through the site.

Potential impacts to surface water quality were assessed through a comparison of analysis results with the Environmental Quality Standard (EQS) published in the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.

For petroleum hydrocarbons, the World Health Organisation, Guidelines for drinking-water quality (WHO, 2017) have been used for assessing impacts on both groundwater and surface water.

A full list of controlled water screening levels used is included in Appendix D.

7.2 Potential Risk to Groundwater

Contaminant concentrations in groundwater samples were below WHO drinking water criteria.

7.3 Potential Risk to Surface Water

Contaminant concentrations in groundwater samples were below WHO drinking water criteria.

7.4 Controlled Waters Assessment Summary

Following screening of the groundwater test results, no contaminant concentrations exceeded WHO drinking water criteria appropriate for the assessment of both groundwater and surface water quality at the site. Therefore, contamination likely to affect groundwater or surface water quality was not identified.

8 Assessment of Ground Gas and Organic Vapour

This section presents a generic quantitative risk assessment to identify potential sources of organic vapour in the ground that could impact on development.

8.1 Vapour Intrusion Assessment – Soil

A generic quantitative risk assessment has been undertaken of the potential for indoor vapour intrusion from volatile organic compounds (VOCs) in soil. A potential VOC is one with 12 or less carbon atoms. In the absence of published criteria, a set of vapour protection standards has been calculated using CLEA software version 1.071 and these are listed in Appendix E.

No volatile contaminant concentrations were above the vapour protection standards for residential land use and therefore further assessment of vapour intrusion from VOCs in soil is not considered to be necessary.

8.2 Vapour Intrusion Assessment – Groundwater

A generic quantitative risk assessment has been undertaken of the potential for indoor vapour intrusion from VOCs in groundwater using guidance published by the Society of Brownfield Risk Assessment guidance, Development of generic assessment criteria for assessing vapour risks to human health from volatile contaminants in groundwater (SoBRA, 2017). The SoBRA GAC_{gwvap} are listed in Appendix E.

None of the measured contaminant concentrations are above GAC_{gwvap} and therefore further assessment of vapour intrusion from VOCs in groundwater is not considered to be necessary.

8.3 Organic Vapour Assessment Summary

The site is not likely to be impacted by organic vapour from either soils or groundwater sources.

9 Contaminated Land Risk Assessment and Conceptual Site Model

9.1 Introduction

Risk assessment is a process by which the risks posed by identified hazards to specific receptors are estimated. In the context of this study, hazards relate to sources, or potential sources of contamination capable of causing harm (e.g. a contaminant concentration exceeding a screening level). Receptors are the entity which may be at risk of adverse effects from the hazard and include human health, surface waters, groundwater, ecological systems, buildings and services. In order for a hazard to present a risk to a receptor they must be linked by an exposure pathway.

This source-pathway-receptor conceptual site model is considered best practice methodology to evaluate risks arising from potential contamination, according to the LCRM guidance.

9.2 Conceptual Site Model

A conceptual site model (CSM) is not presented as no soil or groundwater sources of hydrocarbons and PCB contamination were identified in the preceding screening assessment sections of the report.

9.3 Risk Assessment Summary

The risk assessment process is concluded at this point as there are no plausible risks to human health or controlled waters from hydrocarbons or PCBs in soil or groundwater at the two spill zones.

10 Remediation and Risk Management

No sources of hydrocarbon and PCB contamination have been identified based on the screening assessments undertaken. Therefore, no remediation or mitigation of hydrocarbons or PCBs are required in the future development.

It should be noted, however, that this report relates only to a study of hydrocarbons and PCBs in soil and groundwater at two historic oil spill zones on the site. The report cannot, therefore, provide guidance on any measures needed across other parts of the site or for other potential contaminants.

11 Conclusions and Recommendations

Xplor Environmental has carried out a ground investigation at the former Bowman Mill in Ickleford. The investigation targeted two historic oil spill zones on the site.

The investigation found no evidence of soil or groundwater contamination that could have come from either of two historic oil spills adjacent to a mobile compressor unit in the west and downgradient of a transformer compound in the east.

Low concentrations of petroleum hydrocarbons were detected in made ground soils at a depth of 0.5m in WS101 (beside the mobile compressor unit). However, they did not exceed residential human health screening values and had not penetrated the deeper alluvial clay. Testing indicated the hydrocarbons were mainly middle distillate fractions that would not be present in oil from a compressor unit. PCBs were not detected in any of the soil or groundwater samples tested from this borehole.

Downgradient of the transformer compound, low concentrations of petroleum hydrocarbons were detected in groundwater at a depth of 2.36m in WS103. However, they did not exceed groundwater or surface water screening values. Testing indicated the hydrocarbons were mainly middle distillate fractions that would not be present in transformer oil. PCBs were not detected in any other soil or groundwater samples tested in the boreholes downgradient of the transformer compound.

No remediation is required for a future residential development, or for the protection of controlled waters, from either hydrocarbons or PCBs in soil or groundwater at the historic oil spill zones.

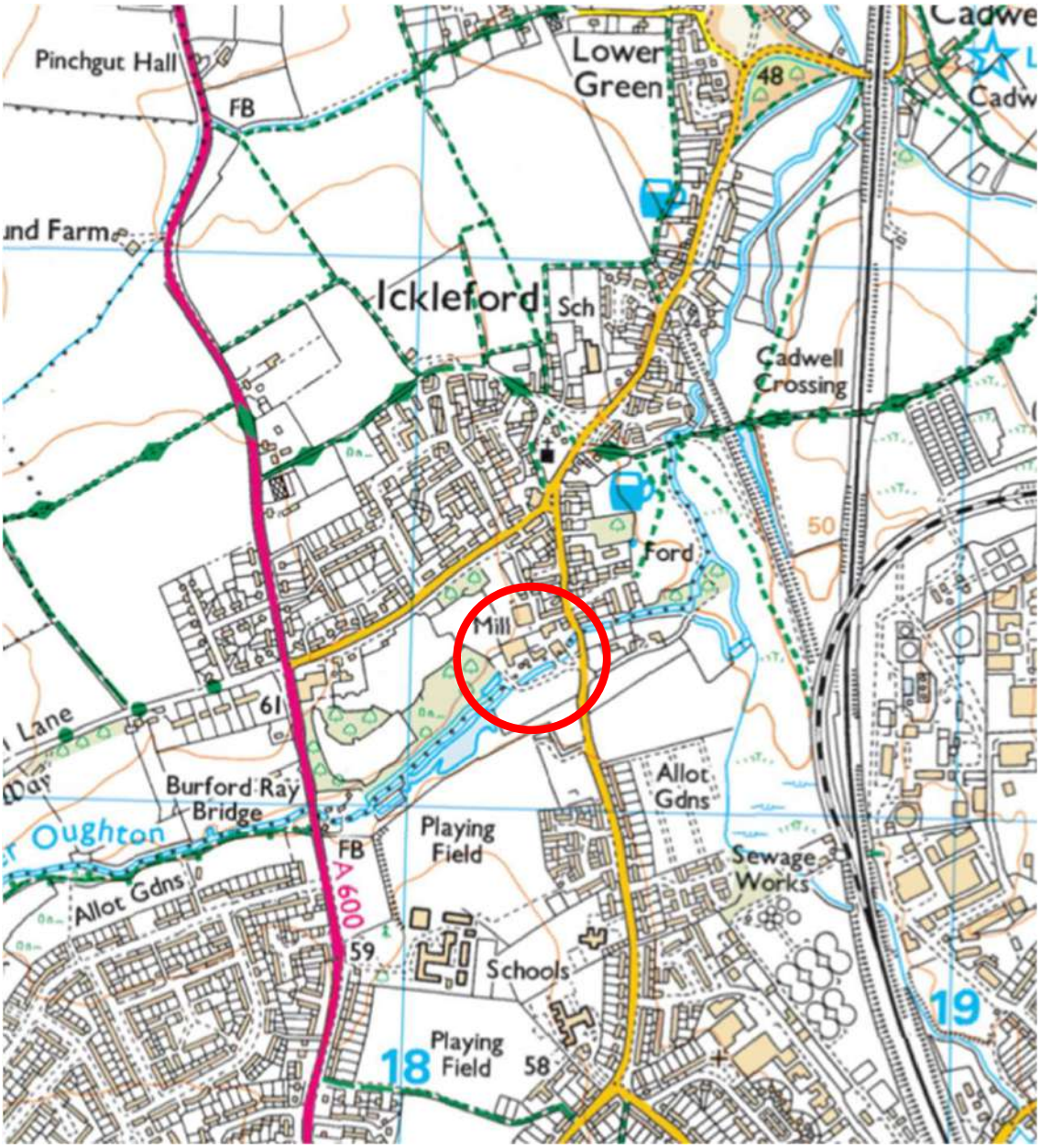
The investigation was targeted and contractors should remain vigilant during the demolition process for evidence of free phase oils, especially when removing foundations or lifting slabs.

Figures

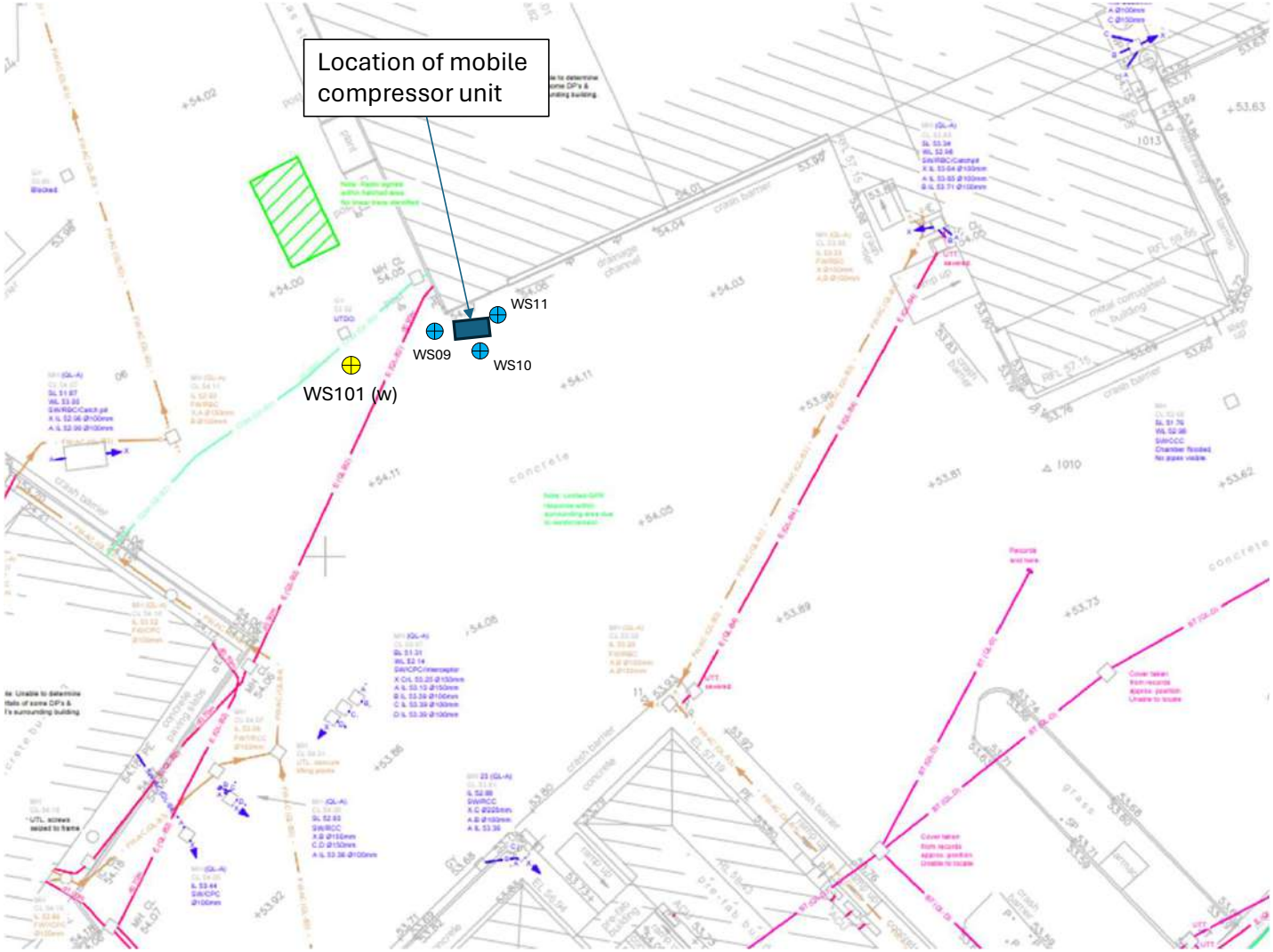
Figure 1 – Site Location Plan

Figure 2 – Exploratory Hole Location Plan (Area 1)

Figure 3 – Exploratory Hole Location Plan (Area 2)



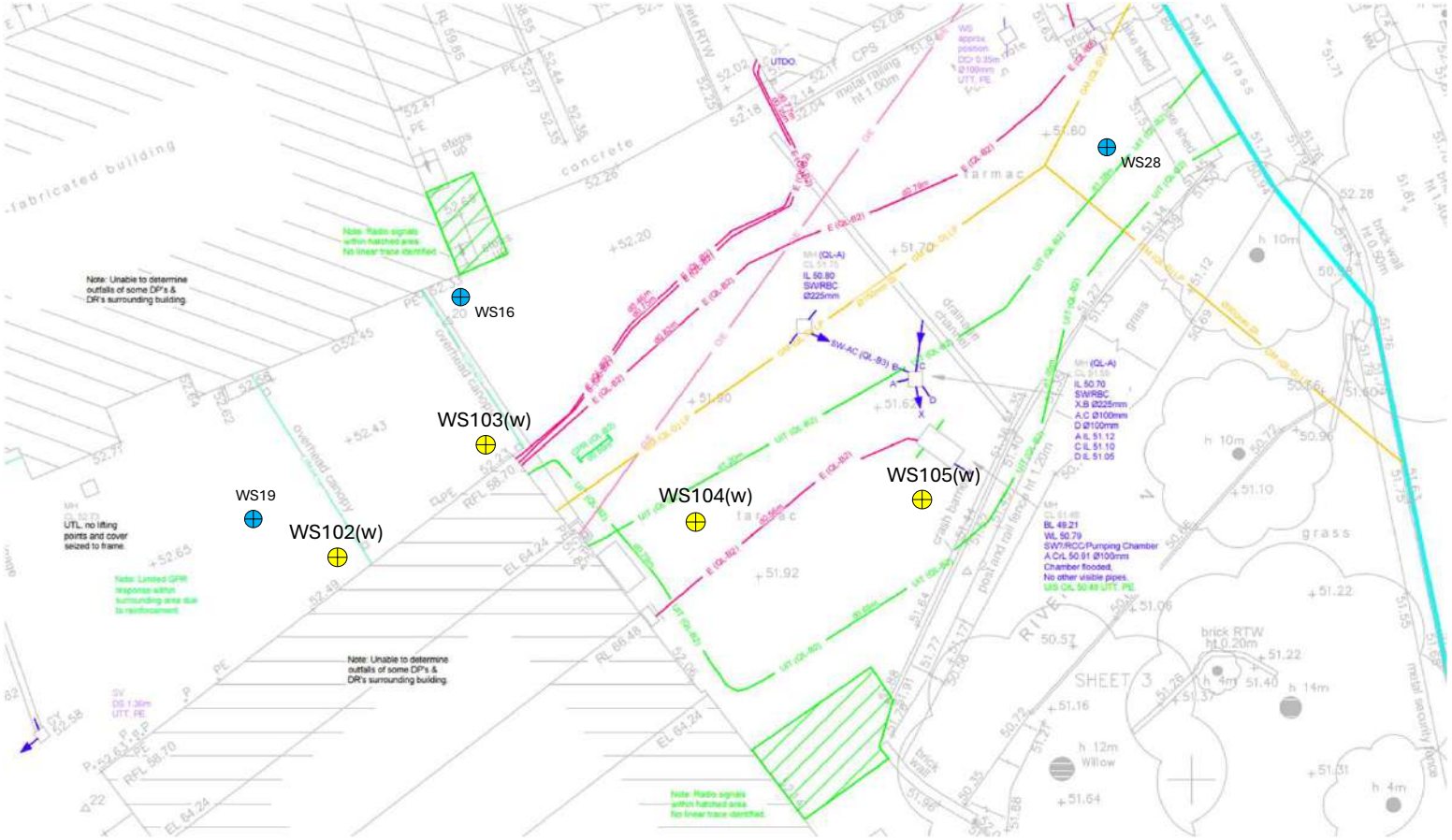
XPLOR Environmental	CLIENT LOGIE PROPERTY CO LTD	PROJECT BOWMAN'S MILL, ICKLEFORD	TITLE SITE LOCATION	SCALE: NTS PREPARED BY: MH	JOB NR.: 23030 REVISION: C01	DATE: 08.04.24 DRAWING NR. FIGURE 1



LEGEND

- GROUNDTECH CONSULTING BOREHOLE (2020)
- XPLOR ENVIRONMENTAL BOREHOLE (2024)
- (w) MONITORING WELL

XPLOR Environmental	CLIENT LOGIE PROPERTY CO. LTD	PROJECT BOWMAN'S FLOUR MILL, ICKLEFORD	TITLE EXPLORATORY HOLE LOCATION PLAN (AREA 1)	SCALE: NTS PREPARED BY: MH	JOB NR.: 23030 REVISION: C03	DATE: 08.04.24 DRAWING NR. FIGURE 2



LEGEND

- GROUNDTECH CONSULTING BOREHOLE (2020)
- XPLOR ENVIRONMENTAL BOREHOLE (2024)
- (w) MONITORING WELL

XPLOR Environmental	CLIENT: LOGIE PROPERTY CO. LTD	PROJECT: BOWMAN'S FLOUR MILL, ICKLEFORD	TITLE: EXPLORATORY HOLE LOCATION PLAN (AREA 2)	SCALE: NTS	JOB NR.: 23030	DATE: 08.04.24
				PREPARED BY: MH	REVISION: C03	DRAWING NR. FIGURE 3

Appendix A – Exploratory Hole Logs

BOREHOLE WS101

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 20.03.24-21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-3.0m

COORDINATES 518150, 231258
COORD SYS OS
SURFACE ELEVATION 54.015

COMMENTS Adjacent to mobile compressor unit. Hand pit to 1.2m.

LOGGED BY MH/BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.5		0			Concrete (reinforced)		
					Orange-brown, clayey SAND with some fine to coarse flint gravel and brick cobbles (MADE GROUND)		
					Grey, sandy gravelly CLAY (MADE GROUND)	Concrete/ bentonite	
		1			Soft to firm, brown and light grey, silty, slightly sandy CLAY with some fine to coarse flint gravel. Occasional black carbonised veins at 1.0-1.5m (ALLUVIUM)		Faint hydrocarbon odour (1.0-1.5m)
1.5							
		2			Very soft, light grey and cream, silty, slightly sandy CLAY (ALLUVIUM)	Pea shingle	
					Light grey, very silty, fine SAND (ALLUVIUM)		
2.5				1			Groundwater at 2.46m
					Dark brown SILT (ALLUVIUM)		
		3			Dark grey, firm, silty CLAY with fine to medium subrounded flint gravel (LOWESTOFT FORMATION)		
					End of borehole at 3.0m		
		4					

Disclaimer This borehole log is intended for environmental not geotechnical purposes.
produced by ESlog.ESdat.net on 08 Apr 2024

BOREHOLE WS102

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 20.03.24-21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-3.0m

COORDINATES 518262, 231308
COORD SYS OS
SURFACE ELEVATION 52.545

COMMENTS Adjacent to Building 10 transformer bay. Hand pit to 1.2m

LOGGED BY MH/BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.5		0			Concrete (reinforced)		
					Dark brown and black, clayey, SAND and GRAVEL (MADE GROUND)		
					Brown and light grey, clayey SILT with some fine gravel. Occasional black veining (MADE GROUND)	Bentonite /concrete	
					Brown clayey, silty SAND and GRAVEL. Gravel is of flint, chalk, brick and mudstone (MADE GROUND GROUND)		
		1			Brown, sandy, gravelly CLAY. Gravel is of flint (GLACIOFLUVIAL DEPOSIT)		
1.5					Brown, silty SAND with fine to coarse gravel of flint, mudstone and sandstone (GLACIOFLUVIAL DEPOSIT)		
					Stiff, grey and light grey mottled, silty CLAY with fine to coarse flint gravel. Occasional medium gravel of mudstone. Very stiff below 2.3m (LOWESTOFT FORMATION)		
		2				Pea shingle	
2.5							
		3			End of borehole at 3.0m. Groundwater not encountered.		
		4					

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BOREHOLE WS103

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 20.03.24-21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-3.0m

COORDINATES 518268, 231314
COORD SYS OS
SURFACE ELEVATION 52.303

COMMENTS Hand pit to 1.2m

LOGGED BY MH/BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.6		1			Concrete (reinforced)	Bentonite/ concrete	
					Sandy CLAY with fine to coarse gravel and cobbles of brick. Fragment of cast iron pipe (MADE GROUND)		
					Orange brown, silty SAND and GRAVEL. Gravel is of fine to coarse flint (GLACIOFLUVIAL DEPOSIT)		
1.5		2			Stiff, brown and light grey mottled, silty CLAY with fine to medium flint, mudstone and chalk (LOWESTOFT FORMATION)	Pea shingle	
2.5		3			Firm, grey, slightly silty CLAY with fine to coarse chalk. Occasional gravel size pockets of weak, light grey mudstone (LOWESTOFT FORMATION)		
		4			End of borehole at 3.0m. Groundwater not encountered.		

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produced by ESlog.ESdat.net on 08 Apr 2024

BOREHOLE WS104

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 21.03.24
TOTAL DEPTH 3.00
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-2.0m

COORDINATES 518279, 231310
COORD SYS OS
SURFACE ELEVATION 51.905

COMMENTS Hand pit to 1.2m

LOGGED BY BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
					Macadam		
					Dark grey, sandy GRAVEL of limestone aggregate (MADE GROUND)		
0.5					Brown, silty, fine to coarse SAND with fine to coarse gravel of flint and siltstone (MADE GROUND)		Hydrocarbon odour at 0.5m
0.7					Light grey, silty CLAY with fine to coarse gravel of mudstone (MADE GROUND)	Bentonite/ concrete	
		1			Brown, clayey, fine to coarse SAND with fine to coarse gravel of flint (GLACIOFLUVIAL DEPOSIT)		
1.5					Firm, dark, grey, silty CLAY with fine to coarse flint gravel (LOWESTOFT FORMATION)		
		2			Stiff, brown, silty CLAY with fine to medium chalk gravel. Occasional light grey, medium gravel of mudstone below 2.8m (LOWESTOFT FORMATION)	Pea shingle	
2.5							
		3			End of borehole at 3.0m. Groundwater not encountered.		
		4					

Disclaimer This borehole log is intended for environmental not geotechnical purposes.
produced by ESlog.ESdat.net on 08 Apr 2024

BOREHOLE WS105

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-0.4m
SCREEN 0.4-2.0m

COORDINATES 518289, 231311
COORD SYS OS
SURFACE ELEVATION 51.541

COMMENTS Hand pit to 1.2m

LOGGED BY BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.3					Macadam Concrete Dark grey, fine to coarse SAND with gravel of concrete (MADE GROUND)	Bentonite/ concete	
0.5					Orange brown, clayey, silty fine to coarse SAND with gravel of fine to medium flint		
0.75					Grey, clayey, fine to coarse SAND with fine to medium gravel of flint and limestone		Groundwater at 0.8m
		1				Pea shingle	
					Soft, dark grey, silty CLAY with fragment of wood and grey, fine to medium sand		
1.5					Grey, silty, fine to coarse SAND with fine to coarse gravel of flint and chalk (ALLUVIUM)		
		2			Stiff, brown silty CLAY with medium to coarse flint gravel (LOWESTOFT FORMATION)		
2.5					Stiff, grey silty CLAY with flint and chalk gravel. Rare rootlets and occasional fine gravel size pockets of brown silt (LOWESTOFT FORMATION)		
		3			End of borehole at 3.0m		
		4					

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produced by ESlog.ESdat.net on 08 Apr 2024

Appendix B – Chemical Laboratory Test Results

Xplor Environmental
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Cambridge
CB3 0JP

e: markh@xplorenvironmental.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 24-010559

Project / Site name:	Bowmans Mill	**Samples received on:**	22/03/2024
Your job number:	23030	**Samples instructed on/ Analysis started on:**	22/03/2024
Your order number:	23030	**Analysis completed by:**	03/04/2024
Report Issue Number:	1	**Report issued on:**	05/04/2024
Samples Analysed:	10 soil samples		

Signed:

Dominika Liana
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.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-010559
Project / Site name: Bowmans Mill
Your Order No: 23030

Lab Sample Number				152457	152458	152459	152460	152461
Sample Reference				WS101	WS101	WS102	WS102	WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	0.50	1.50	0.60
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	34	15	14	11
Total mass of sample received	kg	0.1	NONE	0.3	0.3	0.2	0.3	0.2
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	8.7	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	220	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	320	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	76	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	630	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	65	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	120	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	29	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	220	< 10	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number: 24-010559
Project / Site name: Bowmans Mill
Your Order No: 23030

Lab Sample Number				152462	152463	152464	152465	152466
Sample Reference				WS103	WS104	WS104	WS105	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.70	1.50	0.50	1.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	27.4	< 0.1	40.2	40
Moisture Content	%	0.01	NONE	13	8.8	16	8.7	13
Total mass of sample received	kg	0.1	NONE	0.3	0.2	0.3	0.2	0.3
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-010559
Project / Site name: Bowmans Mill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
152457	WS101	None Supplied	0.5	Brown clay and sand with gravel
152458	WS101	None Supplied	1.5	Brown clay and sand
152459	WS102	None Supplied	0.5	Brown clay and sand with gravel
152460	WS102	None Supplied	1.5	Brown clay and sand with gravel
152461	WS103	None Supplied	0.6	Brown clay and sand with gravel
152462	WS103	None Supplied	1.5	Brown clay and sand with gravel
152463	WS104	None Supplied	0.7	Brown sandy clay with gravel and stones
152464	WS104	None Supplied	1.5	Brown clay and sand with gravel
152465	WS105	None Supplied	0.5	Brown sandy clay with gravel and stones
152466	WS105	None Supplied	1.5	Brown sand with gravel and stones

Analytical Report Number : 24-010559
Project / Site name: Bowmans Mill

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
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS

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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 24-010559
Project / Site name: Bowmans Mill

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS101	N/A	S	152457	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS101	N/A	S	152457	a	PCB's By GC-MS in soil	L027B	a
WS101	N/A	S	152457	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS101	N/A	S	152458	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS101	N/A	S	152458	a	PCB's By GC-MS in soil	L027B	a
WS101	N/A	S	152458	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS102	N/A	S	152459	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS102	N/A	S	152459	a	PCB's By GC-MS in soil	L027B	a
WS102	N/A	S	152459	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS102	N/A	S	152460	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS102	N/A	S	152460	a	PCB's By GC-MS in soil	L027B	a
WS102	N/A	S	152460	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS103	N/A	S	152461	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS103	N/A	S	152461	a	PCB's By GC-MS in soil	L027B	a
WS103	N/A	S	152461	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS103	N/A	S	152462	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS103	N/A	S	152462	a	PCB's By GC-MS in soil	L027B	a
WS103	N/A	S	152462	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS104	N/A	S	152463	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS104	N/A	S	152463	a	PCB's By GC-MS in soil	L027B	a
WS104	N/A	S	152463	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS104	N/A	S	152464	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS104	N/A	S	152464	a	PCB's By GC-MS in soil	L027B	a
WS104	N/A	S	152464	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS105	N/A	S	152465	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS105	N/A	S	152465	a	PCB's By GC-MS in soil	L027B	a
WS105	N/A	S	152465	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS105	N/A	S	152466	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS105	N/A	S	152466	a	PCB's By GC-MS in soil	L027B	a
WS105	N/A	S	152466	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a

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Analytical Report Number : 24-011173

Project / Site name:	Bowmans Mill	**Samples received on:**	26/03/2024
Your job number:	23030	**Samples instructed on/ Analysis started on:**	26/03/2024
Your order number:	23030	**Analysis completed by:**	04/04/2024
Report Issue Number:	1	**Report issued on:**	04/04/2024
Samples Analysed:	5 water samples		

Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-011173
Project / Site name: Bowmans Mill

Your Order No: 23030

Lab Sample Number				156026	156027	156028	156029	156030
Sample Reference				WS101	WS102	WS103	WS104	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.05	1.20	2.36	1.28	0.72
Date Sampled				25/03/2024	25/03/2024	25/03/2024	25/03/2024	25/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	15	< 10	< 10
TPH - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	50	< 10	< 10
TPH - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	60	< 10	< 10
TPH - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	290	< 10	< 10
TPH - Aliphatic >C5 - C35 $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	420	< 10	< 10
TPH - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC10 - EC12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC12 - EC16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	25	< 10	< 10
TPH - Aromatic >EC16 - EC21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	20	< 10	< 10
TPH - Aromatic >EC21 - EC35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC35 $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	45	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
PCBs by GC-MS								
PCB Congener 28	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 52	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 101	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 118	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 138	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 153	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 180	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Total ICES-7 PCBs	µg/l	0.14	NONE	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-011173
Project / Site name: Bowmans Mill

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
PCB's By GC-MS in water	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L028B	W	NONE
Total petroleum hydrocarbons with carbon banding by GC-MS in water	Determination of total petroleum hydrocarbons in water by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L070B	W	NONE
BTEX and/or Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA 8260	L073B	W	ISO 17025
Total petroleum hydrocarbons by GC-MS HS in water	Determination of total petroleum hydrocarbons in water by GC-MS HS	In-house method	L088	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.

Appendix C – Soil Screening Levels

Soil Screening Levels

The following generic screening levels are used in the report for assessing risks to human health from contaminants in soil. All screening levels are for 1% SOM.

Contaminant	Units	Source	Residential with home produce	Residential without home produce	Commercial	Public open space (residential)	Public open space (park)
Cyanide (free)	mg/kg	RIVM	20	20	30	-	-
Cyanide (total)	mg/kg	RIVM	50	50	500	-	-
Boron	mg/kg	S4UL	290	11,000	240,000	21,000	46,000
Arsenic	mg/kg	S4UL	37	40	640	79	170
Cadmium	mg/kg	S4UL	11	85	190	120	532
Chromium (total)	mg/kg	S4UL	910	910	8,600	1,500	33,000
Copper	mg/kg	S4UL	2,400	7,100	68,000	12,000	44,000
Mercury	mg/kg	S4UL	40	56	1,100	120	240
Nickel	mg/kg	S4UL	180	180	980	230	3,400
Lead	mg/kg	C4SL	200	310	2,330	630	1,300
Selenium	mg/kg	S4UL	250	430	12,000	1,100	1,800
Zinc	mg/kg	S4UL	3,700	40,000	730,000	81,000	170,000
Chromium (hex.)	mg/kg	S4UL	6	6	33	7.7	220
TPH Aliphatic >C5-C6	mg/kg	S4UL	42	42	3,200	570,000	95,000
TPH Aliphatic >C6-C8	mg/kg	S4UL	100	100	7,800	600,000	150,000
TPH Aliphatic >C8-C10	mg/kg	S4UL	27	27	2,000	13,000	14,000
TPH Aliphatic >C10-C12	mg/kg	S4UL	130	130	9,700	13,000	21,000
TPH Aliphatic >C12-C16	mg/kg	S4UL	1,100	1,100	59,000	13,000	25,000
TPH Aliphatic >C16-C21	mg/kg	S4UL	65,000	65,000	1,600,000	250,000	450,000
TPH Aliphatic >C21-C35	mg/kg	S4UL	65,000	65,000	1,600,000	250,000	450,000
TPH Aromatic >C5-C7	mg/kg	S4UL	70	370	26,000	56,000	76,000
TPH Aromatic >C7-C8	mg/kg	S4UL	130	860	56,000	56,000	87,000
TPH Aromatic >C8-C10	mg/kg	S4UL	34	47	3,500	5,000	7,200
TPH Aromatic >C10-C12	mg/kg	S4UL	74	250	16,000	5,000	9,200
TPH Aromatic >C12-C16	mg/kg	S4UL	140	1,800	36,000	5,100	10,000
TPH Aromatic >C16-C21	mg/kg	S4UL	260	1,900	28,000	3,800	7,600
TPH Aromatic >C21-C35	mg/kg	S4UL	1,100	1,900	28,000	3,800	7,800
Naphthalene	mg/kg	S4UL	2.3	2.3	190	4,900	1,200
Acenaphthylene	mg/kg	S4UL	170	2,900	83,000	15,000	29,000
Acenaphthene	mg/kg	S4UL	210	3,000	84,000	15,000	29,000
Fluorene	mg/kg	S4UL	170	2,800	63,000	9,900	20,000
Phenanthrene	mg/kg	S4UL	95	1,300	22,000	3,100	6,200
Anthracene	mg/kg	S4UL	2,400	31,000	520,000	74,000	150,000

Contaminant	Units	Source	Residential with home produce	Residential without home produce	Commercial	Public open space (residential)	Public open space (park)
Fluoranthene	mg/kg	S4UL	280	1,500	23,000	3,100	6,300
Pyrene	mg/kg	S4UL	620	3,700	54,000	7,400	15,000
Benzo[a]anthracene	mg/kg	S4UL	7.2	11	170	29	49
Chrysene	mg/kg	S4UL	15	30	350	57	93
Benzo[b]fluoranthene	mg/kg	S4UL	2.6	3.9	44	7.1	13
Benzo[k]fluoranthene	mg/kg	S4UL	77	11	1,200	190	370
Benzo[a]pyrene	mg/kg	S4UL	2.2	3.2	35	5.7	11
Indeno[1,2,3-c,d]pyrene	mg/kg	S4UL	27	45	500	82	150
Dibenz[a,h]anthracene	mg/kg	S4UL	0.24	0.31	3.5	0.57	1.1
Benzo[g,h,i]perylene	mg/kg	S4UL	320	360	3,900	640	1,400
Phenols (total)	mg/kg	S4UL	120	440	440	440	440
Benzene	µg/kg	S4UL	87	380	27,000	72,000	90,000
Toluene	µg/kg	S4UL	130,000	880,000	56,000,000	56,000,000	87,000,000
Ethylbenzene	µg/kg	S4UL	47,000	83,000	5,700,000	24,000,000	17,000,000
m & p-xylene	µg/kg	S4UL	56,000	79,000	5,900,000	41,000,000	17,000,000
o-xylene	µg/kg	S4UL	60,000	88,000	660,000	41,000,000	17,000,000
Sum of PCDDs, PCDFs and dioxin-like PCBs	µg/kg	EA SC050021	8	8	240	-	-

Appendix D – Controlled Waters Screening Levels

Controlled Waters Screening Levels

Generic screening levels used in the report for assessing risks to controlled waters (surface water and groundwater) from contaminants in water and soil leachate samples.

Contaminant	*Units*	*UK Drinking Water Standard (DWS) [1] for groundwater impact*	*WHO Drinking Water Guideline [2]*	*Environmental Quality Standard (EQS) for surface water impact*
Cyanide	µg/l	50	-	1 [6]
Boron	µg/l	1000	-	750 [4]
Arsenic	µg/l	10	-	50 [10]
Cadmium	µg/l	5	-	0.25 [6,7]
Chromium (total)	µg/l	50	-	4.7 [9]
Copper	µg/l	2000	-	4 [8]
Mercury	µg/l	1	-	0.07 [11]
Nickel	µg/l	20	-	3.6 [6,8]
Lead	µg/l	10	-	1.2 [6]
Selenium	µg/l	10	-	7.5 [4]
Zinc	µg/l	5000	-	10.9 [10]
Chromium (hex.)	µg/l	-	-	3.4 [9]
TPH Aliphatic >C5-C6	µg/l	10	15,000	-
TPH Aliphatic >C6-C8	µg/l	10	15,000	-
TPH Aliphatic >C8-C10	µg/l	10	300	-
TPH Aliphatic >C10-C12	µg/l	10	300	-
TPH Aliphatic >C12-C16	µg/l	10	300	-
TPH Aliphatic >C16-C21	µg/l	10	300	-
TPH Aliphatic >C21-C35	µg/l	10	300	-
TPH Aromatic >C5-C7	µg/l	10	10	-
TPH Aromatic >C7-C8	µg/l	10	700	-
TPH Aromatic >C8-C10	µg/l	10	300	-
TPH Aromatic >C10-C12	µg/l	10	90	-
TPH Aromatic >C12-C16	µg/l	10	90	-
TPH Aromatic >C16-C21	µg/l	10	90	-
TPH Aromatic >C21-C35	µg/l	10	90	-
Naphthalene	µg/l	2	-	2 [6]
Anthracene	µg/l	-	1	0.1 [6]
Fluoranthene	µg/l	-	4	0.0063 [6]
Benzo[b]fluoranthene	µg/l	0.1	-	0.00017 [6,9]
Benzo[k]fluoranthene	µg/l	0.1	-	0.00017 [6,9]
Benzo[a]pyrene	µg/l	0.01	0.7	0.00017 [6]
Indeno[1,2,3-c,d]pyrene	µg/l	0.1	-	0.00017 [6,9]
Benzo[g,h,i]perylene	µg/l	0.1	-	0.00017 [6,9]
Phenols (total)	µg/l	0.5	-	7.7 [10]
Benzene	µg/l	1	10	6 [6]
Toluene	µg/l	-	700	74 [10]
Ethylbenzene	µg/l	-	300	-
m & p-xylene	µg/l	-	500	15.5 [3,5]
o-xylene	µg/l	-	500	

Notes

1. Prescribed concentration listed in the Water Supply (Water Quality) Regulations 2016.

2. Drinking water guideline values listed in the World Health Organisation document, Guidelines for drinking-water quality: fourth edition (WHO, 2017). Used to assess impacts to surface water and groundwater from hydrocarbons (use DWS for SPZ1 or Principal aquifer).
3. EQS is the minimum Threshold Value for Groundwater (impacts on surface water) listed in Table 1 of Schedule 5 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
4. EQS is the General Quality of GW Body listed in Table 1 of Schedule 5 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
5. EQS is the sum of m, p & o-xylene.
6. EQS is the AA-EQS (inland surface waters) listed in Table 1 of Part 3 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
7. EQS is for the water hardness band ≥200 mg CaCO3/l.
8. EQS is the sum of PNEC+Cb (Predicted No Effect Concentration + background concentration) calculated in accordance with Table 2 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015. PNEC and Cb for copper are 2.6 and 1.0 µg/l, respectively.
9. Benzo[a]pyrene is used as a marker compound for the substance.
10. EQS is the standard for fresh water listed in Table 1 of Part 2 (specific pollutants) of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
11. EQS is the MAC-EQS (inland surface waters) listed in Table 1 of Part 3 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.

Appendix E – Vapour Protection Standards

Vapour Protection Standards

The following Protection Standards are used in the report for the assessment of human health risks from organic vapour intrusion into buildings (indoor inhalation).

Volatile Organic Compound	*Protection Standard in soil (mg/kg)*[2]		*Protection Standard in groundwater (µg/l)*[3]	
	Residential	*Commercial*	*Residential*	*Commercial*
TPH Aliphatic >C5-C6	161	19,600[4]	1,900	190,000[5]
TPH Aliphatic >C6-C8	529	64,400[4]	1,500	150,000[5]
TPH Aliphatic >C8-C10	156	19,000[4]	57	5,700[5]
TPH Aliphatic >C10-C12	793[4]	96,600[4]	37	3,600[5]
TPH Aromatic >C5-C7	1.48	173	210,000	20,000,000[5]
TPH Aromatic >C7-C8	4,570[4]	517,000[4]	220,000	21,000,000[5]
TPH Aromatic >C8-C10	553	67,400[4]	1,900	190,000[5]
TPH Aromatic >C10-C12	3,050[4]	373,000[4]	6,800	660,000[5]
Naphthalene	13.2	1,720[4]	220	23,000[5]

1. The selected VOCs have the potential to create a vapour intrusion risk and are defined as a volatile substance with 12 carbon atoms or le
2. ss.
3. Protection standards for soil were derived using CLEA software version 1.071 (2015) and calculated for the indoor inhalation pathway.
4. Vapour protection standards for groundwater are the GACgwvap published by the Society of Brownfield Risk Assessment publication, Development of generic assessment criteria for assessing vapour risks to human health from volatile contaminants in groundwater (SoBRA, 2017).
5. Soil protection standard exceeds soil saturation limit; vapour risks from NAPL should be considered in addition.
6. GACgwvap exceeds aqueous solubility; vapour risks from NAPL should be considered in addition.

Appendix F – Defining Risk

Risk Evaluation

Risk evaluation is qualitative and is developed from the model provided in CIRIA C552 *Contaminated Land Risk Assessment – a guide to good practice* (DETR 2001). It involves classifying risk in terms of the probability of occurrence x magnitude of the potential consequence of occurrence. The risk rating is used to determine what action, if any, is needed to further investigate that risk and/or remediate to reduce risk to an acceptable level.

Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event appears very likely in the short term and almost inevitable in the long term or there is actual evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely in the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is not certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur in the very long term.

Classification of Consequence

Classification	Definition	Examples
Severe	• Short-term (acute) risk to human health likely to result in significant harm. • Short-term (acute) risk of pollution of sensitive water resource. • Short-term (acute) risk to an ecosystem, or organism forming part of an ecosystem.	Unusually high concentration of toxic substance on the surface of a garden. Major release into controlled waters. EA Category 1 pollution incident. Closure of an abstraction point. Explosion, causing building collapse (and death if occupied).
Medium	• Chronic damage to human health likely to result in significant harm. • Pollution of sensitive water resource. • Significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentration of contaminant from site exceeds generic or site-specific assessment criteria for human health or water supply pipes. Presence of asbestos. Leaching of contaminants from a site to a principal or secondary (A) aquifer. Concentration exceeds DWS or EQS in Inner Source Protection Zone (SPZ1). EA Category 2+ pollution incident. Death of a species or loss of habitat within an area of national importance.
Mild	• Exposure is unlikely to result in significant harm to human health.	Concentration of contaminant from site below generic or site-specific assessment criteria.

Classification	Definition	Examples
	• Pollution of non-sensitive water resource. • Damage to sensitive buildings, structures and services or the environment.	Pollution of secondary (B or undifferentiated) aquifer. EA Category 3 pollution incident. Damage to a building rendering it unsafe to occupy. Death of a species or loss of habitat within an area of local importance.
Minor	• Harm (but not significant harm) resulting in a financial loss or expenditure to resolve. • Non-permanent human health effects. • Easily repairable damage to buildings, structures and services	Pollution of unproductive strata. Loss of plants in garden or landscape areas.

Risk Estimation

		Consequence			
		Severe	*Medium*	*Mild*	*Minor*
Probability	*High Likelihood*	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Low risk
	Low Likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Low risk	Very low risk	Very low risk
	No linkage	No risk			

Description of the Estimated Risks and Likely Action Required

Risk	Action
Very high	There is a high probability that severe harm could arise or there is evidence that severe harm is currently happening. This risk, if realised, is likely to result in substantial liability. • Urgent investigation required. • Remediation required for the site in its existing state and for development.
High	Harm is likely to arise. Realisation of the risk is likely to present a significant liability. • Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term. • Remediation required for development.
Moderate	A potential linkage is identifiable. However, it is either relatively unlikely that harm would be severe or, if any harm were to occur, it is more likely that the harm would be relatively mild.

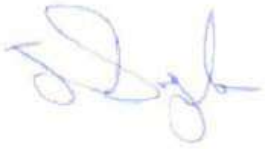
	• Investigation required to quantify the risk and determine potential liability. • Remediation required for development.
Low	It is possible that harm could arise but it is likely that this harm, if realised, would at worst normally be mild. • Investigation is not normally required but could be useful to confirm findings. • Remediation unlikely to be required or will be limited.
Very low	There is a low possibility that harm could arise. In the event of such harm being realised it is not likely to be severe. Site is not capable of being determined under Part 2a. • No further action recommended.



GROUNDTECH
CONSULTING

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Report type:	Geo-Environmental Appraisal
Prepared for:	Bowman's Ingredients Ltd
Date:	January 2020

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SUMMARY

SITE DETAILS	
Site Location	The site is located circa 2.16 kilometres north of Hitchin Town Centre, approximately centred on National Grid Reference 518218, 231295.
Site Area	The site is irregular in shape covers an area of approximately 3.7Ha. Topography across the site is relatively flat lying. The majority of the site is covered with both active and disused works and office buildings associated with the historic mill activities on site. The south of the site forms a soft landscaped area.
GROUND MODEL	
Made Ground Soils	Made Ground is present across the entire site from ground level to between 0.2m and 1.75m bgl. Made Ground generally comprises granular material with brick as a minor constituent, ash is also rarely noted within the Made Ground. Made Ground topsoil with brick and ash is noted within seven locations across the site from ground level to a maximum depth of 0.9m bgl. The majority of the site is surfaced with concrete.
Natural Soils	Natural soils encountered across the site generally confirm the published records, comprising: o Alluvium of soft clay, silt and loose to medium dense sand from 0.2m to a maximum depth of 4.45m bgl o Glaciofluvial Deposits comprising dense Sand and Gravel from 0.15m to a maximum depth of 1.2m bgl o Lowestoft Formation comprising firm to stiff Clay with chalk gravel from 0.35m to a maximum depth of 5.45m bgl.
Bedrock	Bedrock was not encountered during this investigation.
Groundwater	Groundwater was encountered across the site from 1.0m to a maximum depth of 3.45m bgl, predominantly within the Alluvium Deposits.
GROUND ENGINEERING ASSESSMENT	
Foundations	The type of foundations most suitable for the development varies across the site as detailed on the Foundation Zone Plan 19271 04. Traditional Strip footings are most suitable in Zone 1 areas, controlled modulus columns or driven piles are most suitable in Zone 2 areas.
Highways	Made Ground is present at proposed formation level across the majority of the site. Untreated Made Ground should be assumed to have a CBR value of <2.5%, unless proven otherwise.
SuDS	Due to the presence of Clay beneath the majority of the site and a relatively shallow groundwater table the use of SuDS drainage is not considered to be feasible.
Constraints	The main constraint associated with the site is the poor and variable ground conditions associated with the Alluvium deposits across the site. A further constraint is the existing buildings and infrastructure restricting access to large areas of the site.
TIER 1 (GQRA) ASSESSMENT AND REVISED (PL) ASSESSMENT	

Human Health	Due to the presence of localised gross hydrocarbon contamination in the vicinity of a former diesel UST and asbestos in the vicinity of the former mill the risk from contaminated soils to human health is considered to be moderate.
Controlled Waters	Due to the presence of hydrocarbon contamination within groundwater tested from WS09 and WS17 the risk to groundwater is considered to be moderate to low and the risk to surface waters is considered to be moderate.
Permanent Ground Gas	No putrescible material was noted during the investigation and the initial ground gas monitoring indicates that the site falls within the NHBC Green Traffic Light Zone, therefore the risk from ground gases is currently considered to be moderate to low. This will be confirmed within the ground gas risk assessment upon completion of the gas monitoring program.

FINAL APPRAISAL

The following recommendations are made in order to progress the development through planning to construction phase:

- Completion of gas monitoring programme.
- Issue gas assessment.
- Investigation in areas previously inaccessible.
- Intrusive site investigations comprising Cable Percussive Boreholes.
- Demolition Asbestos survey.
- Design of Remedial Specification.
- Confirmation of Remedial Specification with the Local Authority.
- Tree survey by qualified arboriculturist.
- Detailed foundation design and foundation schedule.
- Confirmation of recommendations made within this report with the Local Authority.

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Plans		
Plan Reference	*Revision*	*Title*
19271 01	-	Project Location Plan
19271 02	-	Preliminary Development Constraints Plan
19271 03	-	Exploratory Hole Location Plan
19271 04	-	Foundation Zone Plan
19271 05	-	Contamination Plan
19271 06	-	Illustrative Revised CSM

1.0 INTRODUCTION

1.1 Project Objectives

Groundtech Consulting Limited have been instructed by Bowman's Ingredients Limited and their planning consultant Spawforths to undertake a Geo-Environmental Appraisal for a site at Bowman's Mill in IIckleford.

A Preliminary Risk Assessment (Report Ref: 70027704-10670(1)) was previously undertaken by WSP Parsons Brinckerhoff in December 2018.

A main investigation was undertaken in accordance with BS 5930:2015, BS 10175:2013, BS 8576 and BS 22475 to revise the CSM and quantify the level of risk identified in the PRA. The Appraisal has been prepared in accordance with current UK Legislation and to discharge Land Quality pre-commencement planning conditions.

The report has been undertaken to fulfil the requirements of a preliminary risk assessment in accordance with CLR11 "Model Procedures for the Management of Land Contamination".

1.2 Proposed Development

The proposed development is residential end use comprising low rise housing with soft landscaped gardens and associated roads and infrastructure.



1.3 Limitations

This Geo-Environmental Appraisal is based on information obtained from a number of sources, and the information is assumed to be correct.

Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.

The assessment has been prepared for the exclusive use of the client. No third parties may rely on or reproduce the contents of the report without the written permission of Groundtech Consulting Limited. If any unauthorised third party comes into possession of the report they rely on it at their own risk and Groundtech Consulting Limited will not be obliged to provide a duty of care.

2.0 SITE SETTING

2.1 Location

The site is located circa 2.16 kilometres north of Hitchin Town Centre, as shown on the Project Location Plan 19271 01. The site is approximately centred on National Grid Reference 518218, 231295.



Access to the site is gained off Arlesey Road to the east of the site.

2.2 Site Description

The site is irregular in shape covering an area of approximately 3.7 hectares. Topography is relatively flat lying across the site with the exception of a grassy embankment along the northern boundary of the site.

Office Areas and Car Park

Offices and a laboratory building associated with Bowman's Mill are located in the west of the site, additional office buildings are located in the east of the site. External areas form car parking for the offices and are surfaced with concrete. A small strip of soft landscaping containing mature broad leafed trees is present in the north west of the site adjacent to the laboratory buildings.

A number of interceptors are indicated to be present beneath the concrete surfacing in the west of the site.

Current Production Area

The northern site area largely comprises an active production unit with associated silos, warehouse storage and concrete surfaced service yard for loading and unloading of HGV vehicles. Plastic chemical drums are present in the north of the site adjacent to the active production warehouse.

Derelict Area

The central site area comprises derelict mill buildings and infrastructure including warehouses, flour silos, a boiler house and electricity substation. External site areas are surfaced with concrete. A former diesel underground storage tank (UST) is present adjacent to the warehouse building in the east of the derelict area.

Some plant and machinery remains in the derelict warehouses and buildings. A steel grid covering a potential interceptor is present adjacent to two large disused silos in the central portion of this area.

The roofing to the derelict mill buildings appears to be constructed of asbestos cement sheeting.

Southern Site Area

The southern area of the site comprises a soft landscaped area with mature trees around the perimeter. A feeding area for geese is located in the west of the soft landscaped area.

The River Oughton runs south west to north east across the site, broadly separating the works area from the soft landscaped area. The river appears to have been channelled and has a number of pipes feeding into it, which may be for surface water drainage.

Grass covers the soft landscaped area.

Boundaries and Surrounding Land Uses

The site is bound on all side by security fencing approximately 7 feet high.

Residential properties are located to the north and east of the site, undeveloped fields are located to the south and west.

Site photographs are presented in Appendix 2, and any relevant features are recorded on the Preliminary Development Constraints Plan 19271 02.

3.0 SUMMARY OF PREVIOUS INVESTIGATION

A Preliminary Risk Assessment was undertaken by WSP Parsons Brinckerhoff (Report Ref: 70027704-10670(1)) in December 2016. Below is a summary of the Preliminary Risk Assessment.

3.1 Geology

Made Ground
BGS mapping does not indicate the presence of Made Ground, however due to the historic industrial use of the site Made Ground is anticipated.

Superficial Deposits
Superficial deposits underlying the site are indicated to be Alluvium in the vicinity of the River and Glaciofluvial Deposits beneath the northern portion of the site. These deposits are indicated to be further underlain by the Lowestoft Formation which comprises chalky Glacial Till.

Solid Geology
Solid geology underlying the site is indicated to be the Gault Formation which comprises mostly Mudstone.

3.2 Environmental Setting

The overlaying superficial Alluvium and Glaciofluvial Deposits are classified by the Environment Agency (EA) as Secondary A Aquifers. The underlying Lowestoft Formation superficial deposits are classified as an Undifferentiated Secondary Aquifer.

The Gault Formation Bedrock is classified as an Unproductive Aquifer.

The closest recorded landfill is 383m east of the site. In addition and infilled mill pond and mill race are located in the west of the site.

One recorded on site pollution incident occurred in 1996 relating to discharge of crude sewage to the River Oughton, this was classified as a minor incident. In addition a pollution incident occurred 120m north east of the site relating to organic wastes and other suspended solids into the River Oughton which was classified as a significant incident.

There are no discharge consents within 250m of the site and no fuel stations within 500m of the site.

The site is not in an area which required Radon Protection Measures in the construction of new dwellings.

3.3 Contaminative Sources

A number of potentially contaminative sources were identified by the Preliminary Risk Assessment, these are detailed briefly below:

- General Made Ground associated with the infilled pond/ mill race and construction of the existing buildings on site. Potential Contaminants of Concern (CoCs) may include heavy metals, PAHs and asbestos.
- Contaminants associated with historical uses of the site, particular areas of concern include mechanical workshops, boiler rooms, vehicle cleaning, maintenance and refuelling areas. Potential CoCs include heavy metals, PAHs, VOCs, SVOCs, PCBs and asbestos.

- Hazardous gases associated with significant thickness of Made Ground on and off site, including an infilled gravel pit c.80m south of the site.

3.4 Conceptual Site Model and Risk Assessment

A number of potential receptors were identified by the Preliminary Risk Assessment, the receptors are detailed below along with associated pollution pathways which appear in brackets.

Potential Receptors

- Development workers (dermal contact, inhalation, ingestion of soils and dusts).
- Future residential site users (dermal contact, inhalation, ingestion of soils and dust, consumption of produce from gardens).
- Off-site human health receptors and building structures/services (lateral migration of groundwater and ground gas).
- Controlled water receptors – groundwater (vertical migration to Secondary A Aquifer) and surface water (lateral migration of groundwater).
- Future building structures and services (direct contact with contaminated soils, ingress of ground gases into buildings, notably carbon dioxide, via voids and service entries).

Risk Assessment

The risk assessment from the Preliminary Risk Assessment has determined potentially complete pollutant linkages which could affect redevelopment of the site for residential end use, these are highlighted below:

- Direct contact/ingestion/inhalation of soil-bound contaminants and asbestos by construction workers, neighbouring site users, future site users and future maintenance workers. These are likely to be the dominant potentially complete pollutant linkages driving risks to human health from soil-bound contamination in a future residential development.
- Inhalation of vapours associated with soil and/or groundwater contamination by construction workers, future residents and future maintenance workers.
- Inhalation and accumulation of hazardous ground gases associated with possible in-filled areas by construction workers, future residents and future maintenance workers.
- Migration of contaminants into surface water and underlying aquifers (including preferential pathways associated with on-site structures and services).
- Direct contact between contamination in soil / groundwater and future below ground services and structures.

4.0 SCOPE OF INVESTIGATION AND RATIONALE

4.1 Project Objectives

The aim of the fieldwork was to:

Determine the stratification beneath the site.
Maintain watching brief for visual and olfactory evidence of contamination.
Obtain samples using methodology in current guidance for contamination analysis.
Identify realistic pollution linkages to groundwater.
Obtain relevant geotechnical parameters for preliminary foundation design to address both ULS and SLS conditions.
Determine if targeted supplementary investigation in areas of concern is required and for foundation design and remedial design.
Install monitoring standpipes for gas and groundwater monitoring.
Assess the identified pollution linkages in the CSM.

4.2 Scope of Works

The following Ground Investigation scope was undertaken at the site between the 9th December and 13th December 2019:

- Thirty window sample boreholes (WS01 to WS30) were drilled to depths of between 0.8m and 5.45m bgl using a tracked Dando Terrier drilling rig.
- Three machine excavated trial pits (TP01 to TP03) were dug to between 0.4m and 4.0m bgl using a wheeled JCB 3CX excavator.

The exploratory hole locations are presented on Groundtech Plan 19271 03, and the exploratory hole logs are presented in Appendix 3.

The exploratory holes were positioned to establish the stratification beneath the site and target areas of concern. The exploratory holes were logged by a suitably experienced geo-environmental engineer in general accordance with the following current guidance:

- BS 5930 'Code of Practice for Site Investigations' 2015.
- BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'.
- BS EN ISO 14689:2002 "Geotechnical investigation and testing – Identification and classification of rock".

4.3 Soil Sampling

During the intrusive investigation, representative samples were taken at regular intervals, changes of strata and where evidence of contamination existed. Laboratory analysis was scheduled on the samples obtained.

The samples obtained are summarised in the table below:

Soil Sample	Number
Environmental Sample	63
Disturbed Sample	44

Undisturbed U100 Sample	14

The samples have been obtained in accordance with current environmental and geotechnical guidance. The sampling plan has been designed obtain samples from all required strata using the correct methodology.

Disturbed samples of soil for chemical analysis were placed in the correct sampling containers as required by the laboratory in accordance with their MCERTS and UKAS Accreditation. Transportation was arranged in a timely manner and the samples were at the correct temperature

The sample locations and depths are recorded on the exploratory logs.

4.4 Geo-Environmental Analysis

To inform the Tier I Generic Quantitative Risk Assessment, the following geo-environmental testing was scheduled to assess the risk from contamination on the site. The testing is based on the potential sources identified in the PRA and observations during the Ground Investigation.

Determinand	Matrix	Number
Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc and pH.	Soil	25
Speclated PAH16	Soil	25
TPH CWG	Soil	10
PCBs	Soil	2
Asbestos	Soil	20
Asbestos Quantification	Soil	5
Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc and pH.	Groundwater	6
Speclated PAH16	Groundwater	6
TPH CWG	Groundwater	6
PCBs	Groundwater	6
CaCO3	Groundwater	6
DOC	Groundwater	6

The Geo-Environmental Laboratory Testing Results are presented in Appendix 4.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 1990. The following tests were scheduled:

British Standard	Test Method	Number
Part 2	Water Content	15
Part 2	Plasticity Index Analysis	15
Part 3	pH Value	10
Part 3	Water Soluble Sulphate Content	10
Part 5	One Dimensional Consolidation Test	4
Part 7	Determination of Undrained Shear Strength in Triaxial Compression	5

The Geotechnical Laboratory Testing Results are presented in Appendix 5.

4.5 Gas and Groundwater Monitoring/Sampling

Gas and groundwater monitoring installations were constructed in the boreholes. The standpipes consisted of Polyvinyl Chloride (PVC) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth (m)	Response Zone (m bgl)	Targeted Strata	Reason
WS02	1.50	1.00 – 1.50	Made Ground	Ground Gas/ Groundwater
WS06	4.00	1.00 – 4.00	Sand, Silt and Clay	Ground Gas/ Groundwater
WS09	3.00	1.00 – 3.00	Made Ground, Sand and Clay	Ground Gas/ Groundwater
WS12	4.00	1.00 – 4.00	Clay	Ground Gas/ Groundwater
WS17	4.00	1.00 – 4.00	Clay	Ground Gas/ Groundwater
WS18	5.00	1.00 – 5.00	Clay	Ground Gas/ Groundwater
WS23	3.00	1.00 – 3.00	Sand and Clay	Ground Gas/ Groundwater
WS25	3.00	1.00 – 3.00	Clay	Ground Gas/ Groundwater
WS28	2.00	1.00 – 2.00	Sand and Clay	Ground Gas/ Groundwater
WS29	3.00	1.00 – 3.00	Silt and Clay	Ground Gas/ Groundwater

Permanent gas and flow rate monitoring was carried out using GFM 436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- Oxygen (O_2), carbon dioxide (CO_2) and methane (CH_4) as the percentage volume in air (%v/v).
- Hydrogen sulphide (H_2S) and carbon monoxide (CO) as the percentage volume in air (%v/v).
- Lower Explosive Limit (%LEL) of methane.
- Atmospheric and borehole pressure, including pressure trend.
- Flow measurements (l/hr).
- Weather and ground surface conditions.

Both peak and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes.

Interim permanent gas and groundwater monitoring results are presented in Appendix 6.

4.6 Groundwater Sampling

Well development was carried out to ensure no cross contamination from the drilling activities remained in the water column in the well. During the return visit, the installations were purged to a minimum three times the volume of the water column in the borehole prior to sampling, samples were taken between 7 and 17 days after installation.

Purging was undertaken at a slower rate than the well development, and the sampling at a slower rate again.

Samples were sent to the UKAS Accredited laboratory the same day, sampling was carried out in general accordance with BS5930:2015 and BS 5667:2018.

5.0 GROUND MODEL

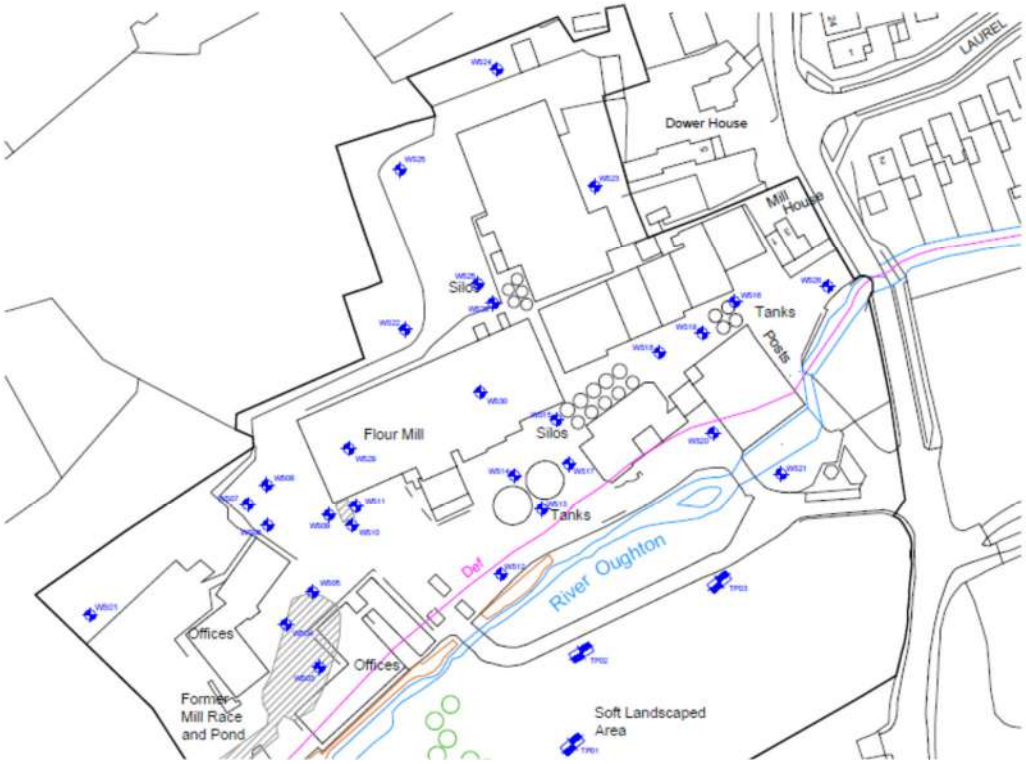
5.1 Made Ground

Made Ground was encountered across the site from ground level to (max) 1.75m bgl, the main Made Ground populations are detailed below:

- Brown clayey topsoil with brick and rare ash from Ground Level to 0.90m bgl (WS01, WS21, WS23, WS24, TP01, TP02 and TP03).
- Light brown gravelly sand with brick from 0.15m to 1.2m bgl (WS02 to WS08, WS10, WS12 to WS15, WS18 to WS20, WS25 to WS30).
- Dark brown/black sand and gravel with ash from 0.18m to 1.75m bgl (WS02, WS11, WS16 and WS18).
- Soft to firm grey brown clay with brick from 0.2m to 1.4m bgl (WS03, WS05, WS09, WS14 and WS23).

The soft landscaped area in the south of the site was surfaced with grass over topsoil, the remainder of the site was surfaced with concrete.

The majority of the Made Ground was granular, with gravelly sand being the most common population of Made Ground across the site.



5.2 Natural Ground

The natural strata encountered generally confirmed the published geological records.

Three main natural stratification encountered during the investigation and are described below:

- Alluvium comprising soft to firm Clay, soft Silt and loose to medium dense Sand was encountered from 0.20m to 4.45m bgl within WS01, WS03, WS04, WS05, WS06, WS08, WS09, WS10, WS12 to WS21, WS23, WS24, WS29, WS30, TP01 and TP02. This strata was extremely variable laterally and with depth, frequently interbedded.
- Glaciofluvial Deposits comprising medium dense to dense Sand and Gravel from 0.6m to 2.45m bgl within WS10, WS16, WS24, WS26 and WS28.
- Lowestoft Formation which comprises firm to stiff Clay with gravel of chalk was encountered from 0.35m to5.45m bgl within WS07, WS08, WS09, WS13 to WS20, WS22, WS23, WS25, WS26, WS28, WS29, WS30, TP01 and TP02.

Alluvium was encountered across the majority of the site and generally deepened near to the river. Alluvium was absent in the north of the site, the Lowestoft Formation was encountered across the site beneath the Alluvium or Glaciofluvial Deposits. The extent of the Alluvium Deposits is indicated on the Foundation Zone Plan 19271 04.

5.3 Bedrock

Bedrock was not encountered during this investigation.

5.4 Groundwater

Groundwater strikes were observed in the following locations:

Location	Depth (m bgl)	Strata	Rate
WS01	2.45	Clay	Rapid Ingress
WS03	2.00	Clay	Rapid Ingress
WS04	1.70	Clay	Rapid Ingress
WS05	1.40	Sand and Gravel	Rapid Ingress
WS06	3.45	Silt	Rapid Ingress
WS08	1.50	Sand	Rapid Ingress
WS09	1.00	Made Ground	Rapid Ingress
WS10	1.10	Sand and Gravel	Rapid Ingress
WS11	1.20	Made Ground	Rapid Ingress
WS12	2.30	Clay	Rapid Ingress
WS13	2.00	Clay	Rapid Ingress
WS14	1.00	Clay	Rapid Ingress
WS15	1.10	Clay	Rapid Ingress
WS16	1.00	Sand and Gravel	Rapid Ingress
WS17	1.50	Clay	Seepage
WS18	2.40	Clay	Rapid Ingress
WS19	1.10	Sand	Rapid Ingress
WS20	1.65	Clay	Rapid Ingress
WS21	2.00	Clay	Rapid Ingress
WS23	2.00	Sand	Rapid Ingress
WS28	1.00	Sand	Rapid Ingress
WS29	2.00	Silt	Rapid Ingress

5.5 Watching Brief

A watching brief was maintained during the Ground Investigation for visual and olfactory evidence of contamination.

Ash was noted as a minor constituent of the Made Ground in eleven locations across the site. Furthermore a moderate hydrocarbon odour was noted within WS09, WS10 and WS11 in the vicinity of a former diesel Underground Storage Tank (UST).

5.6 Excavation Stability

No evidence of spalling or collapse was noted during excavation of the trial pits.

5.7 Excavation Progress

Slow progress while excavating the trial pit was not experienced.

6.0 GROUND ENGINEERING

6.1 Geotechnical Testing Results

Comparison of water content and the value of 0.4 times the Liquid Limit in accordance with BRE Digest 412 'Desiccation in Clay Soils' suggests significant desiccation has taken place when 0.4 times the Liquid Limit is greater than the actual water measured water content. This is a rudimentary method but also a good guide.

Results of the PI analysis and the volume change potential of the clays is summarised in the table below:

Reference	Depth (m)	Modified PI	Volume Change Potential	Dessicated Y/N
WS03	1.20	45.2	High	Y
WS04	1.50	19.8	Low	N
WS07	1.00	40.9	High	N
WS12	1.00	33.0	Medium	N
WS14	1.50	33.0	Medium	N
WS16	2.00	18.1	Low	N
WS17	1.50	51.0	High	N
WS18	1.00	44.2	High	N
WS20	1.50	52.9	High	N
WS22	1.00	20.0	Medium	N
WS23	1.60	16.3	Low	Y
WS24	0.90	23.0	Medium	N
WS25	1.00	23.2	Medium	N
WS28	1.50 – 1.95	30.1	Medium	N
WS29	2.50 – 2.95	22.9	Medium	N

Five undisturbed samples of clay from across the site were scheduled for quick undrained triaxial testing and the results are summarised below:

Reference	Depth (m)	Shear Strength (kPa)	Relative Strength
WS07	2.50 – 2.95	225	Very High
WS17	1.50 – 1.95	22	Low
WS21	1.50 – 1.95	23	Low
WS25	1.50 – 1.95	135	High
WS28	1.50 – 1.95	34	Low

Four undisturbed samples of clay from across the site were scheduled for one dimensional consolidation testing and the results are summarised below:

Reference	Depth (m)	Pressure Range (kPa)	M_v (m^2/MN)
WS17	1.50 – 1.95	120 – 240	0.469
WS21	1.50 – 1.95	120 – 240	0.146
WS25	1.50 – 1.95	120 – 240	0.104
WS28	1.50 – 1.95	120 – 240	0.161

6.2 Assessment Background

The ground engineering investigation has been undertaken to formulate an accurate ground model in order to undertake preliminary foundation design. The ground model has been constructed with a moderate level of confidence, the ground model has evolved from the information obtained by the PRA.

The proposed development is residential end use comprising low rise housing with associated soft landscaped gardens, roads and infrastructure and public open space.

Ground conditions across the site generally consist of concrete over a variety of Made Ground strata from ground level to depths of between 0.2m and 1.75m bgl. Made Ground is generally underlain by Alluvium deposits consisting of soft to firm Clay, soft Silt and loose to medium dense Sand from 0.2m to 4.45m bgl, the northern most area of the site most distal to the river, Made Ground is underlain by Glaciofluvial Deposits comprising medium dense to dense Sand and Gravel from 0.6m to 2.45m bgl. Alluvium and Glaciofluvial Deposits are further underlain by the Lowestoft Formation which comprises firm to stiff clay with gravel of chalk from 0.35m to 5.45m bgl.

A former mill race was encountered within WS02. The mill race was backfilled with granular Made Ground comprising sand and gravel with ash as a minor constituent. The base of the mill race is indicated to be in-situ at 1.70m bgl where the window sample borehole refused. The former mill race fed a reservoir which was also backfilled, the reservoir was encountered within WS03, WS04 and WS05 and is indicated to be between 0.65m and 1.10m deep.

Groundwater was encountered in most locations across the site between 1.0m and 3.45m bgl.

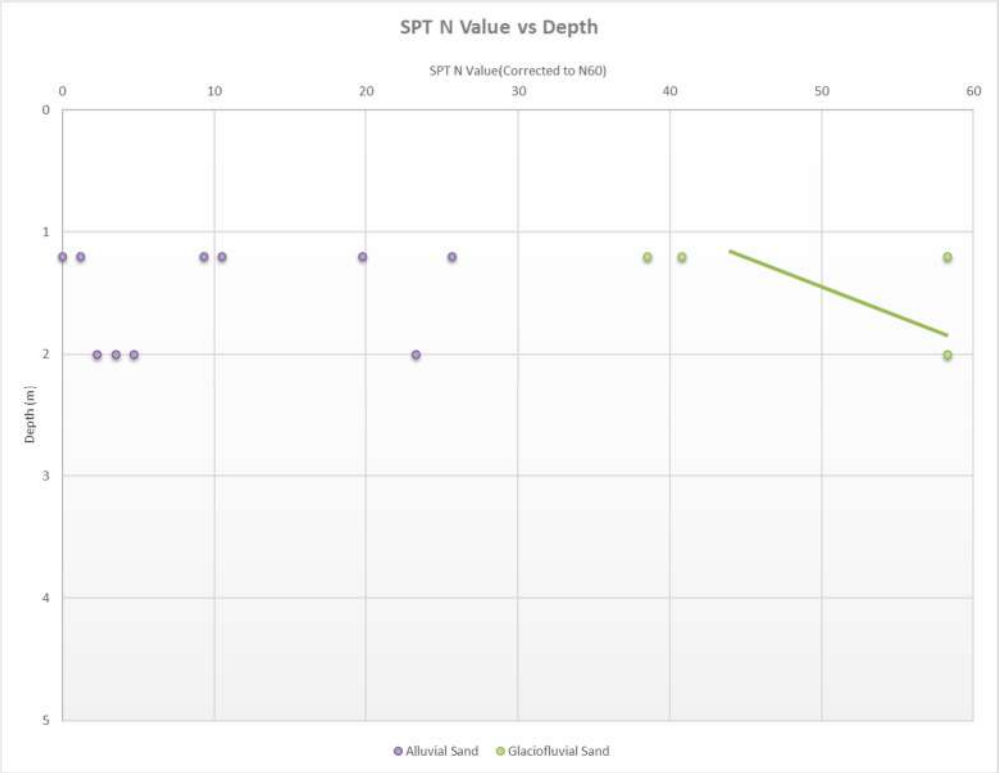
The main limitation associated with the site is considered to be the presence of poorly sorted and often soft/ loose alluvium deposits encountered at traditional founding depth across the site. In some areas of the site (generally closer to the river) suitable bearing strata was not encountered within the window samples boreholes. These areas are identified on the Foundation Zone Plan, drawing 19271 04.

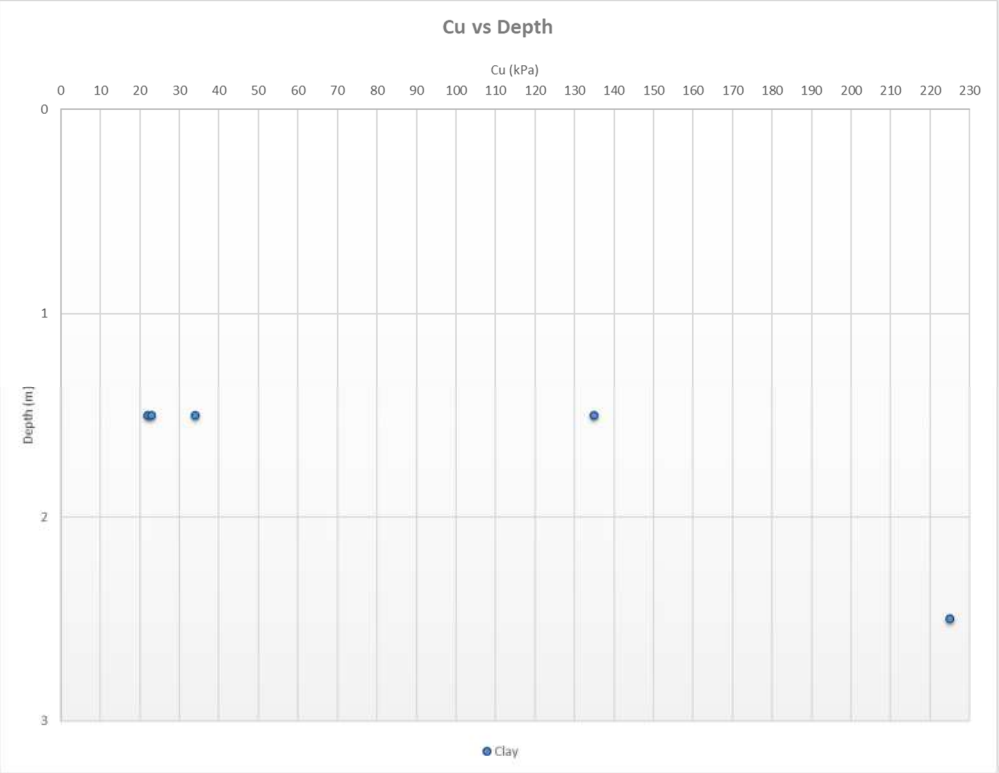
In addition to the above limitation, a large portion of the site was covered by buildings associated with the former Flour Mill operations which historically took place at the site, including factory buildings, boiler rooms, offices and silos. Therefore prior to redevelopment buildings associated with the mill will require demolition with all floor slabs and foundations grubbing up and further investigation is required within the footprint of the buildings.

Soft landscaping in the south of the site will remain as public open space within the proposed development.

6.3 Geotechnical Parameters

The geotechnical test results have been evaluated to derive geotechnical parameters for the soils underlying the site. 'Depth to Cu' and 'Depth to SPT N value' graphs are presented below to provide a generalised ground model for the site.





Characterisation of the geotechnical parameters above has been undertaken to select a characteristic value, which is a cautious estimate of the value affecting the occurrence of the limit state. The selected parameters are summarised below:

- For the loose to medium dense Alluvial Sand at 1.0m bgl, an SPT 'N' value of 8 has been selected and through correlation a ϕ' value of 29° has been selected for Ultimate Limit State (ULS) conditions.
- For the dense Glaciofluvial Sand at 1.0m bgl, an SPT 'N' value of 45 has been selected and through correlation a ϕ' value of 38° has been selected for Ultimate Limit State (ULS) conditions.
- Five Quick Undrained Triaxial tests were scheduled on samples of the natural Clay, shear strengths of between 22kPa and 225kPa were determined indicating low to very high strength Clays.
  - The Alluvial Clay across the site encountered at founding depth is considered to exhibit shear strengths of between 22kPa and 34kPa, a characteristic C_u value of 26kPa has been selected for ULS conditions.
  - The Clay of the Lowestoft Formation is considered to exhibit shear strengths of 135kPa and 225kPa at between 1.0m and 2.0m bgl, a characteristic C_u of 160kPa being selected for ULS conditions.

Two consolidation tests were undertaken on the Clay of the Lowestoft Formation, m_v values of between 0.104m^2/MN and 0.161m^2/MN were determined indicating medium compressibility, therefore a characteristic m_v value of 0.140m^2/MN has been selected for Serviceability Limit State (SLS) conditions.

The clay strata have been proven to be inconsistent in strength across the site and with depth, therefore a Foundation Zone Plan 19271 04 has been provided to determine areas where soft/loose Alluvium Deposits are encountered at founding depth.

6.4 Preliminary Foundation Design

Due to variable shallow ground conditions across the site, two different foundation proposals have been provided and have been determined by the density/strength of the founding strata encountered at traditional founding depths. A Foundation Zone Plan is presented as Plan No. 19271 04 which highlights the areas where each foundation solution is applicable based on the information collected by the window sample boreholes.

Zone 1 – Traditional Shallow Foundations

The most suitable foundation solution for proposed residential dwellings in Zone 1, as illustrated on the Foundation Zone Plan 19271 04, is considered to be traditional strip footings founding within the natural dense Sand or firm to stiff high to very high strength Clay.

Foundations should be deepened through any Made Ground and former construction to be founded within undisturbed natural strata.

The clay is of a medium to high volume change potential, therefore it is assumed that all clays are of high volume change potential. Foundations within the clay should be founded at a minimum depth of 1.0m bgl in accordance with NHBC Chapter 4.2. Foundations within the sand should be at a minimum depth of 0.60m bgl.

Design by Calculation

Preliminary foundation design has been undertaken by calculation, a safe allowable bearing pressure of 140kN/m^2 for ultimate limit state design has been calculated for a 0.6m wide strip foundation within the dense Sand at 0.60m bgl and 125kN/m^2 for the high strength Clay strata at 0.9m bgl.

Settlement within the sand strata beneath the site will be immediate and also minimal, occurring predominantly during the construction phase. Primary settlement within the clay strata will occur, the

degree of settlement based on the bearing capacities provided is less than 25mm, therefore Serviceability Limit State conditions will be satisfied.

If variable strata are encountered at the base of foundation excavations, then foundations should be deepened to found on the similar strata or reinforced to mitigate the potential for differential settlement.

If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during Ground Investigation, work should cease and Groundtech Consulting contacted for further advice.

During the construction phase, supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring.

Zone 2 – Vibro Ground Improvement or Piled Foundations

The most suitable foundation solution for residential dwellings constructed in Zone 2, as illustrated on the Foundation Zone Plan 19271 04, is considered to be reinforced strip footings constructed over vibro improved ground or driven piles. Due to low Cu values of the clay in Zone 2 vibro stone columns are not likely to be considered feasible in accordance with NHBC Chapter 4.5. Sufficient information for design of deep foundations is not currently available, therefore the information below is general. Further Ground Investigation is recommended in order to determine the best solution for areas of poor shallow ground conditions and to allow the preliminary design by calculation.

Controlled Modulus Columns

The most suitable foundation solution for the residential dwellings in Zone 2 is considered to be Ground Improvement with Controlled Modulus Columns utilising bottom feed technique due to the relatively high groundwater level that has been encountered.

Vibro stone columns are considered to be unsuitable for the ground conditions in accordance with NHBC Chapter 4.5 due to some of the clays being of high volume change potential and having a shear strength of less than 30kN/m^2.

A preliminary design resistance for ultimate limit state and serviceability limit state conditions will be the provided by the specialist vibro contractor in their detailed design. The specialist contractor should provide fitness for purpose cover for the treated zones and depth of treatment.

The depth of foundations is to be a minimum of 0.35m below the surface of the vibro treated ground as the integrity of the columns is not validated to this depth. The reinforced concrete foundation should be designed to span between the centres of adjacent stone columns.

Driven Piles

An alternative foundation solution for the proposed residential dwellings is driven piles transferring loads through the Made Ground and loose/soft Alluvium to the underlying high to very high strength Clay.

The proposed development is for a residential housing estate, at this stage the loadings are not available. Pile caps and a reinforced ring beam should be constructed to span between each pile cap and support loadings from walls.

An appropriate working platform should be constructed in accordance with BR470 guidance.

The piling type, length, depth of reinforcement and design should be discussed with a specialist piling contractor. They can then undertake the detailed design including drawings and specifications to provide fitness for purpose design.

6.5 Building Near Trees

Foundation excavations will encounter cohesive strata in the vicinity of existing, proposed or recently removed trees, foundations should be adjusted in full accordance with NHBC Standards Chapter 4.2. Proposed houses around the perimeters of the site are likely to be within the zone of influence of trees, and due to variable ground conditions Clay may be at founding depth.

All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings. The clay is typically of a Medium to high volume change potential, therefore it is assumed that all of the clay materials at this site are of high shrinkage/swelling potential.

A survey of all trees and hedges on the site and within 30m of the site boundary should be undertaken to identify tree species, locations and heights. This information will be required in order to assess the effects of trees on the cohesive strata and inform a foundation schedule.

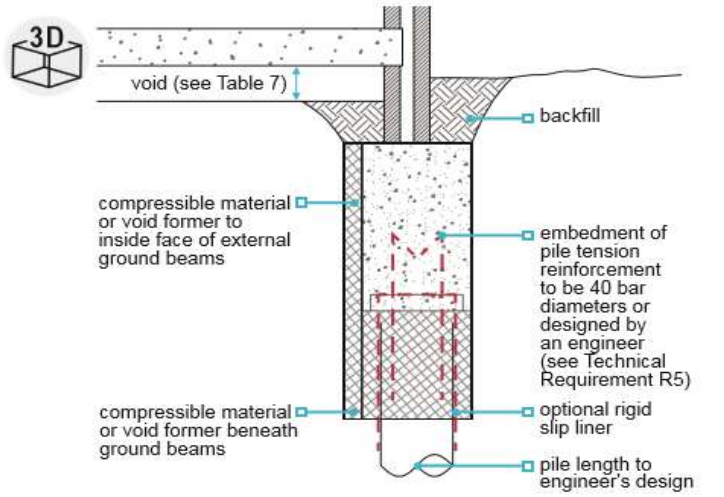
Where foundation depths in clay due to trees already present or recently removed exceeds 1.50m, there is a possibility for heave to occur on removal of the tree. NHBC Guidance states that in areas where volume change potential is medium the following void or void former dimensions should be provided:

- Against side of foundation and ground beam – 35mm
- Underground beams, and suspended in-situ concrete ground floor – 150mm

Due to the proposed piled/ vibro solution across areas of the site, NHBC Chapter 4.2 dictates that heave precautions are required on the inside faces of external ground beams, on the underside of all internal and external ground beams and beneath floor slabs. Heave precautions can comprise a void, void former or compressible material.

Where heave precautions are deemed necessary, the pile/ vibro installation design will need to accommodate the following precautions in the design.

Figure 6: Heave precautions for pile and beam foundations



It is essential that heave material is provided to the entire areas shown. Particular care should be taken to ensure that the full width of the ground beam and the areas around the piles are protected.

Measurements of foundation depths where ground levels are reduced or increased, either recent past or during construction, should be carried out in accordance with NHBC Chapter 4.2.

6.6 Floor Slabs

Made Ground is up to 1.75m deep and generally more than 0.6m deep across the site therefore, floor slabs should be suspended with a 300m void under suspended pre-cast concrete or timber floors.

If a Controlled Modulus Comlumn foundation solution is selected it is recommended that stone columns are also installed beneath the floor slab, this would enable the use of a ground bearing floor slab.

6.7 Construction

Instability of the Made Ground and Alluvium is a possibility and should be considered in the groundworks method statements.

Relatively shallow groundwater was encountered across the site, instability of soils beneath the groundwater table is expected and foundation excavations will require dewatering where excavations are below the groundwater table.

Tracked high specification plant is recommended to maintain the build programme. Breaking equipment will also be required locally to penetrate obstructions in the vicinity of the former mill, including concrete floor slabs, foundations and silo bases.

6.8 Concrete Classification

Made Ground

Water soluble sulphate testing was undertaken on twenty-five samples of the Made Ground. The range of soluble sulphate (SO_4) recorded is <0.0015gl/l to 1.6222g/l. Associated pH values ranged between 7.57 and 11.88 indicating neutral to alkaline conditions.

Twenty-five samples of Made Ground were tested, therefore the mean of the highest 20% of the sulphate test results and lowest 20% pH results should be taken as the characteristic values. For the Made Ground, a characteristic sulphate concentration of 1.3283g/l and a pH value of 7.82 have been selected.

Natural Strata

Water soluble sulphate testing was undertaken on ten samples of the Natural Strata. The range of soluble sulphate (SO_4) recorded is 0.0065gl/l to 1.5766g/l. Associated pH values ranged between 7.58 and 8.83 indicating neutral to slightly alkaline conditions.

Ten samples of Natural Strata were tested, therefore the mean of the highest 20% of the sulphate test results and lowest 20% pH results should be taken as the characteristic values. For the Natural Strata, a characteristic sulphate concentration of 0.8953g/l and a pH value of 7.61 have been selected.

Groundwater is considered to be mobile due to the granular nature of the Made Ground and some of the superficial deposits underlying the site.

The results of laboratory pH and sulphate content indicate that ACEC Class AC-2 and sulphate class DS-2 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

6.9 Highway Design

Made Ground is present at proposed formation level across the majority of the site.

Untreated Made Ground should be assumed to have a CBR value of <2.5%, unless proven otherwise. Highways Agency document HD25 'Interim Advice Note 73/06 Revision 1' (2009) states that where a subgrade has a CBR value lower than 2.5%, it is considered unsuitable support for a pavement foundation since it would tend to deform under construction traffic, and must be improved.

Where highways are proposed in areas underlain by Made Ground, it is recommended that Made Ground to a depth of 1.0m below subgrade level is excavated, sorted and classified in accordance with Series 600 (Earthworks) of the Highways Agency "Specification for Highways Works". Following the above, any suitable material which can be used as part of highway construction shall be compacted in accordance with the earthworks specification.

The soils beneath the site are considered to be frost susceptible due to the fines content and highway construction should be a minimum thickness of 450mm to mitigate the risk.

6.10 Sustainable Urban Drainage System (SuDS)

Soil percolation testing was not undertaken as part of this investigation, however the use of SuDS is unlikely to be feasible due to the presence of widespread impermeable clay deposits and the presence of shallow groundwater beneath the site.

If the use of SuDS is to be considered, soil percolation testing in accordance with BRE 365 should be undertaken in order to obtain soil infiltration rates.

If drainage of the highway to soakaways is to be considered it is suggested that this is discussed with the Local Authority at the earliest opportunity, to confirm the adequacy of proposed testing and to allow their inspection of any testing.

7.0 LAND QUALITY

7.1 Geo-Environmental Testing Results - Soils

Samples of Made Ground have been tested for a range of relevant determinands. In accordance with CLR11 (DEFRA & EA, 2004), a Generic Quantitative Risk Assessment (GQRA) has been undertaken to determine the significance of the concentrations as derived through Geo-Environmental analysis.

The GQRA process comprises the comparison of the actual concentrations measured on site with Generic Assessment Criteria (GACs) for the protection of human health.

The GACs used for the assessment of soil concentrations have been derived using the CLEA model. The GACs used and their ranking of importance are listed below:

- Soil Guideline Values (SGVs) which demonstrate minimal risk,
- LQM/CIEH S4ULs which use the same toxicological data as the SGVs but different exposure criteria.
- C4SLs which demonstrate low risk.

In deriving the GACs for use on Brownfield sites we have assumed a 1.0% Soil Organic Matter, unless the results indicate otherwise.

The proposed end-use for the site is a residential development comprising housing with private domestic gardens with associated driveways, pavements and access roads. We have therefore undertaken the GQRA on the basis that the proposed development site falls under the Residential (with Plant Uptake) land-use scenario as defined in SR3 (EA, 2009b).

A summary of the Geo-Environmental Testing results is presented below and the GQRA Tier I screening Values are presented in Appendix 7:

Metals				
Contaminant	Range of Results (mg/kg unless stated)	Screening Value (mg/kg unless stated)	Number of Exceedances	Locations of Exceedances
Arsenic	2.5 – 23.7	32	0	-
Cadmium	<0.1 – 0.2	10	0	-
Chromium	40.4 – 109.4	910	0	-
Hexavalent Chromium	<0.3	21	0	-
Copper	<1 – 43	2400	0	-
Lead	6 – 77	200	0	-
Mercury	<0.1 – 0.2	1	0	-
Nickel	8.8 – 37.9	130	0	-
Selenium	<1	350	0	-
Zinc	21 – 271	3700	0	-
Polycyclic Aromatic Hydrocarbons (PAHs)				
Contaminant	Range of Results (mg/kg unless stated)	Screening Value (mg/kg unless stated)	Number of Exceedances	Locations of Exceedances
Naphthalene	<0.04 – 0.44	2.3	0	-
Acenaphthylene	<0.03 – 0.45	170	0	-
Acenaphthene	<0.05 – 1.0	210	0	-
Fluorene	<0.04 – 2.38	170	0	-
Phenanthrene	<0.03 – 4.57	95	0	-

Anthracene	<0.04 – 1.48	2400	0	-
Fluoranthene	<0.03 – 6.93	280	0	-
Pyrene	<0.03 – 5.24	620	0	-
Benzo(a)anthracene	<0.06 – 3.35	7.2	0	-
Chrysene	<0.02 – 2.81	15	0	-
Benzo(b)fluoranthene	<0.05 – 3.76	2.6	4	*WS02 – 1.00m* *WS18 – 0.50m* *WS21 – 0.40m* *WS28 – 0.50m*
Benzo(k)fluoranthene	<0.02 – 1.46	77	0	-
Benzo(a)pyrene	<0.04 – 2.82	2.2	2	*WS02 – 1.00m* *WS21 – 0.40m*
Indeno(123cd)pyrene	<0.04 – 1.82	27	0	-
Dibenzo(ah)anthracene	<0.04 – 0.50	0.24	2	*WS02 – 1.00m* *WS21 – 0.40m*
Benzo(ghi)perylene	<0.04 – 2.27	320	0	-
TPH CWG – Aliphatics				
Contaminant	Range of Results (mg/kg unless stated)	Screening Value (mg/kg unless stated)	Number of Exceedances	Locations of Exceedances
>C5-C6	<0.10	42	0	-
>C6-C8	<0.10 – 0.9	100	0	-
>C8-C10	<0.10 – 14	27	0	-
>C10-C12	<0.20 – 901.4	130	3	*WS09 – 1.00m* *WS11 – 1.00m* *WS11 – 1.50m*
>C12-C16	<4.00 – 2519	1,100	1	*WS11 – 1.50m*
>C16-C35	<14 – 3719	65,000	0	-
Total aliphatics C5-35	<19 - 7154	-	-	-
TPH CWG – Aromatics				
Contaminant	Range of Results (mg/kg unless stated)	Screening Value (mg/kg unless stated)	Number of Exceedances	Locations of Exceedances
>C5-EC7	<0.10	70	0	-
>EC7-EC8	<0.10	130	0	-
>EC8-EC10	<0.10 – 0.5	34	0	-
>EC10-EC12	<0.2 – 390.7	74	4	*WS09 – 0.50m* *WS09 – 1.00m* *WS11 – 1.00m* *WS11 – 1.50m*
>EC12-EC16	<4.00 – 1687	140	4	*WS09 – 0.50m* *WS09 – 1.00m* *WS11 – 1.00m* *WS11 – 1.50m*
>EC16-EC21	<7 – 1776	260	4	*WS09 – 0.50m* *WS09 – 1.00m* *WS11 – 1.00m* *WS11 – 1.50m*
>EC21-EC35	<7 – 552	1,100	0	-
Total aromatics C5-35	<19 – 4406	N/A	N/A	-
Total aliphatics and aromatics(C5-35)	<38 – 11,560	N/A	N/A	-
MTBE	<0.005	49	0	-

Benzene	<0.005	0.33	0	-
Toluene	<0.005	610	0	-
Ethylbenzene	<0.005 – 0.170	350	0	-
m/p-Xylene	<0.005 – 0.331	230	0	-
o-Xylene	<0.005	250	0	-
Others				
Organic Matter (%)			<0.2 – 7.1	
Asbestos Screen				
Position	Depth (m bgl)	Asbestos Type		Asbestos Quantity (mass %)
WS01	0.50	None Detected		-
WS02	1.00	None Detected		-
WS05	1.00	None Detected		-
WS08	0.50	None Detected		-
WS10	0.50	None Detected		-
WS12	0.30	None Detected		-
WS13	0.50	Chrysotile		<0.001
WS14	0.50	None Detected		-
WS16	0.40	Chrysotile		<0.001
WS17	0.60	None Detected		-
WS18	0.50	Amosite		<0.001
WS19	0.50	Chrysotile and Amosite		0.002
WS21	0.40	None Detected		-
WS22	0.30	None Detected		-
WS23	0.10	None Detected		-
WS24	0.40	None Detected		-
WS25	0.40	None Detected		-
WS29	0.50	None Detected		-
TP01	0.05	None Detected		-
TP02	0.10	Chrysotile		<0.001

7.2 Tier I Generic Quantitative Risk Assessment - Soils

Made Ground

Made Ground was encountered across the entire site from ground level to a maximum depth of 1.75m bgl, and was generally deeper in the west of the site. In the centre, north, east and south of the site the Made Ground was generally less than 1.0m deep. These soils generally comprised concrete over granular strata with brick as a minor constituent and ash within four locations (WS02, WS11, WS14 and WS23).

Made Ground topsoil was encountered within seven locations across the site (WS01, WS21, WS23, WS24, TP01, TP02 and TP03) which contained brick and ash as a minor constituent, furthermore Made Ground clay was encountered within five locations across the site (WS03, WS05, WS09, WS14 and WS23). A moderate hydrocarbon odour was noted within the soils in the vicinity of WS09, WS10 and WS11.

A backfilled mill race was encountered in WS02, the base of which was still intact at 1.75m bgl. The mill race was backfilled with granular Made Ground which included ash as a minor constituent. The former reservoir fed by the mill race was encountered in WS03, WS04 and WS05, Made Ground was between 0.65m and 1.10m deep and comprised granular and cohesive strata with ash and brick as minor constituents, no putrescible material was noted.

The soft landscaped area to the south of the site and the area beneath the existing building will require further investigation following demolition.

Asbestos was noted in the Preliminary Risk Assessment along the southern bank of the river, which may be related to trace asbestos fibres which were detected within the Made Ground topsoil from TP02.

No visual or olfactory evidence of impaction from interceptors on site was noted within the soils in close proximity. The interceptors were opened during the investigation and appeared to be separating solids out of the waste water from the nearby laboratory building.

pH values of above 11 were noted within Made Ground soils from WS10, WS12, WS14 and WS16 which are all in the vicinity of the derelict mill buildings. There is no clear source for this within the soils, and is likely due to historic industrial uses on the site. These soils are near the surface and pose a risk to site end users as soft landscaping is proposed within plots in these areas.

Heavy Metals

No elevated heavy metal concentrations were detected across the site for residential with plant uptake end use.

Speciated Polycyclic Aromatic Hydrocarbons (PAHs)

Elevated PAH concentrations were detected within four locations across the site (WS02 at 1.0m, WS18 at 0.5m, WS21 at 0.4m and WS28 at 0.5m), ash was noted within the samples from WS02 and WS21 which is likely to be the source of elevated concentrations. Concentrations of Benzo(b)fluoranthene were only marginally elevated within samples from WS18 and WS28.

Statistical Analysis Made Ground – PAHs

Statistical analysis was undertaken using the total concentrations for the Made Ground. The aim of statistical analysis is to demonstrate suitability for reuse, therefore the Null Hypothesis is that the level of contamination (in the land of interest) is the same as, or higher than, the Critical Concentration and the Alternative Hypothesis is that the level of contamination is lower than the Critical Concentration. Therefore, if the Null Hypothesis is rejected with a high degree of confidence then the Alternative Hypothesis is likely to be true indicating that contaminant concentrations are low relative to the Critical Concentration and that, potentially, the land is suitable for use. The results of the statistical analysis are presented in Appendix 8 and are summarised in the points below:

- The statistical analysis for benzo(a)pyrene shows that the Upper Confidence Limit (1.52mg/kg) is less than the Critical Concentration (2.2mg/kg) with an evidence level of 98%, meaning that the Null Hypothesis is rejected with a high degree of confidence. Therefore, despite the elevated benzo(a)pyrene concentrations within two samples of Made Ground, the Made Ground across the site as a whole is reusable based on the concentrations of benzo(a)pyrene that have been recorded. Furthermore, significant mixing and dilution of these concentrations will occur during the site strip and storage of the Made Ground which will reduce localised anomalous results.

- The statistical analysis for dibenz(ah)anthracene shows that the Upper Confidence Limit (0.23mg/kg) is less than the Critical Concentration (0.24mg/kg) with an evidence level of 96%, meaning that the Null Hypothesis is rejected with a high degree of confidence. Therefore, despite the elevated dibenz(ah)anthracene concentrations within two samples of Made Ground, the Made Ground across the site as a whole is reusable based on the concentrations of dibenzI(ah)anthracene that have been recorded. Furthermore, significant mixing and dilution of these concentrations will occur during the site strip and storage of the Made Ground which will reduce localised anomalous results.

- The statistical analysis for benzo(b)fluoranthene shows that the Upper Confidence Limit (2.10mg/kg) is less than the Critical Concentration (2.60mg/kg) with an evidence level of 97%, meaning that the Null Hypothesis is rejected with a high degree of confidence. Therefore, despite the elevated benzo(b)fluoranthene concentrations within four samples of Made Ground, the Made Ground across the site as a whole is reusable based on the concentrations of benzo(b)fluoranthene that have been recorded. Furthermore, significant mixing and dilution of these concentrations will occur during the site strip and storage of the Made Ground which will reduce localised anomalous results.

Total Petroleum Hydrocarbons (TPH)

Elevated aliphatic and aromatic TPH concentrations within the diesel range were noted within WS09 at 0.5m and 1.0m / WS11 at 1.0m and 1.5m bgl. A moderate hydrocarbon odour was noted within WS09, WS10 and WS11 which is in the vicinity of a former underground diesel storage tank. Some of the concentrations are significantly elevated at over ten times the screening value. No elevated concentrations of Benzene, Toluene, Ethylbenzine or Xylene (BTEX) were detected across the site.

Hydrocarbon contamination was limited to an area of approximately 25m^2 in the vicinity the former diesel UST noted on the Preliminary Development Constraints Plan 19271 02. No fuel derived hydrocarbons were observed or recorded within soils across the remainder of the site, including free phase.

Contaminated soils extended to c.1.00 – 1.50m bgl. The interpretation undertaken by the laboratory indicates that degraded diesel is responsible for the elevated concentrations. Elevated concentration were noted within the vapour range (>C10 – C12) within WS09 and WS11 at between 0.50m and 1.50m bgl.

Asbestos in Soils

Asbestos was detected within five samples (WS13 at 0.5m, WS16 at 0.3m, WS18 at 0.5m, WS19 at 0.5m and TP02 at 0.1m) of the total twenty tested from across the site. Chrysotile was detected within four samples and was determined to be trace within samples from WS13, WS16, and TP02, concentrations were marginally above trace within WS19 (0.002%). Amosite was noted within WS18 and WS19 and was determined to be trace within WS18 and marginally above trace within WS19 (0.002%). Chrysotile and amosite was noted within the sample from WS19.

Four samples containing asbestos relate to sand or gravel Made Ground underlying the concrete slabs in the eastern part of the derelict mill area as highlighted on the Contamination Plan 19271 05. One sample of Made Ground topsoil from TP02 to the south of the River Oughton also contained trace asbestos.

Southern Area

Minimal coverage was obtained in the southern area of the site which is indicated by the proposed development plan to become public open space. Two samples of Made Ground topsoil were tested for a range of Contaminants of Concern (COCs) as detailed in Section 4.4.

No elevated concentrations of heavy metals or PAHs were detected within either sample.

Trace quantities of chrysotile asbestos was detected within the sample tested from TP01 at 0.10m bgl.

Areas of concern are shown on the Contamination Plan 19271 05.

7.3 Geo-Environmental Testing Results - Groundwater

Six samples of groundwater were taken from WS06, WS09, WS17, WS18, WS25 and WS29 and were tested for the same suite of determinands as the soils. Samples from WS06, WS09 and WS29 were selected as they

are closes to the former UST, the sample from WS17 was selected as it is adjacent to the boiler house and between the former UST and River Oughton, WS18 was selected due to the proximity to the electricity substation and WS25 was selected as it is up gradient of the former UST, to determine if groundwater migrating from off site is contaminated.

The implementation of the Water Framework Directive (WFD) is to protect and enhance the quality of groundwater and groundwater-dependent ecosystems. The objective of the WFD requires all groundwater bodies (GWBs) are of 'good' status in terms of water quality. This status is based on thresholds for the chemical constituents of groundwater and their impact on ecosystems. Preventing pollution is by far the most sustainable and cost-effective way of maintaining good groundwater quality. The EA are committed to the 'prevent or limit' approach reflected in EU and domestic legislation.

Priority is under the Water Framework Directive to protect water supplies intended for human consumption and ensure protection of groundwater quality that supplies dependent ecosystems. After first guidance in 1992 the following significant guidance has been introduced:

- Water Framework Directive (2000/60/EC) and the Water Act 2003.
- The State of Groundwater in England and Wales 2006.
- Second phase of the environmental permitting regime in 2010 replacing the Groundwater Regulations (1999, 2009).
- Groundwater Daughter Directive.

Pollutants can be divided into those that break down easily (degradable pollutants) and those that do not (non-degradable pollutants). The Water Framework Directive introduced the concept of 'hazardous substances' and 'non-hazardous pollutants', which replaced the previous List I and List II of substances considered to pose the greatest threat to the environment.

- *Hazardous substances* are the most toxic and must be prevented from entering groundwater. Substances in this list may be disposed of to the ground, under a permit, but must not reach groundwater. They include pesticides, sheep dip, solvents, hydrocarbons, mercury, cadmium and cyanide.
- *Non-hazardous pollutants* are less dangerous and can be discharged to groundwater under a permit but must not cause pollution. Examples include sewage, trade effluent and most wastes. Non-hazardous pollutants include any substance capable of causing pollution and the list is much wider than the previous List II of substances. For example, nitrate is now a non-hazardous pollutant whereas before it was not a List II substance.

Polluting substances in groundwater can occur as a gas (gaseous phase) or dissolved in water (aqueous phase), or as a non-aqueous phase liquid (NAPL). Some pollutants include substances that dissolve readily in water. These are said to have high solubility; an example is MTBE. Substances that have low solubility (such as oil) are referred to as non-aqueous phase liquids (NAPLs). NAPLs behave differently in groundwater depending on whether they are lighter or heavier than water. Light non-aqueous phase liquids (LNAPLs) may float on the water table whereas dense non-aqueous phase liquids (DNAPLs) may sink through the aquifer until they reach an impermeable layer. They may then generate plumes of contamination. In both cases, the slowly dissolving pollutant may form a plume of dissolved contamination which moves with the groundwater flow.

A table summarising the groundwater testing results is presented below:

Metals				
Contaminant	Range of Results (ug/l unless stated)	EQS Screening Value (ug/l)	Number of Exceedances	Locations of Exceedances
Arsenic	<2.5 – 5.5	50	0	-
Cadmium	<0.5	5	0	-
Chromium	<1.5	50	0	-
Hexavalent Chromium	<0.006	12	0	-
Copper	<7	20	0	-
Lead	<5	50	0	-
Mercury	<1	1	0	-
Nickel	<2 – 9	50	0	-
Selenium	<3	10*	0	-
Zinc	<3 – 5	3000	0	-
Polycyclic Aromatic Hydrocarbons (PAHs)				
Contaminant	Range of Results (ug/l unless stated)	EQS Screening Value (ug/l)	Number of Exceedances	Locations of Exceedances
Benzo(a)pyrene	<0.016 – 0.170	0.00017	1	*WS17*
Indeno(123cd)pyrene	<0.011 – 0.103	See Note 1	-	-
Benzo(ghi)perylene	<0.011 – 0.078	See Note 1	-	-
Benzo(b)fluoranthene	<0.01 – 0.20	See Note 1	-	-
TPH CWG – Aliphatics				
Contaminant	Range of Results (ug/l unless stated)	WHO (ug/l)	Number of Exceedances	Locations of Exceedances
>C5-C6	<10	10	0	-
>C6-C8	<10	10	0	-
>C8-C10	<10 – 601	30	1	*WS09*
>C10-C12	<5 – 10,678	300*	2	*WS09, WS17*
>C12-C16	<10 – 36,770	300*	2	*WS09, WS17*
>C16-C35	<10 – 62,140	300*	2	*WS09, WS17*
Total aliphatics C5-35	<10 – 110,189	-	-	
TPH CWG – Aromatics				
Contaminant	Range of Results (ug/l unless stated)	EQS Screening Value (ug/l)	Number of Exceedances	Locations of Exceedances
>C5-EC7	<10	10	0	
>EC7-EC8	<10	10	0	
>EC8-EC10	<10 – 20	30	1	*WS09*
>EC10-EC12	<5 – 4716	90*	2	*WS09, WS17*
>EC12-EC16	<10 – 25,510	90*	2	*WS09, WS17*
>EC16-EC21	<10 – 30,860	90*	2	*WS09, WS17*
>EC21-EC35	<10 – 10,200	90*	2	*WS09, WS17*
Total aromatics C5-35	<10 – 71,306	-	-	
Total aliphatics and aromatics(C5-35)	<10 – 181,495	-	-	
MTBE	<5		0	
Benzene	<5	10	0	
Toluene	<5	74	0	
Ethylbenzene	<5	30	0	
m/p-Xylene	<5 – 8	30	0	
o-Xylene	<1 – 12	30	0	
Others				
Total Alkalinity as CaCO3	664 mg/l – 14,860 mg/l			

Dissolved Organic Carbon	<2 mg/l – 30 mg/l
Total Organic Carbon	<2 mg/l – 42 mg/l

Note 1 - For the group of priority substances of polyaromatic hydrocarbons (PAH) (No 28), the biota EQS and corresponding AA-EQS in water refer to the concentration of benzo(a)pyrene, on the toxicity of which they are based. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene must be monitored for comparison with the biota EQS or the corresponding AA-EQS in water.

** A list of potentially applicable water quality standards is given in Environment Agency (2006b). In the absence of EQS values, World Health Organisation (WHO) Guide Values for Drinking Water have been used.*

All of the PCBs tested for were recorded at concentrations below the laboratory limits of detection.

7.4 Tier I Quantitative Risk Assessment - Groundwater

Controlled Waters Setting

Strata underlying the majority of the site consists of Made Ground over Alluvium deposits of Sand, Silt and Clay underlain by the Lowestoft Formation consisting of Clay. In the north of the site Made Ground is underlain by Glaciofluvial Sand and Gravel deposits. Groundwater was frequently encountered within the Alluvium deposits across the site, with the likely flow direction being to the south east toward the River Oughton which flows through the site.

The Alluvium and Glaciofluvial Deposits are both considered to be Secondary A Aquifers. The bedrock was not encountered during this investigation, however it is determined to be and Unproductive Aquifer and is therefore no considered to be a sensitive receptor. The closest recorded groundwater abstraction is 900m north of the site. The site is not within a Source Protection Zone.

The River Oughton crossing the site is indicated to be a secondary river which flows into the River Purwell and later becomes the River Hiz as it continues north. The nearest surface water abstraction is from the River Hiz 464m north east of the site.

During the Ground Investigation groundwater was encountered at depths of between 1.0m and 3.45m bgl across the site, which is considered to be in continuity with the River Oughton. This should be confirmed by carrying out surveying of the boreholes and the watercourse.

The contaminants tested for have been compared to EQS screening levels given the close proximity of the River Oughton on site.

Geo-Environmental/Chemical Testing Results

Significantly elevated levels of aliphatic hydrocarbons were recorded in WS09 and WS17 at a concentrations of up to 601ug/l, 10,678ug/l, 36,770ug/l and 62,140ug/l when compared to the EQS and WHO guideline values of 30ug/l (EQS: >C8-C10) and 300ug/l (WHO: >C10-C12, >C12-C16 and >C16-C35) for CWG banding. Concentration were generally lower within the groundwater sample collected from WS17.

Furthermore significantly elevated levels of aromatic hydrocarbons were recorded within WS09 and WS17 at concentrations of up to 20ug/l, 4716ug/l, 25,510ug/l, 30,860ug/l and 10,200ug/l when compared to the EQS and WHO guideline values of 30ug/l (EQS: >EC8-EC10) and 90ug/l (WHO: >EC10-EC12, >EC12-EC16 and >EC16-EC35) for CWG banding. Again, concentrations were lower within WS17. This was interpreted as being degraded diesel by the Geo-Environmental testing results.

Based on the concentrations of hydrocarbons recorded in WS09 and WS17, the groundwater that is in hydraulic continuity has been impacted by hazardous substances in the form of fuel derived hydrocarbons within the soils. Interpretation of the groundwater results indicates that the source of the elevated hydrocarbon results is degraded diesel – although the USTs have been removed, the source of the impacted soils and groundwater is the historic USTs. The source of the contamination plume in the groundwater is subsequently the degraded diesel encountered in the Made Ground in WS09, WS10 and WS11. A good coverage of the area surrounding the USTs was achieved and the Contamination Plan 19271 05 indicates the exploratory holes where hydrocarbon odours were detected in the soils and the postulated hydrocarbon groundwater plume.

Contamination stemming from residual degraded diesel within the soils in the vicinity of the former UST is highly localised to the soils in this area. No hydrocarbon contamination was noted within any soils across the remainder of the site. Furthermore no free phase was noted during the investigation.

Other Contaminants

Within WS09 and WS17, slightly elevated concentrations of a limited number of speciated PAHs were encountered. Using Benzo(a)Pyrene as a marker, the source of the elevated concentrations is considered to be ash within the Made Ground as Benzo(a)Pyrene is indicative of incomplete combustion of solid fuels.

Surface Waters

There is a potential risk to the River Oughton passing through the site from hydrocarbons present within the groundwater, in particular in the vicinity of WS09. It is recommended that surface water samples are collected from the River Oughton upstream and downstream of where the contamination was encountered within WS09 and WS17.

7.5 Permanent Ground Gases

Gas Monitoring Results

One ground gas monitoring visit has been carried out to date on 23 December 2019. No concentrations of methane (CH_4) have been recorded within the boreholes however, detectable levels of carbon dioxide (CO_2) were recorded within the standpipes, up to a maximum level of 0.4%v/v together with associated oxygen (O_2) concentrations of 19.0%v/v.

In addition, flow rates of between <0.1l/hr and 1.0l/hr have been recorded during the monitoring period. The visit was completed during a period of steady atmospheric pressure which ranged between 1000mb and 1003mb.

Groundwater was encountered within the standpipes during the monitoring period from 0.29m to 2.83m bgl. No groundwater was encountered within WS02.

Key sources targeted by the ground gas monitoring installations include the backfilled mill race, backfilled reservoir and the former UST.

Characterisation of the Gas Screening Value (GSV)

In accordance with CIRIA Report C665, November 2007 it is felt that an adequate risk assessment can be undertaken based on the following limiting factors:

- The proposed development has been considered as high sensitivity based on the site being proposed residential houses with garden areas (Table 5.5 – Typical/Idealised frequency and period of monitoring, after Wilson et al, 2005).

- The risk associated with the generation potential of a source is considered as Low, (assessment based on the environmental setting as well as ground gas results collected).
- Monitoring over a minimum of three months with six recorded readings (Table 5.5 – Typical /idealised frequency and period of monitoring after Wilson et al, 2005).
- Low flow rates have been recorded (Table 8.5 – Modified Wilson & Card classification). For this site, the monitoring visit undertaken correlated with a steady atmospheric pressure trend.

Based upon the results recorded, in accordance with CIRIA Report C665, the risk to the site from ground gases has been assessed by converting the results to gas screening values (GSVs), calculated by multiplying the typical maximum gas concentrations with the recorded maximum positive flow rates. In addition, individual "hazardous gas flow rates" (Qhg) have been derived for each monitoring point. As no levels of methane have been recorded a GSV for carbon dioxide only has been calculated.

GSV (l/hr) = max borehole flow rate (l/hr) x max gas concentration (%)

For this interim assessment, the maximum recorded concentration of carbon dioxide of 0.4%v/v has been used with a gas flow rate of 1.0l/hr to calculate the GSV.

Carbon Dioxide GSV = 0.004 (0.4%) x 1.0 = 0.004 l/hr

Assessment

In order to assess the ground gas regime beneath the site and the need to incorporate ground gas precautions, guidance was taken from CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings'.

Based on the site being developed with low-rise housing, the Boyle and Witherington, 2006 method has been used to carry out the assessment. This is a risk-based approach that is designed to allow an identification of gas protection for a low-rise housing development by comparing the measured gas emission rates to generic 'traffic lights' scenarios. The traffic lights include 'typical maximum concentrations' and are provided for initial screening purposes and risk-based gas screening values for consideration in situations where the typical maximum concentrations are exceeded.

When considering the results, in accordance with CIRIA C665 (Situation B – Low-rise housing with a ventilated underfloor void (min 150mm) and Table 8.7 – NHBC Traffic light system for 150mm void) it can be seen that the GSV value for carbon dioxide is below the assessment GSV of <0.78l/hr and falls within the Green traffic light zone.

NHBC - Green Traffic Light

At this stage, a negligible gas regime has been identified and no gas precautions are required. This will be confirmed on completion of the gas monitoring programme. An extract of the table is presented below.

Traffic Light Classification	Methane [1]		Carbon Dioxide [1]	
	Typical Maximum Concentration [3] (%v/v)	Gas Screening Value [2,4] (l/hr)	Typical Maximum Concentration [3] (%v/v)	Gas Screening Value [2,4] (l/hr)
Green	1	**0.16**	5	**0.78**
Amber 1	5	**0.63**	10	**1.56**
Amber 2	20	**1.56**	30	**3.10**
Red				

Notes:

1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter will be the decider as to what Traffic Light is allocated;
2. Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, as defined in Wilson and Card (1999), which is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentrations can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

In addition due to the potential for ground bearing floor slabs, guidance was taken from CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings'. Based on the site being developed with residential homes with ground bearing floor slabs, the Wilson and Card method has been used to carry out the assessment.

When considering the results, in accordance with CIRIA C665 (Section A Development and Table 8.5 – Modified Wilson and Card Classification) it can be seen that the GSV value for carbon dioxide is below the assessment GSV of <0.07l/hr and falls within Characteristic Situation 1 resulting in no gas protection measures being required.

Characteristic Situation 1

An extract of the table is presented below.

Modified Wilson and Card classification

	Characteristic situation (CIRIA R149)	Comparable classification in DETR *et al* (1999)	Risk classification	Gas screening value (GSV) (CH_4 or CO_2) (l/hr)[1] Threshold	Additional factors	Typical source of generation
	1	A	Very low risk	<0.07	Typically methane <1 % and/or carbon dioxide <5 %. Otherwise consider increase to Situation 2	Natural soils with low organic content "Typical" made ground
	2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/organic content. "Typical" made ground
	3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
	4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking – susceptible to flooding, completed landfill (WMP 26B criteria)
	5	E	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
	6	F	Very high risk	>70		Recent landfill site

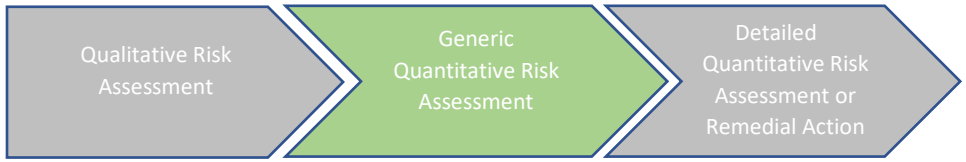
Radon Gas

In accordance with BRE 211 'Radon Guidance on Protective Measures for New Buildings' 2015 and UKRadon the site falls in an area where <1% of homes are affected by radon gas, therefore no radon precautions would be required.

7.6 Revised Pollution Linkage Assessment

A revised pollution linkage assessment has been undertaken in accordance with CLR11 and CIRIA C552 to identify any realistic pollution linkages in order to quantify the risks to human health and controlled waters. The risk classification has been estimated in accordance with the CIRIA C552 assessment criteria outlined in Appendix 9. An Illustrative Revised CSM is presented as Plan No. 19271 06.

Human Health Pollution Linkage Assessment



- The table below represents the second stage in the land quality risk assessment process - **the Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

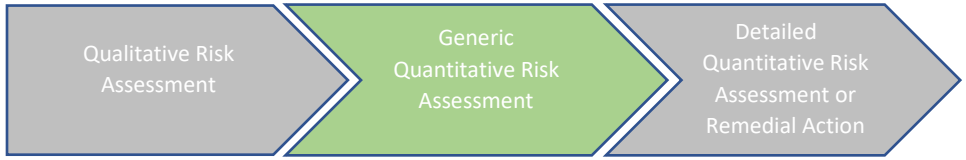
Conceptual Site Model					*Generic Quantitative Risk Assessment*	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	*Rationale and Action*
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Likely	Medium	Moderate	*Pollution Linkage 1 refers to proposed site users coming into contact with contaminated soils on the site. Made Ground is present across the entire site from ground level to a maximum depth of 1.75m bgl. Elevated PAHs were noted within four samples of Made Ground from across the site and are likely a result of ash within the Made Ground strata.* *Asbestos was detected within five samples of Made Ground from across the site and was confirmed to be trace in all but one sample from WS19 which was quantified as 0.002 mass %. Asbestos is generally associated with the sand and gravel Made Ground beneath the concrete covering the site, however one sample from TP02 at 0.1m bgl detected trace concentrations of asbestos within the Made Ground topsoil. The Joint Industry Working Group (JIWG) Receptor Ranking Tool indicates that the overall risk from asbestos to site end users is considered to be very low. The JIWG Receptor Ranking is presented win Appendix 9.* *A moderate hydrocarbon odour was noted within the soils in the vicinity of WS09, WS10 and WS11 which were drilled in the vicinity of a former diesel UST. Geo-Environmental testing has revealed elevated TPHs within samples from WS09 and WS11 at depths of between 0.5m and 1.5m bgl*

Conceptual Site Model						*Generic Quantitative Risk Assessment*
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	*Rationale and Action*
						No PCBs were detected by the Geo-Environmental testing. *The proposed development is for low rise housing with associated soft landscaped gardens and infrastructure. Therefore, a pollution linkage exists within garden areas of plots, specifically in the vicinity of the former UST. Furthermore, large areas of the site were not investigated due to the presence of the existing mill buildings, therefore additional investigation following demolition is required.* *There is considered to be a plausible pollution linkage and supplementary Ground Investigation/remedial works will be required.*
PL2	Contaminated Soils	Inhalation of vapour.	Likely	Medium to Severe	Moderate to Low	*Pollution linkage 2 refers to hydrocarbon vapours migrating into confined spaces within the proposed development. Elevated concentrations of TPHs within the volatile range were detected in the vicinity of WS09, WS10 and WS11 where a former UST was located. Significant hydrocarbon contamination has been detected in a very localised area, therefore a small number of plots in the vicinity will be at risk of migration of vapours into confined spaces within the dwellings and remediation to remove contaminated soils is recommended. The area affected is extremely localised, covering an area of approximately 25m^2 and likely only affecting 2 – 3 plots.* *With the exception of localised hydrocarbon contamination, the development is not likely to be affected by vapours migrating into confined spaces A pollution linkage is considered to exist in a very localised area of the site.*
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	*Pollution Linkage 3 relates to contamination on the subject site affecting adjacent site users. The site is currently covered with hardsurfacing, limiting the potential*

Conceptual Site Model						*Generic Quantitative Risk Assessment*
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	*Rationale and Action*
						for contaminated dusts to spread to adjacent sites. Mobile hydrocarbon contamination has been detected within soils, however the contamination is isolated to an area where a former UST was located near the centre of the large site and it is not considered likely that contamination will migrate off-site as clay strata will inhibit lateral migration of contaminants. *Therefore, no viable pollution linkage is considered to exist.*
PL4	Contaminated Soils	Attacking potable water supply pipe.	Likely	Medium	Moderate	*Pollution Linkage 4 refers to the possible contaminants permeating potable water pipes and consumption by the future residents of the tainted water supply. Contaminated Made Ground is present at the likely installation depth of the potable water supply pipes across the site. Localised hydrocarbon contamination was detected within soils in the vicinity of a former diesel UST, therefore currently locally a pollution linkage is considered to exist.* *A local water company risk assessment is required prior to construction to advise on the level of protection required for the potable water supply.*
PL5	Ground Gas	Migration and accumulation of ground gas in internal spaces.	Unlikely to Low Likelihood	Medium to Severe	Moderate to Low	*Deep Made Ground was not generally encountered at the site. Furthermore, putrescible material was not noted within any of the window sample boreholes and trial pits. Preliminary monitoring undertaken to date indicates that the site falls within NHBC Green Traffic Light Zone and no gas protection measures will be required. This will be confirmed upon completion of the ground gas monitoring.*

Conceptual Site Model						*Generic Quantitative Risk Assessment*
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	*Rationale and Action*
						The site is not within an area requiring radon precautions within foundations.

Controlled Waters Pollution Linkage Assessment



- The table below represents the second stage in the land quality risk assessment process – **Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model						*Generic Quantitative Risk Assessment*
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	*Rationale*
PL6	Contaminated Soils	Impaction of groundwater from soil contamination (diffuse and point). Impaction of groundwater from groundwater plume.	Likely	Medium	Moderate to Low	*Made Ground was encountered across the site from ground level to a maximum depth of 1.75m bgl. Geo-Environmental testing has revealed that fuel derived hydrocarbon contamination exists within the groundwater in the vicinity of WS09 and WS17* *Geological maps indicate that the site is underlain by Alluvium and Glaciofluvial Sand and Gravel, this is further underlain by the Lowestoft Formation which comprises Clay. The bedrock underlying the site is the Gault Formation which comprises Mudstone. The superficial Alluvium deposits have been impacted by hydrocarbons as shown on the Contamination Plan 19271 05.* *The site is not within 500m of a SPZ and is not considered a sensitive resource, the nearest potable groundwater abstraction is 900m north of the site which is sufficient to allow considerable attenuation. Groundwater was encountered within the Sand and Gravel deposits at 1.10m bgl, the full thickness of the Sand and Gravel was not determined due to the density of the soils.* *The bedrock is considered unproductive as an aquifer, however the Secondary A Aquifer has been impacted by hydrocarbon contamination from the former UST on site. However the UST was previously removed and contamination is considered to be*

Conceptual Site Model						*Generic Quantitative Risk Assessment*
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	*Rationale*
						residual within very localised soils. Therefore, a minor pollution linkage is considered to exists and remediation is required.
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Likely	Severe	Moderate	*Pollution Linkage 7 refers to the impaction of The River Oughton which crosses the site from contaminated soils and groundwater.* *Geo-Environmental testing has revealed that the groundwater which is considered to be in continuity with the River Oughton is contaminated with hydrocarbons in two locations (WS09 and WS17). Interpretation of the results indicates that the source of contamination is degraded diesel. Contamination is considered to be highly localised to the impacted soils in the vicinity of the former diesel UST. Removal of the affected soils is recommended as a form of remediation.* *It is considered likely that the groundwater will flow toward the River Oughton. The Alluvium deposits underlying the site are a mix of granular and cohesive soils, which will inhibit migration of groundwater to the river, furthermore areas of the river are channelled, which will stop migration of groundwater into the river.* *The former diesel UST in the vicinity of WS09 is considered to be the source of contamination in this area, however no obvious source exists in the vicinity of WS17 as the soils appeared to be clean. It is possible that the source of contamination is the nearby boiler room, which will be investigated following demolition of the existing buildings.* *In conclusion, a realistic pollution linkage is considered to exist.*

7.7 Outline Remedial Strategy

Cover System

The proposed development is for low rise housing with associate soft landscaped garden areas. Due to the presence of asbestos in the eastern portion of the disused mill area a 500mm clean cover system with an additional 100mm hard dig layer should be adopted within the proposed soft landscaped gardens in the area determined to be affected by asbestos within the soils, as indicated on the Contamination Plan 19271 05. As a minimum the topsoil should be 150mm thick.

For the remainder of the site a minimum of 150mm topsoil should be provided within garden areas of proposed plots where natural strata is encountered at formation level and 300mm topsoil/ subsoil where Made Ground is encountered at formation level.

Where public open space is proposed in the south of the site a 500mm clean cover system with an additional 100mm hard dig layer is recommended due to the presence of asbestos within the topsoil. Alternatively the source of asbestos can be removed and a nominal cover system of 150mm topsoil should be placed where natural strata is encountered at formation level and 300mm topsoil/ subsoil where Made Ground is at formation level.

Cover layer requirements may change based on what is encountered in inaccessible areas following demolition of the mill buildings and supplementary investigation.

The depth and chemical suitability of the cover system should be validated after placement.

Hydrocarbon Contamination - Soils

Significant hydrocarbon contamination was detected within soils in the vicinity of WS09, WS10 and WS11 to depths of up to 1.5m bgl. This contamination should be chased out and excavated and stockpiled separately in a sealed bund before being classified and disposed of at a suitable waste site. The area of affected soils is indicated on the Contamination Plan 19271.

A Detailed Quantitative Risk Assessment (DQRA) is required to determine the Remedial Target Values prior to remediation being undertaken.

Hydrocarbon Contamination - Groundwater

Elevated contaminants have been recorded within the groundwater of WS09 and WS17, in particular hydrocarbons associated with degraded diesel. The source is likely to be the impacted soils from the previous Diesel UST which was located off the south west corner of the former flour mill in the central area of the site. Therefore, it is proposed to remove the impacted soils which is the source in the vicinity of WS09, WS10 and WS11 to prevent any further impaction of the groundwater by the hazardous substance. The groundwater plume is shown on the Contamination Plan 19271 05.

Remediation will comprise the removal of any free product during excavation of soils as a minimum, the contamination is a LNAPL and will exist at the surface of the groundwater. As the source of hydrocarbons will be removed, remediation of dissolved phase hydrocarbons by natural attenuation is proposed in accordance with the Environment Agency 'Guidance on the Assessment and Monitoring of Natural Attenuation of Contaminants in Groundwater' 2000. Additional groundwater monitoring will be undertaken post remediation as validation. The remedial target values will be agreed with the relevant regulators.

Surface Waters
Testing of the surface water from the River Oughton is currently underway to determine if the surface water has been impacted.

Permanent Ground Gas
Ground gas monitoring to date indicates that the site falls within the NHBC Green Traffic Light Zone and ground gas precautions will not be required within the proposed dwellings at the site, however this will be confirmed within the final ground gas risk assessment.

A vapour resistant membrane may be required within approximately two plots in the vicinity of the former diesel UST to protect against any potential residual contamination following remediation of the area. This will be confirmed upon validation of the hotspot removal.

General
Further remedial actions may be required which will be determined by investigation of inaccessible areas post demolition.

A watching brief is recommended during future ground works for any previously unseen contamination. If identified, work should cease in that area and advice sought from Groundtech Consulting Limited.

Approval from the regulators should be obtained prior to the development commencing to avoid any delays at the construction stage.

7.8 Asbestos in Soils

The presence of asbestos within the ground will require, a safe system of work to be set up on site to deal with the asbestos risk from the made ground. This may include but be not limited to:

- The use of qualified personnel where required.
- Careful segregation of stockpiles on site.
- Defining transport routes.
- Cleaning down of machinery in designated areas.
- Decontamination unit for ground workers.
- Damping down of soils to prevent dust migration.

All such works will need to be agreed with the regulatory bodies (HSE, LA).

The JIWG decision support tool for CAR2012 work categories indicates that the combined hazard ranking to construction workers from asbestos within soils is considered to be low. The work is considered to be non-licenced. Basic precautions should be taken including EN149 type FFP3 disposable masks, manual/ localised dust suppression and localised and basic personal decontamination facilities. The JIWG decision tools are presented in Appendix 10.

7.9 Health and Safety - Construction and Ground Workers

During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

Pollution Linkage Ref	Potential Source	Pollution Linkage	Likelihood	Severity	Level of Risk
PL8	Made Ground	Ingestion, direct contact, inhalation of dusts.	Likely	Medium	Moderate
PL9	Asbestos	Ingestion, direct contact, inhalation of dusts.	Unlikely	Medium	Low

General Made Ground is not considered to be significantly contaminated, however soils in the vicinity of WS09, WS10 and WS11 have relatively high concentrations of TPHs, therefore extra care should be taken to ensure the correct PPE is used when excavating in this area. General PPE including protective gloves should be used at all times when handling Made Ground soils at the site. Furthermore, if work is carried out during hot/dry weather dust suppression may be required when excavating granular Made Ground to prevent the generation of potentially harmful dusts. The risk should be communicated to site workers through inductions and information boards.

General guidance on these matters is given in the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Redevelopment of Contaminated Land". In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

7.10 Waste Classification by Assessment

We have reviewed the testing results and inputted them into the HazWasteOnline model which allows users to code and classify waste as defined in the EWC (European Waste Catalogue 2002) based on EC Regulation 1272/2008 on the Classification, labelling and packaging of substances and mixtures (CLP) and latest Environment Agency guidance (WM3 "Guidance on the classification and assessment of waste (1st edition 2015)-Technical Guidance").

This is a useful tool as waste producers have the legal responsibility to classify any waste they produce.

Thirty-seven samples of Made Ground were screened for a selection of determinands detailed in Section 5 and the results input into the HazWasteOnline program. Eight samples are considered to be hazardous, and twenty-nine samples are considered to be non-hazardous, a summary table of results is given below. The full HazWasteOnline report can be found in Appendix 11.

Reference	Depth (m)	Strata Type	Classification by Assessment
WS01	0.50	Made Ground	Non-hazardous

WS01	1.00	Natural Strata	Non-hazardous
WS02	1.00	Made Ground	Non-hazardous
WS03	0.50	Made Ground	Non-hazardous
WS03	1.10	Natural Strata	Non-hazardous
WS05	1.00	Made Ground	Non-hazardous
WS06	0.50	Made Ground	Non-hazardous
WS08	0.50	Made Ground	Non-hazardous
WS09	0.50	Made Ground	Hazardous
WS09	1.00	Made Ground	Hazardous
WS09	1.50	Made Ground	Non-hazardous
WS10	0.50	Made Ground	Hazardous
WS10	1.00	Made Ground	Non-hazardous
WS11	1.00	Made Ground	Hazardous
WS11	1.50	Made Ground	Hazardous
WS12	0.30	Made Ground	Hazardous
WS12	0.50	Natural Strata	Non-hazardous
WS13	0.50	Made Ground	Non-hazardous
WS14	0.50	Made Ground	Hazardous
WS16	0.40	Made Ground	Hazardous
WS17	0.60	Natural Strata	Non-hazardous
WS17	1.00	Natural Strata	Non-hazardous
WS18	0.50	Made Ground	Non-hazardous
WS19	0.50	Made Ground	Non-hazardous
WS19	1.00	Natural Strata	Non-hazardous
WS21	0.40	Made Ground	Non-hazardous
WS22	0.30	Made Ground	Non-hazardous
WS22	1.00	Natural Strata	Non-hazardous
WS23	0.10	Made Ground	Non-hazardous
WS24	0.40	Made Ground	Non-hazardous
WS25	0.40	Made Ground	Non-hazardous
WS25	1.00	Natural Strata	Non-hazardous
WS28	0.50	Made Ground	Non-hazardous
WS28	1.00	Natural Strata	Non-hazardous
WS29	0.50	Made Ground	Non-hazardous
TP01	0.05	Made Ground	Non-hazardous
TP02	0.10	Made Ground	Non-hazardous

Six samples are considered to be hazardous in the vicinity of WS09, WS10 and WS11, this is due to the presence of degraded diesel in the vicinity of the former UST. The hazardous properties include carcinogenic, mutagenic and corrosive. It is recommended that soils should be excavated and placed in a bunded stockpile separate from any other excavated materials on site for further classification prior to removal off site.

Two further samples from WS14 and WS16 are considered to be hazardous due to significantly high pH values of 11.85 and 11.88 respectively. The hazardous properties include carcinogenic, mutagenic and corrosive. Yellow brown gravelly sand in the vicinity of WS14 and black sandy gravel in the vicinity of these WS16 may be left insitu, however if the soils in this area require excavation, soil mixing will occur and likely dilute the pH value of the soils, therefore they may still be suitable for placement beneath hardstanding areas across the site.

Four samples of granular Made Ground from the central area of the site and one sample of Made Ground topsoil from the south of the site contain asbestos, however asbestos concentration have been determined to be below the hazardous limit of 0.1mass%, therefore the asbestos quantities do not affect the waste classification.

7.11 Waste Acceptance Criteria (WAC) Results

Waste Acceptance Criteria (WAC) testing was outside the scope of this investigation and the guidance given below is general.

The possibility of automatic inert classification of the natural soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing, this is the case if:

- *They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source) and*
- *There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other their disposal in other classes of landfill.*

Organic contaminated material was encountered during the investigation in the vicinity of WS09, WS11 and WS12 which has been classified as hazardous. Following excavation and stockpiling of the impacted soils, additional testing should be undertaken to determine if the soils will be accepted at a hazardous landfill or if they require treatment prior to landfill.

Materials should be segregated and where necessary sufficient time is allowed to further classify the material properly, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is recommended that where possible that the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route.

The reuse of soils on the site this should be done in accordance with the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE CoP). Any re-use scheme should be designed to minimise disposal costs.

After a cut and fill balance plan/volume calculation has been carried out, a U1 and T5 exemption could be registered. This will allow the use of the following soils without a waste permit or under Dow CoP MMP:

- 1,000 tonnes (*c.* 600m^3) of non-hazardous soil
- 5,000 tonnes (*c.* 3,000m^3) of natural sand and gravels.
- 50,000 tonnes (*c.* 25,000m^3) of bituminous material to be used in roadways.
- 5,000 tonnes (*c.* 3,000m^3) of crushed concrete / stone.

8.0 FINAL APPRAISAL

8.1 Land Quality

Gross hydrocarbon contamination was encountered within the soils in the vicinity of a former diesel UST, furthermore geo-environmental testing results have highlighted that hydrocarbons have impacted the groundwater in the vicinity of the former UST.

Elevated concentrations of PAHs were detected within four locations across the site, however statistical analysis was undertaken which reveals Upper Confidence Limit is below the Critical Concentration for all elevated PAHs. Therefore there is not considered to be a risk from PAH contamination.

Asbestos was detected within five samples from across the site. Asbestos was determined to be trace in all but one sample, where it was quantified as 0.002 mass%.

Based on the findings of the Ground Investigation the risk to site end users and groundwater is considered to be Moderate to Low and the risk to surface waters is considered to be Moderate.

Based on the lack of putrescible material encountered during the investigation and the initial ground gas monitoring results, the risk from ground gases is considered to be Moderate to Low, however a vapour resistant membrane may be required within plots in the vicinity of the former diesel UST. The site is not in an area requiring radon precautions within foundations. These recommendations will be confirmed upon completion of the ground gas monitoring program.

Geo-environmental testing results indicate that based on total concentrations, the majority of the soils across the site are considered to be non-hazardous. Soils excavated in the vicinity of the former UST are considered to be hazardous based on the TPH concentrations. A further two samples from WS14 and WS16 are considered to be hazardous based on high pH concentrations. Asbestos is below the hazardous threshold of 0.1%, therefore the presence of asbestos does not affect the classification.

Further investigation is required in inaccessible areas including the existing mill and office buildings on the site. Additional investigation is also required in the southern area of the site as only a limited number of locations were undertaken on the soft landscaping.

8.2 Ground Engineering

The type of foundations most suitable for the development varies across the site as detailed on the Foundation Zone Plan. Traditional Strip footings are most suitable in Zone 1 area in the north and east of the site, Controlled Modulus Columns or driven piles are most suitable in Zone 2 area in the central and west of the site.

Made Ground across the site generally exceeds 0.60m deep, therefore suspended floor slabs are recommended. If CMCs are the preferred foundation solution ground bearing floor slabs may be adopted subject to confirmation by a specialist vibro contractor.

Further investigation is required in previously inaccessible areas and deeper investigation is required where poor shallow ground conditions were encountered to obtain parameters for deep foundation design.

Soil percolation testing was not undertaken as part of this investigation, however the use of SuDS drainage is not likely to be feasible due to the presence of Clay beneath the majority of the site and the relatively high groundwater table.

8.3 Required Supplementary Investigation

The following further work is considered necessary to progress the site to construction phase:

Completion of gas monitoring programme.
Issue gas assessment.
Investigation in areas previously inaccessible.
Intrusive site investigations comprising Cable Percussive Boreholes to obtain parameters for deep foundation design.
Demolition Asbestos survey.
Design of Remedial Specification.
Confirmation of Remedial Specification with the Local Authority.
Tree survey by qualified arboriculturist.
Detailed foundation design and foundation schedule.
Confirmation of recommendations made within this report with the Local Authority.

9.0 RELEVANT INDUSTRY REFERENCES

British Standards Institution. *Investigation of Potentially Contaminated sites - code of practice*. BS 10175:2017.

British Standards Institution '*Code of Practice for Site Investigations*' BS 5930:2015

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Environment Agency & NHBC, 2000. R&D Publication 66. Guidance for the Safe Development of Housing on Land Affected by Contamination.

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CIRIA "*Asbestos in soil and made ground: a guide to understanding and managing risks*" C733 2014

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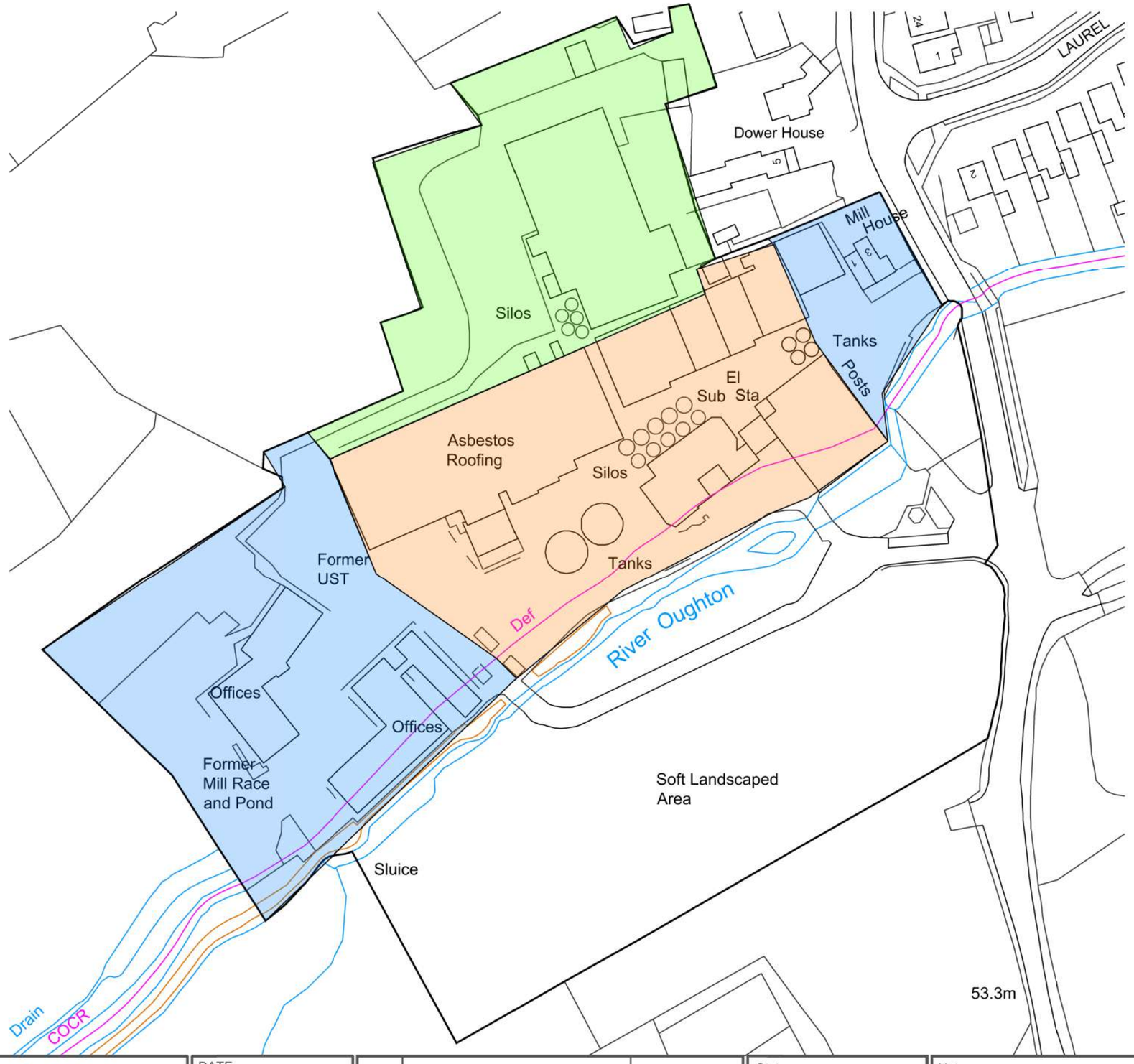
APPENDIX 1 - Plans



GROUNDTECH CONSULTING	CLIENT	DATE				Status	
	BOWMAN'S INGREDIENTS LTD	JANUARY 2020				Preliminary	
	PROJECT TITLE	SCALE				Draft	
	BOWMANS MILL, ICKLEFORD	NTS				Issued	●
	PLAN TITLE	PLAN NUMBER				For Comment	
	PROJECT LOCATION PLAN	19271 01	Rev.	Details	Date	Approved	

Notes

○ Location of the Site



GROUNDTECH CONSULTING

CLIENT	BOWMAN'S INGREDIENTS LTD
PROJECT TITLE	BOWMAN'S MILL, ICKLEFORD
PLAN TITLE	PRELIMINARY DEVELOPMENT CONSTRAINTS PLAN

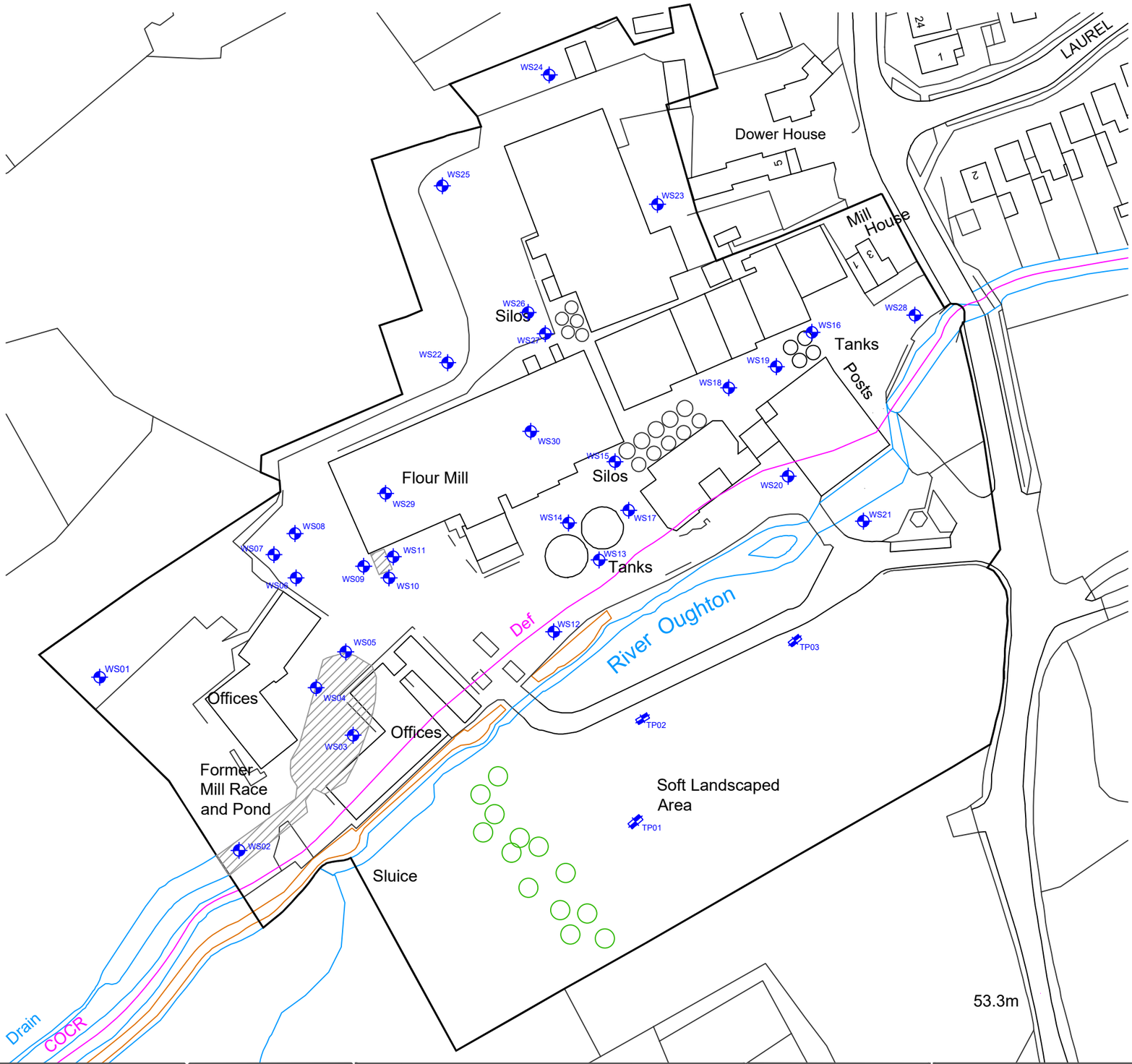
DATE	JANUARY 2020
SCALE	NTS
PLAN NUMBER	19271 02

Rev.	Details	Date

Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes

- Existing offices.
- Existing production plant.
- Derelict mill buildings.



GROUNDTECH CONSULTING

CLIENT	BOWMAN'S INGREDIENTS LTD
PROJECT TITLE	BOWMAN'S MILL, ICKLEFORD
PLAN TITLE	EXPLORATORY HOLE LOCATION PLAN
DATE	JANUARY 2020
SCALE	NTS
PLAN NUMBER	19271 03

Rev.	Details	Date

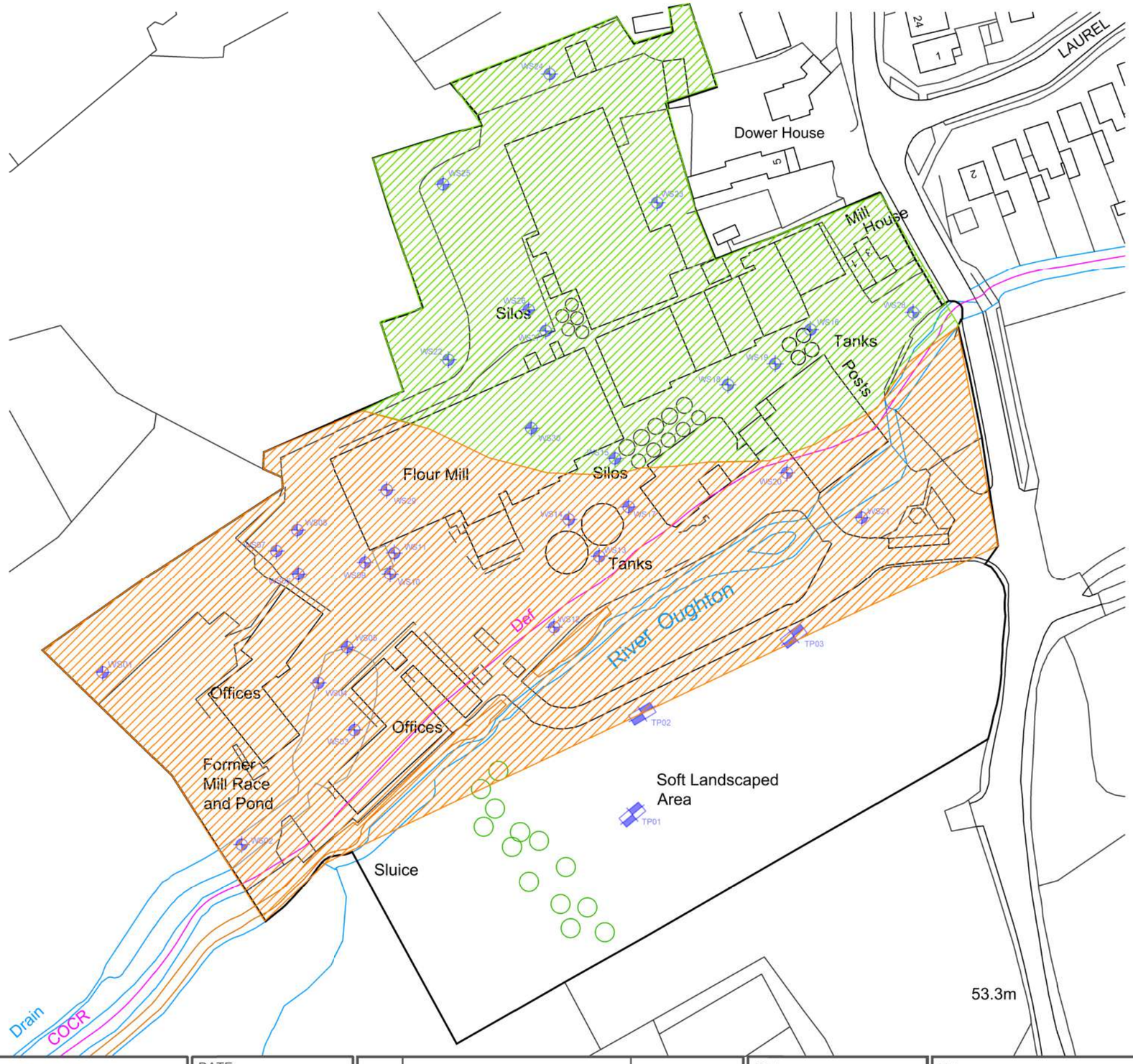
Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes

Window Sample Borehole Locations

Trial Pit Locations

-



GROUNDTECH CONSULTING

CLIENT	BOWMAN'S INGREDIENTS LTD
PROJECT TITLE	BOWMAN'S MILL, ICKLEFORD
PLAN TITLE	FOUNDATION ZONE PLAN
DATE	JANUARY 2020
SCALE	NTS
PLAN NUMBER	19271 04

Rev.	Details	Date

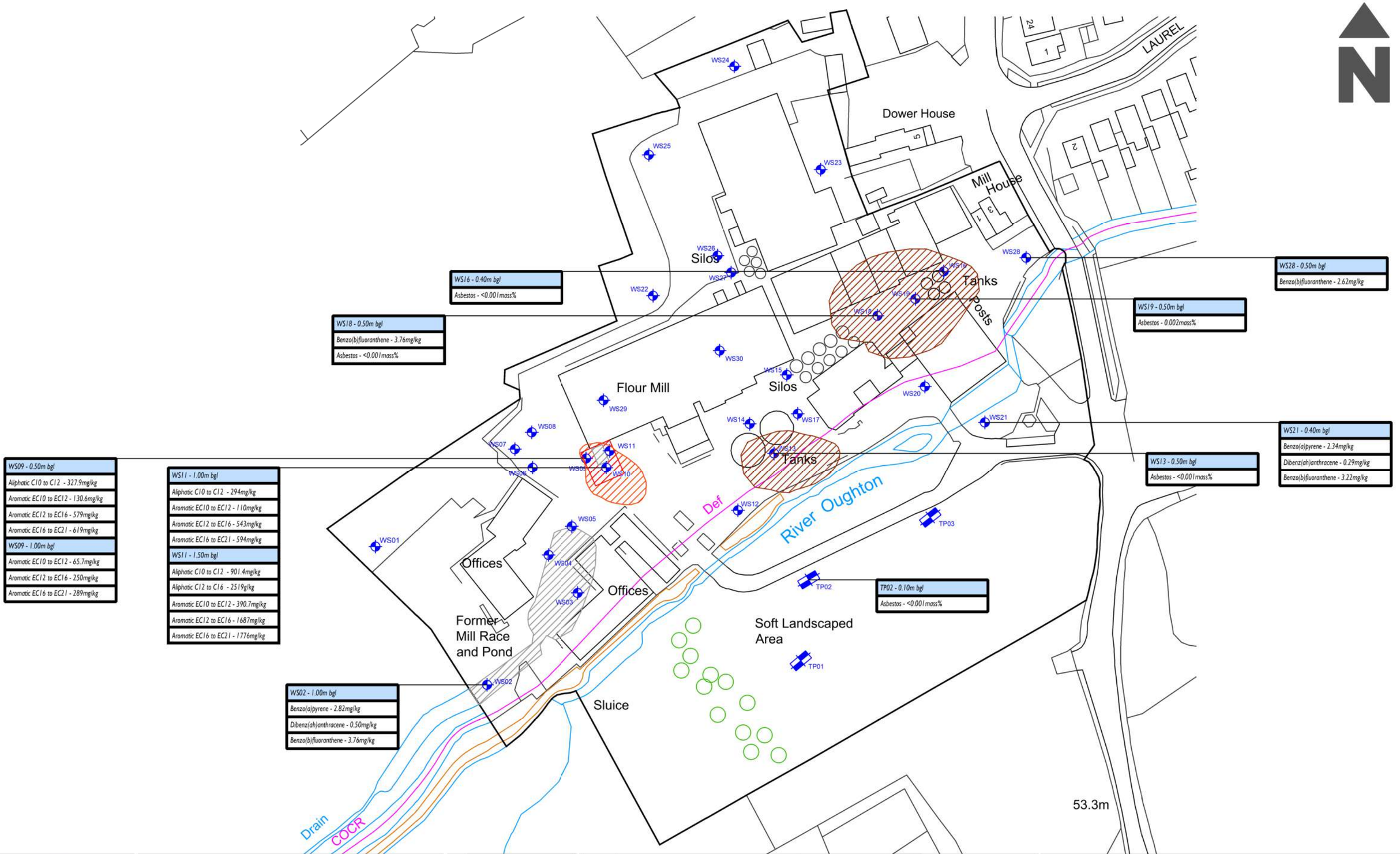
Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes

Zone 1 - Traditional Shallow Foundations Acceptable

Zone 2 - Deep Foundations may be Required, Design Subject to Further Investigation

-



GROUNDTECH CONSULTING

CLIENT	BOWMAN'S INGREDIENTS LTD
PROJECT TITLE	BOWMAN'S MILL, ICKLEFORD
PLAN TITLE	CONTAMINATION PLAN
DATE	JANUARY 2020
SCALE	NTS
PLAN NUMBER	19271 05

Rev.	Details	Date

Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

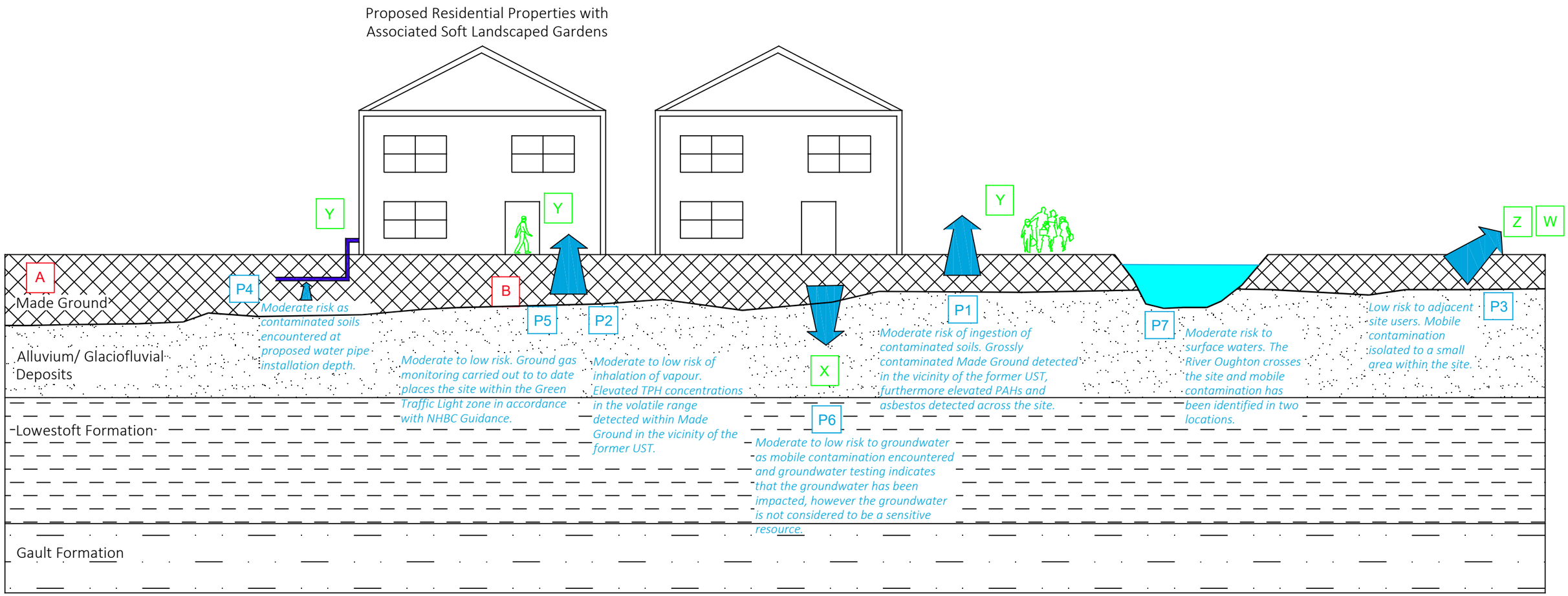
Notes

- Areas requiring 500mm cover layer with 100mm hard dig
- Hydrocarbon impacted soils
- Indicative hydrocarbon groundwater plume

SOURCES
A. Contaminated soils / Made Ground. B. Ground gas.

POLLUTION LINKAGES
P1. Ingestion of soil and dust. P2. Inhalation of vapour. P3. Inhalation of soil dust by adjacent site users. P4. Attacking of potable water supply pipe. P5. Migration and accumulation of ground gas in internal places. P6. Impaction of groundwater from soil contamination. P7. Migration of soil and groundwater contamination impacting surface waters.

RECEPTORS
W. River Oughton On Site. X. Groundwater within the Secondary A Aquifer. Y. Site end users. Z. Adjacent site users.



GROUNDTECH CONSULTING

CLIENT	BOWMAN'S INGREDIENTS LTD
PROJECT TITLE	BOWMAN'S MILL, ICKLEFORD
PLAN TITLE	ILLUSTRATIVE REVISED CSM
DATE	JANUARY 2020
SCALE	NTS
PLAN NUMBER	19271 06

Rev.	Details	Date

Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes

APPENDIX 2 – Site Photographs



1. Site entrance.



2. Office near site entrance (right), disused mill buildings (left).



3. River Oughton.



4. Area of soft landscaping to remain and access road through the site.



5. Derelict mill buildings.



6. Disused Silos.



7. Vicinity of former diesel UST.



8. Office buildings.

APPENDIX 3 – Exploratory Hole Logs

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.50	ES					MADE GROUND: Brown slightly sandy slightly gravelly clayey topsoil. Gravel is angular to subrounded fine to medium of mixed lithology including brick and rare ash.
		1.00	ES		0.90			Medium dense grey slightly clayey slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		1.20		N=17 (4,4/5,4,4,4)				
		2.00		N=2 (3,2/1,0,0,1)	1.50			Loose yellow brown slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
	▼				2.30			Firm grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine of mixed lithology.
		3.00		N=6 (1,1/1,1,2,2)				
		4.00		N=14 (1,2/3,3,3,5)	3.70			Dark brown slightly sandy SILT.
					4.45			End of borehole at 4.45 m

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 2.45m bgl. 3. Hole collapsed to 2.10m. 4. No standpipe installed.

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.23			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.55			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
					0.75			MADE GROUND: Dark brown slightly sandy angular fine to coarse gravel of mixed lithology including ash.
		1.00	ES					MADE GROUND: Dark brown slightly gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including ash.
		1.20		N=37 (6,9/9,8,10,10)				
		1.50	ES					
		1.70		50 (25 for 0mm/50 for 5mm)	1.70			End of borehole at 1.70 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Obstruction encountered at 1.50m bgl. 5. Standpipe installed to 1.50m bgl: 1.00m plain pipe, 0.50m slotted pipe.

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.18			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.50			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.10	ES		1.00			MADE GROUND: Soft grey slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.20	D					Very soft dark brown slightly sandy silty CLAY.
		1.20		N=0 (0,0/0,0,0,0)				
					1.50			Firm dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
	▼	2.00		N=9 (1,2/3,2,2,2)	1.90			Soft to firm light brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
								Gravel band encountered at 2.30m to 2.35m bgl.
		2.50	D					*Becoming firm to stiff at 2.50m bgl.*
		3.00		N=0 (0,0/0,0,0,0)				*Very Soft at 3.00m bgl.*
		4.00		N=9 (1,1/2,2,3,2)				
					4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.00m bgl. 4. Hole collapsed to 2.00m. 5. No standpipe installed.

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Grey reinforced concrete.	
					0.26			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.	
		0.50	ES						
					0.65			Soft grey brown silty CLAY.	
					0.80			Firm light brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.	1
		1.00	ES						
		1.20		N=7 (1,1/1,1,2,3)					
		1.50	D						
	▼								
		2.00	D		2.00			Soft grey brown silty CLAY.	2
		2.00		N=4 (0,0/0,1,1,2)					
		3.00	D		3.00			Soft grey clayey SILT.	3
		3.00		N=1 (1,0/0,1,0,0)					
								End of borehole at 3.45 m	
		4.00		N=0 (0,0/0,0,0,0)					4
					4.45				5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.70m bgl. 4. Hole collapsed to 2.80m. 5. No standpipe installed.

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grey reinforced concrete.
					0.25			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		0.50	ES		0.60			MADE GROUND: Soft grey slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse of mixed lithology including brick and ash.
		1.00	ES		1.10			Soft grey slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
	▼	1.20 1.20	D	N=27 (2,3/6,11,7,3)	1.40			Medium dense yellow brown fine to coarse SAND and angular to rounded fine to coarse GRAVEL of mixed lithology including chert.
					1.60			Very soft dark brown slightly sandy silty CLAY.
		2.00 2.00	D	N=0 (0,0/0,0,0,0)				
		3.00		N=7 (2,1/2,2,1,2)				*Soft to firm at 3.00m bgl.*
					3.45			End of borehole at 3.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.40m bgl. 4. Hole collapsed to 1.50m. 5. No standpipe installed.

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 09/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.00	ES					
		1.20		N=1 (1,2/1,0,0,0)	1.20			Very loose to loose orange brown slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse of mixed lithology including chert.
		1.50	D					
		2.00		N=4 (1,1/1,1,1,1)				
					2.50			Soft dark brown clayey SILT.
		3.00		N=9 (1,1/2,2,2,3)	3.00			Soft to firm lightly grey sandy SILT.
		3.10	D					
	▼				3.50			Firm dark brown silty CLAY.
		3.60	D					
		4.00		N=14 (2,2/2,3,4,5)				
					4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 3.45m bgl. 4. Hole collapsed to 3.00m. 5. Standpipe installed to 4.00m bgl: 1.00m plain pipe, 3.00m slotted pipe.

Borehole Log

Borehole No. **WS07**

Sheet 1 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Grey reinforced concrete.	
					0.20			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.	
		0.50	ES						
		0.80	ES						
					0.90				
		1.00	D					Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.	1
		1.20		N=11 (1,2/2,3,3,3)					
								Becoming stiff at 1.50m bgl.	
		2.00	D						
		2.00		N=7 (2,2/2,1,2,2)					2
		2.50 - 2.95	U					*Very high strength at 2.50m bgl.*	
		3.00		N=23 (2,3/4,6,6,7)				*Stiff at 3.00m bgl.*	3
		4.00		N=21 (2,3/4,4,6,7)					4
		5.00		N=23 (3,3/4,6,6,7)					5
								Continued on next sheet	

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

Borehole Log

Borehole No. **WS07**
Sheet 2 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					5.45			End of borehole at 5.45 m

6
7
8
9
10

Remarks
1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

Borehole Log

Borehole No. **WS08**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.15			MADE GROUND: Grey reinforced concrete.	
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.	
					0.60			Firm light brown mottled grey slightly gravelly sandy CLAY. Gravel is subangular to rounded fine of mixed lithology.	
		1.00	ES		1.00			Soft yellow sandy SILT.	1
		1.20		N=0 (0,0/0,0,0,0)					
	▼	1.50	D		1.40			Loose light yellow silty fine SAND.	
		2.00		N=6 (0,1/1,2,1,2)					2
					2.20			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.	
		2.50	D						
		3.00		N=9 (1,2/2,3,2,2)					3
		4.00		N=14 (3,2/3,3,4,4)					4
					4.45			End of borehole at 4.45 m	
									5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.50m bgl. 4. Hole collapsed to 2.00m. 5. No standpipe installed.

Borehole Log

Borehole No. **WS09**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Soft grey slightly sandy slightly gravelly clay with moderate hydrocarbon odour. Gravel is angular to subangular fine to coarse of mixed lithology.
	▼	1.00	ES					
		1.20		N=9 (8,4/1,3,3,2)				
					1.40			
		1.50	ES					Loose yellow brown silty fine SAND with moderate hydrocarbon odour.
		2.00		N=3 (0,0/0,1,1,1)				
					2.30			
		2.50	ES					Firm to stiff grey slightly sandy slightly gravelly CLAY with slight hydrocarbon odour. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
					3.45			End of borehole at 3.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.00m bgl. 4. Hole collapsed to 1.30m. 5. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

Borehole Log

Borehole No. **WS10**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.25			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Light brown gravelly fine to coarse sand with slight hydrocarbon odour. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
					0.65			Firm yellow brown slightly gravelly sandy CLAY with sli hydrocarbon odour. Gravel is angular subrounded fine to medium of mixed lithology including chert.
	▼	1.00	D					
		1.00	ES		1.10			Very ense yellow brown fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL of mixed lithology including chert.
		1.20		N=50 (6,11/50 for 230mm)				
					1.65			End of borehole at 1.65 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.10m bgl. 4. Hole terminated at 1.65m bgl due to SPT refusal. 5. No standpipe installed.

Borehole Log

Borehole No. **WS11**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.18			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Black gravelly fine to coarse sand with moderate hydrocarbon odour. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		1.00	ES					
	▼	1.20		N=50 (8,12/50 for 225mm)				
		1.50	ES					
		1.65		50 (12,13/50 for 170mm)				
					2.10			End of borehole at 2.10 m

1
2
3
4
5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.20m bgl. 4. Obstruction encountered at 2.10m bgl. 5. No standpipe installed.

Borehole Log

Borehole No. **WS12**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Grey reinforced concrete.
		0.30	ES					MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		0.50	ES		0.40			Soft grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		1.00	D					
		1.20		N=0 (0,0/0,0,0,0)				
		2.00	D					
	▼	2.00		N=4 (1,0/0,1,1,2)				
		3.00		N=2 (1,0/0,1,0,1)				
		4.00		N=6 (4,2/1,1,2,2)				
					4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.30m bgl. 4. Hole collapsed to 2.50m. 5. Standpipe installed to 4.00m bgl: 1.00m plain, 3.00m slotted.

Borehole Log

Borehole No. **WS13**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grey reinforced concrete.
					0.23			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of mixed lithology including brick.
		0.50	ES					
					0.60			Soft grey silty CLAY.
		1.00	D					
		1.00	ES					
		1.20		N=0 (0,0/0,0,0,0)				
	▼	2.00		N=3 (0,0/0,1,1,1)				
					2.30			Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		2.50	D					
		3.00		N=9 (0,1/2,2,3,2)				
		4.00		N=6 (1,2/1,1,2,2)				
					4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.00m bgl. 4. Hole collapsed to 2.20m. 5. No standpipe installed.

Borehole Log

Borehole No. **WS14**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.23			MADE GROUND: Grey reinforced concrete.
		0.30	ES		0.40			MADE GROUND: Soft to firm orange brown slightly sandy gravelly clay. Gravel is angular fine to coarse of mixed lithology including brick.
		0.50	ES					MADE GROUND: Yellow brown gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick and chert.
	▼				0.90			Soft grey silty CLAY.
		1.20		N=1 (0,0/0,0,0,1)				
		1.50	D					
		2.00		N=8 (0,1/2,1,2,3)				
					2.30			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		2.50 - 2.95	U					
		3.00		N=15 (3,3/4,4,3,4)				
					3.45			End of borehole at 3.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.00m bgl. 4. Hole collapsed to 1.50m. 5. No standpipe installed.

Borehole Log

Borehole No. **WS15**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 10/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.17			MADE GROUND: Grey reinforced concrete.
		0.30	ES		0.40			MADE GROUND: Orange brown gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick.
					0.80			Dark brown slightly organic silty fine SAND.
	▼	1.00 1.00	D ES					Soft grey brown sandy CLAY.
		1.20		N=25 (3,5/6,6,7,6)				*Gravel band encountered at 1.40m to 1.45m bgl.*
					1.50			Firm to stiff orange brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mixed lithology including chert.
		2.00 2.00	D	N=9 (1,2/2,3,2,2)				
		3.00		N=11 (1,2/3,3,2,3)				
					3.45			End of borehole at 3.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.10m bgl. 4. Hole collapsed to 2.00m. 5. No standpipe installed.

Borehole Log

Borehole No. **WS16**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			MADE GROUND: Black tarmac.
					0.20			MADE GROUND: Grey reinforced concrete.
		0.40	ES		0.50			MADE GROUND: Black sandy angular fine to coarse gravel of mixed lithology including brick and bitumous gravel.
	▼	1.00	ES		1.00			Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		1.20		N=33 (8,14/14,9,7,3)				Dense orange brown fine to coarse SAND and subangular to subrounded fine to coarse GRAVEL of mixed lithology including chert.
		1.50 - 1.95	U		1.50			Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		2.00	D					
		2.00		N=19 (2,2/4,4,5,6)				
					2.60			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.
		3.00		N=24 (6,6/5,6,6,7)				
					3.45			End of borehole at 3.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.00m bgl. 4. Hole collapsed to 1.00m bgl. 5. No standpipe installed.

Borehole Log

Borehole No. **WS17**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grey reinforced concrete.
		0.60	ES		0.56			Soft grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
		1.00	ES					
		1.20		N=0 (0,0/0,0,0,0)	1.30			Soft grey slightly sandy silty CLAY.
	▼	1.50 1.50 - 1.95	D U					*Low strength at 1.50m bgl.*
		2.00		N=3 (0,0/0,0,1,2)	2.10			Firm grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		2.50 2.50 - 2.95	D U					
		3.00		N=10 (1,2/2,3,2,3)				
		4.00		N=12 (3,3/3,2,4,3)				
					4.45			End of borehole at 4.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Soils saturated from 1.50m bgl. 4. Hole collapsed to 3.00m bgl. 5. Standpipe installed to 4.00m bgl: 1.00m plain pipe, 3.00m slotted pipe.

Borehole Log

Borehole No. **WS18**

Sheet 1 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.17			MADE GROUND: Grey reinforced concrete.	
		0.30 - 3.00	ES		0.40			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.	
		0.50	ES					MADE GROUND: Black slightly sandy angular fine to coarse gravel of mixed lithology including ash.	
					0.70			Firm grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.	1
		1.00	D						
		1.20		N=1 (1,0/0,1,0,0)				*Becoming soft between 1.20m and 1.50m bgl.*	
		1.50 - 1.95	U		1.50			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk.	
		2.00	D						2
		2.00		N=10 (1,1/1,3,3,3)					
	▼								
		2.50 - 2.95	U						
		3.00		N=12 (1,2/2,3,3,4)					3
		4.00		N=10 (1,1/1,2,3,4)					4
		5.00	D						5
								Continued on next sheet	

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.40m bgl. 4. Standpipe installed to 5.00m bgl: 1.00m plain pipe, 4.00m slotted pipe.

Borehole Log

Borehole No. **WS18**

Sheet 2 of 2

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		5.00		N=13 (1,1/2,3,4,4)				
					5.45			End of borehole at 5.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 2.40m bgl. 4. Standpipe installed to 5.00m bgl: 1.00m plain pipe, 4.00m slotted pipe.

Borehole Log

Borehole No. **WS19**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grey reinforced concrete.
					0.30			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
		0.50	ES		0.60			Firm brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
	▼	1.00	D					
	▼	1.00	ES		1.10			Medium dense yellow slightly clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		1.20		N=22 (1,3/5,6,6,5)				
		1.60	D		1.50			Firm brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
								Sand and gravel band at 1.80m bgl.
		2.00		N=11 (1,1/2,2,3,4)				
		2.50 - 2.95	U					
		3.00		N=19 (2,3/4,4,5,6)				
					3.45			End of borehole at 3.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.10m bgl. 4. Hole collapsed to 1.50m bgl. 5. No standpipe installed.

Borehole Log

Borehole No. **WS20**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Grey reinforced concrete.
					0.26			
								MADE GROUND: Yellow gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick.
		0.50	ES					
					0.60			
								Firm grey silty CLAY.
		1.00	ES					*Becoming soft from 1.00m bgl.*
		1.20		N=0 (0,0/0,0,0,0)				
	▼	1.50	D					
					1.90			
		2.00		N=3 (0,0/0,1,1,1)				Soft grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		3.00 3.00	D	N=18 (2,2/3,4,5,6)				*Firm to stiff from 3.00m bgl.*
		4.00		N=24 (5,4/5,6,6,7)				
					4.45			End of borehole at 4.45 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. Groundwater encountered at 1.65m bgl. 4. Hole collapsed to 3.00m bgl. 5. No standpipe installed.

Borehole Log

Borehole No. **WS21**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 11/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	ES		0.50			MADE GROUND: Brown slightly gravelly slightly sandy clayey topsoil. Gravel is angular to rounded fine to coarse of mixed lithology including brick.
		1.00 1.00	D ES					Soft grey brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		1.20		N=18 (0,0/2,3,6,7)				
		1.50 - 1.95	U					*Low strength at 1.50m*
	▼	2.00		N=24 (2,2/4,7,6,7)	2.30			
					2.70			Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		3.00		N=24 (4,5/5,6,6,7)	3.45			Firm to stiff grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
								End of borehole at 3.45 m

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 2.00m bgl. 3. Hole collapsed to 2.00m bgl. 4. No standpipe installed.

Borehole Log

Borehole No. **WS22**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.35			MADE GROUND: Grey sandy angular fine to coarse gravel of limestone.	
		1.00 1.00	D ES					Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chalk and chert.	
		1.20		N=16 (2,2/3,4,4,5)				*Becoming stiff from 1.00m bgl.*	1
		1.50 - 1.95	U						
		2.00 2.00	D	N=18 (3,2/3,5,5,5)				*Becoming grey from 2.10m bgl.*	2
		3.00		N=26 (3,5/5,6,7,8)					3
		4.00		N=50 (5,7/9,14,13,14)				*Very stiff at 4.00m bgl*	4
					4.45			End of borehole at 4.45 m	5

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. No groundwater encountered. 3. No standpipe installed.

Borehole Log

Borehole No. **WS23**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.20			MADE GROUND: Brown slightly gravelly slightly sandy clayey topsoil. Gravel is angular to rounded fine to coarse of mixed lithology including brick.
		0.40	ES		0.50			MADE GROUND: Firm light brown slightly gravelly sandy clay. Gravel is angular to subrounded fine to medium of mixed lithology including brick.
		1.20		N=8 (2,2/2,2,2,2)				Loose orange brown fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.60	D		1.50			Firm orange brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
	▼	2.00		N=20 (4,4/3,4,5,8)	2.00			Medium dense yellow slightly clayey slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of mixed lithology including chert.
		3.00		N=32 (5,6/8,7,8,9)	2.50			Firm to stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
					3.45			End of borehole at 3.45 m

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 2.00m bgl. 3. Hole collapsed to 2.00m bgl. 4. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

Borehole Log

Borehole No. **WS24**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40 - 4.00	ES		0.50			MADE GROUND: Brown slightly gravelly slightly sandy clayey topsoil. Gravel is angular to rounded fine to coarse of mixed lithology including brick.
		0.90	D		1.00			Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		1.20		N=35 (5,6/8,8,9,10)				Dense yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.50	D					
		2.00		N=50 (6,9/50 for 230mm)				*Very dense at 2.00m*
					2.45			End of borehole at 2.45 m

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. No groundwater encountered. 3. No standpipe installed.

Borehole Log

Borehole No. **WS25**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Grey reinforced concrete.	
		0.40	ES		0.50			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.	
		1.00	D					Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.	1
		1.00	ES						
		1.20		N=19 (2,3/4,5,5,5)				*Becoming grey from 1.20m bgl.*	
		1.50 - 1.95	U					*High strength at 1.50m bg*	
		2.00	D					*Gravel becoming fine to coarse from 2.00m bgl.*	2
		2.00		N=21 (3,3/4,5,6,6)					
		3.00		N=50 (9,11/50 for 245mm)					3
					3.45			End of borehole at 3.45 m	
									4
									5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

Borehole Log

Borehole No. **WS26**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.16			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.60			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
		1.00	ES		0.90			Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.20		N=14 (2,3/4,3,3,4)				Stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
								Becoming grey from 1.50m bgl.
		2.00		N=24 (3,4/4,5,7,8)				
		3.00	D					
		3.00		N=50 (8,10/50 for 245mm)				
					3.45			End of borehole at 3.45 m

1
2
3
4
5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

Borehole Log

Borehole No. **WS27**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.21			MADE GROUND: Grey reinforced concrete.
		0.50	ES		0.60			MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
					0.80			MADE GROUND: Multicoloured angular to rounded medium gravel of mixed lithology.
								End of borehole at 0.80 m

1
2
3
4
5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 0.80m bgl, suspected service encountered. 3. No groundwater encountered.

Borehole Log

Borehole No. **WS28**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 12/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Black tarmac.
		0.50	ES		0.60			MADE GROUND: Orange brown sandy angular fine to coarse gravel of mixed lithology including brick.
	▼	1.00	ES					Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.20		N=13 (5,7/5,3,3,2)	1.20			Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chert.
		1.50 - 1.95	U					*Low strength at 1.50m*
								Becoming stiff from 1.70m bgl.
		2.00		N=13 (3,2/3,3,4,3)				
					2.45			End of borehole at 2.45 m

Remarks

1. Hand dug inspection pit to 1.20m bgl. 2. Groundwater encountered at 1.00m bgl. 3. Hole collapsed to 1.20m bgl. 4. Standpipe installed to 2.00m bgl: 1.00m plain pipe, 1.00m slotted pipe.

Borehole Log

Borehole No. **WS29**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 13/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.16			MADE GROUND: Grey reinforced concrete.
		0.50	ES					MADE GROUND: Red brown slightly sandy angular fine to coarse gravel of quartzite.
					0.60			Yellow fine to coarse SAND and subangular to subrounded fine to medium GRAVEL of mixed lithology including chert.
		1.00	ES		1.00			Soft yellow brown clayey SILT.
		1.20		N=1 (0,0/0,0,0,1)				
		1.50	D					
	▼	2.00	D					
		2.00		N=2 (0,0/0,0,1,1)				
					2.20			Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		2.50 - 2.95	U					
		3.00		N=8 (1,2/2,2,2,2)				
					3.45			End of borehole at 3.45 m

1 2 3 4 5

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 2.20m bgl. 3. Groundwater encountered at 2.00m bgl. 4. Hole collapsed to 2.00m bgl. 5. Standpipe installed to 3.00m bgl: 1.00m plain pipe, 2.00m slotted pipe.

Borehole Log

Borehole No. **WS30**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: -	Hole Type WS
Location: ICKLEFORD		Level:	Scale 1:25
Client: BOWMAN'S INGREDIENTS		Dates: 13/12/2019 -	Logged By SF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15	ES		0.12			MADE GROUND: Grey reinforced concrete.
					0.20			MADE GROUND: Yellow gravelly fine to coarse sand. Gravel is angular fine to coarse of mixed lithology including brick.
		0.50	ES					Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
					0.60			Yellow brown silty fine SAND.
		1.00	D		0.90			Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of mixed lithology including chert.
		1.20		N=2 (1,0/1,1,0,0)				
		1.50 - 1.95	U		1.50			Stiff grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including chalk.
		2.00		N=13 (1,2/2,3,4,4)				
		3.00		N=38 (6,7/8,9,9,12)				
		3.70		N=50 (8,10/50 for 245mm)				
					4.15			End of borehole at 4.15 m

Remarks

1. Concrete surfacing cored out. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. No standpipe installed.

Trial Pit Log

Trialpit No **TP01**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: - Level:	Date 12/12/2019
Location: ICKLEFORD		Dimensions (m): Depth 3.90	Scale 1:25
Client: BOWMAN'S INGREDIENTS			Logged SM

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.05	ES					MADE GROUND: Brown slightly clayey slightly gravelly sandy topsoil. Gravel is angular to subrounded fine to medium of mixed lithology including brick.
	0.40	D					
	0.50	ES					
				0.86			Soft to firm dark brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mixed lithology.
				1.60			Light brown slightly clayey fine SAND. *Becoming gravelly from 1.70m bgl.*
			HVP=100	3.40			Stiff high strength grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology.
				3.90			End of pit at 3.90 m

Remarks: 1. No groundwater encountered.

Stability: 1. Pit sides stable.

Trial Pit Log

Trialpit No **TP02**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: - Level:	Date 12/12/2019
Location: ICKLEFORD		Dimensions (m): Depth 4.00	Scale 1:25
Client: BOWMAN'S INGREDIENTS			Logged SM

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES					MADE GROUND: Brown slightly clayey slightly gravelly sandy topsoil. Gravel is angular to subrounded fine to medium of mixed lithology including brick.
	0.50	ES		0.50			Soft to firm dark brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mixed lithology.
				1.86			Light brown slightly clayey fine SAND.
	2.00	D		2.00			Soft to firm grey slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mixed lithology.
			HVP=90				*Becoming stiff and high strength from 2.40m bgl.*
				4.00			End of pit at 4.00 m

1 2 3 4 5

Remarks: 1. No groundwater encountered.

Stability: 1. Pit sides stable.

Trial Pit Log

Trialpit No **TP03**

Sheet 1 of 1

Project Name: BOWMAN'S MILL	Project No. 19271	Co-ords: - Level:	Date 12/12/2019
Location: ICKLEFORD		Dimensions (m): Depth 0.50	Scale 1:25
Client: BOWMAN'S INGREDIENTS			Logged SM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			MADE GROUND: Brown slightly clayey slightly gravelly sandy topsoil. Gravel is angular to subrounded fine to medium of mixed lithology including brick.
				0.50			MADE GROUND: Yellow brown fine to coarse sand.
							End of pit at 0.50 m

Remarks: 1. No groundwater encountered. 2. Gas main encountered at 0.50m bgl.

Stability:

APPENDIX 4 – Geo-Environmental Testing

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

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

Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE

Attention :	Sam Flaherty
Date :	24th December, 2019
Your reference :	19271
Our reference :	Test Report 19/20485 Batch 1
Location :	Bowman's Mill, Ickleford
Date samples received :	13th December, 2019
Status :	Final report
Issue :	1

Forty seven samples were received for analysis on 13th December, 2019 of which twenty six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-2	3-4	8-10	17-19	20-22	32-34	35-37	47-49	53-55	56-58	LOD/LOR	Units	Method No.
Sample ID	WS01	WS01	WS02	WS03	WS03	WS05	WS06	WS08	WS09	WS09			
Depth	0.50	1.00	1.00	0.50	1.10	1.00	0.50	0.50	0.50	1.00			
COC No / misc													
Containers	J T	J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	10/12/2019	10/12/2019	10/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019			
Arsenic #	17.1	-	6.9	8.4	-	21.5	8.9	11.6	12.7	-	<0.5	mg/kg	TM30/PM15
Cadmium #	0.2	-	<0.1	<0.1	-	<0.1	0.1	<0.1	<0.1	-	<0.1	mg/kg	TM30/PM15
Chromium #	58.4	-	53.2	43.2	-	78.0	40.4	67.3	54.6	-	<0.5	mg/kg	TM30/PM15
Copper #	39	-	12	13	-	21	14	20	17	-	<1	mg/kg	TM30/PM15
Lead #	77	-	10	52	-	50	8	9	33	-	<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM30/PM15
Nickel #	24.3	-	8.8	18.2	-	21.0	21.7	23.0	23.8	-	<0.7	mg/kg	TM30/PM15
Selenium #	<1	-	<1	<1	-	<1	<1	<1	<1	-	<1	mg/kg	TM30/PM15
Zinc #	109	-	46	79	-	67	60	82	65	-	<5	mg/kg	TM30/PM15
Arsenic	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Cadmium	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #	<0.04	-	0.44 AA	<0.04	-	<0.04	<0.04	<0.04	0.26	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.07	-	<0.30 AA	0.04	-	<0.03	<0.03	<0.03	<0.03	-	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	-	<0.50 AA	0.11	-	<0.05	<0.05	<0.05	<0.05	-	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	-	<0.40 AA	0.08	-	<0.04	<0.04	<0.04	0.23	-	<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.26	-	3.62 AA	1.19	-	<0.03	<0.03	<0.03	0.39	-	<0.03	mg/kg	TM4/PM8
Anthracene #	0.06	-	0.97 AA	0.22	-	<0.04	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.45	-	4.79 AA	1.70	-	0.09	<0.03	<0.03	0.06	-	<0.03	mg/kg	TM4/PM8
Pyrene #	0.39	-	4.29 AA	1.49	-	0.07	<0.03	<0.03	0.09	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.29	-	3.35 AA	0.72	-	<0.06	<0.06	<0.06	<0.06	-	<0.06	mg/kg	TM4/PM8
Chrysene #	0.25	-	2.81 AA	0.73	-	0.06	<0.02	<0.02	0.04	-	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.44	-	5.22 AA	1.31	-	0.10	<0.07	<0.07	<0.07	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.22	-	2.82 AA	0.72	-	<0.04	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	0.18	-	1.82 AA	0.49	-	<0.04	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	-	0.50 AA	0.10	-	<0.04	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.21	-	2.27 AA	0.52	-	<0.04	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	2.8	-	32.9 AA	9.4	-	<0.6	<0.6	<0.6	1.1	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.32	-	3.76 AA	0.94	-	0.07	<0.05	<0.05	<0.05	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.12	-	1.46 AA	0.37	-	0.03	<0.02	<0.02	<0.02	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	104	-	81 AA	99	-	102	100	97	99	-	<0	%	TM4/PM8

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	1-2	3-4	8-10	17-19	20-22	32-34	35-37	47-49	53-55	56-58	LOD/LOR	Units	Method No.
Sample ID	WS01	WS01	WS02	WS03	WS03	WS05	WS06	WS08	WS09	WS09			
Depth	0.50	1.00	1.00	0.50	1.10	1.00	0.50	0.50	0.50	1.00			
COC No / misc													
Containers	J T	J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	10/12/2019	10/12/2019	10/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019			
TPH CWG													
Aliphatics													
>C5-C6 #	-	-	-	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	-	-	-	-	-	<0.1	-	<0.1	<0.1	0.4	<0.1	mg/kg	TM36/PM12
>C8-C10	-	-	-	-	-	<0.1	-	<0.1	4.6	9.2	<0.1	mg/kg	TM36/PM12
>C10-C12 #	-	-	-	-	-	<0.2	-	<0.2	116.0	327.9	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	-	-	-	-	-	<4	-	<4	346	905	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	-	-	-	-	-	<7	-	<7	440	1044	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	-	-	-	-	-	<7	-	23	200	345	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	-	-	-	-	<19	-	23	1107	2632	<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 #	-	-	-	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	-	-	-	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	-	-	-	-	-	<0.1	-	<0.1	0.1	0.3	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	-	-	-	-	-	<0.2	-	<0.2	65.7	130.6	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	-	-	-	-	-	<4	-	<4	250	579	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	-	-	-	-	-	<7	-	<7	289	619	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	-	-	-	-	-	<7	-	<7	128	210	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	-	-	-	-	-	<19	-	<19	733	1539	<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-35)	-	-	-	-	-	<38	-	<38	1840	4171	<38	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE #	-	-	-	-	-	<5	-	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	-	-	-	-	-	<5	-	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	-	-	-	-	-	<5	-	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	-	-	-	-	-	<5	-	<5	49	102	<5	ug/kg	TM31/PM12
m/p-Xylene #	-	-	-	-	-	<5	-	<5	82	192	<5	ug/kg	TM31/PM12
o-Xylene #	-	-	-	-	-	<5	-	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 52 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 101 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 118 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 138 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 153 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 180 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	-	-	-	-	-	-	-	-	-	<35	ug/kg	TM17/PM8
Natural Moisture Content	37.8	-	10.6	20.4	-	23.6	26.4	19.9	28.8	27.8	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	-	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	-	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0087	0.0189	0.1479	0.3403	0.0476	0.0762	1.4869	0.2765	0.0800	-	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	-	-	-	-	-	-	-	<0.0015	g/l	TM38/PM60
Organic Matter	7.1	-	3.3	0.8	-	2.5	0.7	0.2	1.5	-	<0.2	%	TM21/PM24

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	1-2	3-4	8-10	17-19	20-22	32-34	35-37	47-49	53-55	56-58	LOD/LOR	Units	Method No.
Sample ID	WS01	WS01	WS02	WS03	WS03	WS05	WS06	WS08	WS09	WS09			
Depth	0.50	1.00	1.00	0.50	1.10	1.00	0.50	0.50	0.50	1.00			
COC No / misc													
Containers	J T	J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	10/12/2019	10/12/2019	10/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019			
pH #	8.40	8.25	8.97	8.31	7.63	7.94	7.97	9.87	9.57	-	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	59-61	65-67	68-70	74-76	77-79	80-82	83-85	86-88	95-97	104-106	LOD/LOR	Units	Method No.
Sample ID	WS09	WS10	WS10	WS11	WS11	WS12	WS12	WS13	WS14	WS16			
Depth	1.50	0.50	1.00	1.00	1.50	0.30	0.50	0.50	0.50	0.40			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	11/12/2019	11/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019			
Arsenic #	-	12.8	-	12.5	-	7.3	-	-	14.2	-	<0.5	mg/kg	TM30/PM15
Cadmium #	-	<0.1	-	<0.1	-	<0.1	-	-	<0.1	-	<0.1	mg/kg	TM30/PM15
Chromium #	-	73.5	-	58.8	-	109.4	-	-	67.9	-	<0.5	mg/kg	TM30/PM15
Copper #	-	15	-	9	-	8	-	-	9	-	<1	mg/kg	TM30/PM15
Lead #	-	9	-	31	-	7	-	-	30	-	<5	mg/kg	TM30/PM15
Mercury #	-	<0.1	-	<0.1	-	<0.1	-	-	<0.1	-	<0.1	mg/kg	TM30/PM15
Nickel #	-	21.4	-	17.3	-	9.8	-	-	16.1	-	<0.7	mg/kg	TM30/PM15
Selenium #	-	<1	-	<1	-	<1	-	-	<1	-	<1	mg/kg	TM30/PM15
Zinc #	-	44	-	42	-	21	-	-	40	-	<5	mg/kg	TM30/PM15
Arsenic	-	-	-	-	-	-	-	35.5	-	28.2	<0.5	mg/kg	TM30/PM62
Cadmium	-	-	-	-	-	-	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	-	-	-	-	23.8	-	23.8	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	-	-	-	-	21	-	<1	<1	mg/kg	TM30/PM62
Lead	-	-	-	-	-	-	-	155	-	31	<5	mg/kg	TM30/PM62
Mercury	-	-	-	-	-	-	-	<0.1	-	<0.1	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	-	-	-	-	25.0	-	54.8	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	-	-	-	-	<1	-	<1	<1	mg/kg	TM30/PM62
Zinc	-	-	-	-	-	-	-	149	-	135	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #	-	<0.04	-	0.14	-	<0.04	-	<0.04	<0.04	0.22	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	-	0.30	-	<0.03	-	<0.03	<0.03	0.11	<0.03	mg/kg	TM4/PM8
Acenaphthene #	-	<0.05	-	0.25	-	<0.05	-	<0.05	<0.05	0.10	<0.05	mg/kg	TM4/PM8
Fluorene #	-	<0.04	-	2.38	-	<0.04	-	<0.04	<0.04	0.18	<0.04	mg/kg	TM4/PM8
Phenanthrene #	-	<0.03	-	2.95	-	<0.03	-	0.05	<0.03	0.88	<0.03	mg/kg	TM4/PM8
Anthracene #	-	<0.04	-	<0.04	-	<0.04	-	<0.04	<0.04	0.23	<0.04	mg/kg	TM4/PM8
Fluoranthene #	-	<0.03	-	0.18	-	<0.03	-	0.19	0.05	2.26	<0.03	mg/kg	TM4/PM8
Pyrene #	-	<0.03	-	0.42	-	<0.03	-	0.18	0.05	2.12	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	<0.06	-	<0.06	-	<0.06	-	0.16	<0.06	0.87	<0.06	mg/kg	TM4/PM8
Chrysene #	-	<0.02	-	0.14	-	<0.02	-	0.18	0.04	1.06	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	-	<0.07	-	<0.07	-	<0.07	-	0.35	<0.07	1.88	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	<0.04	-	<0.04	-	<0.04	-	0.16	<0.04	0.96	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	-	<0.04	-	<0.04	-	<0.04	-	0.13	<0.04	0.74	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	<0.04	-	<0.04	-	<0.04	-	<0.04	<0.04	0.12	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	<0.04	-	<0.04	-	<0.04	-	0.14	<0.04	0.84	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	<0.6	-	6.8	-	<0.6	-	1.5	<0.6	12.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	<0.05	-	<0.05	-	<0.05	-	0.25	<0.05	1.35	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	<0.02	-	<0.02	-	<0.02	-	0.10	<0.02	0.53	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	102	-	100	-	103	-	99	100	100	<0	%	TM4/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	59-61	65-67	68-70	74-76	77-79	80-82	83-85	86-88	95-97	104-106	LOD/LOR	Units	Method No.
Sample ID	WS09	WS10	WS10	WS11	WS11	WS12	WS12	WS13	WS14	WS16			
Depth	1.50	0.50	1.00	1.00	1.50	0.30	0.50	0.50	0.50	0.40			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	11/12/2019	11/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1 SV	<0.1	mg/kg	TM36/PM12
>C6-C8 #	0.1	<0.1	<0.1	0.2	0.9	-	-	-	-	<0.1 SV	<0.1	mg/kg	TM36/PM12
>C8-C10	0.6	0.1	<0.1	11.1	14.0	-	-	-	-	0.3 SV	<0.1	mg/kg	TM36/PM12
>C10-C12 #	12.2	11.1	<0.2	294.0	901.4	-	-	-	-	46.8	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	43	50	<4	877	2519	-	-	-	-	300	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	55	68	<7	966	2853	-	-	-	-	503	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	14	32	<7	319	866	-	-	-	-	265	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	125	161	<19	2467	7154	-	-	-	-	1115	<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	0.4	0.5	-	-	-	-	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	23.8	7.3	<0.2	110.0	390.7	-	-	-	-	16.9	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	52	26	<4	543	1687	-	-	-	-	115	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	50	47	<7	594	1776	-	-	-	-	302	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	14	27	<7	211	552	-	-	-	-	300	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	140	107	<19	1458	4406	-	-	-	-	734	<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-35)	265	268	<38	3925	11560	-	-	-	-	1849	<38	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE #	<5	<5	<5	<5	<5	-	-	-	-	<5 SV	<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5	<5	<5	-	-	-	-	<5 SV	<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5	<5	<5	-	-	-	-	<5 SV	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5	141	170	-	-	-	-	<5 SV	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5	198	331	-	-	-	-	<5 SV	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5	<5	<5	-	-	-	-	<5 SV	<5	ug/kg	TM31/PM12
PCB 28 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 52 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 101 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 118 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 138 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 153 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
PCB 180 #	-	-	-	-	-	-	-	-	-	-	<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	-	-	-	-	-	-	-	-	-	<35	ug/kg	TM17/PM8
Natural Moisture Content	43.6	27.8	18.4	20.7	17.8	18.6	-	26.4	24.9	13.2	<0.1	%	PM4/PM0
Hexavalent Chromium #	-	<0.3	-	<0.3	-	<0.3	-	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-	0.1465	-	0.0509	-	0.0903	1.3976	-	0.0873	-	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	-	-	-	-	0.0166	-	0.0164	<0.0015	g/l	TM38/PM60
Organic Matter	-	0.2	-	1.2	-	<0.2	-	NDP	<0.2	NDP	<0.2	%	TM21/PM24

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	59-61	65-67	68-70	74-76	77-79	80-82	83-85	86-88	95-97	104-106	LOD/LOR	Units	Method No.
Sample ID	WS09	WS10	WS10	WS11	WS11	WS12	WS12	WS13	WS14	WS16			
Depth	1.50	0.50	1.00	1.00	1.50	0.30	0.50	0.50	0.50	0.40			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	10/12/2019	11/12/2019	11/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019			
pH #	-	11.71	-	8.44	-	11.63	7.79	9.93	11.85	11.88	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	110-112	113-115	119-121	122-123	124-125	130-131					LOD/LOR	Units	Method No.
Sample ID	WS17	WS17	WS18	WS19	WS19	WS21							
Depth	0.60	1.00	0.50	0.50	1.00	0.40							
COC No / misc													
Containers	V J T	V J T	V J T	V J	V J	V J							
Sample Date	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019							
Arsenic #	12.4	-	-	11.4	-	8.7					<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	-	-	0.2	-	0.2					<0.1	mg/kg	TM30/PM15
Chromium #	66.7	-	-	52.1	-	61.4					<0.5	mg/kg	TM30/PM15
Copper #	20	-	-	43	-	24					<1	mg/kg	TM30/PM15
Lead #	26	-	-	39	-	54					<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	-	<0.1	-	<0.1					<0.1	mg/kg	TM30/PM15
Nickel #	20.8	-	-	28.1	-	19.5					<0.7	mg/kg	TM30/PM15
Selenium #	<1	-	-	<1	-	<1					<1	mg/kg	TM30/PM15
Zinc #	81	-	-	106	-	108					<5	mg/kg	TM30/PM15
Arsenic	-	-	19.9	-	-	-					<0.5	mg/kg	TM30/PM62
Cadmium	-	-	0.9	-	-	-					<0.1	mg/kg	TM30/PM62
Chromium	-	-	24.3	-	-	-					<0.5	mg/kg	TM30/PM62
Copper	-	-	56	-	-	-					<1	mg/kg	TM30/PM62
Lead	-	-	967	-	-	-					<5	mg/kg	TM30/PM62
Mercury	-	-	<0.1	-	-	-					<0.1	mg/kg	TM30/PM62
Nickel	-	-	43.3	-	-	-					<0.7	mg/kg	TM30/PM62
Selenium	-	-	2	-	-	-					<1	mg/kg	TM30/PM62
Zinc	-	-	351	-	-	-					<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #	<0.04	-	0.32	0.22	-	0.11					<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	-	0.09	0.05	-	0.45					<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	-	1.00	<0.05	-	<0.05					<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	-	0.94	<0.04	-	<0.04					<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	-	4.57	0.32	-	1.07					<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	-	1.48	0.07	-	0.35					<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.07	-	6.93	0.60	-	3.57					<0.03	mg/kg	TM4/PM8
Pyrene #	0.07	-	5.24	0.57	-	2.86					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	-	2.61	0.43	-	2.13					<0.06	mg/kg	TM4/PM8
Chrysene #	0.05	-	2.32	0.53	-	2.16					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.10	-	3.66	1.01	-	4.47					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	-	1.79	0.45	-	2.34					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	-	1.12	0.35	-	1.73					<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	-	0.17	0.08	-	0.29					<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	-	1.09	0.37	-	1.74					<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	-	33.3	5.1	-	23.3					<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.07	-	2.64	0.73	-	3.22					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	-	1.02	0.28	-	1.25					<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	103	-	100	101	-	94					<0	%	TM4/PM8

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	110-112	113-115	119-121	122-123	124-125	130-131					LOD/LOR	Units	Method No.
Sample ID	WS17	WS17	WS18	WS19	WS19	WS21							
Depth	0.60	1.00	0.50	0.50	1.00	0.40							
COC No / misc													
Containers	V J T	V J T	V J T	V J	V J	V J							
Sample Date	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019							
TPH CWG													
Aliphatics													
>C5-C6 #	-	-	-	-	-	-					<0.1	mg/kg	TM36/PM12
>C6-C8 #	-	-	-	-	-	-					<0.1	mg/kg	TM36/PM12
>C8-C10	-	-	-	-	-	-					<0.1	mg/kg	TM36/PM12
>C10-C12 #	-	-	-	-	-	-					<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	-	-	-	-	-	-					<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	-	-	-	-	-	-					<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	-	-	-	-	-	-					<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	-	-	-	-	-					<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 #	-	-	-	-	-	-					<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	-	-	-	-	-	-					<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	-	-	-	-	-	-					<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	-	-	-	-	-	-					<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	-	-	-	-	-	-					<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	-	-	-	-	-	-					<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	-	-	-	-	-	-					<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	-	-	-	-	-	-					<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-35)	-	-	-	-	-	-					<38	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE #	-	-	-	-	-	-					<5	ug/kg	TM31/PM12
Benzene #	-	-	-	-	-	-					<5	ug/kg	TM31/PM12
Toluene #	-	-	-	-	-	-					<5	ug/kg	TM31/PM12
Ethylbenzene #	-	-	-	-	-	-					<5	ug/kg	TM31/PM12
m/p-Xylene #	-	-	-	-	-	-					<5	ug/kg	TM31/PM12
o-Xylene #	-	-	-	-	-	-					<5	ug/kg	TM31/PM12
PCB 28 #	-	-	<5	<5	-	-					<5	ug/kg	TM17/PM8
PCB 52 #	-	-	<5	<5	-	-					<5	ug/kg	TM17/PM8
PCB 101 #	-	-	<5	<5	-	-					<5	ug/kg	TM17/PM8
PCB 118 #	-	-	<5	<5	-	-					<5	ug/kg	TM17/PM8
PCB 138 #	-	-	<5	<5	-	-					<5	ug/kg	TM17/PM8
PCB 153 #	-	-	<5	<5	-	-					<5	ug/kg	TM17/PM8
PCB 180 #	-	-	<5	<5	-	-					<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	-	<35	<35	-	-					<35	ug/kg	TM17/PM8
Natural Moisture Content	22.9	-	23.5	19.7	-	39.4					<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	-	<0.3	<0.3	-	<0.3					<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.1446	0.0587	-	1.6222	0.1800	0.0152					<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	0.4976	-	-	-					<0.0015	g/l	TM38/PM60
Organic Matter	1.8	-	NDP	4.5	-	2.9					<0.2	%	TM21/PM24

Please see attached notes for all abbreviations and acronyms

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	110-112	113-115	119-121	122-123	124-125	130-131					LOD/LOR	Units	Method No.
Sample ID	WS17	WS17	WS18	WS19	WS19	WS21							
Depth	0.60	1.00	0.50	0.50	1.00	0.40							
COC No / misc													
Containers	V J T	V J T	V J T	V J	V J	V J							
Sample Date	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019							
pH #	9.72	7.93	9.41	8.15	8.31	8.61					<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Groundtech Consulting Limited

Reference: 19271

Location: Bowman's Mill, Ickleford

Contact: Sam Flaherty

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
19/20485	1	WS05	1.00	32-34	No interpretation possible
19/20485	1	WS08	0.50	47-49	No interpretation possible
19/20485	1	WS09	0.50	53-55	Degraded diesel
19/20485	1	WS09	1.00	56-58	Degraded diesel
19/20485	1	WS09	1.50	59-61	Degraded diesel
19/20485	1	WS10	0.50	65-67	Degraded diesel
19/20485	1	WS10	1.00	68-70	No interpretation possible
19/20485	1	WS11	1.00	74-76	Degraded diesel
19/20485	1	WS11	1.50	77-79	Degraded diesel
19/20485	1	WS16	0.40	104-106	Degraded diesel

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

Note:

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

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

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20485	1	WS01	0.50	2	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS02	1.00	10	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS05	1.00	34	18/12/2019	**General Description (Bulk Analysis)**	soil/stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS08	0.50	49	18/12/2019	**General Description (Bulk Analysis)**	soil/stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS10	0.50	67	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS12	0.30	82	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS13	0.50	88	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	Fibre Bundles
					18/12/2019	**Asbestos ACM**	NAD

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20485	1	WS13	0.50	88	18/12/2019	**Asbestos Type**	Chrysotile
					18/12/2019	**Asbestos Level Screen**	less than 0.1%
					19/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					19/12/2019	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					19/12/2019	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)
19/20485	1	WS14	0.50	97	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS16	0.40	106	18/12/2019	**General Description (Bulk Analysis)**	Soil/Stone
					18/12/2019	**Asbestos Fibres**	Fibre Bundles
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	Chrysotile
					18/12/2019	**Asbestos Level Screen**	less than 0.1%
					19/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					19/12/2019	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					19/12/2019	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)
19/20485	1	WS17	0.60	112	18/12/2019	**General Description (Bulk Analysis)**	Soil/Stone
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	1	WS18	0.50	121	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	Free Fibres
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	Amosite
					18/12/2019	**Asbestos Level Screen**	less than 0.1%
					19/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					19/12/2019	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					19/12/2019	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)

Client Name: Groundtech Consulting Limited

Reference: 19271

Location: Bowman's Mill, Ickleford

Contact: Sam Flaherty

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
19/20485	1	WS13	0.50	86-88	TM21/PM24	Asbestos detected in sample
19/20485	1	WS16	0.40	104-106	TM21/PM24	Asbestos detected in sample
19/20485	1	WS18	0.50	119-121	TM21/PM24	Asbestos detected in sample

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 19/20485						

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/20485

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution

EMT Job No: 19/20485

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes

EMT Job No: 19/20485

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes

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Groundtech Consulting Limited
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Manchester
M28 8EE

Attention :	Sam Flaherty
Date :	23rd December, 2019
Your reference :	19271
Our reference :	Test Report 19/20485 Batch 2
Location :	Bowman's Mill, Ickleford
Date samples received :	14th December, 2019
Status :	Final report
Issue :	1

Twenty six samples were received for analysis on 14th December, 2019 of which thirteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	134-136	140-142	152-154	155-157	158-160	164-166	167-169	170-172	181-183	184-186	LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	WS22	WS22	WS23	WS24	WS25	WS25	WS28	WS28			
Depth	0.05	0.10	0.30	1.00	0.10	0.40	0.40	1.00	0.50	1.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	2	2	2	2	2	2	2	2	2	2			
Date of Receipt	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019			
Arsenic #	23.7	-	2.5	-	19.4	15.2	8.0	-	10.7	-	<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	-	<0.1	-	0.2	0.1	<0.1	-	<0.1	-	<0.1	mg/kg	TM30/PM15
Chromium #	54.6	-	44.4	-	80.9	49.9	47.6	-	91.4	-	<0.5	mg/kg	TM30/PM15
Copper #	28	-	19	-	28	14	16	-	9	-	<1	mg/kg	TM30/PM15
Lead #	61	-	6	-	62	28	11	-	16	-	<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	mg/kg	TM30/PM15
Nickel #	28.8	-	12.9	-	37.9	23.9	15.5	-	14.4	-	<0.7	mg/kg	TM30/PM15
Selenium #	<1	-	<1	-	<1	<1	<1	-	<1	-	<1	mg/kg	TM30/PM15
Zinc #	128	-	53	-	271	95	45	-	32	-	<5	mg/kg	TM30/PM15
Arsenic	-	16.6	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Cadmium	-	0.2	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	24.1	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	<1	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	66	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	0.2	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	22.2	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	<1	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	124	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	0.06	<0.03	-	0.14	<0.03	<0.03	-	0.07	-	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	-	0.27	-	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	-	<0.04	<0.04	<0.04	-	0.16	-	<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.08	0.24	<0.03	-	0.60	<0.03	<0.03	-	0.89	-	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	0.06	<0.04	-	0.18	<0.04	<0.04	-	0.21	-	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.32	0.60	<0.03	-	1.61	<0.03	<0.03	-	3.67	-	<0.03	mg/kg	TM4/PM8
Pyrene #	0.26	0.56	<0.03	-	1.31	<0.03	<0.03	-	2.87	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.23	0.35	<0.06	-	0.83	<0.06	<0.06	-	1.69	-	<0.06	mg/kg	TM4/PM8
Chrysene #	0.20	0.42	<0.02	-	0.93	<0.02	<0.02	-	1.79	-	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.42	0.77	<0.07	-	1.81	<0.07	<0.07	-	3.64	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.19	0.39	<0.04	-	0.90	<0.04	<0.04	-	2.00	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	0.14	0.30	<0.04	-	0.62	<0.04	<0.04	-	1.29	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	0.06	<0.04	-	0.12	<0.04	<0.04	-	0.23	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.14	0.29	<0.04	-	0.64	<0.04	<0.04	-	1.20	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	2.0	4.1	<0.6	-	9.7	<0.6	<0.6	-	20.0	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.30	0.55	<0.05	-	1.30	<0.05	<0.05	-	2.62	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.12	0.22	<0.02	-	0.51	<0.02	<0.02	-	1.02	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	97	102	103	-	100	100	89	-	103	-	<0	%	TM4/PM8
Natural Moisture Content	27.9	24.9	7.7	-	36.8	23.0	17.9	-	9.7	-	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0064	-	0.0171	0.1158	0.0048	<0.0015	1.0987	0.1700	0.0472	1.5766	<0.0015	g/l	TM38/PM20

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	134-136	140-142	152-154	155-157	158-160	164-166	167-169	170-172	181-183	184-186	LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	WS22	WS22	WS23	WS24	WS25	WS25	WS28	WS28			
Depth	0.05	0.10	0.30	1.00	0.10	0.40	0.40	1.00	0.50	1.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	2	2	2	2	2	2	2	2	2	2			
Date of Receipt	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019	14/12/2019			
Sulphate as SO4 (2:1 Ext)	-	<0.0015	-	-	-	-	-	-	-	-	<0.0015	g/l	TM38/PM60
Organic Matter	1.6	NDP	<0.2	-	6.6	3.7	<0.2	-	0.4	-	<0.2	%	TM21/PM24
pH #	8.44	8.10	8.57	8.32	7.94	8.41	9.31	8.08	8.32	7.87	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	187-189										LOD/LOR	Units	Method No.
Sample ID	WS29												
Depth	0.50												
COC No / misc													
Containers	V J T												
Sample Date	13/12/2019												
Sample Type	Soil												
Batch Number	2												
Date of Receipt	14/12/2019												
Arsenic #	18.1										<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1										<0.1	mg/kg	TM30/PM15
Chromium #	53.2										<0.5	mg/kg	TM30/PM15
Copper #	13										<1	mg/kg	TM30/PM15
Lead #	11										<5	mg/kg	TM30/PM15
Mercury #	<0.1										<0.1	mg/kg	TM30/PM15
Nickel #	25.3										<0.7	mg/kg	TM30/PM15
Selenium #	<1										<1	mg/kg	TM30/PM15
Zinc #	85										<5	mg/kg	TM30/PM15
Arsenic	-										<0.5	mg/kg	TM30/PM62
Cadmium	-										<0.1	mg/kg	TM30/PM62
Chromium	-										<0.5	mg/kg	TM30/PM62
Copper	-										<1	mg/kg	TM30/PM62
Lead	-										<5	mg/kg	TM30/PM62
Mercury	-										<0.1	mg/kg	TM30/PM62
Nickel	-										<0.7	mg/kg	TM30/PM62
Selenium	-										<1	mg/kg	TM30/PM62
Zinc	-										<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene #	<0.04										<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04										<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03										<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03										<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06										<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04										<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6										<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02										<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	96										<0	%	TM4/PM8
Natural Moisture Content	31.3										<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	1.0361										<0.0015	g/l	TM38/PM20

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	187-189												
Sample ID	WS29												
Depth	0.50												
COC No / misc													
Containers	V J T												
Sample Date	13/12/2019												
Sample Type	Soil												
Batch Number	2												
Date of Receipt	14/12/2019												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Sulphate as SO4 (2:1 Ext)	-										<0.0015	g/l	TM38/PM60
Organic Matter	0.2										<0.2	%	TM21/PM24
pH #	8.69										<0.01	pH units	TM73/PM11

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

Note:

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

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

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20485	2	TP01	0.05	136	18/12/2019	**General Description (Bulk Analysis)**	soil/stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	2	TP02	0.10	142	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	Fibre Bundles
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	Chrysotile
					18/12/2019	**Asbestos Level Screen**	less than 0.1%
					19/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					19/12/2019	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					19/12/2019	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)
19/20485	2	WS19	0.50	146	18/12/2019	**General Description (Bulk Analysis)**	soil-stones
					18/12/2019	**Asbestos Fibres**	Fibre Bundles
					18/12/2019	**Asbestos Fibres (2)**	Fibre Bundles
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos ACM (2)**	NAD
					18/12/2019	**Asbestos Type**	Amosite
					18/12/2019	**Asbestos Type (2)**	Chrysotile
					19/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					19/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	0.002 (mass %)
					19/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	0.002 (mass %)
					19/12/2019	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					19/12/2019	**Asbestos Gravimetric & PCOM Total**	0.002 (mass %)
19/20485	2	WS21	0.40	150	18/12/2019	**General Description (Bulk Analysis)**	soil.stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	2	WS22	0.30	154	18/12/2019	**General Description (Bulk Analysis)**	Soil/Stones
					18/12/2019	**Asbestos Fibres**	NAD

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20485	2	WS22	0.30	154	18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	2	WS23	0.10	160	18/12/2019	**General Description (Bulk Analysis)**	Soil/Stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	2	WS24	0.40	166	18/12/2019	**General Description (Bulk Analysis)**	Soil/Stone
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	2	WS25	0.40	169	18/12/2019	**General Description (Bulk Analysis)**	soil.stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD
19/20485	2	WS29	0.50	189	18/12/2019	**General Description (Bulk Analysis)**	soil.stones
					18/12/2019	**Asbestos Fibres**	NAD
					18/12/2019	**Asbestos ACM**	NAD
					18/12/2019	**Asbestos Type**	NAD
					18/12/2019	**Asbestos Level Screen**	NAD

Client Name: Groundtech Consulting Limited

Reference: 19271

Location: Bowman's Mill, Ickleford

Contact: Sam Flaherty

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
19/20485	2	TP02	0.10	140-142	TM21/PM24	Asbestos detected in sample

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 19/20485						

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/20485

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

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

EMT Job No: 19/20485

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

EMT Job No: 19/20485

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes

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Manchester
M28 8EE

Attention :	Sam Flaherty
Date :	27th December, 2019
Your reference :	19271
Our reference :	Test Report 19/20485 Batch 3
Location :	Bowman's Mill, Ickleford
Date samples received :	20th December, 2019
Status :	Final report
Issue :	1

Two samples were received for analysis on 20th December, 2019 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Solid

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

EMT Sample No.	199	200									LOD/LOR	Units	Method No.
Sample ID	WS05	WS24											
Depth	2	1.5											
COC No / misc													
Containers	T	T											
Sample Date	09/12/2019	12/12/2019											
Sample Type	Soil	Soil											
Batch Number	3	3											
Date of Receipt	20/12/2019	20/12/2019											
Sulphate as SO4 (2:1 Ext) #	0.2139	0.0065									<0.0015	g/l	TM38/PM20
pH #	7.58	8.83									<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 19/20485						

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/20485

SOILS

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

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

EMT Job No: 19/20485

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

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Attention :	Sam Flaherty
Date :	6th January, 2020
Your reference :	19271
Our reference :	Test Report 19/20485 Batch 4
Location :	Bowman's Mill, Ickleford
Date samples received :	24th December, 2019
Status :	Final report
Issue :	1

Eight samples were received for analysis on 24th December, 2019 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	201-205	206-210	216-220	221-225	226-230	236-239					LOD/LOR	Units	Method No.
Sample ID	WS06	WS09	WS17	WS18	WS25	WS29							
Depth													
COC No / misc													
Containers	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G							
Sample Date	23/12/2019	23/12/2019	23/12/2019	23/12/2019	23/12/2019	23/12/2019							
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid							
Batch Number	4	4	4	4	4	4							
Date of Receipt	24/12/2019	24/12/2019	24/12/2019	24/12/2019	24/12/2019	24/12/2019							
Dissolved Arsenic	<2.5	<2.5	5.5	<2.5	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Total Dissolved Chromium	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper	<7	<7	<7	<7	<7	<7					<7	ug/l	TM30/PM14
Dissolved Lead	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Mercury	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel	3	3	8	<2	9	7					<2	ug/l	TM30/PM14
Dissolved Selenium	<3	<3	<3	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Zinc	<3	<3	5	<3	<3	<3					<3	ug/l	TM30/PM14
PAH MS													
Naphthalene	<0.1	5.1 AA	<0.1	0.5	<0.1	<0.1					<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.013	6.076 AA	0.090	0.026	<0.013	<0.013					<0.013	ug/l	TM4/PM30
Acenaphthene	<0.013	8.178 AA	0.160	1.456	0.025	<0.013					<0.013	ug/l	TM4/PM30
Fluorene	<0.014	40.382 SV AA	0.657	0.372	0.085	0.020					<0.014	ug/l	TM4/PM30
Phenanthrene	0.017	37.353 SV AA	0.524	0.038	0.127	0.013					<0.011	ug/l	TM4/PM30
Anthracene	<0.013	0.723 AA	0.036	0.110	<0.013	<0.013					<0.013	ug/l	TM4/PM30
Fluoranthene	<0.012	1.840 AA	0.165	0.194	<0.012	<0.012					<0.012	ug/l	TM4/PM30
Pyrene	<0.013	7.692 AA	0.229	0.113	0.032	<0.013					<0.013	ug/l	TM4/PM30
Benzo(a)anthracene	<0.015	0.255 AA	0.091	0.016	<0.015	<0.015					<0.015	ug/l	TM4/PM30
Chrysene	<0.011	1.305 AA	0.106	0.013	<0.011	<0.011					<0.011	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.018	0.277 AA	0.260	<0.018	<0.018	<0.018					<0.018	ug/l	TM4/PM30
Benzo(a)pyrene	<0.016	<0.080 AA	0.170	<0.016	<0.016	<0.016					<0.016	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.011	<0.055 AA	0.103	<0.011	<0.011	<0.011					<0.011	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.01	<0.05 AA	0.02	<0.01	<0.01	<0.01					<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.011	<0.055 AA	0.078	<0.011	<0.011	<0.011					<0.011	ug/l	TM4/PM30
PAH 16 Total	<0.195	109.181 AA	2.689	2.838	0.269	<0.195					<0.195	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01	0.20 AA	0.19	<0.01	<0.01	<0.01					<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01	0.08 AA	0.07	<0.01	<0.01	<0.01					<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	79	73 AA	73	82	85	84					<0	%	TM4/PM30
MTBE	<5	<5	<5	<5	<5	<5					<5	ug/l	TM31/PM12
Benzene	<5	<5	<5	<5	<5	<5					<5	ug/l	TM31/PM12
Toluene	<5	<5	<5	<5	<5	<5					<5	ug/l	TM31/PM12
Ethylbenzene	<5	<5	<5	<5	<5	<5					<5	ug/l	TM31/PM12
m/p-Xylene	<5	8	<5	<5	<5	<5					<5	ug/l	TM31/PM12
o-Xylene	<5	12	<5	<5	<5	<5					<5	ug/l	TM31/PM12

Please see attached notes for all abbreviations and acronyms

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty
EMT Job No: 19/20485

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	201-205	206-210	216-220	221-225	226-230	236-239					LOD/LOR	Units	Method No.
Sample ID	WS06	WS09	WS17	WS18	WS25	WS29							
Depth													
COC No / misc													
Containers	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G	V HN P G							
Sample Date	23/12/2019	23/12/2019	23/12/2019	23/12/2019	23/12/2019	23/12/2019							
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid							
Batch Number	4	4	4	4	4	4							
Date of Receipt	24/12/2019	24/12/2019	24/12/2019	24/12/2019	24/12/2019	24/12/2019							
TPH CWG													
Aliphatics													
>C5-C6	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10	<10	601	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12	<5	10678	57	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16	<10	36770	360	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21	<10	46940	600	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35	<10	15200	330	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	<10	110189	1347	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10	<10	20	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12	<5	4716	70	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16	<10	25510	290	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21	<10	30860	390	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35	<10	10200	110	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	<10	71306	860	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35)	<10	181495	2207	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
PCB 28	<0.1	<1.5 AB	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM17/PM30
PCB 52	<0.1	<1.5 AB	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM17/PM30
PCB 101	<0.1	<1.5 AB	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM17/PM30
PCB 118	<0.1	<1.5 AB	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM17/PM30
PCB 138	<0.1	<1.5 AB	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM17/PM30
PCB 153	<0.1	<1.5 AB	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM17/PM30
PCB 180	<0.1	<1.5 AB	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM17/PM30
Total 7 PCBs	<0.7	<10.5 AB	<0.7	<0.7	<0.7	<0.7					<0.7	ug/l	TM17/PM30
Sulphate as SO4	241.3	14.0	18.3	611.6	24.7	1359.7					<0.5	mg/l	TM38/PM0
Hexavalent Chromium	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006					<0.006	mg/l	TM38/PM0
Total Alkalinity as CaCO3	1602	840	944	2592	14860	664					<1	mg/l	TM75/PM0
Dissolved Organic Carbon	<2	30	18	8	13	3					<2	mg/l	TM60/PM0
pH	7.83	7.49	8.32	7.29	7.01	7.47					<0.01	pH units	TM73/PM0
Total Organic Carbon	<2	42	16	5	6	<2					<2	mg/l	TM60/PM0

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Groundtech Consulting Limited

Reference: 19271

Location: Bowman's Mill, Ickleford

Contact: Sam Flaherty

Matrix : Liquid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
19/20485	4	WS06		201-205	No interpretation possible
19/20485	4	WS09		206-210	Degraded diesel
19/20485	4	WS17		216-220	Degraded diesel
19/20485	4	WS18		221-225	No interpretation possible
19/20485	4	WS25		226-230	No interpretation possible
19/20485	4	WS29		236-239	No interpretation possible

Client Name: Groundtech Consulting Limited
Reference: 19271
Location: Bowman's Mill, Ickleford
Contact: Sam Flaherty

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 19/20485						

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/20485

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

AB	x15 Dilution

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

EMT Job No: 19/20485

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.				
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.				

EMT Job No: 19/20485

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM75	Modified US EPA method 310.1. Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.				

APPENDIX 5 – Geotechnical Testing

LABORATORY REPORT

4043

Contract Number: PSL19/7807

Report Date: 10 January 2020

Client's Reference: 19271/941

Client Name: Groundtech Consulting
PO Box 499
Manchester
M28 4EE

For the attention of: Sam Flaherty

Contract Title: Bowmans Mill, Ickleford

Date Received: 20/12/2019
Date Commenced: 20/12/2019
Date Completed: 10/1/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	S Royle (Laboratory Manager)

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awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS03		D	1.20		Brown slightly gravelly slightly sandy CLAY.
WS04		D	1.50		Brown gravelly very sandy CLAY.
WS07		D	1.00		Brown slightly gravelly slightly sandy CLAY.
WS29		U	2.50	2.95	Brown mottled grey slightly gravelly sandy CLAY.
WS12		D	1.00		Brown slightly gravelly slightly sandy CLAY.
WS14		D	1.50		Brown slightly sandy very silty CLAY.
WS16		D	2.00		Brown mottled grey slightly gravelly very sandy CLAY.
WS18		D	1.00		Brown slightly gravelly slightly sandy CLAY.
WS20		D	1.50		Brown gravelly CLAY.
WS22		D	1.00		Brown mottled grey slightly gravelly very sandy CLAY.
WS23		D	1.60		Brown slightly gravelly very sandy CLAY.
WS24		D	0.90		Brown gravelly sandy CLAY.
WS25		D	1.00		Brown slightly gravelly sandy CLAY.
WS28		U	1.50	1.95	Brown slightly gravelly sandy CLAY.
WS17		D	1.50		Brown mottled grey CLAY with some organic material.
WS07		U	2.50	2.95	Very stiff brown mottled grey gravelly sandy CLAY.
WS17		U	1.50	1.95	Soft brown mottled grey CLAY with some organic material.
WS28		U	1.50	1.95	Soft brown mottled grey slightly gravelly sandy CLAY.
WS21		U	1.50	1.95	Soft brown mottled grey gravelly very sandy CLAY.

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS25		U	1.50	1.95	Stiff brown mottled grey gravelly sandy CLAY.

4043

Professional Soils Laboratory

Bowman's Mill, Ickleford

Contract No:
PSL19/7807
Client Ref:
19271

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS03		D	1.20		28			75	32	43	95	Very high plasticity CV.
WS04		D	1.50		18			35	18	17	86	Intermediate plasticity CI.
WS07		D	1.00		35			65	27	38	93	High plasticity CH.
WS29		U	2.50	2.95	18			41	19	22	96	Intermediate plasticity CI.
WS12		D	1.00		31			57	25	32	97	High plasticity CH.
WS14		D	1.50		39			64	31	33	100	High plasticity CH.
WS16		D	2.00		16			33	16	17	94	Low plasticity CL.
WS18		D	1.00		38			73	31	42	95	Very high plasticity CV.
WS20		D	1.50		40			79	33	46	87	Very high plasticity CV.
WS22		D	1.00		16			36	17	19	95	Intermediate plasticity CI.
WS23		D	1.60		11			29	14	15	92	Low plasticity CL.
WS24		D	0.90		19			39	19	20	87	Intermediate plasticity CI.
WS25		D	1.00		18			42	20	22	95	Intermediate plasticity CI.
WS28		U	1.50	1.95	21			51	23	28	93	High plasticity CH.
WS17		D	1.50		53			85	34	51	100	Very high plasticity CV.

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Bowman's Mill, Ickleford

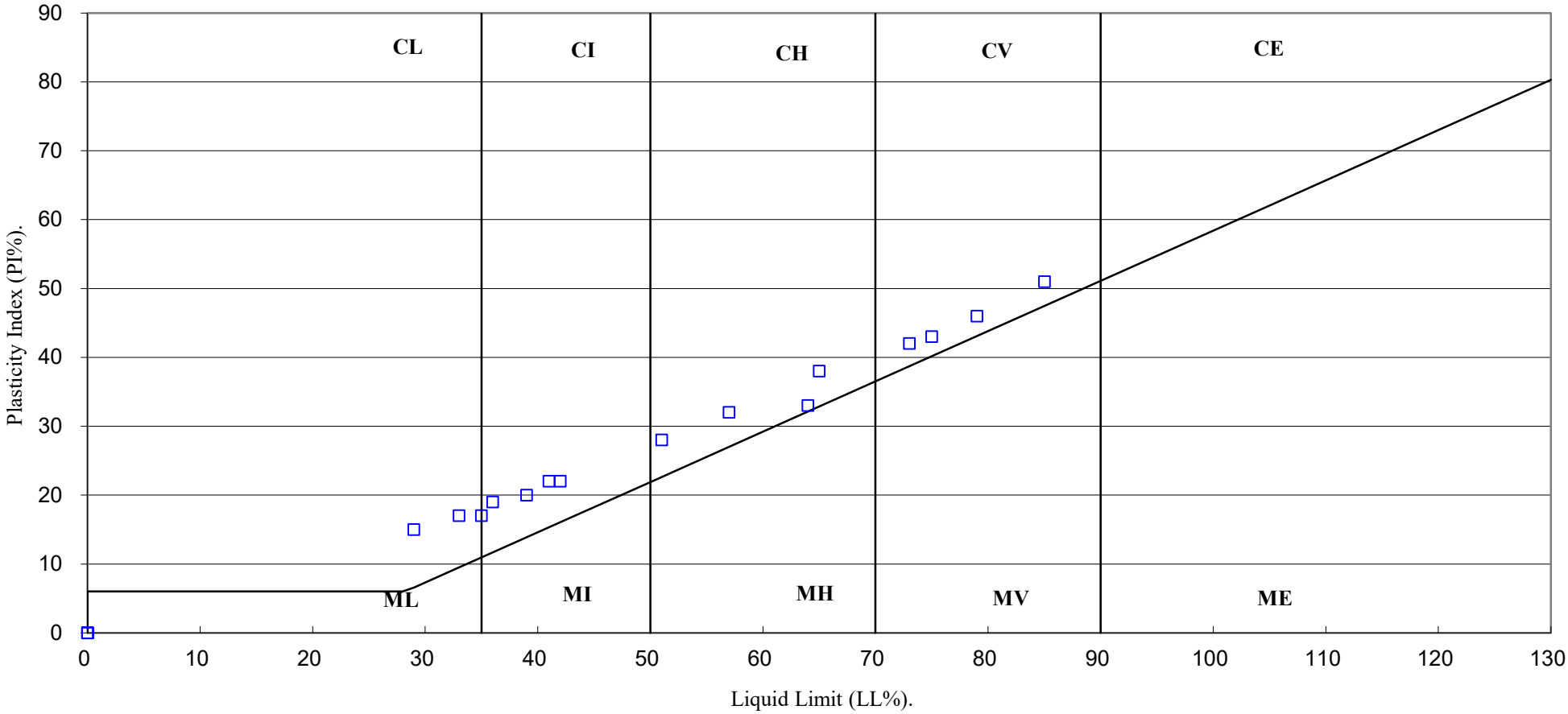
Contract No:

PSL19/7807

Client Ref:

19271

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Bowman's Mill, Ickleford	Contract No: PSL19/7807 Client Ref: 19271

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

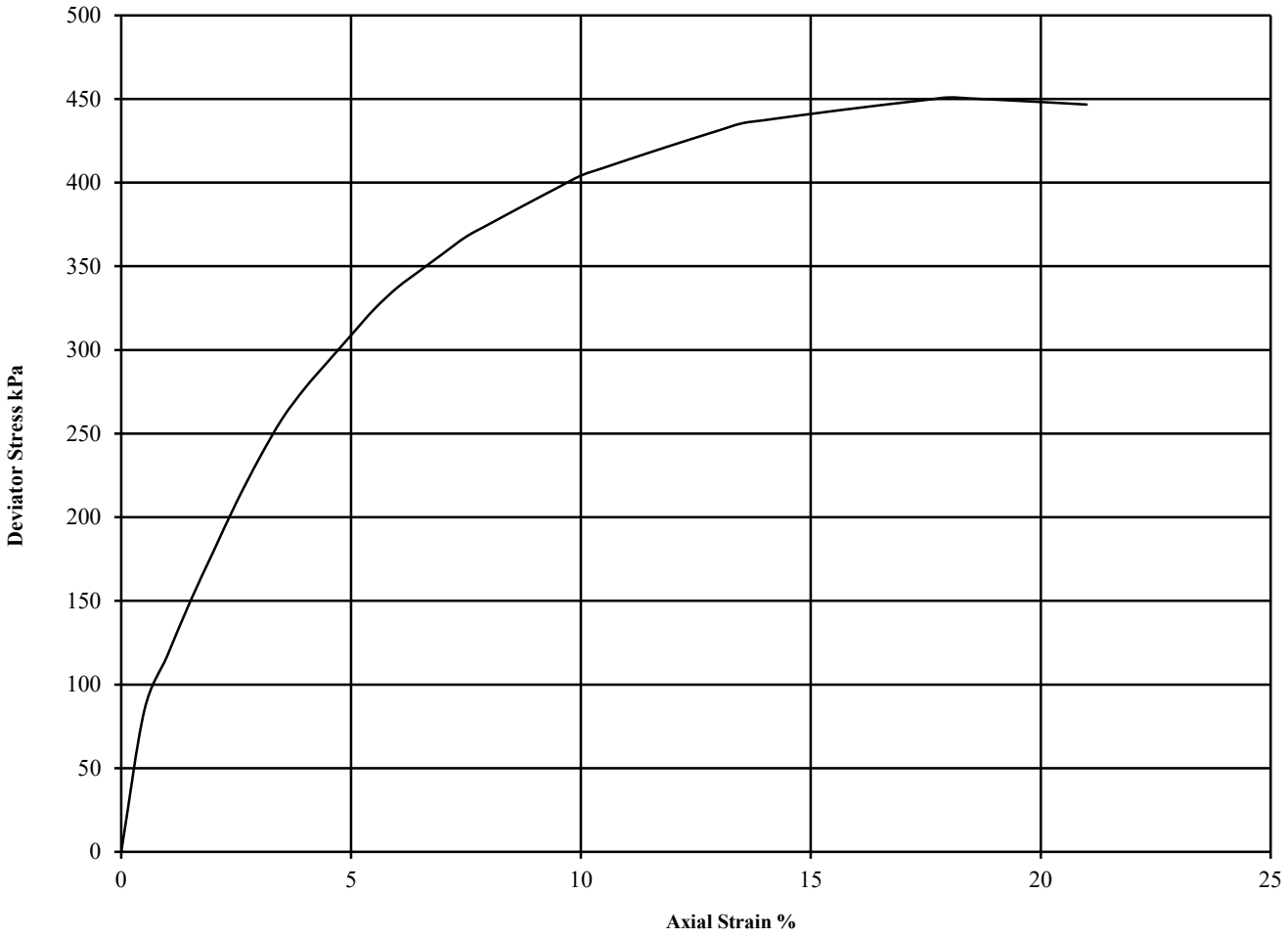
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS07 **Top Depth (m):** 2.50

Sample Number: **Base Depth (m):** 2.95

Sample Type U



Diameter (mm):		61	Height (mm):		122	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.52
1	16	2.10	1.81	50	451	225	18.0	Plastic	See summary of soil descriptions

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Client Ref: 19271

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

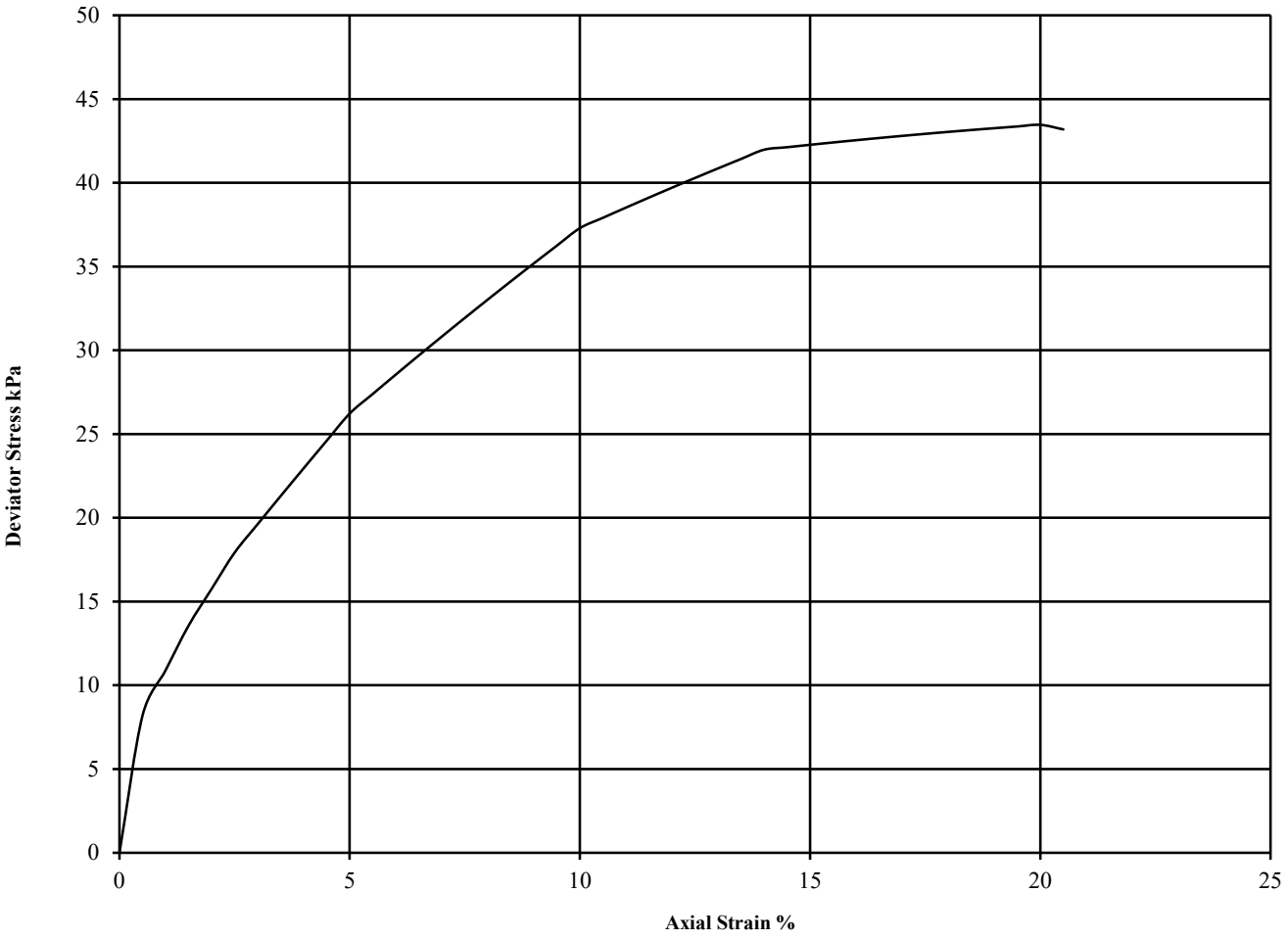
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS17 **Top Depth (m):** 1.50

Sample Number: **Base Depth (m):** 1.95

Sample Type U



Diameter (mm):		70	Height (mm):		140	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.46
1	66	1.63	0.98	30	43	22	20.0	Plastic	See summary of soil descriptions

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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

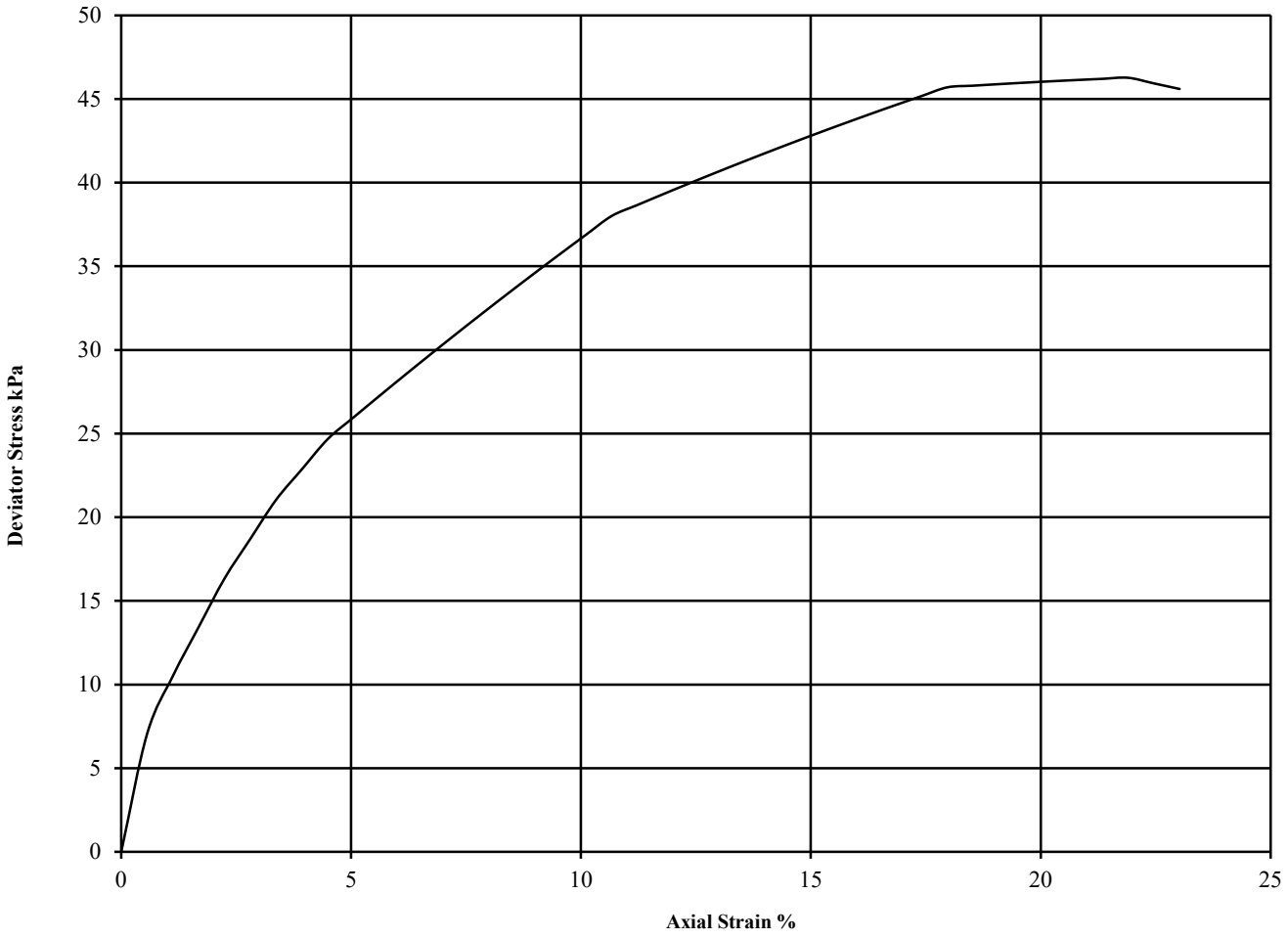
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS21 **Top Depth (m):** 1.50

Sample Number: **Base Depth (m):** 1.95

Sample Type U



Diameter (mm):		73	Height (mm):		130	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.44
1	18	2.09	1.78	30	46	23	21.9	Plastic	See summary of soil descriptions

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Contract No: PSL19/7807

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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

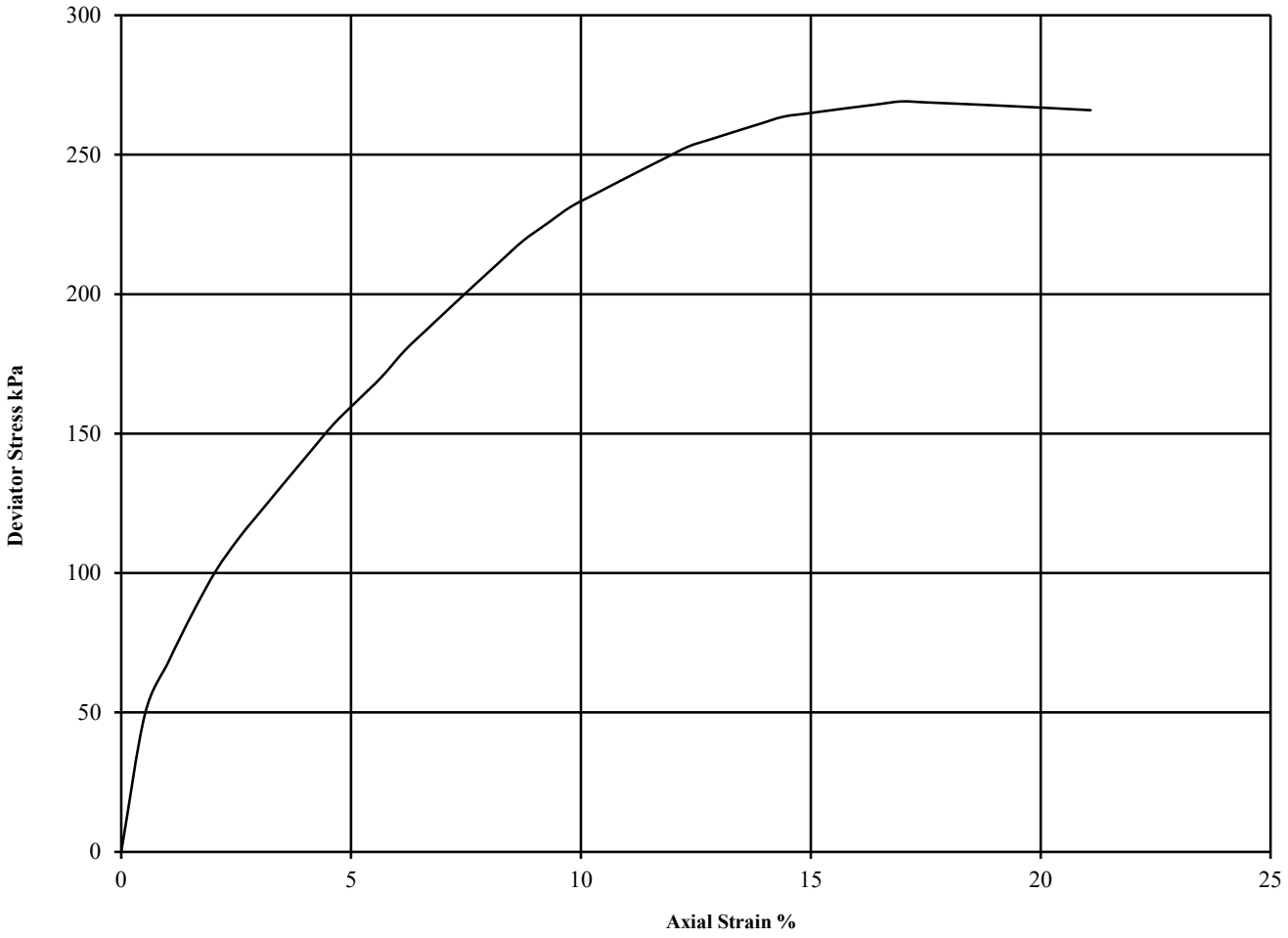
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS25 **Top Depth (m):** 1.50

Sample Number: **Base Depth (m):** 1.95

Sample Type U



Diameter (mm):		72	Height (mm):		140	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.46
1	16	2.09	1.81	30	269	135	17.0	Plastic	See summary of soil descriptions

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Client Ref: 19271

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

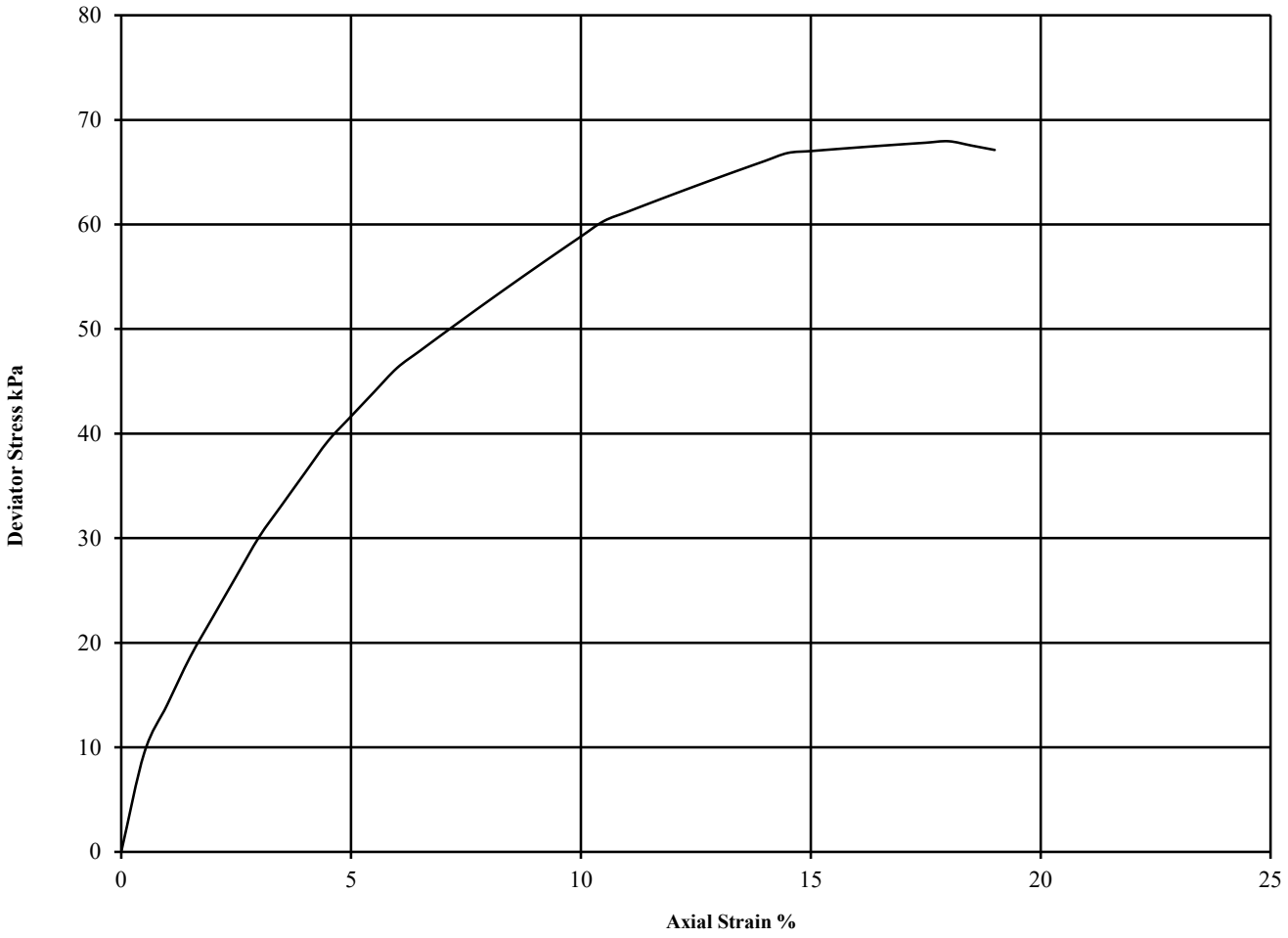
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS28 **Top Depth (m):** 1.50

Sample Number: **Base Depth (m):** 1.95

Sample Type U



Diameter (mm):		63	Height (mm):		126	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.51
1	21	2.07	1.71	30	68	34	18.0	Plastic	See summary of soil descriptions

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Bowman's Mill, Ickleford

Contract No: PSL19/7807

Client Ref: 19271

ONE DIMENSIONAL CONSOLIDATION TEST

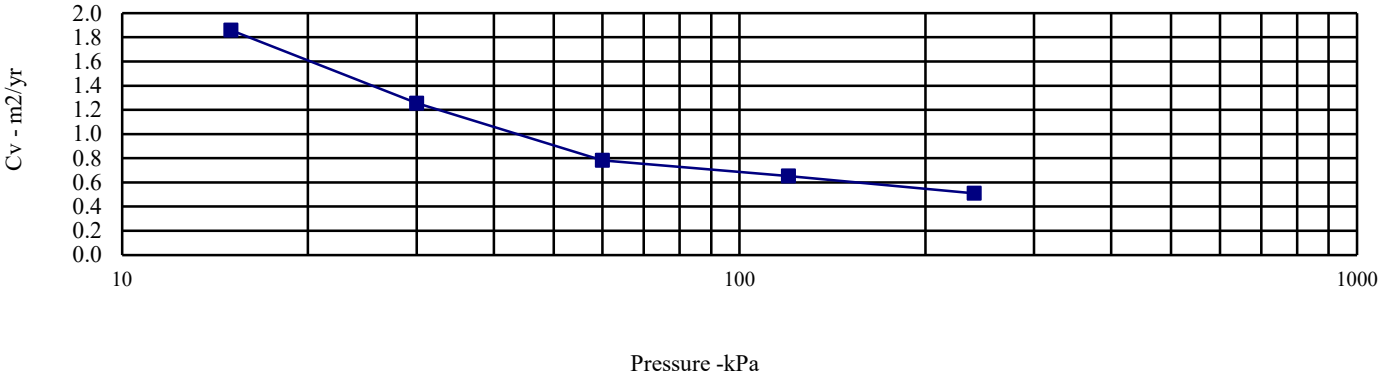
BS 1377: Part 5: 1990: Clause 3

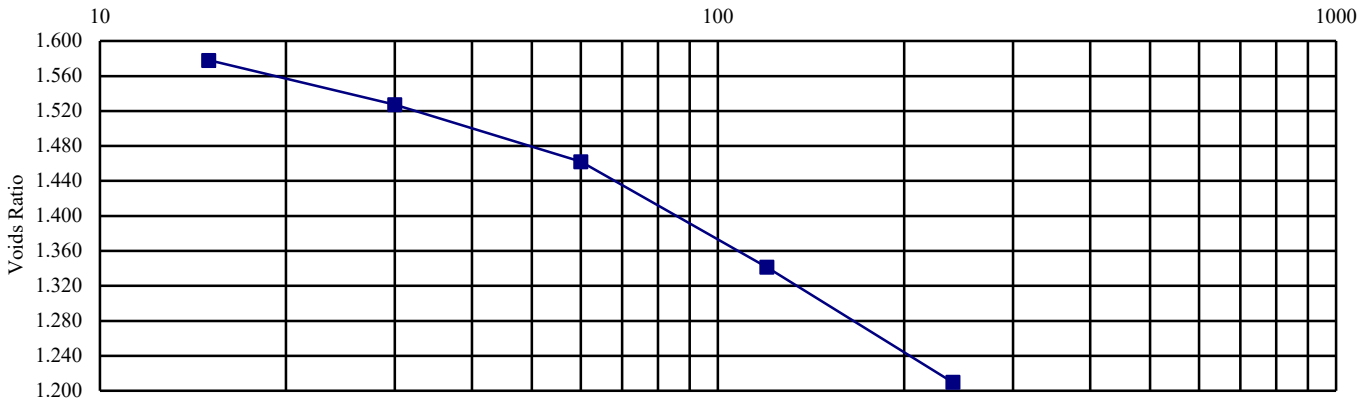
Hole Number: **WS17** **Top Depth (m):** **1.50**

Sample Number: **Base Depth (m) :** **1.95**

Sample Type: **U**

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	66						
Bulk Density (Mg/m3):	1.67	0	15	1.347	1.859	Method used to	
Dry Density (Mg/m3):	1.01	15	30	1.313	1.255	determine CV:	T90
Voids Ratio:	1.631	30	60	0.859	0.783	Nominal temperature	
Degree of saturation:	107.2	60	120	0.817	0.653	during test ' C:	20
Height (mm):	19.746	120	240	0.469	0.511	Remarks:	
Diameter (mm)	50.02					See summary of soil descriptions	
Particle Density (Mg/m3): Assumed	2.65						





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Client Ref: **19271**

ONE DIMENSIONAL CONSOLIDATION TEST

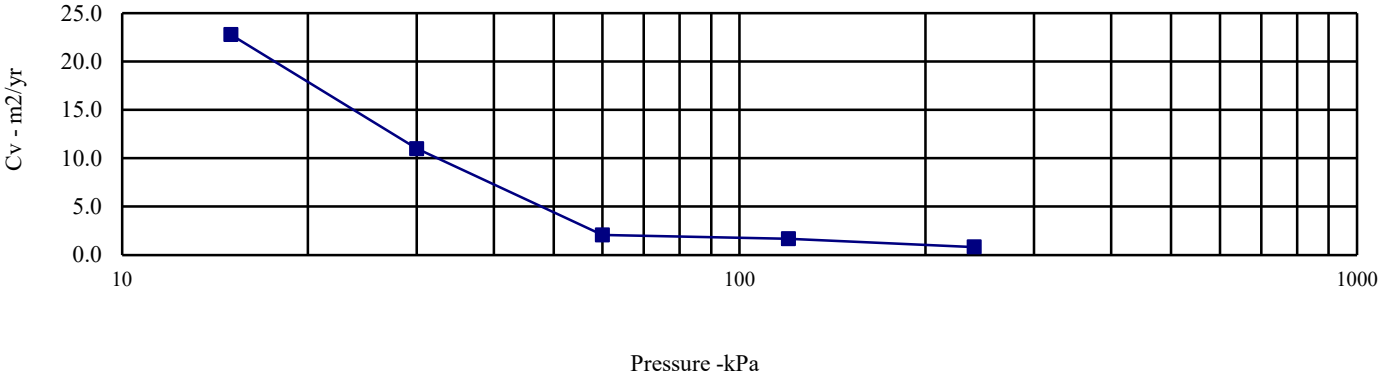
BS 1377: Part 5: 1990: Clause 3

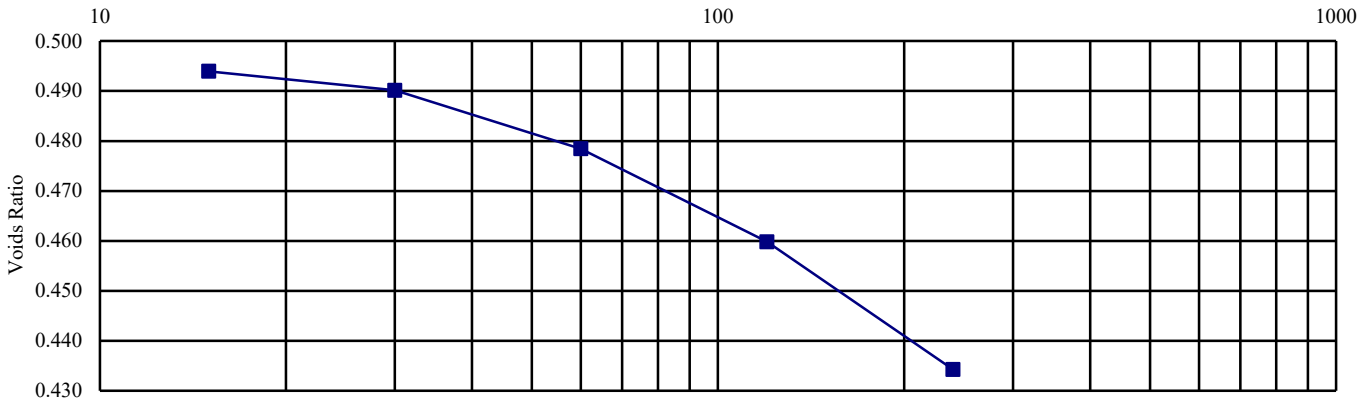
Hole Number: **WS21** **Top Depth (m):** **1.50**

Sample Number: **Base Depth (m) :** **1.95**

Sample Type: **U**

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	18						
Bulk Density (Mg/m3):	2.10	0	15	0.198	22.781	Method used to determine CV:	T90
Dry Density (Mg/m3):	1.77	15	30	0.169	10.999		
Voids Ratio:	0.498	30	60	0.262	2.066	Nominal temperature during test ' C:	20
Degree of saturation:	98.3	60	120	0.210	1.673		
Height (mm):	19.818	120	240	0.146	0.826	Remarks: See summary of soil descriptions	
Diameter (mm)	50.023						
Particle Density (Mg/m3): Assumed	2.65						





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ONE DIMENSIONAL CONSOLIDATION TEST

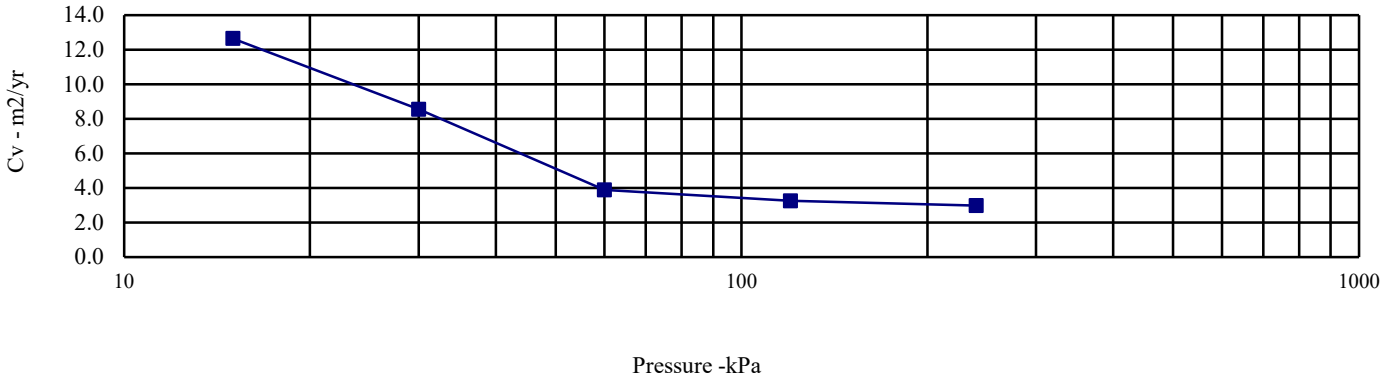
BS 1377: Part 5: 1990: Clause 3

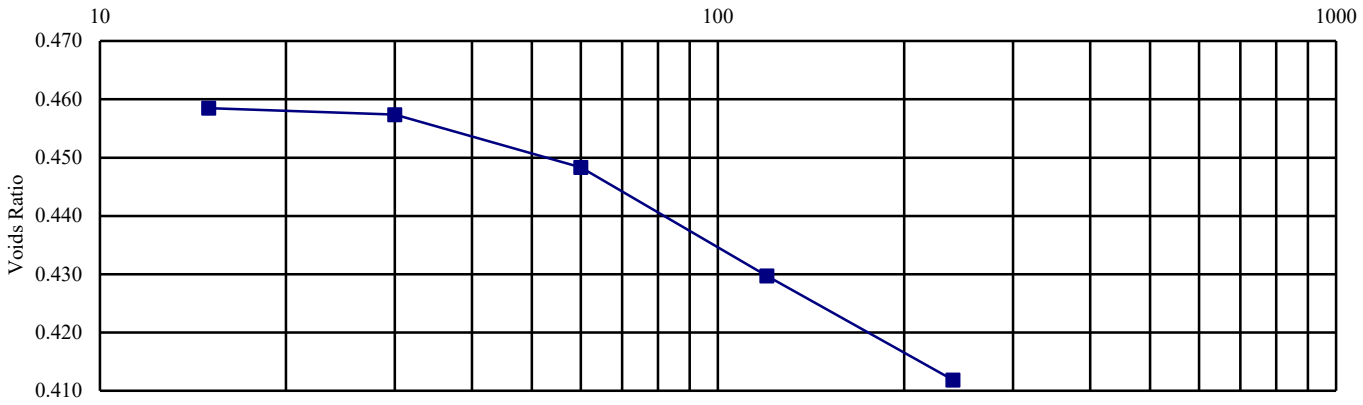
Hole Number: **WS25** **Top Depth (m):** **1.50**

Sample Number: **Base Depth (m) :** **1.95**

Sample Type: **U**

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	16						
Bulk Density (Mg/m3):	2.09	0	15	0.370	12.643	Method used to	
Dry Density (Mg/m3):	1.81	15	30	0.051	8.551	determine CV:	T90
Voids Ratio:	0.467	30	60	0.207	3.879	Nominal temperature	
Degree of saturation:	89.7	60	120	0.215	3.247	during test ' C:	20
Height (mm):	19.818	120	240	0.104	2.976	Remarks:	
Diameter (mm)	50.025					See summary of soil descriptions	
Particle Density (Mg/m3): Assumed	2.65						





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ONE DIMENSIONAL CONSOLIDATION TEST

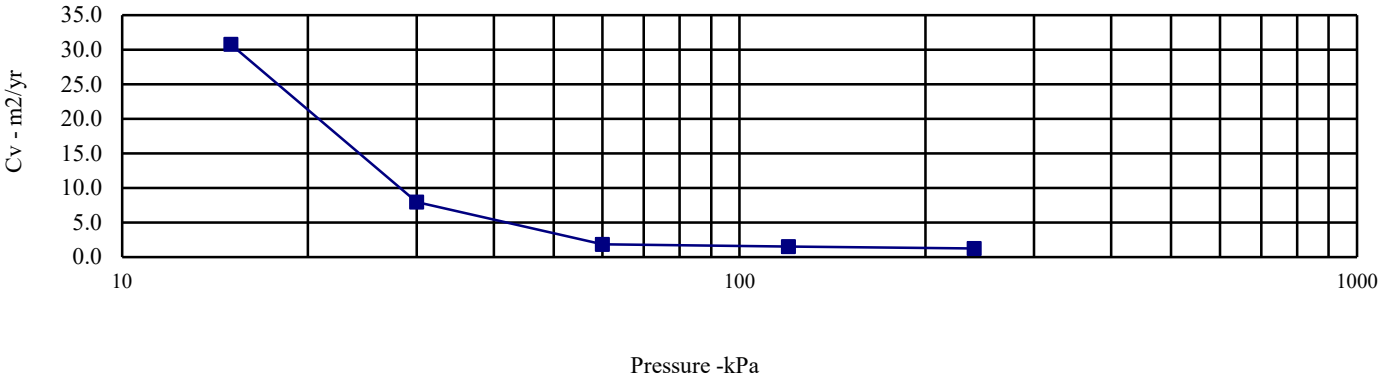
BS 1377: Part 5: 1990: Clause 3

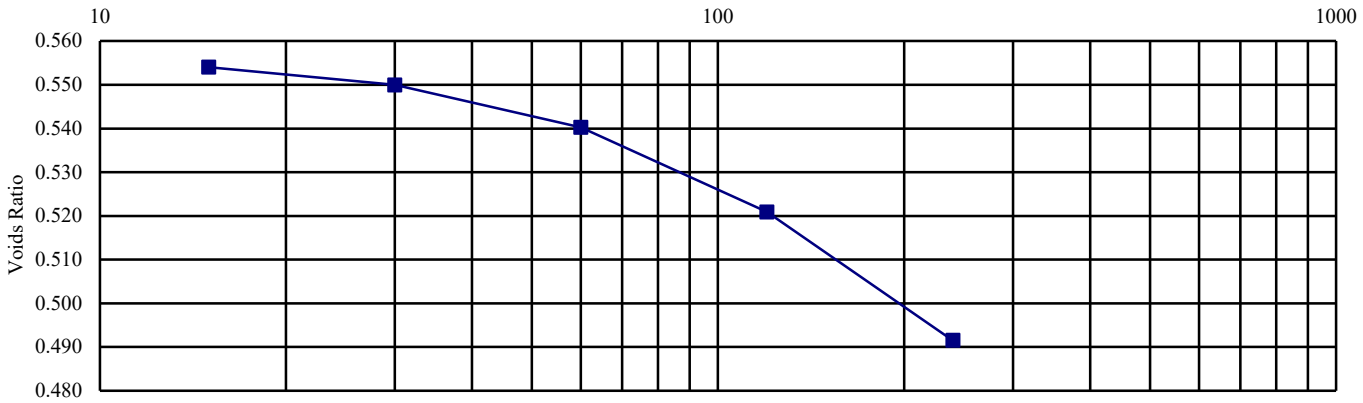
Hole Number: **WS28** **Top Depth (m):** **1.50**

Sample Number: **Base Depth (m) :** **1.95**

Sample Type: **U**

Initial Conditions		Pressure Range kPa		Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	21						
Bulk Density (Mg/m3):	2.06	0	15	0.094	30.764	Method used to	
Dry Density (Mg/m3):	1.70	15	30	0.174	7.923	determine CV:	T90
Voids Ratio:	0.556	30	60	0.208	1.823	Nominal temperature	
Degree of saturation:	100.9	60	120	0.210	1.494	during test ' C:	20
Height (mm):	19.922	120	240	0.161	1.223	Remarks:	
Diameter (mm)	50.03					See summary of soil descriptions	
Particle Density (Mg/m3): Assumed	2.65						





UKAS TESTING 4043	PSL Professional Soils Laboratory	**Bowman's Mill, Ickleford**	**Contract No:** PSL19/7807 **Client Ref:** 19271

APPENDIX 6 – Permanent Gas Monitoring Results

PERMANENT GROUND GAS MONITORING FORM

GROUNDTECH CONSULTING

SITE NAME:	*BOWMANS MILL, ICKLEFORD*	***ENGINEER:***	*Steffan Mullen*
CLIENT:	*SPAWFORTHS*	***DATE:***	*23/12/2019*
JOB NO:	*19271*		

Pressure Trend:	*Steady*	***Weather:***	*Overcast*	***Equipment:***	*GFM 436*

Ambient:	O_2 (%v/v)	CH_4 (%v/v)	CO_2 (%v/v)	LEL	H_2S (ppm)	CO (ppm)
Start	19.9	0.0	0.0	0.0	0.0	0.0
Finish	19.9	0.0	0.0	0.0	0.0	0.0

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q_{hg} CO_2 (l/hr)	Q_{hg} CH_4 (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS02	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.4	19.7	19.4	0.0	0.0	0.0	-10.0	0.0004	0.0000	1003	-		NGW
WS06	0.0	1.0	0.00	0.0	0.0	0.0	0.4	0.4	19.7	19.7	0.0	0.0	0.0	0.0	0.0004	0.0000	1003	-		0.80
WS09	0.0	0.0	0.00	0.0	0.0	0.0	0.3	0.1	19.8	20.0	0.0	0.0	0.0	0.0	0.0003	0.0000	1003	-		0.36
WS12	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.1	20.1	0.0	0.0	0.0	0.0	0.0000	0.0000	1003	-		0.58
WS17	0.2	0.2	0.04	0.0	0.0	0.0	0.0	0.0	20.1	20.1	0.0	0.0	0.0	0.0	0.0000	0.0000	1002	-		0.29
WS18	0.2	0.0	0.04	0.0	0.0	0.0	0.1	0.1	20.1	20.1	0.0	0.0	0.0	0.0	0.0002	0.0000	1002	-		0.92
WS23	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.2	20.2	0.0	0.0	0.0	0.0	0.0000	0.0000	1001	-		2.60
WS25	0.0	0.0	0.00	0.0	0.0	0.0	0.4	0.0	19.0	19.9	0.0	0.0	0.0	0.0	0.0004	0.0000	1000	-		2.83
WS28	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	19.9	19.9	0.0	0.0	0.0	0.0	0.0000	0.0000	1001	-		1.20
WS29	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	18.6	18.6	0.0	0.0	0.0	0.0	0.0000	0.0000	1001	-		1.90

Notes:

APPENDIX 7 – Tier 1 Generic Screening Values

Generic Tier I Generic Assessment Criteria (GAC)

GROUNDTECH CONSULTING

Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source
SOM	%	1	2.5	6	1	2.5	6	
Arsenic	mg/kg	32	32	32	640	640	640	SGVs
Beryllium	mg/kg	1.7	1.7	1.7	12	12	12	LQM S4ULs
Boron (water soluble)	mg/kg	290	290	290	240000	240000	240000	LQM S4ULs
Cadmium	mg/kg	10	10	10	230	230	230	SGVs
Chromium (Total)	mg/kg	910	910	910	8600	8600	8600	LQM S4ULs
Chromium (VI)	mg/kg	21	21	21	49	49	49	DEFRA C4SLs
Copper	mg/kg	2400	2400	2400	68000	68000	68000	LQM S4ULs
Lead	mg/kg	200	200	200	2300	2300	2300	DEFRA C4SLs
Organic Mercury	mg/kg	1.2	1.2	1.2	26	26	26	LQM S4ULs
Nickel	mg/kg	130	130	130	1800	1800	1800	SGVs
Selenium	mg/kg	350	350	350	13000	13000	13000	SGVs
Vanadium	mg/kg	410	410	410	9000	9000	9000	LQM S4ULs
Zinc	mg/kg	3700	3700	3700	730000	730000	730000	LQM S4ULs
Aliphatic EC 5 - 6	mg/kg	42	78	160	3200 (304) [sol]	5900 (558) [sol]	12000 (1150) [sol]	LQM S4ULs
Aliphatic EC 6 - 8	mg/kg	100	230	530	7800 (144) [sol]	17000 (322) [sol]	40000 (736) [sol]	LQM S4ULs
Aliphatic EC 8 - 10	mg/kg	27	65	150	2000 (78) [sol]	4800 (190) [sol]	11000 (451) [vap]	LQM S4ULs
Aliphatic EC 10 - 12	mg/kg	130 (48) [vap]	330 (118) [vap]	760 (283) [vap]	9700 (48) [sol]	23000 (118) [vap]	47000 (283) [vap]	LQM S4ULs
Aliphatic EC 12 - 16	mg/kg	1100 (24) [sol]	2400 (59) [sol]	4300 (142) [sol]	59000 (24) [sol]	82000 (59) [sol]	90000 (142) [sol]	LQM S4ULs
Aliphatic EC 16 - 35	mg/kg	65000 (8.48) [f,sol]	92000 (21) [f,sol]	110000 [f]	1600000 [f]	1700000 [f]	1800000 [f]	LQM S4ULs
Aliphatic EC 35 - 44	mg/kg	65000 (8.48) [f,sol]	92000 (21) [f,sol]	110000 [f]	1600000 [f]	1700000 [f]	1800000 [f]	LQM S4ULs
Aromatic EC 5 - 7	mg/kg	70	140	300	26000 (1220) [sol]	46000 (2260) [sol]	86000 (4710) [sol]	LQM S4ULs
Aromatic EC 7 - 8	mg/kg	130	290	660	56000 (869) [vap]	110000 (1920)	180000 (4360)	LQM S4ULs
Aromatic EC 8 - 10	mg/kg	34	83	190	3500 (613) [vap]	8100 (1500) [vap]	17000 (3580) [vap]	LQM S4ULs
Aromatic EC 10 - 12	mg/kg	74	180	380	16000 (364) [sol]	28000 (899) [sol]	34000 (2150) [sol]	LQM S4ULs
Aromatic EC 12 -16	mg/kg	140	330	660	36000 (169) [sol]	37000	38000	LQM S4ULs
Aromatic EC 16 - 21	mg/kg	260 [f]	540 [f]	930 [f]	28000 [f]	28000 [f]	28000 [f]	LQM S4ULs
Aromatic EC 21 - 35	mg/kg	1100 [f]	1500 [f]	1700 [f]	28000 [f]	28000 [f]	28000 [f]	LQM S4ULs
Aromatic EC 35 - 44	mg/kg	1100 [f]	1500 [f]	1700 [f]	28000 [f]	28000 [f]	28000 [f]	LQM S4ULs
Benzene	mg/kg	0.33	0.33	0.33	95	95	95	SGVs
Toluene	mg/kg	610	610	610	4400	4400	4400	SGVs
Ethyl Benzene	mg/kg	350	350	350	2800	2800	2800	SGVs
Xylene - o	mg/kg	250	250	250	2600	2600	2600	SGVs
Xylene - m	mg/kg	240	240	240	3500	3500	3500	SGVs
Xylene - p	mg/kg	230	230	230	3200	3200	3200	SGVs
MTBE (methyl tert-butyl	mg/kg	49	84	160	7900	13000	24000	CL:AIRE 2010
Acenaphthene	mg/kg	210	510	1100	84000 (57) [sol]	97000 (141) [sol]	100000	LQM SAULs
Acenaphthylene	mg/kg	170	420	920	83000 (86.1) [sol]	97000 (212) [sol]	100000	LQM S4ULs
Anthracene	mg/kg	2400	5400	11000	520000	540000	540000	LQM S4ULs
Benz(a)anthracene	mg/kg	7.2	11	13	170	170	180	LQM S4ULs
Benzo(a)pyrene	mg/kg	2.2	2.7	5*	35	35	77*	DEFRA C4SL*/LQM
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	44	44	45	LQM S4ULs
Benzo(ghi)perylene	mg/kg	320	340	350	3900	4000	4000	LQM S4ULs
Benzo(k)fluoranthene	mg/kg	77	93	100	1200	1200	1200	LQM S4ULs
Chrysene	mg/kg	15	22	27	350	350	350	LQM S4ULs
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.3	3.5	3.6	3.6	LQM S4ULs
Fluoranthene	mg/kg	280	560	890	23000	23000	23000	LQM S4ULs
Fluorene	mg/kg	170	400	860	63000 (30.9) [sol]	68000	71000	LQM S4ULs
Indeno(123-cd)pyrene	mg/kg	27	36	41	500	510	510	LQM S4ULs
Naphthalene	mg/kg	2.3 f	5.6 f	13 f	190 [f] (76.4) [sol]	460 [f] (183) [sol]	1100 [f] (432) [sol]	LQM S4ULs
Phenanthrene	mg/kg	95	220	440	22000	22000	23000	LQM S4ULs
Pyrene	mg/kg	620	1200	2000	54000	54000	54000	LQM S4ULs

Proposed End Use	Unit	Residential with Plant Uptake			Commercial			Source
SOM	%	1	2.5	6	1	2.5	6	
Phenol	mg/kg	420	420	420	3200	3200	3200	SGVs
Chlorophenols	mg/kg	0.87 [g]	2	4.5	3500	4000	4300	LQM S4ULs
Pentachlorophenol	mg/kg	0.22	0.52	1.2	400	400	400	LQM S4ULs
Carbon disulphide	mg/kg	0.14	0.29	0.62	11	22	47	LQM S4ULs
Hexachlorobutadiene	mg/kg	0.29	0.7	1.6	31	66	120	LQM S4ULs
1,1,1,2 Tetrachloroethane	mg/kg	1.6	3.4	7.5	270	550	1100	LQM S4ULs
1,1,1 Trichloroethane	mg/kg	8.8	18	39	660	1300	3000	LQM S4ULs
Trichloroethene	mg/kg	0.016	0.034	0.075	1.2	2.6	5.7	LQM S4ULs
Tetrachoromethane	mg/kg	0.026	0.056	0.13	2.9	6.3	14	LQM S4ULs
1,2-Dichloroethane	mg/kg	0.0071	0.011	0.019	0.67	0.97	1.7	LQM S4ULs
Chloroethene (Vinyl	mg/kg	0.00064	0.00087	0.0014	0.059	0.077	0.12	LQM S4ULs
Trichloromethane	mg/kg	0.91	1.7	3.4	99	170	350	LQM S4ULs
Tetrachloroethene	mg/kg	0.18	0.39	0.9	19	42	95	LQM S4ULs
Hexachlorobenzene	mg/kg	1.8 (0.2) [vap]	3.3 (0.5) [vap]	4.9	110 (0.2) [vap]	120	120	LQM S4ULs
Pentachlorobenzene	mg/kg	5.8	12	22	640 (43) [sol]	770 (107) [sol]	830	LQM S4ULs
1,2,4,5-Tetrachlorobenzene	mg/kg	0.33	0.77	1.6	42 (19.7) [sol]	72 (49.1) [sol]	96	LQM S4ULs
1,2,3,5-Tetrachlorobenzene	mg/kg	0.66	1.69	3.7	49 (39.4) [vap]	120 (98.1) [vap]	240 (235) [vap]	LQM S4ULs
1,2,3,4-Tetrachlorobenzene	mg/kg	15	36	78	1700 (122) [vap]	3080 (304) [vap]	4400 (728) [vap]	LQM S4ULs
1,3,5-Trichlorobenzene	mg/kg	0.33	0.81	1.9	23	55	130	LQM S4ULs
1,2,4-Trichlorobenzene	mg/kg	2.6	6.4	15	220	530	1300	LQM S4ULs
1,2,3-Trichlorobenzene	mg/kg	1.5	3.6	8.6	102	250	590	LQM S4ULs
1,4-dichlorobenzene	mg/kg	61 [f]	150 [f]	350 [f]	4400 [f] (224) [vap]	10000 [f] (540) [vap]	25000 [f] (1280) [vap]	LQM S4ULs
1,3-dichlorobenzene	mg/kg	0.4	1	2.3	30	73	170	LQM S4ULs
1,2-Dichlorobenzene	mg/kg	23	55	130	2000 (571) [sol]	4800 (1370) [sol]	11000 (3240) [sol]	LQM S4ULs
Chlorobenzene	mg/kg	0.46	1	2.4	56	130	290	LQM S4ULs
Gamma-	mg/kg	0.06	0.14	0.33	67	69	70	LQM S4ULs
Beta-	mg/kg	0.085	0.2	0.46	65	65	65	LQM S4ULs
Alpaha -	mg/kg	0.23	0.55	1.2	170	180	180	LQM S4ULs
Beta -Endosulfan	mg/kg	7	17	39	6300 (0.00007)	7800 (0.0002) [vap]	8700	LQM S4ULs
Alpha-Endosulfan	mg/kg	7.4	18	41	5600 (0.003) [vap]	7400 (0.007) [vap]	8400 (0.016) [vap]	LQM S4ULs
Dichlorvos	mg/kg	0.032	0.066	0.14	140	140	140	LQM S4ULs
Atrazine	mg/kg	3.3	7.6	17.4	9300	9400	9400	LQM S4ULs
Dieldrin	mg/kg	0.97	2	3.5	170	170	170	LQM S4ULs
Aldrin	mg/kg	5.7	6.6	7.1	170	170	170	LQM S4ULs
HMX	mg/kg	5.7	13	26	110000	110000	110000	LQM S4ULs
2,4,6-Trinitrotoulene	mg/kg	1.6	3.7	8.1	1000	1000	1000	LQM S4ULs
RDX	mg/kg	120	250	540	210000	210000	210000	LQM S4ULs

[sol] S4UL exceeds the solubility saturation limit (which is presented in brackets)

[vap] S4ULS presented exceeds the vapour saturation limit, which is presented in brackets

[f] For naphthalene, the S4UL is based on a comparison of inhalation exposure with the TDI_{inhal} for localised affects

[f] S4UL based on comparison of inhalation exposure with inhalation TDI for localised effects

[dir] S4ULs based on a threshold protecive direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustation only

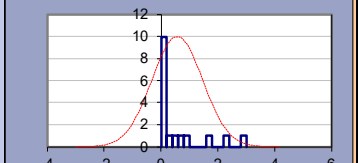
APPENDIX 8 – ESI Statistical Analysis

Test Results

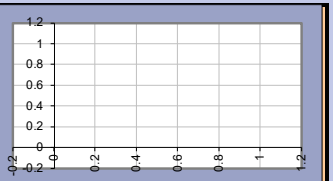
Client/client ref: BOWMAN'S IN(Site ref: BOWMAN'S MILL, ICKLEFORD Date: 21-Jan-2020
Project ref: 19271 Data description: PAHs for Residential End Use User details: SF

Dataset	Benzo(a)Pyrene (mg/kg)
Sample mean, $\bar{x}$ (mg/kg)	0.5776
Sample standard deviation, s	0.8906
Sample size, n	17
Critical concentration, Cc (mg/kg)	2.2

Use Normal distribution to test



Outliers & non-detects	
Outliers present?	YES
Significance level	5%
Outliers removed?	0
Non-detects	0

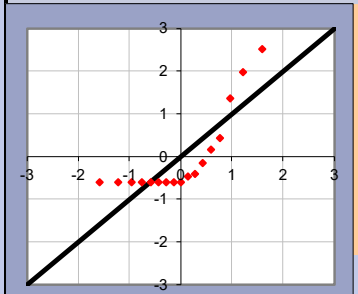


Normality test

Significance le 5%

Non-normal distribution

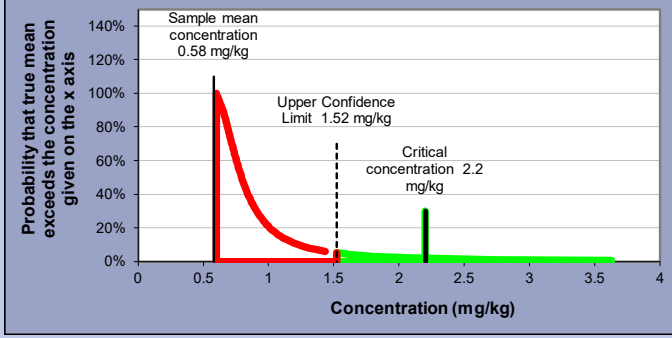
Use: Auto: Chebychev



Test scenario:

Planning: is true mean lower than critical concentration (μ < Cc)?

Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**98%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

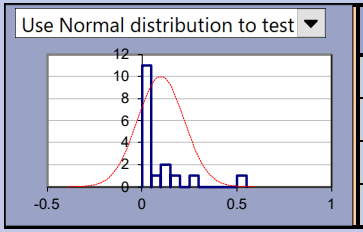
μ < Cc (re this dataset)

Back to data | Back to summary | Go to outlier test | Go to normality test

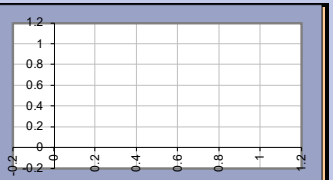
Test Results

Client/client ref: BOWMAN'S IN(Site ref: BOWMAN'S MILL, ICKLEFORD Date: 21-Jan-2020
Project ref: 19271 Data description: PAHs for Residential End Use User details: SF

Dataset	Dibenz(ah)anthracene (mg/kg)
Sample mean, $\bar{x}$ (mg/kg)	0.1
Sample standard deviation, s	0.1228
Sample size, n	17
Critical concentration, Cc (mg/kg)	0.24



Outliers & non-detects	
Outliers present?	YES
Significance level	5%
Outliers removed?	0
Non-detects	0

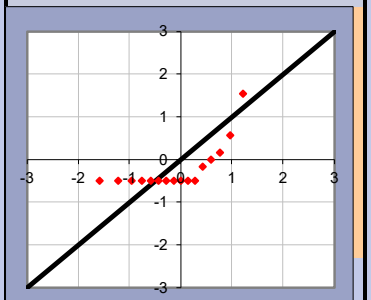


Normality test

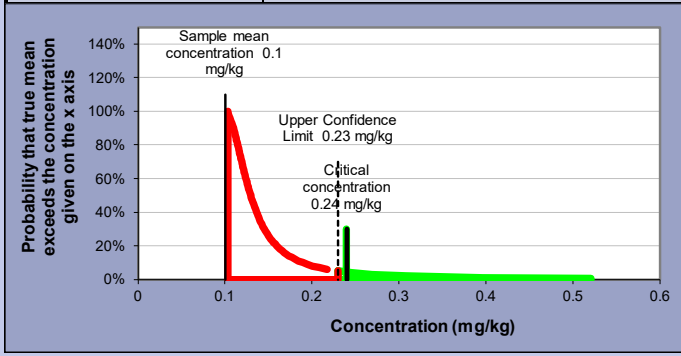
Significance le 5%

Non-normal distribution

Use: Auto: Chebychev



Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?
Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	96%
Base decision on:	evidence level
Evidence level required:	95%
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

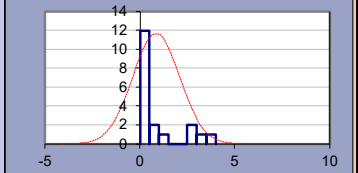
Back to data | Back to summary | Go to outlier test | Go to normality test

Test Results

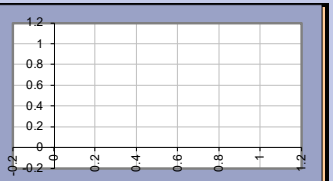
Client/client ref: BOWMAN'S IN(Site ref: BOWMAN'S MILL, ICKLEFORD Date: 21-Jan-2020
Project ref: 19271 Data description: PAHs for Residential End Use User details: SF

Dataset: Benzo(b)fluoranthene (mg/kg)	
Sample mean, $\bar{x}$ (mg/kg)	0.8616
Sample standard deviation, s	1.2398
Sample size, n	19
Critical concentration, Cc (mg/kg)	2.6

Use Normal distribution to test



Outliers & non-detects	
Outliers present?	NO
Significance level	5%
Outliers removed?	0
Non-detects	0

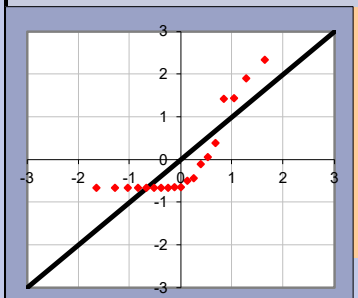


Normality test

Significance le 5%

Non-normal distribution

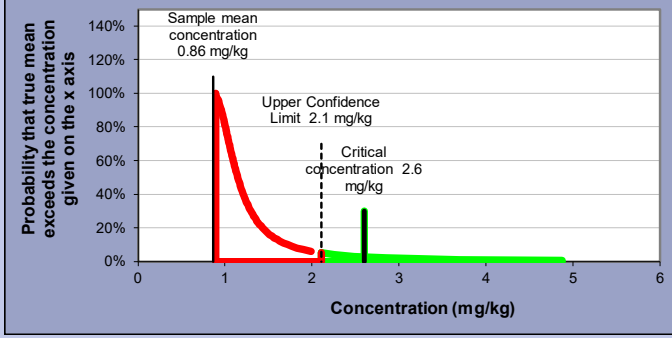
Use: Auto: Chebychev



Test scenario:

Planning: is true mean lower than critical concentration (μ < Cc)?

Null hypothesis:	The true mean concentration is equal to or greater than the critical concentration: μ ≥ Cc
Alternative hypothesis:	The true mean concentration is less than the critical concentration: μ < Cc



Evidence against Null hypothesis:	**97%**
Base decision on:	evidence level
Evidence level required:	**95%**
Balance of probability?	N/A
Reject Null Hypothesis?	Yes

μ < Cc (re this dataset)

Back to data | Back to summary | Go to outlier test | Go to normality test

APPENDIX 9 - CIRIA Risk Assessment Methodology

Contaminated Land Risk Assessment

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ⇨ Hazard Assessment ⇨ Risk Estimation ⇨ Risk Evaluation

CLR11 outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under CLR11, three tiers of risk assessment exist - Preliminary, Generic Quantitative and Detailed Quantitative.

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

- High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;

- Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;

- Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term;

- Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

- Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
  Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse;

- Medium: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
  Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve;

- Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment;
  Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

- Minor: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
  Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

- Very high: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required;

- High: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term;

- Moderate: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;

- Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild;

- Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX 10 – JIWG Assessment Sheets

JIWG

Joint Industry Working Group

Asbestos in Soil and Construction & Demolition Materials

Decision Support Tool for Receptor Risk Ranking

Stage 1

Hazard Identification		Score
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Asbestos fibre type	Mainly chrysotile and trace amphibole (no crocidolite)	1
Sub-total		11
Hazard ranking		Medium

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.
It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.

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Version 2, February 2017

Stage 2

Emission Factors		Score
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Low quantities - >0.01 to <0.05 %wt/wt	2
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Negligible	0
Activity type and effect on deterioration of ACMs	Low disturbance, minimal deterioration expected	2
Best description of primary host material matrix	Coarse to Fine Sand	2
Sub-total		**6**
Exposure ranking		**Low**

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Stage 3

Pathway and Receptor Sensitivity		Score	
Receptor category	Residential	No score required	
Age of Receptor	Young adult (>16 and <24)	2	
Duration of exposure/site occupancy	> 1hr <10 hr daily exposure (e.g. part-time to full time occupational exposure or extended daily recreational exposure)	3	
Receptor ranking		5	Medium
Combined hazard, exposure and receptor ranking			Medium
Pathway: Distance of Receptor from Source	In or within 10m of area of disturbance	4	
Pathway: Depth to impacted material	Material buried at depth, unlikely to be disturbed except for deeper construction related excavation	B	
Pathway ranking		4B	Very Low
Overall ranking			Very Low

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Project Reference	

Site Name	Bowman's Mill
Client	Bowman's Ingredients Ltd

Run by	SF
Date	10-Jan-20
Reviewed by	

Characterisation of scenario being evaluated	

Interpretation of scenario ranking by DST	

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JIWG

Joint Industry Working Group

Asbestos in Soil and Construction & Demolition Materials

Project Reference	19271
Site Name	Bowman's Mill, Ickleford
Client	Bowman's Ingredients Ltd
Run by	SF
Date	10-Jan-20
Scenario details	

Decision Support Tool for CAR2012 Work Categories

Stage 1

Hazard Factors

		Score
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs at outset of work	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Very Low quantities - <0.001 to 0.01 %wt/wt	1
Sub-total		**11**

Note: the asbestos licensing regime is unaffected by the type of asbestos fibre present in ACMs

Hazard ranking **Medium**

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.
It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.

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Stage 2

Exposure Factors

		Score
Anticipated airborne fibre concentration - Control Limit or SALI?	<0.01 fibres/ml	1
Anticipated duration of exposure to asbestos	> 2 hours in a 7 day period and Up to 10 hours in a day (e.g. full time occupational exposure)	4
Activity type and effect on deterioration of ACMs during work	Low intensity, no or minimal deterioration expected	0
Best description of primary host material matrix (soil/made ground)	Coarse to Fine Sand	2
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Low	2
Sub-total		**9**
Exposure ranking		Low
Combined hazard and exposure ranking	**20**	Low

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Stage 3

Risk Assessment Outputs

Probable Licensing Status	Non-Licensed Work
RPE*	EN149 type FFP3 disposable
Dust Suppression**	Manual/localised dust suppression
Hygiene/Decontamination***	Localised and basic personal decontamination facilities

*Where RPE has to be worn continuously for long periods (e.g. more than 1-hour), then powered RPE may be necessary.
**Reduction in control measures possible if natural mitigation factors are present (e.g. raining, wet ground)
***Guide only; suitability of selected personal hygiene measures may be reviewed on a site/contamination-specific basis

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APPENDIX 11 – HazWasteOnline Report

Waste Classification Report

6KLF2-4ZWLX-8SNTP

Job name

EMT-19-20485-Batch-1-File-1

Description/Comments

Project

19271

Site

Bowman's Mill, Ickleford

Related Documents

#	Name	Description
1	EMT-19-20485-Batch-1-File-1.hwol	.hwol file used to create the Job

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Sam Flaherty
Date:
10 Jan 2020 16:15 GMT
Telephone:
0800 1613730

Company:
Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE

Report

Created by: Sam Flaherty
Created date: 10 Jan 2020 16:15 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01-09/12/2019-0.50m		Non Hazardous		3
2	WS01-09/12/2019-1.00m		Non Hazardous		5
3	WS02-09/12/2019-1.00m		Non Hazardous		6
4	WS03-09/12/2019-0.50m		Non Hazardous		8
5	WS03-09/12/2019-1.10m		Non Hazardous		10
6	WS05-09/12/2019-1.00m		Non Hazardous		11
7	WS06-09/12/2019-0.50m		Non Hazardous		13
8	WS08-10/12/2019-0.50m		Non Hazardous		15
9	WS09-10/12/2019-0.50m		Hazardous	HP 7, HP 11	17
10	WS09-10/12/2019-1.00m		Hazardous	HP 7, HP 11	20
11	WS09-10/12/2019-1.50m		Non Hazardous		22
12	WS10-10/12/2019-0.50m		Hazardous	HP 8	24

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
13	WS10-10/12/2019-1.00m		Non Hazardous		27
14	WS11-10/12/2019-1.00m		Hazardous	HP 7, HP 11	28
15	WS11-10/12/2019-1.50m		Hazardous	HP 7, HP 11	31
16	WS12-10/12/2019-0.30m		Hazardous	HP 8	33
17	WS12-10/12/2019-0.50m		Non Hazardous		35
18	WS13-10/12/2019-0.50m		Non Hazardous		36
19	WS14-11/12/2019-0.50m		Hazardous	HP 8	38
20	WS16-11/12/2019-0.40m		Hazardous	HP 3(i), HP 7, HP 8, HP 11	40
21	WS17-11/12/2019-0.60m		Non Hazardous		43
22	WS17-11/12/2019-1.00m		Non Hazardous		45
23	WS18-11/12/2019-0.50m		Non Hazardous		46
24	WS19-11/12/2019-0.50m		Non Hazardous		48
25	WS19-11/12/2019-1.00m		Non Hazardous		50
26	WS21-11/12/2019-0.40m		Non Hazardous		51

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Classification of sample: WS01-09/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS01-09/12/2019-0.50m
Moisture content:
37.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 37.8% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		17.1 mg/kg	1.32	16.384 mg/kg	0.00164 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.2 mg/kg	1.142	0.166 mg/kg	0.0000166 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		58.4 mg/kg	1.462	61.941 mg/kg	0.00619 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		39 mg/kg	1.126	31.865 mg/kg	0.00319 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	77 mg/kg	1.56	87.159 mg/kg	0.00559 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		24.3 mg/kg	2.976	52.484 mg/kg	0.00525 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		109 mg/kg	2.774	219.435 mg/kg	0.0219 %		
11		pH PH		8.4 pH		8.4 pH	8.4 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene 205-917-1 / 208-96-8		0.07 mg/kg		0.0508 mg/kg	0.00000508 %		
14		acenaphthene 201-469-6 / 83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				0.26	mg/kg		0.189	mg/kg	0.0000189 %		
			201-581-5	85-01-8									
17		anthracene				0.06	mg/kg		0.0435	mg/kg	0.00000435 %		
			204-371-1	120-12-7									
18		fluoranthene				0.45	mg/kg		0.327	mg/kg	0.0000327 %		
			205-912-4	206-44-0									
19		pyrene				0.39	mg/kg		0.283	mg/kg	0.0000283 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.29	mg/kg		0.21	mg/kg	0.000021 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.25	mg/kg		0.181	mg/kg	0.0000181 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.32	mg/kg		0.232	mg/kg	0.0000232 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.12	mg/kg		0.0871	mg/kg	0.00000871 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.22	mg/kg		0.16	mg/kg	0.000016 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.18	mg/kg		0.131	mg/kg	0.0000131 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.21	mg/kg		0.152	mg/kg	0.0000152 %		
			205-883-8	191-24-2									
										Total:	0.0444 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS01-09/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS01-09/12/2019-1.00m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH				8.25 pH		8.25 pH	8.25 pH		
				PH							
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS02-09/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS02-09/12/2019-1.00m
Moisture content:
10.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 10.6% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		6.9	mg/kg	1.32	8.237	mg/kg	0.000824 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		53.2	mg/kg	1.462	70.303	mg/kg	0.00703 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		12	mg/kg	1.126	12.216	mg/kg	0.00122 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	10	mg/kg	1.56	14.103	mg/kg	0.000904 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		8.8	mg/kg	2.976	23.681	mg/kg	0.00237 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		46	mg/kg	2.774	115.38	mg/kg	0.0115 %		
11		pH PH		8.97	pH		8.97	pH	8.97 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		0.44	mg/kg		0.398	mg/kg	0.0000398 %		
13		acenaphthylene 205-917-1 / 208-96-8		<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<**LOD**
14		acenaphthene 201-469-6 / 83-32-9		<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				3.62	mg/kg		3.273	mg/kg	0.000327 %		
			201-581-5	85-01-8									
17		anthracene				0.97	mg/kg		0.877	mg/kg	0.0000877 %		
			204-371-1	120-12-7									
18		fluoranthene				4.79	mg/kg		4.331	mg/kg	0.000433 %		
			205-912-4	206-44-0									
19		pyrene				4.29	mg/kg		3.879	mg/kg	0.000388 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				3.35	mg/kg		3.029	mg/kg	0.000303 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.81	mg/kg		2.541	mg/kg	0.000254 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				3.76	mg/kg		3.4	mg/kg	0.00034 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.46	mg/kg		1.32	mg/kg	0.000132 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.82	mg/kg		2.55	mg/kg	0.000255 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.82	mg/kg		1.646	mg/kg	0.000165 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.5	mg/kg		0.452	mg/kg	0.0000452 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				2.27	mg/kg		2.052	mg/kg	0.000205 %		
			205-883-8	191-24-2									
										Total:	0.0273 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS03-09/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS03-09/12/2019-0.50m
Moisture content:
20.4%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20.4% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		8.4	mg/kg	1.32	9.212	mg/kg	0.000921 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		43.2	mg/kg	1.462	52.441	mg/kg	0.00524 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		13	mg/kg	1.126	12.157	mg/kg	0.00122 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	52	mg/kg	1.56	67.367	mg/kg	0.00432 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		18.2	mg/kg	2.976	44.99	mg/kg	0.0045 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		79	mg/kg	2.774	182.025	mg/kg	0.0182 %		
11		pH PH		8.31	pH		8.31	pH	8.31 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene 205-917-1 / 208-96-8		0.04	mg/kg		0.0332	mg/kg	0.00000332 %		
14		acenaphthene 201-469-6 / 83-32-9		0.11	mg/kg		0.0914	mg/kg	0.00000914 %		
15		fluorene 201-695-5 / 86-73-7		0.08	mg/kg		0.0664	mg/kg	0.00000664 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				1.19	mg/kg		0.988	mg/kg	0.0000988 %		
			201-581-5	85-01-8									
17		anthracene				0.22	mg/kg		0.183	mg/kg	0.0000183 %		
			204-371-1	120-12-7									
18		fluoranthene				1.7	mg/kg		1.412	mg/kg	0.000141 %		
			205-912-4	206-44-0									
19		pyrene				1.49	mg/kg		1.238	mg/kg	0.000124 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.72	mg/kg		0.598	mg/kg	0.0000598 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.73	mg/kg		0.606	mg/kg	0.0000606 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.94	mg/kg		0.781	mg/kg	0.0000781 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.37	mg/kg		0.307	mg/kg	0.0000307 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.72	mg/kg		0.598	mg/kg	0.0000598 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.49	mg/kg		0.407	mg/kg	0.0000407 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.1	mg/kg		0.0831	mg/kg	0.00000831 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.52	mg/kg		0.432	mg/kg	0.0000432 %		
			205-883-8	191-24-2									
										Total:	0.0355 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS03-09/12/2019-1.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS03-09/12/2019-1.10m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH		PH		7.63 pH		7.63 pH	7.63 pH		
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS05-09/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS05-09/12/2019-1.00m
Moisture content:
23.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23.6% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		21.5 mg/kg	1.32	22.967 mg/kg	0.0023 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<**LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		78 mg/kg	1.462	92.234 mg/kg	0.00922 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		21 mg/kg	1.126	19.129 mg/kg	0.00191 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	50 mg/kg	1.56	63.099 mg/kg	0.00405 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		21 mg/kg	2.976	50.568 mg/kg	0.00506 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		67 mg/kg	2.774	150.378 mg/kg	0.015 %		
11		TPH (C6 to C40) petroleum group TPH		<38 mg/kg		<38 mg/kg	<0.0038 %		<**LOD**
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
13		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
14		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
16		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
17		pH				7.94	pH		7.94	pH	7.94 pH		
				PH									
18		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
19		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
20		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
21		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
22		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
23		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
24		fluoranthene				0.09	mg/kg		0.0728	mg/kg	0.00000728 %		
			205-912-4	206-44-0									
25		pyrene				0.07	mg/kg		0.0566	mg/kg	0.00000566 %		
			204-927-3	129-00-0									
26		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
27		chrysene				0.06	mg/kg		0.0485	mg/kg	0.00000485 %		
		601-048-00-0	205-923-4	218-01-9									
28		benzo[b]fluoranthene				0.07	mg/kg		0.0566	mg/kg	0.00000566 %		
		601-034-00-4	205-911-9	205-99-2									
29		benzo[k]fluoranthene				0.03	mg/kg		0.0243	mg/kg	0.00000243 %		
		601-036-00-5	205-916-6	207-08-9									
30		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
31		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
32		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
33		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
										Total:	0.0418 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS06-09/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS06-09/12/2019-0.50m
Moisture content:
26.4%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 26.4% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		8.9 mg/kg	1.32	9.297 mg/kg	0.00093 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.1 mg/kg	1.142	0.0904 mg/kg	0.00000904 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		40.4 mg/kg	1.462	46.714 mg/kg	0.00467 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		14 mg/kg	1.126	12.47 mg/kg	0.00125 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	8 mg/kg	1.56	9.872 mg/kg	0.000633 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		21.7 mg/kg	2.976	51.096 mg/kg	0.00511 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		60 mg/kg	2.774	131.684 mg/kg	0.0132 %		
11		pH PH		7.97 pH		7.97 pH	7.97 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
14		acenaphthene 201-469-6 / 83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
17		anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
18		fluoranthene	205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
19		pyrene	204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
25		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
27		benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
										Total:	0.0262 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS08-10/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS08-10/12/2019-0.50m
Moisture content:
19.9%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		11.6 mg/kg	1.32	12.774 mg/kg	0.00128 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<**LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		67.3 mg/kg	1.462	82.037 mg/kg	0.0082 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		20 mg/kg	1.126	18.78 mg/kg	0.00188 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	9 mg/kg	1.56	11.708 mg/kg	0.000751 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		23 mg/kg	2.976	57.093 mg/kg	0.00571 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		82 mg/kg	2.774	189.725 mg/kg	0.019 %		
11		TPH (C6 to C40) petroleum group TPH		<38 mg/kg		<38 mg/kg	<0.0038 %		<**LOD**
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
13		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
14		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
16		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
17		pH				9.87	pH		9.87	pH	9.87 pH		
				PH									
18		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
19		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
20		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
21		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
22		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
23		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
24		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
25		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
26		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
27		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
28		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
29		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
30		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
31		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
32		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
33		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
										Total:	0.041 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS09-10/12/2019-0.50m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS09-10/12/2019-0.50m
Moisture content:
28.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.143%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.143%)

Determinands

Moisture content: 28.8% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		12.7	mg/kg	1.32	13.019	mg/kg	0.0013 %		
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		**<LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		54.6	mg/kg	1.462	61.957	mg/kg	0.0062 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		**<LOD**
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		17	mg/kg	1.126	14.86	mg/kg	0.00149 %		
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	33	mg/kg	1.56	39.964	mg/kg	0.00256 %		
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		**<LOD**
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23.8	mg/kg	2.976	54.996	mg/kg	0.0055 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
10		zinc { zinc chromate }				65	mg/kg	2.774	140	mg/kg	0.014 %		
		024-007-00-3											
11		TPH (C6 to C40) petroleum group				1840	mg/kg		1428.571	mg/kg	0.143 %		
				TPH									
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
13		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
14		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
15		ethylbenzene				0.049	mg/kg		0.038	mg/kg	0.0000038 %		
		601-023-00-4	202-849-4	100-41-4									
16		xylene				0.082	mg/kg		0.0637	mg/kg	0.00000637 %		
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
17		pH				9.57	pH		9.57	pH	9.57 pH		
				PH									
18		naphthalene				0.26	mg/kg		0.202	mg/kg	0.0000202 %		
		601-052-00-2	202-049-5	91-20-3									
19		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
20		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
21		fluorene				0.23	mg/kg		0.179	mg/kg	0.0000179 %		
			201-695-5	86-73-7									
22		phenanthrene				0.39	mg/kg		0.303	mg/kg	0.0000303 %		
			201-581-5	85-01-8									
23		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
24		fluoranthene				0.06	mg/kg		0.0466	mg/kg	0.00000466 %		
			205-912-4	206-44-0									
25		pyrene				0.09	mg/kg		0.0699	mg/kg	0.00000699 %		
			204-927-3	129-00-0									
26		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
27		chrysene				0.04	mg/kg		0.0311	mg/kg	0.00000311 %		
		601-048-00-0	205-923-4	218-01-9									
28		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
29		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
30		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
31		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
32		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
33		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
										Total:	0.174 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations too low to be considered flammable.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 3.8e-06%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.143%)
xylene: (conc.: 6.37e-06%)

Classification of sample: WS09-10/12/2019-1.00m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS09-10/12/2019-1.00m
Moisture content:
27.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.326%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.326%)

Determinands

Moisture content: 27.8% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		TPH (C6 to C40) petroleum group				4171	mg/kg		3263.693	mg/kg	0.326 %		
				TPH									
2		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		603-181-00-X	216-653-1	1634-04-4									
3		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
4		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
5		ethylbenzene				0.102	mg/kg		0.0798	mg/kg	0.00000798 %		
		601-023-00-4	202-849-4	100-41-4									
6		xylene				0.192	mg/kg		0.15	mg/kg	0.000015 %		
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.326 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations too low to be considered flammable.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 7.98e-06%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.326%)
xylene: (conc.: 0.00001%)

Classification of sample: WS09-10/12/2019-1.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS09-10/12/2019-1.50m
Moisture content:
43.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 43.6% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		TPH (C6 to C40) petroleum group		TPH		265	mg/kg		184.54	mg/kg	0.0185 %		
2		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
3		benzene 601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4		toluene 601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5		ethylbenzene 601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
6		xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
										Total:	0.0185 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"
Force this Hazardous property to non hazardous because Not considered flammable as concentrations are considered to be too low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0185%)

Classification of sample: WS10-10/12/2019-0.50m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS10-10/12/2019-0.50m
Moisture content:
27.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 11.71 pH)

Determinands

Moisture content: 27.8% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide }		12.8 mg/kg	1.32	13.224 mg/kg	0.00132 %		
		033-003-00-0 / 215-481-4 / 1327-53-3							
2		cadmium { cadmium oxide }		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0 / 215-146-2 / 1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide }		73.5 mg/kg	1.462	84.057 mg/kg	0.00841 %		
		/ 215-160-9 / 1308-38-9							
4		chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
		024-001-00-0 / 215-607-8 / 1333-82-0							
5		copper { dicopper oxide; copper (I) oxide }		15 mg/kg	1.126	13.215 mg/kg	0.00132 %		
		029-002-00-X / 215-270-7 / 1317-39-1							
6		lead { lead chromate }	1	9 mg/kg	1.56	10.985 mg/kg	0.000704 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
7		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X / 231-299-8 / 7487-94-7							
8		nickel { nickel chromate }		21.4 mg/kg	2.976	49.837 mg/kg	0.00498 %		
		028-035-00-7 / 238-766-5 / 14721-18-7							
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		034-002-00-8 / /							
10		zinc { zinc chromate }		44 mg/kg	2.774	95.511 mg/kg	0.00955 %		
		024-007-00-3 / /							
11		TPH (C6 to C40) petroleum group		268 mg/kg		209.703 mg/kg	0.021 %		
		/ / TPH							
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X / 216-653-1 / 1634-04-4							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
14		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
15		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
16		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
17		pH				11.71	pH		11.71	pH	11.71 pH		
				PH									
18		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
19		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
20		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
21		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
22		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
23		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
24		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
25		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
26		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
27		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
28		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
29		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
30		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
31		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
32		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
33		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
										Total:	0.0477 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Not considered flammable as concentrations are considered to be too low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.021%)

Classification of sample: WS10-10/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS10-10/12/2019-1.00m
Moisture content:
18.4%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.4% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		TPH (C6 to C40) petroleum group		TPH		<38	mg/kg		<38	mg/kg	<0.0038 %		<**LOD**
2		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		603-181-00-X	216-653-1	1634-04-4									
3		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
4		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
5		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
6		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0038 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: WS11-10/12/2019-1.00m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS11-10/12/2019-1.00m
Moisture content:
20.7%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.325%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.325%)

Determinands

Moisture content: 20.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				12.5	mg/kg	1.32	13.674	mg/kg	0.00137 %		
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide }				58.8	mg/kg	1.462	71.201	mg/kg	0.00712 %		
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
		024-001-00-0	215-607-8	1333-82-0									
5		copper { dicopper oxide; copper (I) oxide }				9	mg/kg	1.126	8.395	mg/kg	0.00084 %		
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	31	mg/kg	1.56	40.062	mg/kg	0.00257 %		
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				17.3	mg/kg	2.976	42.659	mg/kg	0.00427 %		
		028-035-00-7	238-766-5	14721-18-7									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
		034-002-00-8											
10		zinc { zinc chromate }				42	mg/kg	2.774	96.532	mg/kg	0.00965 %		
		024-007-00-3											
11		TPH (C6 to C40) petroleum group				3925	mg/kg		3251.864	mg/kg	0.325 %		
				TPH									
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		603-181-00-X	216-653-1	1634-04-4									
13		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
14		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
15		ethylbenzene				0.141	mg/kg		0.117	mg/kg	0.0000117 %		
		601-023-00-4	202-849-4	100-41-4									
16		xylene				0.198	mg/kg		0.164	mg/kg	0.0000164 %		
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
17		pH				8.44	pH		8.44	pH	8.44 pH		
				PH									
18		naphthalene				0.14	mg/kg		0.116	mg/kg	0.0000116 %		
		601-052-00-2	202-049-5	91-20-3									
19		acenaphthylene				0.3	mg/kg		0.249	mg/kg	0.0000249 %		
			205-917-1	208-96-8									
20		acenaphthene				0.25	mg/kg		0.207	mg/kg	0.0000207 %		
			201-469-6	83-32-9									
21		fluorene				2.38	mg/kg		1.972	mg/kg	0.000197 %		
			201-695-5	86-73-7									
22		phenanthrene				2.95	mg/kg		2.444	mg/kg	0.000244 %		
			201-581-5	85-01-8									
23		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			204-371-1	120-12-7									
24		fluoranthene				0.18	mg/kg		0.149	mg/kg	0.0000149 %		
			205-912-4	206-44-0									
25		pyrene				0.42	mg/kg		0.348	mg/kg	0.0000348 %		
			204-927-3	129-00-0									
26		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
27		chrysene				0.14	mg/kg		0.116	mg/kg	0.0000116 %		
		601-048-00-0	205-923-4	218-01-9									
28		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
29		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
30		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
31		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-893-2	193-39-5									
32		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
33		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.352 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations too low to be considered flammable.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 0.00001%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.325%)
xylene: (conc.: 0.00001%)

Classification of sample: WS11-10/12/2019-1.50m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS11-10/12/2019-1.50m
Moisture content:
17.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.981%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.981%)

Determinands

Moisture content: 17.8% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		TPH (C6 to C40) petroleum group				11560	mg/kg		9813.243	mg/kg	0.981 %		
				TPH									
2		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		603-181-00-X	216-653-1	1634-04-4									
3		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
4		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
5		ethylbenzene				0.17	mg/kg		0.144	mg/kg	0.0000144 %		
		601-023-00-4	202-849-4	100-41-4									
6		xylene				0.331	mg/kg		0.281	mg/kg	0.0000281 %		
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.981 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentrations too low to be considered flammable.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 0.00001%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.981%)
xylene: (conc.: 0.00002%)

Classification of sample: WS12-10/12/2019-0.30m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS12-10/12/2019-0.30m
Moisture content:
18.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 11.63 pH)

Determinands

Moisture content: 18.6% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				7.3	mg/kg	1.32	8.127	mg/kg	0.000813 %		
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide }				109.4	mg/kg	1.462	134.818	mg/kg	0.0135 %		
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
		024-001-00-0	215-607-8	1333-82-0									
5		copper { dicopper oxide; copper (I) oxide }				8	mg/kg	1.126	7.595	mg/kg	0.000759 %		
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	7	mg/kg	1.56	9.206	mg/kg	0.00059 %		
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				9.8	mg/kg	2.976	24.593	mg/kg	0.00246 %		
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
		034-002-00-8											
10		zinc { zinc chromate }				21	mg/kg	2.774	49.121	mg/kg	0.00491 %		
		024-007-00-3											
11		pH				11.63	pH		11.63	pH	11.63 pH		
				PH									
12		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
14		acenaphthene	201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
15		fluorene	201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
16		phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
17		anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
18		fluoranthene	205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
19		pyrene	204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
25		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
27		benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
										Total:	0.0234 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS12-10/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS12-10/12/2019-0.50m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH				7.79 pH		7.79 pH	7.79 pH		
				PH							
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS13-10/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS13-10/12/2019-0.50m
Moisture content:
26.4%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 26.4% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		35.5	mg/kg	1.32	37.082	mg/kg	0.00371 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.1	mg/kg	1.142	0.0904	mg/kg	0.00000904 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		23.8	mg/kg	1.462	27.52	mg/kg	0.00275 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		21	mg/kg	1.126	18.705	mg/kg	0.00187 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	155	mg/kg	1.56	191.275	mg/kg	0.0123 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		25	mg/kg	2.976	58.866	mg/kg	0.00589 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate } 024-007-00-3		149	mg/kg	2.774	327.016	mg/kg	0.0327 %		
11		pH PH		9.93	pH		9.93	pH	9.93 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13		acenaphthylene 205-917-1 / 208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14		acenaphthene 201-469-6 / 83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15		fluorene 201-695-5 / 86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				0.05	mg/kg		0.0396	mg/kg	0.00000396 %		
			201-581-5	85-01-8									
17		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			204-371-1	120-12-7									
18		fluoranthene				0.19	mg/kg		0.15	mg/kg	0.000015 %		
			205-912-4	206-44-0									
19		pyrene				0.18	mg/kg		0.142	mg/kg	0.0000142 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.16	mg/kg		0.127	mg/kg	0.0000127 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.18	mg/kg		0.142	mg/kg	0.0000142 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.25	mg/kg		0.198	mg/kg	0.0000198 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.1	mg/kg		0.0791	mg/kg	0.00000791 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.16	mg/kg		0.127	mg/kg	0.0000127 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.13	mg/kg		0.103	mg/kg	0.0000103 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.14	mg/kg		0.111	mg/kg	0.0000111 %		
			205-883-8	191-24-2									
28		asbestos				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5									
										Total:	0.0607 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS14-11/12/2019-0.50m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS14-11/12/2019-0.50m
Moisture content:
24.9%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 11.85 pH)

Determinands

Moisture content: 24.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide }		14.2 mg/kg	1.32	15.011 mg/kg	0.0015 %		
		033-003-00-0 / 215-481-4 / 1327-53-3							
2		cadmium { cadmium oxide }		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0 / 215-146-2 / 1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide }		67.9 mg/kg	1.462	79.455 mg/kg	0.00795 %		
		/ 215-160-9 / 1308-38-9							
4		chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
		024-001-00-0 / 215-607-8 / 1333-82-0							
5		copper { dicopper oxide; copper (I) oxide }		9 mg/kg	1.126	8.113 mg/kg	0.000811 %		
		029-002-00-X / 215-270-7 / 1317-39-1							
6		lead { lead chromate }	1	30 mg/kg	1.56	37.466 mg/kg	0.0024 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
7		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X / 231-299-8 / 7487-94-7							
8		nickel { nickel chromate }		16.1 mg/kg	2.976	38.365 mg/kg	0.00384 %		
		028-035-00-7 / 238-766-5 / 14721-18-7							
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		034-002-00-8 / /							
10		zinc { zinc chromate }		40 mg/kg	2.774	88.844 mg/kg	0.00888 %		
		024-007-00-3 / /							
11		pH		11.85 pH		11.85 pH	11.85 pH		
		/ / PH							
12		naphthalene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			205-917-1	208-96-8									
14		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-469-6	83-32-9									
15		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			201-695-5	86-73-7									
16		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			201-581-5	85-01-8									
17		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			204-371-1	120-12-7									
18		fluoranthene				0.05	mg/kg		0.04	mg/kg	0.000004 %		
			205-912-4	206-44-0									
19		pyrene				0.05	mg/kg		0.04	mg/kg	0.000004 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.04	mg/kg		0.032	mg/kg	0.0000032 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0258 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS16-11/12/2019-0.40m

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:
WS16-11/12/2019-0.40m
Moisture content:
13.2%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to hazardous because Considered potentially flammable due to high concentration.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.163%)

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.163%)

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 11.88 pH)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.163%)

Determinands

Moisture content: 13.2% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				28.2 mg/kg	1.32	32.891 mg/kg	0.00329 %		
		033-003-00-0	215-481-4	1327-53-3							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
2		cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.202	mg/kg	0.0000202 %		
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide }				23.8	mg/kg	1.462	30.729	mg/kg	0.00307 %		
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
		024-001-00-0	215-607-8	1333-82-0									
5		copper { dicopper oxide; copper (I) oxide }				<1	mg/kg	1.126	<1.126	mg/kg	<0.000113 %		<**LOD**
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	31	mg/kg	1.56	42.716	mg/kg	0.00274 %		
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				54.8	mg/kg	2.976	144.081	mg/kg	0.0144 %		
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
		034-002-00-8											
10		zinc { zinc chromate }				135	mg/kg	2.774	330.839	mg/kg	0.0331 %		
		024-007-00-3											
11		TPH (C6 to C40) petroleum group				1849	mg/kg		1633.392	mg/kg	0.163 %		
				TPH									
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		603-181-00-X	216-653-1	1634-04-4									
13		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
14		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
15		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
16		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
17		pH				11.88	pH		11.88	pH	11.88 pH		
				PH									
18		naphthalene				0.22	mg/kg		0.194	mg/kg	0.0000194 %		
		601-052-00-2	202-049-5	91-20-3									
19		acenaphthylene				0.11	mg/kg		0.0972	mg/kg	0.00000972 %		
			205-917-1	208-96-8									
20		acenaphthene				0.1	mg/kg		0.0883	mg/kg	0.00000883 %		
			201-469-6	83-32-9									
21		fluorene				0.18	mg/kg		0.159	mg/kg	0.0000159 %		
			201-695-5	86-73-7									
22		phenanthrene				0.88	mg/kg		0.777	mg/kg	0.0000777 %		
			201-581-5	85-01-8									
23		anthracene				0.23	mg/kg		0.203	mg/kg	0.0000203 %		
			204-371-1	120-12-7									
24		fluoranthene				2.26	mg/kg		1.996	mg/kg	0.0002 %		
			205-912-4	206-44-0									
25		pyrene				2.12	mg/kg		1.873	mg/kg	0.000187 %		
			204-927-3	129-00-0									
26		benzo[a]anthracene				0.87	mg/kg		0.769	mg/kg	0.0000769 %		
		601-033-00-9	200-280-6	56-55-3									
27		chrysene				1.06	mg/kg		0.936	mg/kg	0.0000936 %		
		601-048-00-0	205-923-4	218-01-9									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
28		benzo[b]fluoranthene				1.35	mg/kg		1.193	mg/kg	0.000119 %		
		601-034-00-4	205-911-9	205-99-2									
29		benzo[k]fluoranthene				0.53	mg/kg		0.468	mg/kg	0.0000468 %		
		601-036-00-5	205-916-6	207-08-9									
30		benzo[a]pyrene; benzo[def]chrysene				0.96	mg/kg		0.848	mg/kg	0.0000848 %		
		601-032-00-3	200-028-5	50-32-8									
31		indeno[123-cd]pyrene				0.74	mg/kg		0.654	mg/kg	0.0000654 %		
			205-893-2	193-39-5									
32		dibenz[a,h]anthracene				0.12	mg/kg		0.106	mg/kg	0.0000106 %		
		601-041-00-2	200-181-8	53-70-3									
33		benzo[ghi]perylene				0.84	mg/kg		0.742	mg/kg	0.0000742 %		
			205-883-8	191-24-2									
34		asbestos				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5									
										Total:	0.223 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS17-11/12/2019-0.60m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS17-11/12/2019-0.60m
Moisture content:
22.9%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		12.4 mg/kg	1.32	13.321 mg/kg	0.00133 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<**LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		66.7 mg/kg	1.462	79.321 mg/kg	0.00793 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		20 mg/kg	1.126	18.322 mg/kg	0.00183 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	26 mg/kg	1.56	32.999 mg/kg	0.00212 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		20.8 mg/kg	2.976	50.371 mg/kg	0.00504 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		81 mg/kg	2.774	182.836 mg/kg	0.0183 %		
11		pH PH		9.72 pH		9.72 pH	9.72 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
14		acenaphthene 201-469-6 / 83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			201-581-5	85-01-8									
17		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			204-371-1	120-12-7									
18		fluoranthene				0.07	mg/kg		0.057	mg/kg	0.0000057 %		
			205-912-4	206-44-0									
19		pyrene				0.07	mg/kg		0.057	mg/kg	0.0000057 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.07	mg/kg		0.057	mg/kg	0.0000057 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.03	mg/kg		0.0244	mg/kg	0.00000244 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0369 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS17-11/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS17-11/12/2019-1.00m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH				7.93 pH		7.93 pH	7.93 pH		
				PH							
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS18-11/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS18-11/12/2019-0.50m
Moisture content:
23.5%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23.5% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide }		19.9 mg/kg	1.32	21.275 mg/kg	0.00213 %		
		033-003-00-0 / 215-481-4 / 1327-53-3							
2		cadmium { cadmium oxide }		0.9 mg/kg	1.142	0.832 mg/kg	0.0000832 %		
		048-002-00-0 / 215-146-2 / 1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide }		24.3 mg/kg	1.462	28.758 mg/kg	0.00288 %		
		/ 215-160-9 / 1308-38-9							
4		chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
		024-001-00-0 / 215-607-8 / 1333-82-0							
5		copper { dicopper oxide; copper (I) oxide }		56 mg/kg	1.126	51.052 mg/kg	0.00511 %		
		029-002-00-X / 215-270-7 / 1317-39-1							
6		lead { lead chromate }	1	967 mg/kg	1.56	1221.329 mg/kg	0.0783 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
7		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
		080-010-00-X / 231-299-8 / 7487-94-7							
8		nickel { nickel chromate }		43.3 mg/kg	2.976	104.35 mg/kg	0.0104 %		
		028-035-00-7 / 238-766-5 / 14721-18-7							
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		2 mg/kg	2.554	4.135 mg/kg	0.000414 %		
		034-002-00-8 / /							
10		zinc { zinc chromate }		351 mg/kg	2.774	788.442 mg/kg	0.0788 %		
		024-007-00-3 / /							
11		pH		9.41 pH		9.41 pH	9.41 pH		
		/ / PH							
12		naphthalene		0.32 mg/kg		0.259 mg/kg	0.0000259 %		
		601-052-00-2 / 202-049-5 / 91-20-3							
13		acenaphthylene		0.09 mg/kg		0.0729 mg/kg	0.00000729 %		
		/ 205-917-1 / 208-96-8							
14		acenaphthene		1 mg/kg		0.81 mg/kg	0.000081 %		
		/ 201-469-6 / 83-32-9							
15		fluorene		0.94 mg/kg		0.761 mg/kg	0.0000761 %		
		/ 201-695-5 / 86-73-7							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				4.57	mg/kg		3.7	mg/kg	0.00037 %		
			201-581-5	85-01-8									
17		anthracene				1.48	mg/kg		1.198	mg/kg	0.00012 %		
			204-371-1	120-12-7									
18		fluoranthene				6.93	mg/kg		5.611	mg/kg	0.000561 %		
			205-912-4	206-44-0									
19		pyrene				5.24	mg/kg		4.243	mg/kg	0.000424 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				2.61	mg/kg		2.113	mg/kg	0.000211 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.32	mg/kg		1.879	mg/kg	0.000188 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				2.64	mg/kg		2.138	mg/kg	0.000214 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.02	mg/kg		0.826	mg/kg	0.0000826 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				1.79	mg/kg		1.449	mg/kg	0.000145 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.12	mg/kg		0.907	mg/kg	0.0000907 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.17	mg/kg		0.138	mg/kg	0.0000138 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.09	mg/kg		0.883	mg/kg	0.0000883 %		
			205-883-8	191-24-2									
28		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
29		asbestos				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5									
										Total:	0.182 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS19-11/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS19-11/12/2019-0.50m
Moisture content:
19.7%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.7% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		11.4	mg/kg	1.32	12.575	mg/kg	0.00126 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.2	mg/kg	1.142	0.191	mg/kg	0.0000191 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		52.1	mg/kg	1.462	63.615	mg/kg	0.00636 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		43	mg/kg	1.126	40.445	mg/kg	0.00404 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	39	mg/kg	1.56	50.821	mg/kg	0.00326 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		28.1	mg/kg	2.976	69.869	mg/kg	0.00699 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		106	mg/kg	2.774	245.664	mg/kg	0.0246 %		
11		pH PH		8.15	pH		8.15	pH	8.15 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		0.22	mg/kg		0.184	mg/kg	0.0000184 %		
13		acenaphthylene 205-917-1 / 208-96-8		0.05	mg/kg		0.0418	mg/kg	0.00000418 %		
14		acenaphthene 201-469-6 / 83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				0.32	mg/kg		0.267	mg/kg	0.0000267 %		
			201-581-5	85-01-8									
17		anthracene				0.07	mg/kg		0.0585	mg/kg	0.00000585 %		
			204-371-1	120-12-7									
18		fluoranthene				0.6	mg/kg		0.501	mg/kg	0.0000501 %		
			205-912-4	206-44-0									
19		pyrene				0.57	mg/kg		0.476	mg/kg	0.0000476 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.43	mg/kg		0.359	mg/kg	0.0000359 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.53	mg/kg		0.443	mg/kg	0.0000443 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.73	mg/kg		0.61	mg/kg	0.000061 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.28	mg/kg		0.234	mg/kg	0.0000234 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.45	mg/kg		0.376	mg/kg	0.0000376 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.35	mg/kg		0.292	mg/kg	0.0000292 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.08	mg/kg		0.0668	mg/kg	0.00000668 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.37	mg/kg		0.309	mg/kg	0.0000309 %		
			205-883-8	191-24-2									
28		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0473 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS19-11/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS19-11/12/2019-1.00m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH		PH		8.31 pH		8.31 pH	8.31 pH		
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS21-11/12/2019-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS21-11/12/2019-0.40m
Moisture content:
39.4%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 39.4% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		8.7 mg/kg	1.32	8.24 mg/kg	0.000824 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.2 mg/kg	1.142	0.164 mg/kg	0.0000164 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		61.4 mg/kg	1.462	64.376 mg/kg	0.00644 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		24 mg/kg	1.126	19.384 mg/kg	0.00194 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	54 mg/kg	1.56	60.423 mg/kg	0.00387 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		19.5 mg/kg	2.976	41.634 mg/kg	0.00416 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		108 mg/kg	2.774	214.927 mg/kg	0.0215 %		
11		pH PH		8.61 pH		8.61 pH	8.61 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		0.11 mg/kg		0.0789 mg/kg	0.00000789 %		
13		acenaphthylene 205-917-1 / 208-96-8		0.45 mg/kg		0.323 mg/kg	0.0000323 %		
14		acenaphthene 201-469-6 / 83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				1.07	mg/kg		0.768	mg/kg	0.0000768 %		
			201-581-5	85-01-8									
17		anthracene				0.35	mg/kg		0.251	mg/kg	0.0000251 %		
			204-371-1	120-12-7									
18		fluoranthene				3.57	mg/kg		2.561	mg/kg	0.000256 %		
			205-912-4	206-44-0									
19		pyrene				2.86	mg/kg		2.052	mg/kg	0.000205 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				2.13	mg/kg		1.528	mg/kg	0.000153 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.16	mg/kg		1.549	mg/kg	0.000155 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				3.22	mg/kg		2.31	mg/kg	0.000231 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.25	mg/kg		0.897	mg/kg	0.0000897 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.34	mg/kg		1.679	mg/kg	0.000168 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.73	mg/kg		1.241	mg/kg	0.000124 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.29	mg/kg		0.208	mg/kg	0.0000208 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.74	mg/kg		1.248	mg/kg	0.000125 %		
			205-883-8	191-24-2									
										Total:	0.0408 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.8.4129.8241 (08 Jan 2020)
HazWasteOnline Database: 2020.8.4129.8241 (08 Jan 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

Waste Classification Report

3BKEV-JC44V-S9GMF

Job name

EMT-19-20485-Batch-2-File-1

Description/Comments

Project

19271

Site

Bowman's Mill, Ickleford

Related Documents

#	Name	Description
1	EMT-19-20485-Batch-2-File-1.HWOL	.hwol file used to create the Job

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Sam Flaherty
Date:
10 Jan 2020 16:04 GMT
Telephone:
0800 1613730

Company:
Groundtech Consulting Limited
PO Box 499
Manchester
M28 8EE

Report

Created by: Sam Flaherty
Created date: 10 Jan 2020 16:04 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP01-12/12/2019-0.05m		Non Hazardous		3
2	TP02-12/12/2019-0.10m		Non Hazardous		5
3	WS19-11/12/2019-0.50m		Non Hazardous		7
4	WS22-12/12/2019-0.30m		Non Hazardous		8
5	WS22-12/12/2019-1.00m		Non Hazardous		10
6	WS23-12/12/2019-0.10m		Non Hazardous		11
7	WS24-12/12/2019-0.40m		Non Hazardous		13
8	WS25-12/12/2019-0.40m		Non Hazardous		15
9	WS25-12/12/2019-1.00m		Non Hazardous		17
10	WS28-12/12/2019-0.50m		Non Hazardous		18
11	WS28-12/12/2019-1.00m		Non Hazardous		20
12	WS29-13/12/2019-0.50m		Non Hazardous		21

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Appendix B: Rationale for selection of metal species	24
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Classification of sample: TP01-12/12/2019-0.05m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP01-12/12/2019-0.05m
Moisture content:
27.9%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 27.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide }		23.7 mg/kg	1.32	24.466 mg/kg	0.00245 %		
		033-003-00-0 / 215-481-4 / 1327-53-3							
2		cadmium { cadmium oxide }		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0 / 215-146-2 / 1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide }		54.6 mg/kg	1.462	62.393 mg/kg	0.00624 %		
		/ 215-160-9 / 1308-38-9							
4		chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
		024-001-00-0 / 215-607-8 / 1333-82-0							
5		copper { dicopper oxide; copper (I) oxide }		28 mg/kg	1.126	24.648 mg/kg	0.00246 %		
		029-002-00-X / 215-270-7 / 1317-39-1							
6		lead { lead chromate }	1	61 mg/kg	1.56	74.393 mg/kg	0.00477 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
7		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X / 231-299-8 / 7487-94-7							
8		nickel { nickel chromate }		28.8 mg/kg	2.976	67.018 mg/kg	0.0067 %		
		028-035-00-7 / 238-766-5 / 14721-18-7							
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		034-002-00-8 / /							
10		zinc { zinc chromate }		128 mg/kg	2.774	277.632 mg/kg	0.0278 %		
		024-007-00-3 / /							
11		pH		8.44 pH		8.44 pH	8.44 pH		
		/ / PH							
12		naphthalene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3							
13		acenaphthylene		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		/ 205-917-1 / 208-96-8							
14		acenaphthene		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		/ 201-469-6 / 83-32-9							
15		fluorene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		/ 201-695-5 / 86-73-7							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene	201-581-5	85-01-8		0.08	mg/kg		0.0625	mg/kg	0.00000625 %		
17		anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18		fluoranthene	205-912-4	206-44-0		0.32	mg/kg		0.25	mg/kg	0.000025 %		
19		pyrene	204-927-3	129-00-0		0.26	mg/kg		0.203	mg/kg	0.0000203 %		
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.23	mg/kg		0.18	mg/kg	0.000018 %		
21		chrysene	601-048-00-0	205-923-4	218-01-9	0.2	mg/kg		0.156	mg/kg	0.0000156 %		
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.3	mg/kg		0.235	mg/kg	0.0000235 %		
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.12	mg/kg		0.0938	mg/kg	0.00000938 %		
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.19	mg/kg		0.149	mg/kg	0.0000149 %		
25		indeno[123-cd]pyrene	205-893-2	193-39-5		0.14	mg/kg		0.109	mg/kg	0.0000109 %		
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
27		benzo[ghi]perylene	205-883-8	191-24-2		0.14	mg/kg		0.109	mg/kg	0.0000109 %		
										Total:	0.0509 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP02-12/12/2019-0.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP02-12/12/2019-0.10m
Moisture content:
24.9%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 24.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		16.6 mg/kg	1.32	17.548 mg/kg	0.00175 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.2 mg/kg	1.142	0.183 mg/kg	0.0000183 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		24.1 mg/kg	1.462	28.201 mg/kg	0.00282 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		<1 mg/kg	1.126	<1.126 mg/kg	<0.000113 %		<**LOD**
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	66 mg/kg	1.56	82.424 mg/kg	0.00528 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		0.2 mg/kg	1.353	0.217 mg/kg	0.0000217 %		
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		22.2 mg/kg	2.976	52.901 mg/kg	0.00529 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		124 mg/kg	2.774	275.416 mg/kg	0.0275 %		
11		pH PH		8.1 pH		8.1 pH	8.1 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene 205-917-1 / 208-96-8		0.06 mg/kg		0.048 mg/kg	0.0000048 %		
14		acenaphthene 201-469-6 / 83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				0.24	mg/kg		0.192	mg/kg	0.0000192 %		
			201-581-5	85-01-8									
17		anthracene				0.06	mg/kg		0.048	mg/kg	0.0000048 %		
			204-371-1	120-12-7									
18		fluoranthene				0.6	mg/kg		0.48	mg/kg	0.000048 %		
			205-912-4	206-44-0									
19		pyrene				0.56	mg/kg		0.448	mg/kg	0.0000448 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.35	mg/kg		0.28	mg/kg	0.000028 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.42	mg/kg		0.336	mg/kg	0.0000336 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.55	mg/kg		0.44	mg/kg	0.000044 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.22	mg/kg		0.176	mg/kg	0.0000176 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.39	mg/kg		0.312	mg/kg	0.0000312 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.3	mg/kg		0.24	mg/kg	0.000024 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.06	mg/kg		0.048	mg/kg	0.0000048 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.29	mg/kg		0.232	mg/kg	0.0000232 %		
			205-883-8	191-24-2									
28		asbestos				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5									
										Total:	0.0445 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS19-11/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS19-11/12/2019-0.50m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		asbestos 650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		20 mg/kg		20 mg/kg	0.002 %		
								Total:	0.002 %		

Key

User supplied data

Classification of sample: WS22-12/12/2019-0.30m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS22-12/12/2019-0.30m
Moisture content:
7.7%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.7% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide }		2.5 mg/kg	1.32	3.065 mg/kg	0.000306 %		
		033-003-00-0 / 215-481-4 / 1327-53-3							
2		cadmium { cadmium oxide }		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0 / 215-146-2 / 1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide }		44.4 mg/kg	1.462	60.254 mg/kg	0.00603 %		
		/ 215-160-9 / 1308-38-9							
4		chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
		024-001-00-0 / 215-607-8 / 1333-82-0							
5		copper { dicopper oxide; copper (I) oxide }		19 mg/kg	1.126	19.862 mg/kg	0.00199 %		
		029-002-00-X / 215-270-7 / 1317-39-1							
6		lead { lead chromate }	1	6 mg/kg	1.56	8.69 mg/kg	0.000557 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
7		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X / 231-299-8 / 7487-94-7							
8		nickel { nickel chromate }		12.9 mg/kg	2.976	35.649 mg/kg	0.00356 %		
		028-035-00-7 / 238-766-5 / 14721-18-7							
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		034-002-00-8 / /							
10		zinc { zinc chromate }		53 mg/kg	2.774	136.518 mg/kg	0.0137 %		
		024-007-00-3 / /							
11		pH		8.57 pH		8.57 pH	8.57 pH		
		/ / PH							
12		naphthalene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3							
13		acenaphthylene		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		/ 205-917-1 / 208-96-8							
14		acenaphthene		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		/ 201-469-6 / 83-32-9							
15		fluorene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		/ 201-695-5 / 86-73-7							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			201-581-5	85-01-8									
17		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			204-371-1	120-12-7									
18		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			205-912-4	206-44-0									
19		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0265 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS22-12/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS22-12/12/2019-1.00m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH		PH		8.32 pH		8.32 pH	8.32 pH		
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS23-12/12/2019-0.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS23-12/12/2019-0.10m
Moisture content:
36.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 36.8% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		19.4 mg/kg	1.32	18.724 mg/kg	0.00187 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.2 mg/kg	1.142	0.167 mg/kg	0.0000167 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } / 215-160-9 / 1308-38-9		80.9 mg/kg	1.462	86.433 mg/kg	0.00864 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		28 mg/kg	1.126	23.044 mg/kg	0.0023 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	62 mg/kg	1.56	70.693 mg/kg	0.00453 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		37.9 mg/kg	2.976	82.456 mg/kg	0.00825 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		271 mg/kg	2.774	549.557 mg/kg	0.055 %		
11		pH PH		7.94 pH		7.94 pH	7.94 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene / 205-917-1 / 208-96-8		0.14 mg/kg		0.102 mg/kg	0.0000102 %		
14		acenaphthene / 201-469-6 / 83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
15		fluorene / 201-695-5 / 86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene	201-581-5	85-01-8		0.6	mg/kg		0.439	mg/kg	0.0000439 %		
17		anthracene	204-371-1	120-12-7		0.18	mg/kg		0.132	mg/kg	0.0000132 %		
18		fluoranthene	205-912-4	206-44-0		1.61	mg/kg		1.177	mg/kg	0.000118 %		
19		pyrene	204-927-3	129-00-0		1.31	mg/kg		0.958	mg/kg	0.0000958 %		
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.83	mg/kg		0.607	mg/kg	0.0000607 %		
21		chrysene	601-048-00-0	205-923-4	218-01-9	0.93	mg/kg		0.68	mg/kg	0.000068 %		
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	1.3	mg/kg		0.95	mg/kg	0.000095 %		
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.51	mg/kg		0.373	mg/kg	0.0000373 %		
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.9	mg/kg		0.658	mg/kg	0.0000658 %		
25		indeno[123-cd]pyrene	205-893-2	193-39-5		0.62	mg/kg		0.453	mg/kg	0.0000453 %		
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.12	mg/kg		0.0877	mg/kg	0.00000877 %		
27		benzo[ghi]perylene	205-883-8	191-24-2		0.64	mg/kg		0.468	mg/kg	0.0000468 %		
										Total:	0.0816 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS24-12/12/2019-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS24-12/12/2019-0.40m
Moisture content:
23%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		15.2	mg/kg	1.32	16.316	mg/kg	0.00163 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.1	mg/kg	1.142	0.0929	mg/kg	0.00000929 %		
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		49.9	mg/kg	1.462	59.294	mg/kg	0.00593 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		14	mg/kg	1.126	12.815	mg/kg	0.00128 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	28	mg/kg	1.56	35.508	mg/kg	0.00228 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		23.9	mg/kg	2.976	57.831	mg/kg	0.00578 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		95	mg/kg	2.774	214.263	mg/kg	0.0214 %		
11		pH PH		8.41	pH		8.41	pH	8.41 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene 205-917-1 / 208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
14		acenaphthene 201-469-6 / 83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
17		anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
18		fluoranthene	205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
19		pyrene	204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
25		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
27		benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
										Total:	0.0387 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS25-12/12/2019-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS25-12/12/2019-0.40m
Moisture content:
17.9%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		8	mg/kg	1.32	8.959	mg/kg	0.000896 %		
2		cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		47.6	mg/kg	1.462	59.008	mg/kg	0.0059 %		
4		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		16	mg/kg	1.126	15.279	mg/kg	0.00153 %		
6		lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	11	mg/kg	1.56	14.553	mg/kg	0.000933 %		
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		15.5	mg/kg	2.976	39.128	mg/kg	0.00391 %		
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate } 024-007-00-3		45	mg/kg	2.774	105.883	mg/kg	0.0106 %		
11		pH PH		9.31	pH		9.31	pH	9.31 pH		
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
13		acenaphthylene 205-917-1 / 208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
14		acenaphthene 201-469-6 / 83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
15		fluorene 201-695-5 / 86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
17		anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
18		fluoranthene	205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
19		pyrene	204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
25		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
27		benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
										Total:	0.0242 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS25-12/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS25-12/12/2019-1.00m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH				8.08 pH		8.08 pH	8.08 pH		
				PH							
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS28-12/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS28-12/12/2019-0.50m
Moisture content:
9.7%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.7% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide }		10.7 mg/kg	1.32	12.878 mg/kg	0.00129 %		
		033-003-00-0 / 215-481-4 / 1327-53-3							
2		cadmium { cadmium oxide }		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0 / 215-146-2 / 1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide }		91.4 mg/kg	1.462	121.774 mg/kg	0.0122 %		
		/ 215-160-9 / 1308-38-9							
4		chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
		024-001-00-0 / 215-607-8 / 1333-82-0							
5		copper { dicopper oxide; copper (I) oxide }		9 mg/kg	1.126	9.237 mg/kg	0.000924 %		
		029-002-00-X / 215-270-7 / 1317-39-1							
6		lead { lead chromate }	1	16 mg/kg	1.56	22.75 mg/kg	0.00146 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
7		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X / 231-299-8 / 7487-94-7							
8		nickel { nickel chromate }		14.4 mg/kg	2.976	39.069 mg/kg	0.00391 %		
		028-035-00-7 / 238-766-5 / 14721-18-7							
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		034-002-00-8 / /							
10		zinc { zinc chromate }		32 mg/kg	2.774	80.923 mg/kg	0.00809 %		
		024-007-00-3 / /							
11		pH		8.32 pH		8.32 pH	8.32 pH		
		/ / PH							
12		naphthalene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3							
13		acenaphthylene		0.07 mg/kg		0.0638 mg/kg	0.00000638 %		
		/ 205-917-1 / 208-96-8							
14		acenaphthene		0.27 mg/kg		0.246 mg/kg	0.0000246 %		
		/ 201-469-6 / 83-32-9							
15		fluorene		0.16 mg/kg		0.146 mg/kg	0.0000146 %		
		/ 201-695-5 / 86-73-7							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene				0.89	mg/kg		0.811	mg/kg	0.0000811 %		
			201-581-5	85-01-8									
17		anthracene				0.21	mg/kg		0.191	mg/kg	0.0000191 %		
			204-371-1	120-12-7									
18		fluoranthene				3.67	mg/kg		3.345	mg/kg	0.000335 %		
			205-912-4	206-44-0									
19		pyrene				2.87	mg/kg		2.616	mg/kg	0.000262 %		
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.69	mg/kg		1.541	mg/kg	0.000154 %		
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				1.79	mg/kg		1.632	mg/kg	0.000163 %		
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				2.62	mg/kg		2.388	mg/kg	0.000239 %		
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.02	mg/kg		0.93	mg/kg	0.000093 %		
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2	mg/kg		1.823	mg/kg	0.000182 %		
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.29	mg/kg		1.176	mg/kg	0.000118 %		
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.23	mg/kg		0.21	mg/kg	0.000021 %		
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.2	mg/kg		1.094	mg/kg	0.000109 %		
			205-883-8	191-24-2									
										Total:	0.03 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS28-12/12/2019-1.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS28-12/12/2019-1.00m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		pH		PH		7.87 pH		7.87 pH	7.87 pH		
								Total:	0%		

Key

User supplied data
Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS29-13/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS29-13/12/2019-0.50m
Moisture content:
31.3%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 31.3% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		arsenic { arsenic trioxide }		18.1 mg/kg	1.32	18.201 mg/kg	0.00182 %		
		033-003-00-0 / 215-481-4 / 1327-53-3							
2		cadmium { cadmium oxide }		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0 / 215-146-2 / 1306-19-0							
3		chromium in chromium(III) compounds { chromium(III) oxide }		53.2 mg/kg	1.462	59.219 mg/kg	0.00592 %		
		/ 215-160-9 / 1308-38-9							
4		chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
		024-001-00-0 / 215-607-8 / 1333-82-0							
5		copper { dicopper oxide; copper (I) oxide }		13 mg/kg	1.126	11.147 mg/kg	0.00111 %		
		029-002-00-X / 215-270-7 / 1317-39-1							
6		lead { lead chromate }	1	11 mg/kg	1.56	13.068 mg/kg	0.000838 %		
		082-004-00-2 / 231-846-0 / 7758-97-6							
7		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X / 231-299-8 / 7487-94-7							
8		nickel { nickel chromate }		25.3 mg/kg	2.976	57.349 mg/kg	0.00573 %		
		028-035-00-7 / 238-766-5 / 14721-18-7							
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		034-002-00-8 / /							
10		zinc { zinc chromate }		85 mg/kg	2.774	179.591 mg/kg	0.018 %		
		024-007-00-3 / /							
11		pH		8.69 pH		8.69 pH	8.69 pH		
		/ / PH							
12		naphthalene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3							
13		acenaphthylene		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		/ 205-917-1 / 208-96-8							
14		acenaphthene		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		/ 201-469-6 / 83-32-9							
15		fluorene		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		/ 201-695-5 / 86-73-7							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
17		anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
18		fluoranthene	205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
19		pyrene	204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<**LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<**LOD**
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
25		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
27		benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
										Total:	0.0338 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.8.4129.8241 (08 Jan 2020)
HazWasteOnline Database: 2020.8.4129.8241 (08 Jan 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

APPENDIX 12 – Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

1) Significant harm is being caused or there is a significant possibility of such harm being caused;
2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- CLR11 – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;

APPENDIX 13 - Limitations

Limitations

This contract was completed by Groundtech Consulting on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with due skill and care, taking into consideration the project brief provided, project objectives, agreed scope of works, prevailing site conditions and budget allocation.

Other than that defined in the paragraph above, Groundtech Consulting provides no other accountability or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted industry practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Groundtech Consulting. A third party who relies on this report, does so at their own and sole risk and no liability to such parties is provided by Groundtech Consulting.

It is the understanding of Groundtech Consulting that this report is to be used for the intended purpose as set out in the introduction. The purpose was instrumental in determining the scope and level of the services provided. Should the purpose of the report or the proposed end use of the site change, this report will no longer be directly applicable, and its validity readdressed. No reliance upon the report in the revised situation should be assumed by the client without the permission of Groundtech Consulting.

The report was written in 2020, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change and should be investigated if there is any significant delay in acting on the findings of this report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions in this report should not be relied upon in the future without the written confirmation from Groundtech Consulting that it is safe to do so.

The observations and conclusions outlined in this report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting.

Groundtech Consulting are not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The services provided are based upon Groundtech Consulting observations of existing physical conditions at the site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and Groundtech Consulting assume the information to be correct.

No responsibility can be accepted for errors for third party information presented in this report. Groundtech Consulting were not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Groundtech Consulting are not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable due to its heterogeneous properties and as investigation exploratory locations only allow examination of the ground at discrete

locations. The potential exists for ground conditions to be encountered which are different to those considered in this report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. Geo-Environmental testing was carried out for a limited number of parameters [as stipulated in the contract] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawings provided in this report are not meant to be an accurate base plan, but are preliminary and used to present the general relative locations of features on, and surrounding, the site.

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Ground Investigation & Contamination Assessment

Former Bowman's Mill, Arlesey Road, Ickleford

23030-XPL-XX-XX-T-GO-501

April 2024 Revision C01

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Revision History

Rev.	Date	Purpose	Prepared	Checked	Approved
C01	12.04.24	-	M Henderson	M King	M Henderson

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1 Executive Summary

Details	*Summary of Main Text*
Introduction	This Ground Investigation and Contamination Risk Assessment report has been prepared for Logie Property Co. Ltd. The report relates to two historic oil spill zones associated with (1) a mobile compressor unit in the west and (2) an electricity transformer compound in the east.
Site Description	The site comprised the former Bowman's mill on Arlesey Road, Ickleford, which at the time of the investigation was vacant and disused.
Geology and hydrogeology	Superficial deposits of Alluvium and Glaciofluvial Deposits are Secondary A aquifers and unconfined at this location. These are overlying the Lowestoft Formation and a bedrock of the Gault Formation, which are both unproductive strata. The site is not within an SPZ.
Hydrology	The River Oughton runs through the site and is directly downgradient of a transformer oil spill zone in the east.
Investigation findings	The investigation found no evidence of soil or groundwater contamination that could have come from either of the two historic oil spills. Although low concentrations of some hydrocarbon fractions were detected in made ground soils at a depth of 0.5m beside the mobile compressor unit (WS101) they were not of a type used in a compressor unit. In addition, concentrations did not exceed residential human health screening levels and were also not present in the deeper alluvial clay layer. PCBs were not detected in soil or groundwater. Hydrocarbons and PCBs were not present above controlled waters screening levels in soil or groundwater samples from the boreholes located downgradient of the transformer compound in Building 10 (WS102-WS105). No remediation of hydrocarbons or PCBs in soil or groundwater beneath the historic spill zones is required.
Recommendations	Contractors should remain vigilant during demolition for evidence of free phase oils, especially when removing foundations or lifting slabs.

2 Introduction

2.1 General

This Ground Investigation and Contamination Assessment report has been prepared by Xplor Environmental (Xplor) for Logie Property Co. Ltd.

2.2 Scope of Work

The terms of reference for the work were set out in the Xplor proposal 23030-XPL-XX-XX-T-GO-101-C01 dated 07 March 2024.

2.3 Purpose

The purpose of the investigation was to establish if two recent oil spills on site have caused contamination of either soil or groundwater. The two areas in question were as follows:

- A mobile compressor unit adjacent to Building 41 in the west, and;
- An electricity transformer compound in Building 10 in the east.

2.4 Technical Approach

The report has been prepared using data from a ground investigation, involving sampling from boreholes and chemical laboratory testing.

Competent persons have been involved in the preparation and checking of the report.

2.5 Future Development

The assessment is based on future residential land use.

3 Site Information and Setting

3.1 Site Location

The site is located on Arlesey Road, Ickleford, Hertfordshire SG5 3UN, approximately 2km north of Hitchin.

The National Grid Reference for the site is 518218, 231295. A location plan is presented as Figure 1.

3.2 Site Description

The 3.7 hectare site is in two parts, comprising the former Bowman's Mill in the north and a strip of managed grassland in the south. These two parts are separated by the channel of the River Oughton, which flows approximately from west to east.

At the time of the investigation the mill site contained numerous vacant buildings and large silos. Between these structures were site roads, parking zones and yards, most of which were surfaced with concrete.

3.2.1 Area 1 (Mobile Compressor Unit)

Area 1 was located adjacent to the southwest corner of Building 41 (a warehouse) and contained a disused mobile compressor unit. Staining of the ground and a residue of oily sand used as an absorbent were visible. The area was surfaced with concrete and a gulley drain was approximately 4m away downgradient.

3.2.2 Area 2 (Electricity Transformer Compound)

Area 2 comprised the yard located north and east of Buildings 8-10 and 12-13. Based on information provided by the site manager, Building 10 contained three redundant electricity transformers manufactured between 1969 and 2009 (PCB use in transformers was banned in the UK after 1981). The yard was surfaced with a mix of concrete and macadam and is directly adjacent the river.

3.3 Geology

The British Geological Survey (BGS) online geology viewer indicates the site is underlain by superficial Alluvium (clay, silt, sand and gravel) and Glaciofluvial Deposits (sand and gravel). The Lowestoft Formation (diamicton) may be present beneath these deposits.

The underlying bedrock is of the Gault Formation (mudstone).

3.4 Hydrogeology

The superficial Alluvium and Glaciofluvial Deposits are a Secondary A aquifer. The underlying Lowestoft Formation and bedrock Gault Formation are unproductive strata (non-aquifers).

The site is not within a groundwater Source Protection Zone (SPZ).

3.5 Hydrology

The River Oughton runs through the site, approximately from west to east.

3.6 Previous Reports

3.6.1 WSP Parsons Brinckerhoff

WSP PB prepared a Phase 1 preliminary risk assessment report in December 2016 (reference 70027704-10670-1) based on desktop data and a site walkover.

Their report confirmed the site had been in use as a mill prior to 1881 and up until recent times.

It identified several sources of potential contamination, mainly from the recent operation of a flour mill, including the storage and use of heating oil, diesel and degreasers, vehicle and mechanical maintenance and electrical sub-stations.

3.6.2 Groundtech Consulting

Groundtech Consulting carried out an extensive ground investigation across the mill site, mainly north of the river, in December 2019 and January 2020.

The site work comprised 30nr shallow boreholes and 3nr trial pits. Several boreholes were positioned across the two historic spill zones featured in this investigation.

Chemical laboratory testing was performed on soil and groundwater samples. The testing included analysis for petroleum hydrocarbons and polychlorinated biphenyls (PCBs), which are the contaminants of concern in this investigation. The testing, therefore, provides a baseline of conditions that were present prior to the spills.

Groundtech drilled 3nr boreholes close to the mobile compressor unit (WS09, WS10 and WS11) and 3nr boreholes (WS16, WS18 and WS19) in the yard close to the transformers.

WS09, WS10 and WS11 all encountered olfactory evidence of hydrocarbons in soil prior to the mobile compressor unit being placed at the location. The presence of hydrocarbons was confirmed by the test results. PCBs were below limits of detection (LOD) in groundwater, however soil samples were not tested for PCBs.

Olfactory or visual evidence of hydrocarbons were not present in WS16, WS18 and WS19 in the yard adjacent to the transformer compound. Hydrocarbons and PCBs were below limits of detection (LODs) in soil and groundwater samples.

4 Ground Investigation

4.1 Site Work

Site work was carried out on 20 and 21 March 2024 and was as described in table 4.1.

Table 4.1 Summary of Exploratory Holes

Type	*Reference*	*Depth*
Dynamic sampling boreholes	WS101 to WS105	3.0m

The exploratory holes were set out by an Xplor engineer in locations to maximise the available data, whilst operating within the constraints of the site and the investigation rationale.

The engineer's logs of the exploratory holes are presented in Appendix A.

The locations of exploratory holes are presented on Figures 2 and 3.

4.2 Investigation Rationale

The investigation targeted the sources of potential contamination as described in table 4.2.

Table 4.2 Investigation Rationale

Hole	*Target*	*Contaminants of concern*
WS101	Downgradient of mobile compressor unit.	Hydrocarbons and PCBs
WS102 to WS105	Downgradient of transformer compound.	Hydrocarbons and PCBs

4.3 Sampling

Soil samples were recovered from the exploratory holes and stored/transported in containers appropriate for the laboratory testing undertaken.

Sample types and depths are recorded on the relevant exploratory hole logs.

Following well development and purging, groundwater samples were obtained on 25 March 2024 from the wells installed in all boreholes using dedicated disposable bailers.

4.4 Installations

Permanent monitoring wells were installed in all the boreholes capable of sampling groundwater. Installations typically comprised a 50mm diameter sealed plain casing (0.5-1.0m depth) and, beneath this, a slotted casing and gravel pack to the base of the hole.

4.5 Chemical Laboratory Analysis

Table 4.3 lists the chemical laboratory that tests were scheduled on samples recovered from the exploratory holes.

Table 4.3 Chemical Analysis

Test	*Soil*	*Water*
TPHCWG aromatic/aliphatic petroleum hydrocarbons, benzene, toluene, ethylbenzene and xylenes (BTEX) and methyl tert-butyl ether (MTBE)	10	5
Polychlorinated biphenyls (PCBs, 7 congeners)	10	5

Chemical analysis was undertaken by a UKAS-accredited laboratory and the certificates of analysis are provided in Appendix B.

5 Ground and Groundwater Conditions

5.1 General

During the ground investigation, the following strata sequence was encountered in the exploratory holes. The strata generally matched the expected geology.

Table 5.1 Strata Sequence

Stratum	*Depth, mbgl*		*Thickness, m*
	Top	*Base*	
Made ground and surfacing	GL	0.6 – 1.4	0.6 – 1.4
Alluvium	1.0 – 1.4	1.9 – 2.84	0.5 – 1.84
Glaciofluvial Deposit	0.6 – 0.8	1.3 – 1.5	0.7 – 1.0
Lowestoft Formation	1.3 – 2.84	Base not proved	

Features, structures or certain ground conditions may be present between exploratory hole locations, which are different to those encountered during the investigation.

5.2 Made Ground and Surfacing

Made ground was present in all boreholes, beneath a surfacing of reinforced concrete (WS101-WS103) or macadam (WS104-WS105).

Beneath surfacing were mixed layers of clay, silt, sand and gravel with cobble-size brick pieces in WS101 and WS103. Fragments of cast iron pipe and wood were in WS103 and WS105, respectively. The broken faces of the pipe were not fresh and, therefore, does not indicate an underground services strike.

5.3 Alluvium

Very soft to firm layers of light grey and brown, silty, sandy clay and silty sand were beneath the made ground in WS101 and WS105.

5.4 Glaciofluvial Deposit

Underlying the made ground in WS102 to WS104 were layers of sandy gravelly clay, and sand and gravel in varying proportions.

5.5 Lowestoft Formation

Underlying the alluvium (in WS101 and WS105) and Glaciofluvial Deposit (in WS102-WS104) was a firm to stiff, light to dark grey and brown, silty, slightly gravelly clay (diamicton). The gravel component was of flint, mudstone and chalk. The base of this stratum was not proved.

5.6 Groundwater Conditions

Groundwater was struck in WS101 and WS105 during drilling and achieved levels between 0.8m and 2.46m depth on completion.

During the sampling visit, groundwater was encountered in all monitoring wells at depths between 0.72m and 2.36m.

5.7 Evidence of Contamination

Table 5.2 lists the indicators of potential contamination observed during drilling and monitoring.

Table 5.1 Evidence of Contamination

Observation	*Description*
Made ground	Beneath surfacing in all boreholes.
Odours	Faint hydrocarbon odour in WS101 between 1.0m and 1.5m (in Alluvium)
	Hydrocarbon odour in WS104 at 0.5m (in made ground)

6 Assessment of Soil Chemical Data

This section presents a human health generic risk assessment to identify potential sources of soil contamination requiring further evaluation. The assessment involves a comparison of chemical laboratory test results to screening levels that are considered to be appropriate to the site and its future use.

6.1 Selection of Assessment Criteria

The soil screening levels for petroleum hydrocarbons used in this assessment were drawn from the Suitable for Use Levels (S4ULs) published in 2015 by Land Quality Management Ltd and the Chartered Institute of Environmental Health. Soil Guideline Values published for dioxin-like PCBs published by the Environment Agency in 2009 were used for assessing PCBs. A full list of soil screening levels used is presented in Appendix C.

The future development will be residential with private gardens and for the purpose of this assessment the land use scenario is residential with homegrown produce (RwHP).

Screening levels were selected based on a soil organic matter (SOM) content of 1%.

6.2 Generic Screening for Human Health

All measured concentrations of petroleum hydrocarbons and PCBs were below the screening levels and, therefore, further assessment in relation to human health risks from these contaminants is not required.

7 Assessment of Groundwater Chemical Data

This section presents a generic assessment to identify potential sources of contamination that could impact on controlled waters (groundwater and surface water).

7.1 Selection of Assessment Criteria

Potential water-based receptors have been identified as follows:

- Groundwater: the most sensitive aquifers beneath the site are the superficial Alluvium and Glaciofluvial Deposit, a Secondary A aquifer. The aquifers are unconfined at this location.
- Surface water: the River Oughton runs through the site.

Potential impacts to surface water quality were assessed through a comparison of analysis results with the Environmental Quality Standard (EQS) published in the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.

For petroleum hydrocarbons, the World Health Organisation, Guidelines for drinking-water quality (WHO, 2017) have been used for assessing impacts on both groundwater and surface water.

A full list of controlled water screening levels used is included in Appendix D.

7.2 Potential Risk to Groundwater

Contaminant concentrations in groundwater samples were below WHO drinking water criteria.

7.3 Potential Risk to Surface Water

Contaminant concentrations in groundwater samples were below WHO drinking water criteria.

7.4 Controlled Waters Assessment Summary

Following screening of the groundwater test results, no contaminant concentrations exceeded WHO drinking water criteria appropriate for the assessment of both groundwater and surface water quality at the site. Therefore, contamination likely to affect groundwater or surface water quality was not identified.

8 Assessment of Ground Gas and Organic Vapour

This section presents a generic quantitative risk assessment to identify potential sources of organic vapour in the ground that could impact on development.

8.1 Vapour Intrusion Assessment – Soil

A generic quantitative risk assessment has been undertaken of the potential for indoor vapour intrusion from volatile organic compounds (VOCs) in soil. A potential VOC is one with 12 or less carbon atoms. In the absence of published criteria, a set of vapour protection standards has been calculated using CLEA software version 1.071 and these are listed in Appendix E.

No volatile contaminant concentrations were above the vapour protection standards for residential land use and therefore further assessment of vapour intrusion from VOCs in soil is not considered to be necessary.

8.2 Vapour Intrusion Assessment – Groundwater

A generic quantitative risk assessment has been undertaken of the potential for indoor vapour intrusion from VOCs in groundwater using guidance published by the Society of Brownfield Risk Assessment guidance, Development of generic assessment criteria for assessing vapour risks to human health from volatile contaminants in groundwater (SoBRA, 2017). The SoBRA GAC_{gwvap} are listed in Appendix E.

None of the measured contaminant concentrations are above GAC_{gwvap} and therefore further assessment of vapour intrusion from VOCs in groundwater is not considered to be necessary.

8.3 Organic Vapour Assessment Summary

The site is not likely to be impacted by organic vapour from either soils or groundwater sources.

9 Contaminated Land Risk Assessment and Conceptual Site Model

9.1 Introduction

Risk assessment is a process by which the risks posed by identified hazards to specific receptors are estimated. In the context of this study, hazards relate to sources, or potential sources of contamination capable of causing harm (e.g. a contaminant concentration exceeding a screening level). Receptors are the entity which may be at risk of adverse effects from the hazard and include human health, surface waters, groundwater, ecological systems, buildings and services. In order for a hazard to present a risk to a receptor they must be linked by an exposure pathway.

This source-pathway-receptor conceptual site model is considered best practice methodology to evaluate risks arising from potential contamination, according to the LCRM guidance.

9.2 Conceptual Site Model

A conceptual site model (CSM) is not presented as no soil or groundwater sources of hydrocarbons and PCB contamination were identified in the preceding screening assessment sections of the report.

9.3 Risk Assessment Summary

The risk assessment process is concluded at this point as there are no plausible risks to human health or controlled waters from hydrocarbons or PCBs in soil or groundwater at the two spill zones.

10 Remediation and Risk Management

No sources of hydrocarbon and PCB contamination have been identified based on the screening assessments undertaken. Therefore, no remediation or mitigation of hydrocarbons or PCBs are required in the future development.

It should be noted, however, that this report relates only to a study of hydrocarbons and PCBs in soil and groundwater at two historic oil spill zones on the site. The report cannot, therefore, provide guidance on any measures needed across other parts of the site or for other potential contaminants.

11 Conclusions and Recommendations

Xplor Environmental has carried out a ground investigation at the former Bowman Mill in Ickleford. The investigation targeted two historic oil spill zones on the site.

The investigation found no evidence of soil or groundwater contamination that could have come from either of two historic oil spills adjacent to a mobile compressor unit in the west and downgradient of a transformer compound in the east.

Low concentrations of petroleum hydrocarbons were detected in made ground soils at a depth of 0.5m in WS101 (beside the mobile compressor unit). However, they did not exceed residential human health screening values and had not penetrated the deeper alluvial clay. Testing indicated the hydrocarbons were mainly middle distillate fractions that would not be present in oil from a compressor unit. PCBs were not detected in any of the soil or groundwater samples tested from this borehole.

Downgradient of the transformer compound, low concentrations of petroleum hydrocarbons were detected in groundwater at a depth of 2.36m in WS103. However, they did not exceed groundwater or surface water screening values. Testing indicated the hydrocarbons were mainly middle distillate fractions that would not be present in transformer oil. PCBs were not detected in any other soil or groundwater samples tested in the boreholes downgradient of the transformer compound.

No remediation is required for a future residential development, or for the protection of controlled waters, from either hydrocarbons or PCBs in soil or groundwater at the historic oil spill zones.

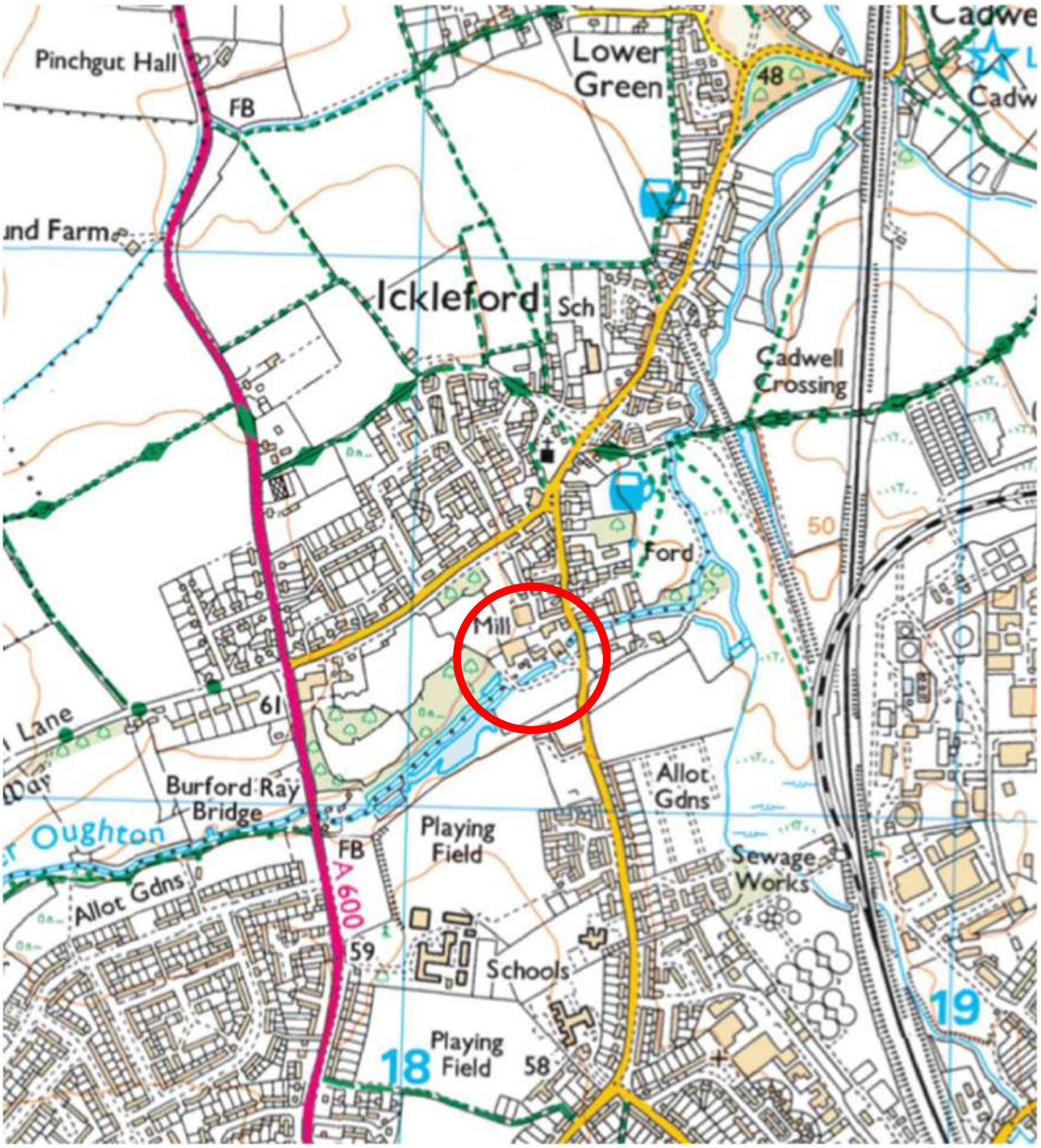
The investigation was targeted and contractors should remain vigilant during the demolition process for evidence of free phase oils, especially when removing foundations or lifting slabs.

Figures

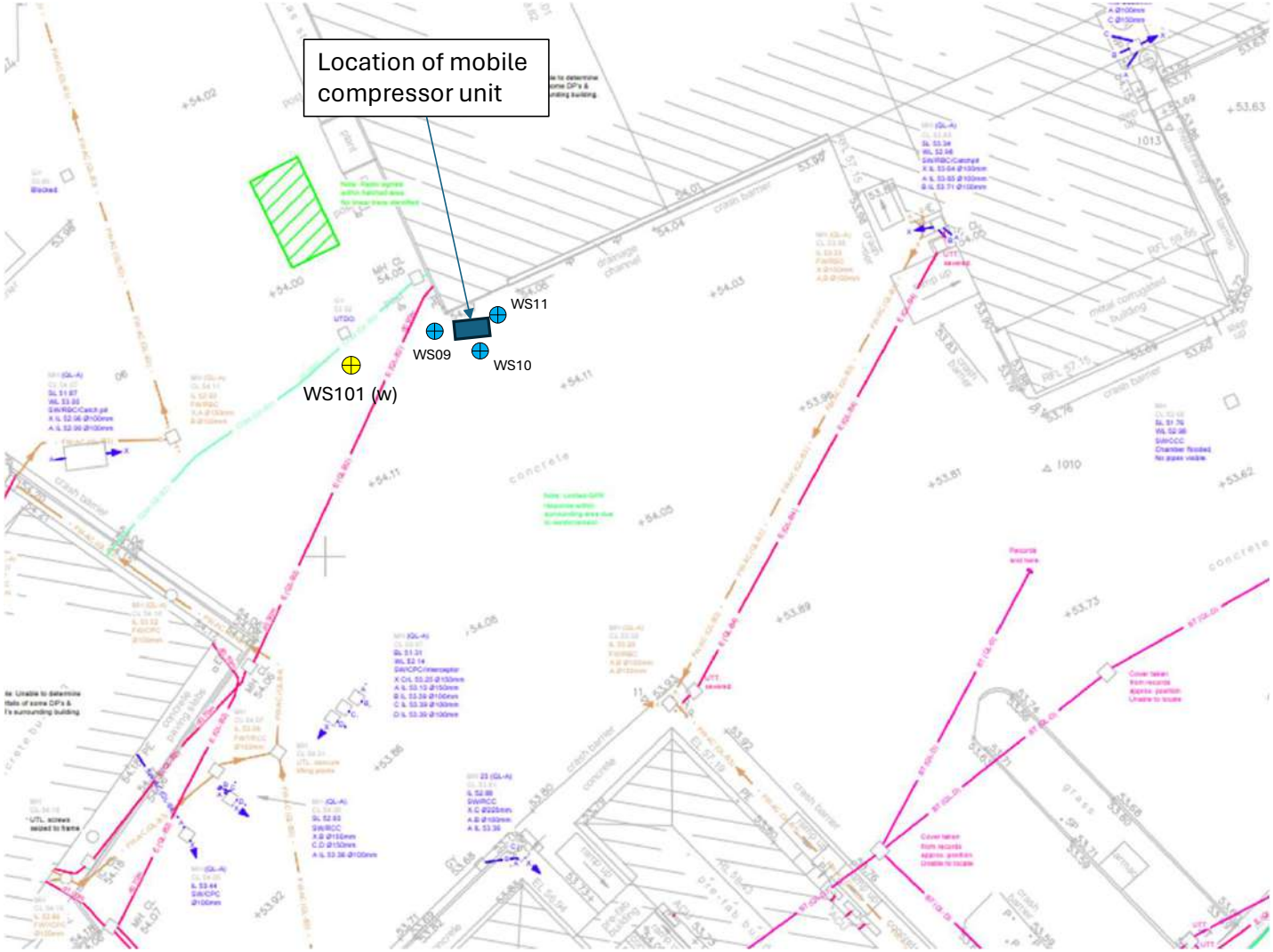
Figure 1 – Site Location Plan

Figure 2 – Exploratory Hole Location Plan (Area 1)

Figure 3 – Exploratory Hole Location Plan (Area 2)



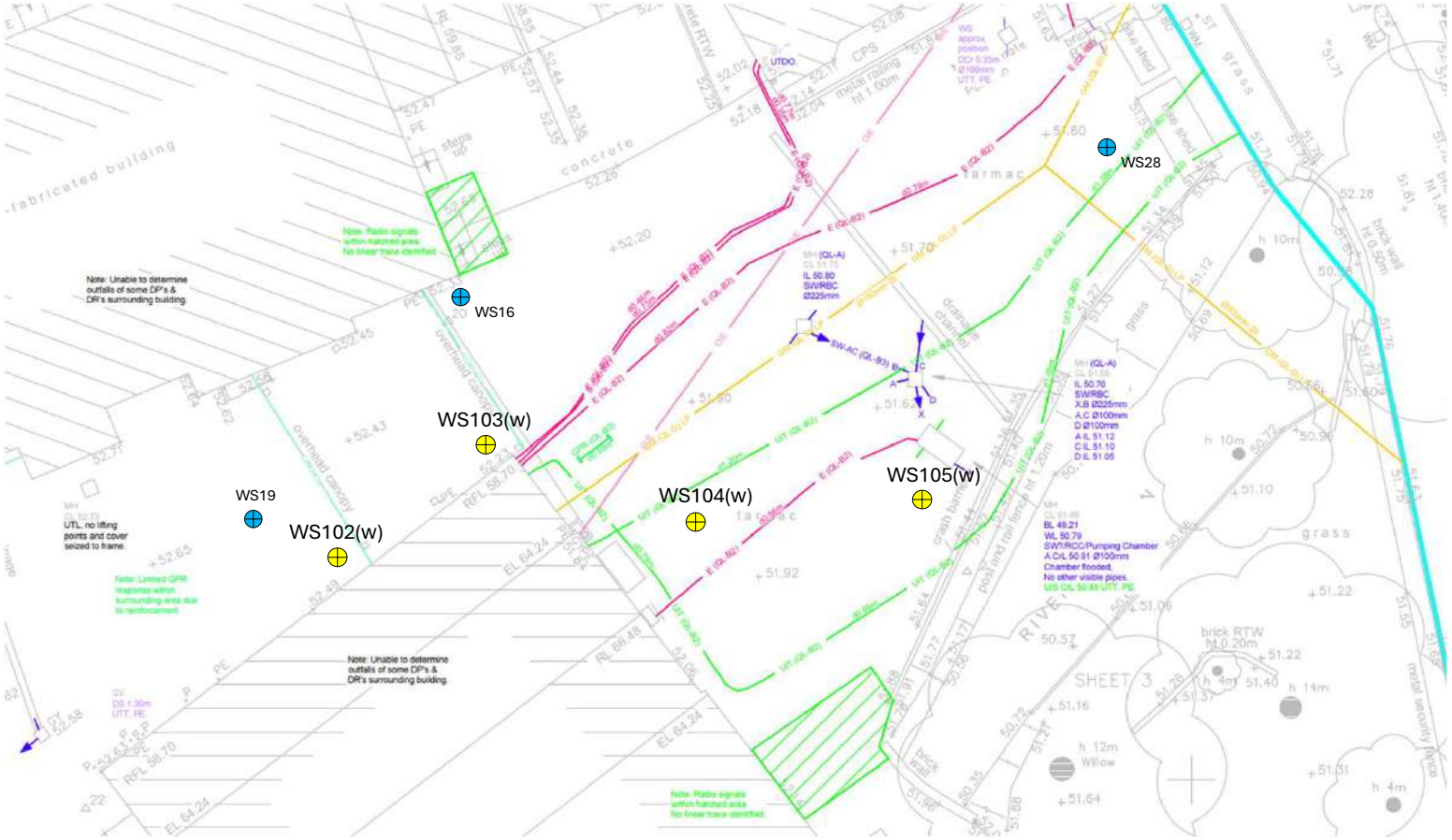
XPLOR Environmental	CLIENT LOGIE PROPERTY CO LTD	PROJECT BOWMAN'S MILL, ICKLEFORD	TITLE SITE LOCATION	SCALE: NTS PREPARED BY: MH	JOB NR.: 23030 REVISION: C01	DATE: 08.04.24 DRAWING NR. FIGURE 1



LEGEND

- GROUNDTECH CONSULTING BOREHOLE (2020)
- XPLOR ENVIRONMENTAL BOREHOLE (2024)
- (w) MONITORING WELL

XPLOR Environmental	CLIENT LOGIE PROPERTY CO. LTD	PROJECT BOWMAN'S FLOUR MILL, ICKLEFORD	TITLE EXPLORATORY HOLE LOCATION PLAN (AREA 1)	SCALE: NTS PREPARED BY: MH	JOB NR.: 23030 REVISION: C03	DATE: 08.04.24 DRAWING NR. FIGURE 2



LEGEND

- GROUNDTECH CONSULTING BOREHOLE (2020)
- XPLOR ENVIRONMENTAL BOREHOLE (2024)
- (w) MONITORING WELL

XPLOR Environmental	CLIENT: LOGIE PROPERTY CO. LTD	PROJECT: BOWMAN'S FLOUR MILL, ICKLEFORD	TITLE: EXPLORATORY HOLE LOCATION PLAN (AREA 2)	SCALE: NTS	JOB NR.: 23030	DATE: 08.04.24
				PREPARED BY: MH	REVISION: C03	DRAWING NR. FIGURE 3

Appendix A – Exploratory Hole Logs

BOREHOLE WS101

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 20.03.24-21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-3.0m

COORDINATES 518150, 231258
COORD SYS OS
SURFACE ELEVATION 54.015

COMMENTS Adjacent to mobile compressor unit. Hand pit to 1.2m.

LOGGED BY MH/BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.5		0			Concrete (reinforced)		
					Orange-brown, clayey SAND with some fine to coarse flint gravel and brick cobbles (MADE GROUND)		
					Grey, sandy gravelly CLAY (MADE GROUND)	Concrete/ bentonite	
		1			Soft to firm, brown and light grey, silty, slightly sandy CLAY with some fine to coarse flint gravel. Occasional black carbonised veins at 1.0-1.5m (ALLUVIUM)		Faint hydrocarbon odour (1.0-1.5m)
1.5							
		2			Very soft, light grey and cream, silty, slightly sandy CLAY (ALLUVIUM)	Pea shingle	
					Light grey, very silty, fine SAND (ALLUVIUM)		
2.5				1			Groundwater at 2.46m
					Dark brown SILT (ALLUVIUM)		
		3			Dark grey, firm, silty CLAY with fine to medium subrounded flint gravel (LOWESTOFT FORMATION)		
					End of borehole at 3.0m		
		4					

Disclaimer This borehole log is intended for environmental not geotechnical purposes.
produced by ESlog.ESdat.net on 08 Apr 2024

BOREHOLE WS102

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 20.03.24-21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-3.0m

COORDINATES 518262, 231308
COORD SYS OS
SURFACE ELEVATION 52.545

COMMENTS Adjacent to Building 10 transformer bay. Hand pit to 1.2m

LOGGED BY MH/BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.5		0			Concrete (reinforced)		
					Dark brown and black, clayey, SAND and GRAVEL (MADE GROUND)		
					Brown and light grey, clayey SILT with some fine gravel. Occasional black veining (MADE GROUND)	Bentonite /concrete	
					Brown clayey, silty SAND and GRAVEL. Gravel is of flint, chalk, brick and mudstone (MADE GROUND GROUND)		
		1			Brown, sandy, gravelly CLAY. Gravel is of flint (GLACIOFLUVIAL DEPOSIT)		
1.5					Brown, silty SAND with fine to coarse gravel of flint, mudstone and sandstone (GLACIOFLUVIAL DEPOSIT)		
					Stiff, grey and light grey mottled, silty CLAY with fine to coarse flint gravel. Occasional medium gravel of mudstone. Very stiff below 2.3m (LOWESTOFT FORMATION)		
		2				Pea shingle	
2.5							
		3			End of borehole at 3.0m. Groundwater not encountered.		
		4					

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produced by ESlog.ESdat.net on 08 Apr 2024

BOREHOLE WS103

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 20.03.24-21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-3.0m

COORDINATES 518268, 231314
COORD SYS OS
SURFACE ELEVATION 52.303

COMMENTS Hand pit to 1.2m

LOGGED BY MH/BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.6		1			Concrete (reinforced)	Bentonite/ concrete	
					Sandy CLAY with fine to coarse gravel and cobbles of brick. Fragment of cast iron pipe (MADE GROUND)		
					Orange brown, silty SAND and GRAVEL. Gravel is of fine to coarse flint (GLACIOFLUVIAL DEPOSIT)		
1.5		2			Stiff, brown and light grey mottled, silty CLAY with fine to medium flint, mudstone and chalk (LOWESTOFT FORMATION)	Pea shingle	
2.5		3			Firm, grey, slightly silty CLAY with fine to coarse chalk. Occasional gravel size pockets of weak, light grey mudstone (LOWESTOFT FORMATION)		
		4			End of borehole at 3.0m. Groundwater not encountered.		

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produced by ESlog.ESdat.net on 08 Apr 2024

BOREHOLE WS104

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 21.03.24
TOTAL DEPTH 3.00
DIAMETER 87-77mm
CASING 0-1.0m
SCREEN 1.0-2.0m

COORDINATES 518279, 231310
COORD SYS OS
SURFACE ELEVATION 51.905

COMMENTS Hand pit to 1.2m

LOGGED BY BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
					Macadam		
					Dark grey, sandy GRAVEL of limestone aggregate (MADE GROUND)		
0.5					Brown, silty, fine to coarse SAND with fine to coarse gravel of flint and siltstone (MADE GROUND)		Hydrocarbon odour at 0.5m
0.7					Light grey, silty CLAY with fine to coarse gravel of mudstone (MADE GROUND)	Bentonite/ concrete	
		1			Brown, clayey, fine to coarse SAND with fine to coarse gravel of flint (GLACIOFLUVIAL DEPOSIT)		
1.5					Firm, dark, grey, silty CLAY with fine to coarse flint gravel (LOWESTOFT FORMATION)		
		2			Stiff, brown, silty CLAY with fine to medium chalk gravel. Occasional light grey, medium gravel of mudstone below 2.8m (LOWESTOFT FORMATION)	Pea shingle	
2.5							
		3			End of borehole at 3.0m. Groundwater not encountered.		
		4					

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produced by ESlog.ESdat.net on 08 Apr 2024

BOREHOLE WS105

PROJECT NUMBER 23030
PROJECT NAME Bowman's Mill, Ickleford
CLIENT Logie Property Co. Ltd

DRILLING DATE 21.03.24
TOTAL DEPTH 3.0m
DIAMETER 87-77mm
CASING 0-0.4m
SCREEN 0.4-2.0m

COORDINATES 518289, 231311
COORD SYS OS
SURFACE ELEVATION 51.541

COMMENTS Hand pit to 1.2m

LOGGED BY BW
CHECKED BY MH

Samples	% Recovery	Depth (m)	Graphic Log	SPT(N)	Description	Installation	Observations
0.3					Macadam Concrete Dark grey, fine to coarse SAND with gravel of concrete (MADE GROUND)	Bentonite/ concete	
0.5					Orange brown, clayey, silty fine to coarse SAND with gravel of fine to medium flint		
0.75					Grey, clayey, fine to coarse SAND with fine to medium gravel of flint and limestone		Groundwater at 0.8m
		1				Pea shingle	
					Soft, dark grey, silty CLAY with fragment of wood and grey, fine to medium sand		
1.5					Grey, silty, fine to coarse SAND with fine to coarse gravel of flint and chalk (ALLUVIUM)		
		2			Stiff, brown silty CLAY with medium to coarse flint gravel (LOWESTOFT FORMATION)		
2.5					Stiff, grey silty CLAY with flint and chalk gravel. Rare rootlets and occasional fine gravel size pockets of brown silt (LOWESTOFT FORMATION)		
		3			End of borehole at 3.0m		
		4					

Disclaimer This borehole log is intended for environmental not geotechnical purposes.
produced by ESlog.ESdat.net on 08 Apr 2024

Appendix B – Chemical Laboratory Test Results

Xplor Environmental
34 Church Lane
Girton
Cambridge
CB3 0JP

e: markh@xplorenvironmental.co.uk

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 : 24-010559

Project / Site name:	Bowmans Mill	**Samples received on:**	22/03/2024
Your job number:	23030	**Samples instructed on/ Analysis started on:**	22/03/2024
Your order number:	23030	**Analysis completed by:**	03/04/2024
Report Issue Number:	1	**Report issued on:**	05/04/2024
Samples Analysed:	10 soil samples		

Signed:

Dominika Liana
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.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-010559
Project / Site name: Bowmans Mill
Your Order No: 23030

Lab Sample Number				152457	152458	152459	152460	152461
Sample Reference				WS101	WS101	WS102	WS102	WS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50	0.50	1.50	0.60
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	34	15	14	11
Total mass of sample received	kg	0.1	NONE	0.3	0.3	0.2	0.3	0.2
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	8.7	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	220	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	320	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	76	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	630	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	65	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	120	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	29	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	220	< 10	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number: 24-010559
Project / Site name: Bowmans Mill
Your Order No: 23030

Lab Sample Number				152462	152463	152464	152465	152466
Sample Reference				WS103	WS104	WS104	WS105	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.70	1.50	0.50	1.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	27.4	< 0.1	40.2	40
Moisture Content	%	0.01	NONE	13	8.8	16	8.7	13
Total mass of sample received	kg	0.1	NONE	0.3	0.2	0.3	0.2	0.3
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >C5 - C35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-010559
Project / Site name: Bowmans Mill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
152457	WS101	None Supplied	0.5	Brown clay and sand with gravel
152458	WS101	None Supplied	1.5	Brown clay and sand
152459	WS102	None Supplied	0.5	Brown clay and sand with gravel
152460	WS102	None Supplied	1.5	Brown clay and sand with gravel
152461	WS103	None Supplied	0.6	Brown clay and sand with gravel
152462	WS103	None Supplied	1.5	Brown clay and sand with gravel
152463	WS104	None Supplied	0.7	Brown sandy clay with gravel and stones
152464	WS104	None Supplied	1.5	Brown clay and sand with gravel
152465	WS105	None Supplied	0.5	Brown sandy clay with gravel and stones
152466	WS105	None Supplied	1.5	Brown sand with gravel and stones

Analytical Report Number : 24-010559
Project / Site name: Bowmans Mill

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
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS

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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report

Analytical Report Number : 24-010559
Project / Site name: Bowmans Mill

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS101	N/A	S	152457	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS101	N/A	S	152457	a	PCB's By GC-MS in soil	L027B	a
WS101	N/A	S	152457	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS101	N/A	S	152458	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS101	N/A	S	152458	a	PCB's By GC-MS in soil	L027B	a
WS101	N/A	S	152458	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS102	N/A	S	152459	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS102	N/A	S	152459	a	PCB's By GC-MS in soil	L027B	a
WS102	N/A	S	152459	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS102	N/A	S	152460	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS102	N/A	S	152460	a	PCB's By GC-MS in soil	L027B	a
WS102	N/A	S	152460	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS103	N/A	S	152461	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS103	N/A	S	152461	a	PCB's By GC-MS in soil	L027B	a
WS103	N/A	S	152461	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS103	N/A	S	152462	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS103	N/A	S	152462	a	PCB's By GC-MS in soil	L027B	a
WS103	N/A	S	152462	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS104	N/A	S	152463	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS104	N/A	S	152463	a	PCB's By GC-MS in soil	L027B	a
WS104	N/A	S	152463	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS104	N/A	S	152464	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS104	N/A	S	152464	a	PCB's By GC-MS in soil	L027B	a
WS104	N/A	S	152464	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS105	N/A	S	152465	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS105	N/A	S	152465	a	PCB's By GC-MS in soil	L027B	a
WS105	N/A	S	152465	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a
WS105	N/A	S	152466	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS105	N/A	S	152466	a	PCB's By GC-MS in soil	L027B	a
WS105	N/A	S	152466	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088	a

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Analytical Report Number : 24-011173

Project / Site name:	Bowmans Mill	**Samples received on:**	26/03/2024
Your job number:	23030	**Samples instructed on/ Analysis started on:**	26/03/2024
Your order number:	23030	**Analysis completed by:**	04/04/2024
Report Issue Number:	1	**Report issued on:**	04/04/2024
Samples Analysed:	5 water samples		

Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-011173
Project / Site name: Bowmans Mill

Your Order No: 23030

Lab Sample Number				156026	156027	156028	156029	156030
Sample Reference				WS101	WS102	WS103	WS104	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.05	1.20	2.36	1.28	0.72
Date Sampled				25/03/2024	25/03/2024	25/03/2024	25/03/2024	25/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH - Aliphatic >C5 - C6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >C6 - C8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >C8 - C10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >C10 - C12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	15	< 10	< 10
TPH - Aliphatic >C12 - C16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	50	< 10	< 10
TPH - Aliphatic >C16 - C21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	60	< 10	< 10
TPH - Aliphatic >C21 - C35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	290	< 10	< 10
TPH - Aliphatic >C5 - C35 $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	420	< 10	< 10
TPH - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC10 - EC12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC12 - EC16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	25	< 10	< 10
TPH - Aromatic >EC16 - EC21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	20	< 10	< 10
TPH - Aromatic >EC21 - EC35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC35 $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	45	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
PCBs by GC-MS								
PCB Congener 28	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 52	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 101	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 118	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 138	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 153	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
PCB Congener 180	µg/l	0.02	NONE	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Total ICES-7 PCBs	µg/l	0.14	NONE	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-011173
Project / Site name: Bowmans Mill

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
PCB's By GC-MS in water	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L028B	W	NONE
Total petroleum hydrocarbons with carbon banding by GC-MS in water	Determination of total petroleum hydrocarbons in water by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L070B	W	NONE
BTEX and/or Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA 8260	L073B	W	ISO 17025
Total petroleum hydrocarbons by GC-MS HS in water	Determination of total petroleum hydrocarbons in water by GC-MS HS	In-house method	L088	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.

Appendix C – Soil Screening Levels

Soil Screening Levels

The following generic screening levels are used in the report for assessing risks to human health from contaminants in soil. All screening levels are for 1% SOM.

Contaminant	Units	Source	Residential with home produce	Residential without home produce	Commercial	Public open space (residential)	Public open space (park)
Cyanide (free)	mg/kg	RIVM	20	20	30	-	-
Cyanide (total)	mg/kg	RIVM	50	50	500	-	-
Boron	mg/kg	S4UL	290	11,000	240,000	21,000	46,000
Arsenic	mg/kg	S4UL	37	40	640	79	170
Cadmium	mg/kg	S4UL	11	85	190	120	532
Chromium (total)	mg/kg	S4UL	910	910	8,600	1,500	33,000
Copper	mg/kg	S4UL	2,400	7,100	68,000	12,000	44,000
Mercury	mg/kg	S4UL	40	56	1,100	120	240
Nickel	mg/kg	S4UL	180	180	980	230	3,400
Lead	mg/kg	C4SL	200	310	2,330	630	1,300
Selenium	mg/kg	S4UL	250	430	12,000	1,100	1,800
Zinc	mg/kg	S4UL	3,700	40,000	730,000	81,000	170,000
Chromium (hex.)	mg/kg	S4UL	6	6	33	7.7	220
TPH Aliphatic >C5-C6	mg/kg	S4UL	42	42	3,200	570,000	95,000
TPH Aliphatic >C6-C8	mg/kg	S4UL	100	100	7,800	600,000	150,000
TPH Aliphatic >C8-C10	mg/kg	S4UL	27	27	2,000	13,000	14,000
TPH Aliphatic >C10-C12	mg/kg	S4UL	130	130	9,700	13,000	21,000
TPH Aliphatic >C12-C16	mg/kg	S4UL	1,100	1,100	59,000	13,000	25,000
TPH Aliphatic >C16-C21	mg/kg	S4UL	65,000	65,000	1,600,000	250,000	450,000
TPH Aliphatic >C21-C35	mg/kg	S4UL	65,000	65,000	1,600,000	250,000	450,000
TPH Aromatic >C5-C7	mg/kg	S4UL	70	370	26,000	56,000	76,000
TPH Aromatic >C7-C8	mg/kg	S4UL	130	860	56,000	56,000	87,000
TPH Aromatic >C8-C10	mg/kg	S4UL	34	47	3,500	5,000	7,200
TPH Aromatic >C10-C12	mg/kg	S4UL	74	250	16,000	5,000	9,200
TPH Aromatic >C12-C16	mg/kg	S4UL	140	1,800	36,000	5,100	10,000
TPH Aromatic >C16-C21	mg/kg	S4UL	260	1,900	28,000	3,800	7,600
TPH Aromatic >C21-C35	mg/kg	S4UL	1,100	1,900	28,000	3,800	7,800
Naphthalene	mg/kg	S4UL	2.3	2.3	190	4,900	1,200
Acenaphthylene	mg/kg	S4UL	170	2,900	83,000	15,000	29,000
Acenaphthene	mg/kg	S4UL	210	3,000	84,000	15,000	29,000
Fluorene	mg/kg	S4UL	170	2,800	63,000	9,900	20,000
Phenanthrene	mg/kg	S4UL	95	1,300	22,000	3,100	6,200
Anthracene	mg/kg	S4UL	2,400	31,000	520,000	74,000	150,000

Contaminant	Units	Source	Residential with home produce	Residential without home produce	Commercial	Public open space (residential)	Public open space (park)
Fluoranthene	mg/kg	S4UL	280	1,500	23,000	3,100	6,300
Pyrene	mg/kg	S4UL	620	3,700	54,000	7,400	15,000
Benzo[a]anthracene	mg/kg	S4UL	7.2	11	170	29	49
Chrysene	mg/kg	S4UL	15	30	350	57	93
Benzo[b]fluoranthene	mg/kg	S4UL	2.6	3.9	44	7.1	13
Benzo[k]fluoranthene	mg/kg	S4UL	77	11	1,200	190	370
Benzo[a]pyrene	mg/kg	S4UL	2.2	3.2	35	5.7	11
Indeno[1,2,3-c,d]pyrene	mg/kg	S4UL	27	45	500	82	150
Dibenz[a,h]anthracene	mg/kg	S4UL	0.24	0.31	3.5	0.57	1.1
Benzo[g,h,i]perylene	mg/kg	S4UL	320	360	3,900	640	1,400
Phenols (total)	mg/kg	S4UL	120	440	440	440	440
Benzene	µg/kg	S4UL	87	380	27,000	72,000	90,000
Toluene	µg/kg	S4UL	130,000	880,000	56,000,000	56,000,000	87,000,000
Ethylbenzene	µg/kg	S4UL	47,000	83,000	5,700,000	24,000,000	17,000,000
m & p-xylene	µg/kg	S4UL	56,000	79,000	5,900,000	41,000,000	17,000,000
o-xylene	µg/kg	S4UL	60,000	88,000	660,000	41,000,000	17,000,000
Sum of PCDDs, PCDFs and dioxin-like PCBs	µg/kg	EA SC050021	8	8	240	-	-

Appendix D – Controlled Waters Screening Levels

Controlled Waters Screening Levels

Generic screening levels used in the report for assessing risks to controlled waters (surface water and groundwater) from contaminants in water and soil leachate samples.

Contaminant	*Units*	*UK Drinking Water Standard (DWS) [1] for groundwater impact*	*WHO Drinking Water Guideline [2]*	*Environmental Quality Standard (EQS) for surface water impact*
Cyanide	µg/l	50	-	1 [6]
Boron	µg/l	1000	-	750 [4]
Arsenic	µg/l	10	-	50 [10]
Cadmium	µg/l	5	-	0.25 [6,7]
Chromium (total)	µg/l	50	-	4.7 [9]
Copper	µg/l	2000	-	4 [8]
Mercury	µg/l	1	-	0.07 [11]
Nickel	µg/l	20	-	3.6 [6,8]
Lead	µg/l	10	-	1.2 [6]
Selenium	µg/l	10	-	7.5 [4]
Zinc	µg/l	5000	-	10.9 [10]
Chromium (hex.)	µg/l	-	-	3.4 [9]
TPH Aliphatic >C5-C6	µg/l	10	15,000	-
TPH Aliphatic >C6-C8	µg/l	10	15,000	-
TPH Aliphatic >C8-C10	µg/l	10	300	-
TPH Aliphatic >C10-C12	µg/l	10	300	-
TPH Aliphatic >C12-C16	µg/l	10	300	-
TPH Aliphatic >C16-C21	µg/l	10	300	-
TPH Aliphatic >C21-C35	µg/l	10	300	-
TPH Aromatic >C5-C7	µg/l	10	10	-
TPH Aromatic >C7-C8	µg/l	10	700	-
TPH Aromatic >C8-C10	µg/l	10	300	-
TPH Aromatic >C10-C12	µg/l	10	90	-
TPH Aromatic >C12-C16	µg/l	10	90	-
TPH Aromatic >C16-C21	µg/l	10	90	-
TPH Aromatic >C21-C35	µg/l	10	90	-
Naphthalene	µg/l	2	-	2 [6]
Anthracene	µg/l	-	1	0.1 [6]
Fluoranthene	µg/l	-	4	0.0063 [6]
Benzo[b]fluoranthene	µg/l	0.1	-	0.00017 [6,9]
Benzo[k]fluoranthene	µg/l	0.1	-	0.00017 [6,9]
Benzo[a]pyrene	µg/l	0.01	0.7	0.00017 [6]
Indeno[1,2,3-c,d]pyrene	µg/l	0.1	-	0.00017 [6,9]
Benzo[g,h,i]perylene	µg/l	0.1	-	0.00017 [6,9]
Phenols (total)	µg/l	0.5	-	7.7 [10]
Benzene	µg/l	1	10	6 [6]
Toluene	µg/l	-	700	74 [10]
Ethylbenzene	µg/l	-	300	-
m & p-xylene	µg/l	-	500	15.5 [3,5]
o-xylene	µg/l	-	500	

Notes

1. Prescribed concentration listed in the Water Supply (Water Quality) Regulations 2016.

2. Drinking water guideline values listed in the World Health Organisation document, Guidelines for drinking-water quality: fourth edition (WHO, 2017). Used to assess impacts to surface water and groundwater from hydrocarbons (use DWS for SPZ1 or Principal aquifer).
3. EQS is the minimum Threshold Value for Groundwater (impacts on surface water) listed in Table 1 of Schedule 5 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
4. EQS is the General Quality of GW Body listed in Table 1 of Schedule 5 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
5. EQS is the sum of m, p & o-xylene.
6. EQS is the AA-EQS (inland surface waters) listed in Table 1 of Part 3 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
7. EQS is for the water hardness band ≥200 mg CaCO3/l.
8. EQS is the sum of PNEC+Cb (Predicted No Effect Concentration + background concentration) calculated in accordance with Table 2 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015. PNEC and Cb for copper are 2.6 and 1.0 µg/l, respectively.
9. Benzo[a]pyrene is used as a marker compound for the substance.
10. EQS is the standard for fresh water listed in Table 1 of Part 2 (specific pollutants) of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.
11. EQS is the MAC-EQS (inland surface waters) listed in Table 1 of Part 3 of the Water Framework Directive (WFD) (Standards and Classification) Directions (England and Wales) 2015.

Appendix E – Vapour Protection Standards

Vapour Protection Standards

The following Protection Standards are used in the report for the assessment of human health risks from organic vapour intrusion into buildings (indoor inhalation).

Volatile Organic Compound	*Protection Standard in soil (mg/kg)*[2]		*Protection Standard in groundwater (µg/l)*[3]	
	Residential	*Commercial*	*Residential*	*Commercial*
TPH Aliphatic >C5-C6	161	19,600[4]	1,900	190,000[5]
TPH Aliphatic >C6-C8	529	64,400[4]	1,500	150,000[5]
TPH Aliphatic >C8-C10	156	19,000[4]	57	5,700[5]
TPH Aliphatic >C10-C12	793[4]	96,600[4]	37	3,600[5]
TPH Aromatic >C5-C7	1.48	173	210,000	20,000,000[5]
TPH Aromatic >C7-C8	4,570[4]	517,000[4]	220,000	21,000,000[5]
TPH Aromatic >C8-C10	553	67,400[4]	1,900	190,000[5]
TPH Aromatic >C10-C12	3,050[4]	373,000[4]	6,800	660,000[5]
Naphthalene	13.2	1,720[4]	220	23,000[5]

1. The selected VOCs have the potential to create a vapour intrusion risk and are defined as a volatile substance with 12 carbon atoms or le
2. ss.
3. Protection standards for soil were derived using CLEA software version 1.071 (2015) and calculated for the indoor inhalation pathway.
4. Vapour protection standards for groundwater are the GACgwvap published by the Society of Brownfield Risk Assessment publication, Development of generic assessment criteria for assessing vapour risks to human health from volatile contaminants in groundwater (SoBRA, 2017).
5. Soil protection standard exceeds soil saturation limit; vapour risks from NAPL should be considered in addition.
6. GACgwvap exceeds aqueous solubility; vapour risks from NAPL should be considered in addition.

Appendix F – Defining Risk

Risk Evaluation

Risk evaluation is qualitative and is developed from the model provided in CIRIA C552 *Contaminated Land Risk Assessment – a guide to good practice* (DETR 2001). It involves classifying risk in terms of the probability of occurrence x magnitude of the potential consequence of occurrence. The risk rating is used to determine what action, if any, is needed to further investigate that risk and/or remediate to reduce risk to an acceptable level.

Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event appears very likely in the short term and almost inevitable in the long term or there is actual evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely in the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is not certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur in the very long term.

Classification of Consequence

Classification	Definition	Examples
Severe	• Short-term (acute) risk to human health likely to result in significant harm. • Short-term (acute) risk of pollution of sensitive water resource. • Short-term (acute) risk to an ecosystem, or organism forming part of an ecosystem.	Unusually high concentration of toxic substance on the surface of a garden. Major release into controlled waters. EA Category 1 pollution incident. Closure of an abstraction point. Explosion, causing building collapse (and death if occupied).
Medium	• Chronic damage to human health likely to result in significant harm. • Pollution of sensitive water resource. • Significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentration of contaminant from site exceeds generic or site-specific assessment criteria for human health or water supply pipes. Presence of asbestos. Leaching of contaminants from a site to a principal or secondary (A) aquifer. Concentration exceeds DWS or EQS in Inner Source Protection Zone (SPZ1). EA Category 2+ pollution incident. Death of a species or loss of habitat within an area of national importance.
Mild	• Exposure is unlikely to result in significant harm to human health.	Concentration of contaminant from site below generic or site-specific assessment criteria.

Classification	Definition	Examples
	• Pollution of non-sensitive water resource. • Damage to sensitive buildings, structures and services or the environment.	Pollution of secondary (B or undifferentiated) aquifer. EA Category 3 pollution incident. Damage to a building rendering it unsafe to occupy. Death of a species or loss of habitat within an area of local importance.
Minor	• Harm (but not significant harm) resulting in a financial loss or expenditure to resolve. • Non-permanent human health effects. • Easily repairable damage to buildings, structures and services	Pollution of unproductive strata. Loss of plants in garden or landscape areas.

Risk Estimation

		Consequence			
		Severe	*Medium*	*Mild*	*Minor*
Probability	*High Likelihood*	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Low risk
	Low Likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Low risk	Very low risk	Very low risk
	No linkage	No risk			

Description of the Estimated Risks and Likely Action Required

Risk	Action
Very high	There is a high probability that severe harm could arise or there is evidence that severe harm is currently happening. This risk, if realised, is likely to result in substantial liability. • Urgent investigation required. • Remediation required for the site in its existing state and for development.
High	Harm is likely to arise. Realisation of the risk is likely to present a significant liability. • Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term. • Remediation required for development.
Moderate	A potential linkage is identifiable. However, it is either relatively unlikely that harm would be severe or, if any harm were to occur, it is more likely that the harm would be relatively mild.

	• Investigation required to quantify the risk and determine potential liability. • Remediation required for development.
Low	It is possible that harm could arise but it is likely that this harm, if realised, would at worst normally be mild. • Investigation is not normally required but could be useful to confirm findings. • Remediation unlikely to be required or will be limited.
Very low	There is a low possibility that harm could arise. In the event of such harm being realised it is not likely to be severe. Site is not capable of being determined under Part 2a. • No further action recommended.

Appendix 2 – Exploratory Hole Logs

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Ickleford Mill

WS101

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 24-07-24 Finish 24-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.50	B		0.48			MADE GROUND: CONCRETE.
		0.80	ES		0.80			MADE GROUND: Crushed BRICK and CONCRETE.
		1.00 - 1.45	SPT	N 10	1.00			MADE GROUND: Firm brown slightly gravelly sandy CLAY. Gravel is subangular to rounded fine to coarse brick and concrete.
		1.20	D					
					1.40			Orange gravelly coarse SAND. Gravel is angular fine to medium flint.
		2.00 - 4.00	B	N 12				Firm brown gravelly sandy CLAY. Gravel is angular to subangular flint
		2.00 - 2.45	SPT					2.00 - 2.45 Firm, medium strength.
		3.00 - 3.45	SPT	N 12				3.00 - 3.45 Firm, medium strength.
		4.00 - 4.45	SPT	N 22				4.00 - 4.45 Stiff, high strength.
		5.00	D	N 50	5.00			Firm brown gravelly sandy CLAY. Gravel is angular to subangular flint
		5.00 - 5.45	SPT					5.00 - 5.45 Very stiff, very high strength. Refused at 5.45mbgl.
					5.45			Borehole completed at 5.45m.
					{8.00}			

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Hydraulic breaker 0.00m-0.48mbgl. Dynamic sampled 0.00m-5.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 5.00mbgl, granular response zone (5.00m-2.00m), bentonite seal 2.00m-0.10m, gas valve and flush steel cover 0.10m-0.00m bgl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: ES

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 1/8/24

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Site: Ickleford Mill

WS103

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 22-07-24 Finish 22-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.14			MADE GROUND: CONCRETE.
		0.40 0.50	ES B					Firm greenish brown sandy gravelly CLAY. Gravel is rounded fine to coarse flint.
		1.00 - 1.45	SPT	N 1	1.00			1.00 - 1.45 Very soft, extremely low strength. Soft grey silty sandy slightly gravelly CLAY. Gravel is angular to rounded fine to medium flint and chalk.
		2.00 - 2.45	SPT	N 11				2.00 - 2.45 Firm, medium strength.
	▽	3.00 3.00 - 3.45	D SPT	N 22				3.00 - 3.45 Stiff, high strength.
		4.00 - 4.45	SPT	N 20				4.00 - 4.45 Stiff, high strength.
		5.00 5.00 - 5.45	D SPT	N 50	5.00			Soft grey silty sandy slightly gravelly CLAY. Gravel is angular to rounded fine to medium flint and chalk.
					5.45			5.00 - 5.45 Very stiff, very high strength. Refused at 5.45mbgl. Borehole completed at 5.45m.
					{8.00}			

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Hydraulic breaker 0.00m-0.14mbgl. Hand dug inspection pit 0.14m-1.00mbgl.
Dynamic sampled 1.00m-5.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 5.00mbgl, granular response zone (5.00m-2.00m), bentonite seal 2.00m-0.10m, gas valve and flush steel cover 0.10m-0.00m bgl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
22/07/24	3.00		

All dimensions in metres
Scale 1:50

Logged By: ES

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 1/8/24

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Site: Ickleford Mill

WS103a

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 23-07-24 Finish 23-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.50	B					MADE GROUND: Grass over brown slightly gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint.
		0.70	ES					
		1.00 - 1.45	SPT	N 0	0.90			Soft dark brown slightly gravelly sandy silty CLAY. Gravel is angular medium flint. 1.00 - 1.45 Very soft, extremely low strength.
		2.00 - 2.45	SPT	N 3				
		2.50	D		2.30			Brown coarse SAND.
	▽	3.00	D		3.00			Borehole collapsed. Borehole completed at 3.00m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-3.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
23/07/24	3.00		

All dimensions in metres
Scale 1:50

Logged By: ES

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 1/8/24

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Site: Ickleford Mill

WS105

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 24-07-24 Finish 24-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.26			MADE GROUND: CONCRETE.
		0.40	ES		0.30			MADE GROUND: Crushed BRICK and CONCRETE.
		0.50	B					Soft grey silty sandy slightly gravelly CLAY. Gravel is angular to rounded fine to medium flint and chalk.
		1.00 - 3.00	B	N 3				
		1.00 - 1.45	SPT					1.00 - 1.45 Very soft, extremely low strength.
		2.00 - 2.45	SPT	N 7				2.00 - 2.45 Soft, low strength.
	▽	3.00 - 3.45	SPT	N 3				3.00 - 3.45 Very soft, extremely low strength.
		4.00 - 4.45	SPT	N 9				4.00 - 4.45 Firm, low strength.
		5.00	D	N 11				
		5.00 - 5.45	SPT					5.00 - 5.45 Firm, medium strength. 5.00 - 6.00 Borehole collapsed.
		6.00	D	N 16	6.00			
		6.00 - 6.45	SPT					Soft grey silty sandy slightly gravelly CLAY. Gravel is angular to rounded fine to medium flint and chalk.
					6.45			6.00 - 6.45 Stiff, medium strength.
								Borehole completed at 6.45m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Hydraulic breaker 0.00m-0.26mbgl. Dynamic sampled 0.26m-6.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 5.00mbgl, granular response zone (5.00m-2.00m), bentonite seal 2.00m-0.10m, gas valve and flush steel cover 0.10m-0.00m bgl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
24/07/24	3.00		

All dimensions in metres
Scale 1:50

Logged By: ES

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 1/8/24

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Site: Ickleford Mill

WS106

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 22-07-24 Finish 22-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.50	B ES					MADE GROUND: Grass over brown slightly gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint.
		1.00 - 1.45	SPT	N 10				0.80 - 2.00 Becoming gravelly. 1.00 - 1.45 Firm, medium strength.
		2.00 - 2.45	SPT	N 7	2.00			2.00 - 2.45 Soft, low strength. Soft dark brown slightly gravelly sandy silty CLAY. Gravel is angular medium flint and chalk.
	▽	3.00 3.00 - 3.45	D SPT	N 4				3.00 - 3.45 Soft, very low strength. 3.00 - 4.00 Borehole collapsed after dynamic sampling.
					4.00			Borehole completed at 4.00m.
					{8.00}			

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-4.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
22/07/24	3.00		

All dimensions in metres
Scale 1:50

Logged By: ES

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 1/8/24

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Site: Ickleford Mill

WS107

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 23-07-24 Finish 23-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.35			MADE GROUND: CONCRETE.
		0.65	B		0.60			MADE GROUND: Crushed BRICK & CONCRETE.
		1.00 - 1.45	SPT	N 4				MADE GROUND: Soft brown sandy gravelly CLAY. Sand is coarse. Gravel is angular to subangular concrete, brick and flint. 1.00 - 1.45 Soft, very low strength.
		1.90	ES					
		2.00 - 2.45	SPT	N 8				
		2.10 - 2.80	B					2.00 - 2.45 Soft to firm, low strength.
		2.30	D					
	▽	3.00 - 3.45	SPT	N 11	2.80			Brown clayey gravelly coarse SAND. Gravel is angular medium flint. 3.00 - 3.45 Medium dense. 3.00 - 6.00 Borehole collapsed.
		4.00 - 4.45	SPT	N 2	4.00			4.00 - 4.45 Very soft, extremely low strength. Soft dark grey silty CLAY.
		5.00	D	N 6				
		5.00 - 5.45	SPT					5.00 - 5.45 Soft, low strength.
		6.00 - 6.45	SPT	N 8	6.00			Soft dark grey silty CLAY.
					6.45			6.00 - 6.45 Soft to firm, low strength.
								Borehole completed at 6.45m.
					{8.00}			

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Hydraulic breaker 0.00m-0.35mbgl. Dynamic sampled 0.35m-6.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 3.00mbgl, granular response zone (3.00m-2.00m), bentonite seal 2.00m-0.10m, gas valve and flush steel cover 0.10m-0.00m bgl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
23/07/24	3.00		

All dimensions in metres
Scale 1:50

Logged By: ES

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Ickleford Mill

WS108

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 22-07-24 Finish 22-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.50	B					MADE GROUND: Grass over brown slightly gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint.
		0.80	ES					
		1.00 - 1.45	SPT	N 8				0.80 - 1.75 Becoming gravelly. 1.00 - 1.45 Loose.
					1.75			
		2.00 - 2.45	SPT	N 11				Soft dark brown slightly gravelly sandy silty CLAY. Gravel is angular medium flint. 2.00 - 2.45 Firm, medium strength.
	▽	3.00 - 3.45	SPT	N 8				3.00 - 3.45 Soft to firm, low strength.
		4.00	D	N 12				
		4.00 - 4.45	SPT					4.00 - 4.45 Firm, medium strength.
								4.70 - 5.00 Becoming gravelly.
		5.00 - 5.45	SPT	N 14				5.00 - 5.45 Firm, medium strength.
		6.00	D	N 14	6.00			
		6.00 - 6.45	SPT					Soft dark brown slightly gravelly sandy silty CLAY. Gravel is angular medium flint.
					6.45			6.00 - 6.45 Firm, medium strength.
								Borehole completed at 6.45m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-6.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00m bgl.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
22/07/24	3.00		

All dimensions in metres
Scale 1:50

Logged By: ES

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 1/8/24

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Site: Ickleford Mill

WS109

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 23-07-24 Finish 23-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.50	B ES		0.70			MADE GROUND: Grass over soft brown sandy gravelly CLAY. Gravel is angular coarse brick.
		1.00 - 1.45	SPT	N 0				Greyish brown clayey SILT. 1.00 - 1.45 Very soft, extremely low strength.
		2.00 - 2.45	SPT	N 4				2.00 - 2.45 Soft, very low strength.
		2.70 - 4.00	B		2.70			Greyish brown clayey gravelly SILT Gravel is angular medium to fine flint.
	▽	3.00 - 3.45	SPT	N 10				3.00 - 3.45 Firm, medium strength.
		4.00 - 5.90	B	N 11	4.00			
		4.00 - 4.45	SPT					4.00 - 4.45 Firm, medium strength. 4.00 - 6.00 Borehole collapsed. Greyish brown clayey SILT.
		5.00 - 5.45	SPT	N 14				5.00 - 5.45 Firm, medium strength.
		6.00	D	N 16	6.00			
		6.00 - 6.45	SPT					Greyish brown clayey SILT. 6.00 - 6.45 Stiff, medium strength.
					6.45			Borehole completed at 6.45m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-6.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 4.00m bgl, granular response zone (4.00m-2.00m), bentonite seal 2.00m-0.10m, gas valve and flush steel cover 0.10m-0.00m bgl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
23/07/24	3.00		

All dimensions in metres
Scale 1:50

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Site				
Ickleford Mill				**WS110**
Job No: CRM.1027.189	Dates: Start 23-07-24, Finish 23-07-24	Ground Level (m)	Co-Ordinates	
Client: Hill Partnerships				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.20			MADE GROUND: CONCRETE.
					0.25			MADE GROUND: Type1 MOT.
		0.50	B					
		0.70	ES		0.60			MADE GROUND: Crushed BRICK and CONCRETE.
		0.80 - 1.50	B		0.80			Firm greenish brown gravelly sandy CLAY. Gravel is angular to subrounded flint.
		1.00 - 1.45	SPT	N 4				Orange clayey SAND & GRAVEL. Sand is coarse. Gravel is angular to subangular flint.
					1.50			1.00 - 1.45 Loose.
								Firm brown slightly sandy CLAY.
		2.00 - 2.45	SPT	N 8	2.00			2.00 - 2.45 Soft to firm, low strength.
								Soft dark grey slightly gravelly silty CLAY. Gravel is angular to rounded fine to coarse flint and chalk.
	▽	3.00 - 3.45	SPT	N 11				3.00 - 3.45 Firm, medium strength.
								3.20 - 3.30 Becoming sandy.
		4.00 - 4.45	SPT	N 12				4.00 - 4.45 Firm, medium strength.
								4.00 - 5.00 Borehole collapsed.
		5.00	D	N 50	5.00			Soft dark grey slightly gravelly silty CLAY. Gravel is angular to rounded fine to coarse flint and chalk.
		5.00 - 5.45	SPT					5.00 - 5.45 Very stiff, very high strength. Refused at 5.45mbgl.
					5.45			Borehole completed at 5.45m.
					{8.00}			

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Hydraulic breaker 0.00m-0.20mbgl. Dynamic sampled 0.20m-5.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 4.00mbgl, granular response zone (4.00m-2.00m), bentonite seal 2.00m-0.10m, gas valve and flush steel cover 0.10m-0.00m bgl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
23/07/24	3.00		

All dimensions in metres
Scale 1:50

Logged By: ES

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Site: Ickleford Mill

WS111

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 23-07-24 Finish 23-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.15			MADE GROUND: CONCRETE.
					0.30			MADE GROUND: Orange BALLAST.
		0.50	B					MADE GROUND: Grey and red gravelly coarse SAND. Gravel is angular to subangular concrete and brick.
					0.70			
		1.00	ES	N 4				Dark grey silty CLAY.
		1.00 - 1.45	SPT					1.00 - 1.45 Soft, very low strength.
		1.10	D		1.20			Soft brown slightly gravelly sandy CLAY. Gravel is angular medium flint.
		2.00 - 2.45	SPT	N 11				2.00 - 2.45 Firm, medium strength.
	▽	3.00	D	N 8	3.00			
		3.00 - 3.45	SPT					3.00 - 3.45 Soft to firm, low strength.
								Soft dark grey silty CLAY.
		4.00 - 4.45	SPT	N 8				4.00 - 4.45 Soft to firm, low strength.
								4.00 - 6.00 Borehole collapsed.
		5.00 - 5.45	SPT	N 7				5.00 - 5.45 Soft, low strength.
		6.00	D	N 14	6.00			
		6.00 - 6.45	SPT					Soft dark grey silty CLAY.
					6.45			6.00 - 6.45 Firm, medium strength.
								Borehole completed at 6.45m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Hydraulic breaker 0.00m-0.15mbgl. Dynamic sampled 0.15m-6.00mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 3.00mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 4.00mbgl, granular response zone (4.00m-2.00m), bentonite seal 2.00m-0.10m, gas valve and flush steel cover 0.10m-0.00m bgl.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
23/07/24	3.00		

All dimensions in metres
Scale 1:50

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WS112

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 24-07-24 Finish 24-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.10			MADE GROUND: CONCRETE blocks.
		0.40	ES					MADE GROUND: BALLAST.
		0.50	B		0.50			MADE GROUND: Brown gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint.
		1.00 - 1.90	B	N 4	0.95			Soft brown sandy CLAY.
		1.00 - 1.45	SPT					1.00 - 1.45 Soft, very low strength.
					1.90			
		2.00	D	N 50	2.00			Orange SAND & GRAVEL. Sand is coarse. Gravel is angular to subangular coarse flint.
		2.00 - 2.45	SPT					
					2.45			Orange SAND & GRAVEL. Sand is coarse. Gravel is angular to subangular coarse flint.
								2.00 - 2.45 Very dense. Refused at 2.45mbgl.
								Borehole completed at 2.45m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-2.00mbgl.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

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WS113

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 24-07-24 Finish 24-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20	ES		0.30			MADE GROUND: Grass over cemented type 1 MOT.
		0.50	B		0.60			MADE GROUND: Brown clayey gravelly SAND. Gravel is angular to rounded fine to coarse flint and concrete.
		1.00 1.00 - 1.45	D SPT	N 15				Stiff brown gravelly sandy CLAY. Gravel is angular to subangular flint 1.00 - 1.45 Firm to stiff, medium strength.
		2.00 2.00 - 2.45	D SPT	N 50	2.00			Stiff brown gravelly sandy CLAY. Gravel is angular to subangular flint 2.00 - 2.45 Very stiff, very high strength. Refused at 2.45mbgl.
					2.45			Borehole completed at 2.45m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-2.00mbgl.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

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Site: Ickleford Mill

WS114

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 24-07-24 Finish 24-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.40	ES		0.30			MADE GROUND: Grass over brown slightly gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint.
		0.50	B					Brown clayey sandy gravelly medium SAND. Gravel is subrounded to rounded fine to coarse flint
		0.80	D					
		1.00 - 1.38	SPT	N 50	1.00			Brown clayey sandy gravelly medium SAND. Gravel is subrounded to rounded fine to coarse flint.
					1.38			1.00 - 1.38 Very dense. Refused at 1.38mbgl.
								Borehole completed at 1.38m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-1.00mbgl.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

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Site: Ickleford Mill

WS115

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 24-07-24 Finish 24-07-24		

Client: Hill Partnerships

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.30	ES					MADE GROUND: Grass over brown slightly gravelly clayey medium SAND. Gravel is angular to subangular concrete and flint.
		0.50	B		0.50			
		0.80 - 1.00	D		0.80			Brown slightly gravelly clayey medium SAND. Gravel is angular to subangular flint.
		1.00 - 1.39	SPT	N 50	1.00			Orange SAND AND GRAVEL Sand is coarse. Gravel is angular fine to coarse flint.
					1.39			Orange SAND AND GRAVEL Sand is coarse. Gravel is angular fine to coarse flint. 1.00 - 1.39 Very dense. Refused at 1.39mbgl.
								Borehole completed at 1.39m.
					{8.00}			

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Premier 110 window sampling rig.
METHOD: Dynamic sampled 0.00m-1.00mbgl.
CASING: No casing used.
REMARKS: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: ES

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Site: Ickleford Mill

BH01

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 18-07-24 Finish 18-07-24		

Client: Hill Partnerships

Sheet: 1 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.30			MADE GROUND: REINFORCED CONCRETE.
								MADE GROUND: Brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular and subrounded fine to coarse concrete, brick, and charcoal.
		1.20 - 1.65	D SPT	N 22	1.30			
		1.75	D					Orange brown clayey sandy GRAVEL. Sand is medium to coarse. Gravel is angular and rounded fine to coarse flint.
		2.00 - 2.45	D SPT	N 14	2.00			
		2.75	D					2.00 - 2.45 Firm, medium strength. Grey brown mottled grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular and rounded to subrounded fine to coarse chalk and flint.
		3.00 - 3.45	D SPT	N 16				
		3.75	D					3.00 - 3.45 Stiff, medium strength.
		4.00 - 4.45	SPT	N 31				
		4.75	D					4.00 - 4.45 Very stiff, high strength.
		5.00 - 5.45	U100					
		6.00	D					
		6.50 - 6.95	D SPT	N 23				
		7.50	D					6.50 - 6.95 Stiff, high strength.
		8.00 - 8.45	U100		{8.00}			

Continued next sheet

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.20mbgl. Cable percussive drilled 1.20m-20.00mbgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered from 13.50mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 17.00mbgl, granular response zone (17.00m-14.00m), bentonite seal (14.00m-11.00m), arisings (11.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

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Site				
Ickleford Mill				**BH01**
Job No: CRM.1027.189	Dates: Start 18-07-24, Finish 18-07-24	Ground Level (m)	Co-Ordinates	
Client: Hill Partnerships				Sheet: 2 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		9.00	D					9.00 - 9.45 Stiff to very stiff, high strength.
		9.50 - 9.95	D SPT	N 30				
		10.50	D					
		11.00 - 11.45	U100					
		12.00	D					
		12.50 - 12.95	D SPT	N 35				12.50 - 12.95 Very stiff, high strength.
	▽	13.50	D					
		14.00 - 14.45	D SPT	N 44				14.00 - 14.45 Very stiff, very high strength.
		15.00	D					
		15.50 - 15.95	D SPT	N 49				15.50 - 15.50 Very stiff, very high strength.
					{16.00}			Continued next sheet

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.20mbgl. Cable percussive drilled 1.20m-20.00mbgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered from 13.50mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 17.00mbgl, granular response zone (17.00m-14.00m), bentonite seal (14.00m-11.00m), arisings (11.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
18/07/24	13.50		

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

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Site: Ickleford Mill

BH01

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 18-07-24 Finish 18-07-24		

Client: Hill Partnerships

Sheet: 3 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		16.50	D					
		17.00 - 17.45	D SPT	N 53				17.00 - 17.45 Very stiff, very high strength. Refused.
		18.00	D					
		18.50 - 18.95	D SPT	N 110				18.50 - 18.95 Very stiff, very high strength. Refused.
		19.50	D					
		20.00 20.00 - 20.45	D SPT	N 80	20.00			Grey brown mottled grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular and rounded to subrounded fine to coarse chalk and flint. Becoming dark grey with depth.
					20.45			20.00 - 20.45 Very stiff, very high strength. Refused.
								Borehole completed at 20.45m.
					{24.00}			

16 17 18 19 20 21 22 23 24

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.20mbgl. Cable percussive drilled 1.20m-20.00mbgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered from 13.50mbgl.
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 17.00mbgl, granular response zone (17.00m-14.00m), bentonite seal (14.00m-11.00m), arisings (11.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB

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Site				
Ickleford Mill				**BH02**
Job No: CRM.1027.189	Dates: Start 18-07-24, Finish 18-07-24	Ground Level (m)	Co-Ordinates	
Client: Hill Partnerships				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
	▽	0.00 - 0.30 0.30 0.50	ES D B		1.10			MADE GROUND: Grass over dark brown slightly sandy slightly gravelly CLAY with rootlets. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse brick and concrete.
					{8.00}			Concrete obstruction encountered. Borehole terminated. Borehole completed at 1.10m.

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.10mbgl.
CASING: No casing used.
REMARKS: Groundwater encountered at 0.90mbgl, rose to 0.70mbgl.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
18/07/24	0.90		0.70

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

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Site				
Ickleford Mill				**BH02A**
Job No: CRM.1027.189	Dates: Start 18-07-24, Finish 19-07-24	Ground Level (m)	Co-Ordinates	
Client: Hill Partnerships				Sheet: 1 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.00 - 0.30	ES					MADE GROUND: Grass over dark brown slightly sandy slightly gravelly CLAY with rootlets. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse rare brick.
		0.30	D					
		0.50	B					
		1.00 - 1.45	D SPT	N 7	1.00			1.00 - 1.45 Soft, low strength. Orange brown mottled grey and orange slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is rounded and subrounded fine to coarse chalk.
		1.75	D					
		2.00 - 2.45	U100					1.75 - 3.00 Becoming grey brown mottled grey. 2.00 - 2.45 Stiff, high strength.
		2.75	D					
		3.00 - 3.45	D SPT	N 21				3.00 - 3.45 Stiff, high strength. 3.00 - 20.00 Becoming dark grey.
		3.75	D					
		4.00 - 4.45	D SPT	N 23				4.00 - 4.45 Stiff, high strength.
		4.75	D					
		5.00 - 5.45	D SPT	N 26				
		6.00	D					
		6.50 - 6.95	D SPT	N 30				6.50 - 6.95 Stiff to very stiff, high strength.
		7.50	D					
		8.00 - 8.45	D	N 32	{8.00}			Continued next sheet

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.00mbgl. Cable percussive drilled 1.00m-20.50mbgl.
CASING: 15.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered from 8.20m-14.10mbgl.
Chiselling 15mins (10.70m-10.90m), 20mins (12.10m-12.40m), 15mins (15.70m-15.90m).
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site				BH02A
Ickleford Mill				
Job No: CRM.1027.189	Dates: Start 18-07-24, Finish 19-07-24	Ground Level (m)	Co-Ordinates	
Client: Hill Partnerships				Sheet: 2 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
	▽		SPT					
		9.00	D					9.00 - 9.45 Stiff to very stiff, high strength.
		9.50 - 9.95	D SPT	N 35				
		10.50	D					
		11.00 - 11.45	D SPT	N 41				11.00 - 11.45 Very stiff, very high strength.
		12.00	D					
		12.50 - 12.95	D SPT	N 47				12.50 - 12.95 Very stiff, very high strength.
		13.50	D					
	▽	14.00 - 14.45	D SPT	N 37				14.00 - 14.45 Very stiff, high strength. 14.00 - 20.00 Becoming gravelly.
		15.00	D					
		15.50 - 15.95	D SPT	N 49				15.50 - 15.95 Very stiff, very high strength.
					{16.00}			Continued next sheet

8 9 10 11 12 13 14 15 16

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.00mbgl. Cable percussive drilled 1.00m-20.50mbgl.
CASING: 15.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered from 8.20m-14.10mbgl.
Chiselling 15mins (10.70m-10.90m), 20mins (12.10m-12.40m), 15mins (15.70m-15.90m).
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
18/07/24	8.20		
19/07/24	14.10		

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
Tel: 01454 269237
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Site: Ickleford Mill

BH02A

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 18-07-24 Finish 19-07-24		

Client: Hill Partnerships

Sheet: 3 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		16.50	D					
		17.00 - 17.45	D SPT	N 41				17.00 - 17.45 Very stiff, very high strength.
		18.00	D					
		18.50 - 18.95	D SPT	N 54				18.50 - 18.95 Very stiff, very high strength. Refused.
		19.50	D					
		20.00 - 20.45	D SPT	N 47				20.00 - 20.45 Very stiff, very high strength.
					20.50			Borehole completed at 20.50m.
					{24.00}			

16 17 18 19 20 21 22 23 24

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.00mbgl. Cable percussive drilled 1.00m-20.50mbgl.
CASING: 15.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered from 8.20m-14.10mbgl.
Chiselling 15mins (10.70m-10.90m), 20mins (12.10m-12.40m), 15mins (15.70m-15.90m).
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
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Site: Ickleford Mill

BH03

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 19-07-24 Finish 22-07-24		

Client: Hill Partnerships

Sheet: 1 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.20			MADE GROUND: CONCRETE.
		0.50	B					MADE GROUND: Brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular and subrounded fine to coarse brick, concrete and charcoal.
					0.80			
		1.00 - 1.45	B SPT	N 1				Dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular and rounded fine to coarse flint. 1.00 - 1.45 Very soft, extremely low strength.
					1.50			
		1.75	D					Dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular and subrounded fine to coarse chalk and flint.
		2.00 - 2.50	B	NR				
	▽	2.00 - 2.45	U100					
		2.75	D					
		3.00 - 3.45	D SPT	N 9				3.00 - 3.45 Firm, low strength.
		3.75	D					
		4.00 - 4.45	D SPT	N 12				4.00 - 4.45 Firm, medium strength.
		4.75	D					
		5.00 - 5.45	D SPT	N 16				5.00 - 5.45 Stiff, medium strength.
		6.00	D					
		6.50 - 6.95	D SPT	N 27				6.50 - 6.95 Stiff, high strength.
		7.50	D					
		8.00 - 8.45	U100		{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.00mbgl. Cable percussive drilled 1.00m-20.50mbgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater encountered at 2.20mbgl, rose to 1.80mbgl.
Chiselling 1hr (0.00m-0.40m), 30mins (0.40m-0.80m), 20mins (12.70m-12.90m), 15mins (17.40m-17.50m), and 10mins (19.60-19.70m).
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 20.00mbgl, granular response zone (20.00m-17.00m), bentonite seal (17.00m-14.00m), arisings (11.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
19/07/24	2.20	2.00	1.80

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site				BH03
Ickleford Mill				
Job No: CRM.1027.189	Dates: Start 19-07-24, Finish 22-07-24	Ground Level (m)	Co-Ordinates	
Client: Hill Partnerships				Sheet: 2 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		9.00	D					9.00 - 9.45 Very stiff, high strength.
		9.50 - 9.95	D SPT	N 33				
		10.50	D					
		11.00 - 11.45	U100					
		12.00	D					
		12.50 - 12.95	D SPT	N 62				12.50 - 12.95 Very stiff, very high strength. Refused.
		13.50	D					
		14.00 - 14.45	D SPT	N 39				14.00 - 14.45 Very stiff, very high strength.
		15.00	D					
		15.50 - 15.95	D SPT	N 37				15.50 - 15.95 Very stiff, high strength.
					{16.00}			Continued next sheet

8 9 10 11 12 13 14 15 16

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.00mbgl. Cable percussive drilled 1.00m-20.50mbgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater encountered at 2.20mbgl, rose to 1.80mbgl.
Chiselling 1hr (0.00m-0.40m), 30mins (0.40m-0.80m), 20mins (12.70m-12.90m), 15mins (17.40m-17.50m), and 10mins (19.60-19.70m).
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 20.00mbgl, granular response zone (20.00m-17.00m), bentonite seal (17.00m-14.00m), arisings (11.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Ickleford Mill

BH03

Job No: CRM.1027.189

Dates: Start 19-07-24, Finish 22-07-24

Ground Level (m):

Co-Ordinates:

Client: Hill Partnerships

Sheet: 3 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		16.50	D					
		17.00 - 17.45	D SPT	N 42				17.00 - 17.45 Very stiff, very high strength.
		18.00	D					
		18.50 - 18.95	D SPT	N 49				18.50 - 18.95 Very stiff, very high strength.
		19.50	D					
		20.00 - 20.45	D SPT	N 51	20.00			20.00 - 20.45 Very stiff, very high strength. Refused.
					20.50			Dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular and subrounded fine to coarse chalk and flint.
								Borehole completed at 20.50m.
					{24.00}			

16 17 18 19 20 21 22 23 24

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hand dug inspection pit 0.00m-1.00mbgl. Cable percussive drilled 1.00m-20.50mbgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater encountered at 2.20mbgl, rose to 1.80mbgl.
Chiselling 1hr (0.00m-0.40m), 30mins (0.40m-0.80m), 20mins (12.70m-12.90m), 15mins (17.40m-17.50m), and 10mins (19.60-19.70m).
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 20.00mbgl, granular response zone (20.00m-17.00m), bentonite seal (17.00m-14.00m), arisings (11.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Ickleford Mill

BH04

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 19-07-24 Finish 19-07-24		

Client: Hill Partnerships

Sheet: 1 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.15			MADE GROUND: TARMACADAM.
		0.30 - 0.50	ES		0.30			MADE GROUND: CONCRETE.
		0.50	B		0.50			MADE GROUND: Brown gravelly medium to coarse SAND. Gravel is angular and subrounded brick, concrete and tarmacadam.
		0.50 - 0.70	ES					
		1.00 - 1.45	B SPT	N 23				MADE GROUND: Greyish brown and yellow brown very clayey SAND & GRAVEL. Sand is fine to coarse. Gravel is angular and subrounded brick and tarmacadam. 1.00 - 1.45 Medium dense.
		2.00 - 2.45	B SPT	N 8				2.00 - 2.45 Loose.
		2.75	D		2.75			Dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular and subrounded fine to coarse chalk and flint. 3.00 - 3.45 Firm, low strength.
		3.00 - 3.45	U100					
		3.75	D					
		4.00 - 4.45	D SPT	N 16				4.00 - 4.45 Stiff, medium strength.
		4.75	D					
		5.00 - 5.45	U100					
		6.00	D					
		6.50 - 6.95	D SPT	N 25				6.50 - 6.95 Stiff, high strength.
		7.50	D					
		8.00 - 8.45	U100		{8.00}			Continued next sheet

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hydraulic breaker 0.00m-0.30mbgl. Hand dug inspection pit 0.30m-1.00mbgl.
Cable percussive drilled 1.00m-20.00m bgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered at 15.00mbgl.
Chiselling 30mins (15.40m-15.60m).
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 20.00mbgl, granular response zone (20.00m-17.00m), bentonite seal (17.00m-14.00m), arisings (14.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site				BH04
Ickleford Mill				
Job No: CRM.1027.189	Dates: Start 19-07-24, Finish 19-07-24	Ground Level (m)	Co-Ordinates	
Client: Hill Partnerships				Sheet: 2 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		9.00	D					9.00 - 9.45 Stiff to very stiff, high strength.
		9.50 - 9.95	D SPT	N 30				
		10.50	D					
		11.00 - 11.45	U100					
		12.00	D					
		12.50 - 12.95	D SPT	N 39				12.50 - 12.95 Very stiff, very high strength.
		13.50	D					
		14.00 - 14.45	D SPT	N 48				14.00 - 14.45 Very stiff, very high strength.
	▽	15.00	D					
		15.50 - 15.95	D	N 50				
		15.50 - 15.50	SPT					15.50 - 15.50 Very stiff, very high strength. Refused.
					{16.00}			Continued next sheet

8 9 10 11 12 13 14 15 16

General Remarks

EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hydraulic breaker 0.00m-0.30mbgl. Hand dug inspection pit 0.30m-1.00mbgl.
Cable percussive drilled 1.00m-20.00m bgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered at 15.00mbgl.
Chiselling 30mins (15.40m-15.60m).
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 20.00mbgl, granular response zone (20.00m-17.00m), bentonite seal (17.00m-14.00m), arisings (14.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
19/07/24	15.00		

All dimensions in metres
Scale 1:50

Logged By: SB

1.0 ENZYGO WS LOG CRM.1027.189 ICKLEFORD.GPJ GINT STD AGS 3_1 ENZYGO.GPJ 29/7/24

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ickleford Mill

BH04

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.189	Start 19-07-24 Finish 19-07-24		

Client: Hill Partnerships

Sheet: 3 of 3

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		16.50	D					
		17.00 - 17.45	D SPT	N 68				17.00 - 17.45 Very stiff, very high strength. Refused.
		18.00	D					
		18.50 - 18.95	D SPT	N 104				18.50 - 18.95 Very stiff, very high strength. Refused.
		19.50	D					
		20.00 20.00 - 20.00	D SPT	N 50	20.00 20.00			Dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular and subrounded fine to coarse chalk and flint. 20.00 - 20.00 Very stiff, very high strength. Refused. Borehole completed at 20.00m.
					{24.00}			

16 17 18 19 20 21 22 23 24

General Remarks

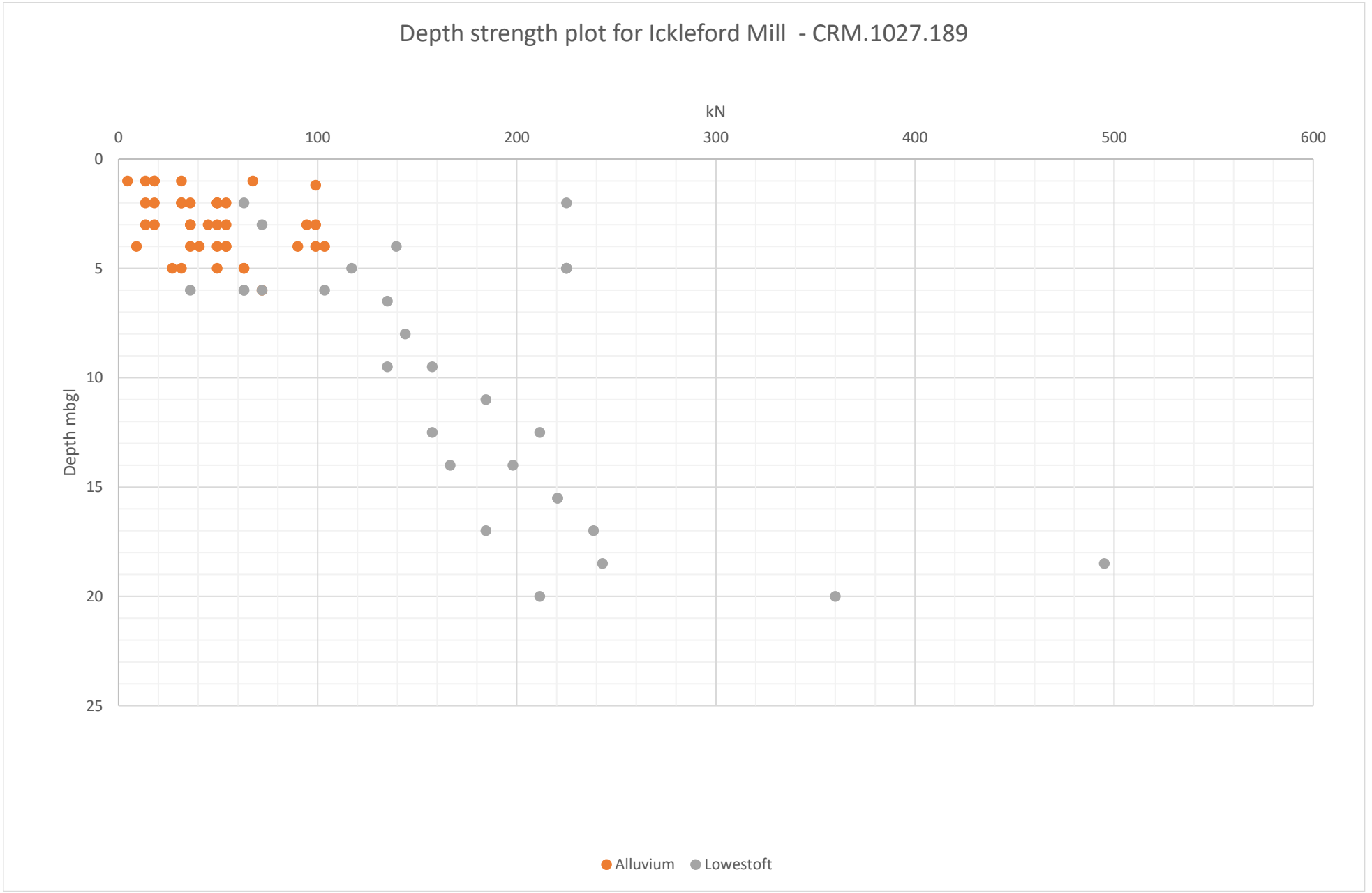
EQUIPMENT: Pilcon cable percussion rig.
METHOD: Hydraulic breaker 0.00m-0.30mbgl. Hand dug inspection pit 0.30m-1.00mbgl.
Cable percussive drilled 1.00m-20.00m bgl.
CASING: 10.00m of 200mm, and 20.00mm of 150mm diameter steel casing used.
REMARKS: Groundwater seepage encountered at 15.00mbgl.
Chiselling 30mins (15.40m-15.60m).
BACKFILL: On completion, a slotted pipe (63mm OD) was installed to 20.00mbgl, granular response zone (20.00m-17.00m), bentonite seal (17.00m-14.00m), arisings (14.00m-0.15m) flush steel cover and gas valve (0.15m-0.00m).

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: SB


Depth strength plot for Ickleford Mill - CRM.1027.189
kN
0
100
200
300
400
500
600
Depth mbgl
0
5
10
15
20
25
Alluvium
Lowestoft

Appendix 3 – Chemical Testing

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CB11 4LB

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7 Woodshots Meadow,
Croxley Green
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WD18 8YS

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Analytical Report Number : 24-032504

Project / Site name:	Ickleford Mill, Arlesey Road, Ickleford	**Samples received on:**	24/07/2024
Your job number:	CRM.1027.189	**Samples instructed on/ Analysis started on:**	24/07/2024
Your order number:		**Analysis completed by:**	30/07/2024
Report Issue Number:	1	**Report issued on:**	30/07/2024
Samples Analysed:	5 soil samples		

Signed: JSzwagrak

Joanna Szwagrzak
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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-032504
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

Lab Sample Number				267095	267096	267097	267098	267099
Sample Reference				BH01	BH02A	BH03	BH04	BH04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.70	0.00-0.30	0.20-0.50	0.30-0.50	0.50-0.70
Date Sampled				18/07/2024	18/07/2024	19/07/2024	19/07/2024	19/07/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	27	< 0.1	12.2	19.1	< 0.1
Moisture Content	%	0.01	NONE	13	18	19	7.1	15
Total mass of sample received	kg	0.1	NONE	1.5	1.5	1.5	1.5	1.5
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	KSZ	KSZ	KSZ
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	8.9	-	9.7	-	9.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	120	-	970	-	990
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	57.9	-	486	-	497
Organic Matter (automated)	%	0.1	MCERTS	2.3	4.6	1.4	2.1	0.7
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.12	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05	0.06	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.9	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.24	< 0.05	< 0.05	0.15	0.51
Phenanthrene	mg/kg	0.05	MCERTS	2.1	0.1	0.31	0.33	0.63
Anthracene	mg/kg	0.05	MCERTS	0.95	< 0.05	0.06	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	39	1.4	0.67	0.56	0.14
Pyrene	mg/kg	0.05	MCERTS	35	1.3	0.57	0.66	0.19
Benzo(a)anthracene	mg/kg	0.05	MCERTS	16	0.57	0.26	0.25	< 0.05
Chrysene	mg/kg	0.05	MCERTS	17	0.75	0.3	0.34	0.09
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	19	0.72	0.37	0.23	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	5.8	0.33	0.19	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	14	0.6	0.32	0.17	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	6.8	0.27	0.18	0.1	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.09	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	7.6	0.34	0.22	0.14	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	164	6.44	3.46	2.98	1.56
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	14	13	18	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	23	27	24	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	21	17	8.2	6.5
Lead (aqua regia extractable)	mg/kg	1	MCERTS	62	49	36	9.2	8.8
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	22	20	19	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	30	41	45	47	33
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	49	75	65	46	33

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Analytical Report Number: 24-032504
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

Lab Sample Number				267095	267096	267097	267098	267099
Sample Reference				BH01	BH02A	BH03	BH04	BH04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.70	0.00-0.30	0.20-0.50	0.30-0.50	0.50-0.70
Date Sampled				18/07/2024	18/07/2024	19/07/2024	19/07/2024	19/07/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	0.029
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	0.026	0.34
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	1.7	31	17
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	7.6	< 2.0	12	480	380
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	20	890	660
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	9.6	< 8.0	22	340	180
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	17	< 10	55	1700	1200
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	6.7	5
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	14	< 2.0	2.1	180	150
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	120	< 10	< 10	440	230
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	160	19	15	190	68
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	300	19	17	810	450
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Pesticides								
Alpha-BHC (Benzene Hexachloride)	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Alachlor	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Gamma-BHC (Lindane, gamma HCH)	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Omethoate	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
1,2,3-Trichlorobenzene	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
1,3,5-Trichlorobenzene	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
2,6-Dichlorobenzonitrile	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Dimethylvinphos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Demeton-O	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Demeton-S	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Endrin Aldehyde	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Endrin Ketone	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Hexachlorobutadiene	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Phosphamidon (Sum)	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
1,2,4,5-Tetrachlorobenzene	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Endosulfan sulfate	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Etrimfos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Fenvalerate (Sum)	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Hexachlorobenzene	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Mevinphos, E+Z	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Pentachlorobenzene	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Pirimiphos-ethyl	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Propetamphos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Tecnazene	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-

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Analytical Report Number: 24-032504
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

Lab Sample Number				267095	267096	267097	267098	267099
Sample Reference				BH01	BH02A	BH03	BH04	BH04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.70	0.00-0.30	0.20-0.50	0.30-0.50	0.50-0.70
Date Sampled				18/07/2024	18/07/2024	19/07/2024	19/07/2024	19/07/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Triadimefon	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Aldrin	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Azinphos-methyl	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Beta-BHC	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Cis-Chlordane	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Chlorfenvinphos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Chlorpyrifos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Chlorothalonil	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Carbophenothion	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Delta-BHC	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Dieldrin	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Heptachlor Exo-epoxide	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Endrin	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Endosulfan I (alpha isomer)	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Endosulfan II (beta isomer)	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Fenthion	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Isodrin	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Methacrifos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
O,p'-DDD	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
O,p'-DDE	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
O,p'-DDT	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Parathion	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Parathion-methyl	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Pendimethalin	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Phorate	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Phosalone	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
P,p'-DDD	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
P,p'-DDE	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
P,p'-DDT	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
P,p'-Methoxychlor	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Propyzamide	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Triazophos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Trans-Chlordane	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Dichlorvos	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Dimethoate	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Diazinon	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Ethion	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Fenitrothion	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Malathion	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Pirimiphos-methyl	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Trifluralin	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-
Azinphos-ethyl	µg/kg	10	NONE	< 10	< 10	< 10	< 10	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 24-032504
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
267095	BH01	None Supplied	0.30-0.70	Brown clay and loam with gravel and stones
267096	BH02A	None Supplied	0.00-0.30	Brown loam with vegetation
267097	BH03	None Supplied	0.20-0.50	Brown clay and loam with stones
267098	BH04	None Supplied	0.30-0.50	Brown sand with gravel and stones
267099	BH04	None Supplied	0.50-0.70	Brown clay and loam with gravel

Analytical Report Number : 24-032504
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

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
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Pesticides by GC-MS/MS	Detemination of Pesticides in soil by GC MS/MS	In-house method	L055B	W	NONE
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS

Analytical Report Number : 24-032504
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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Analytical Report Number : 24-032958

Project / Site name:	Ickleford Mill, Arlesey Road, Ickleford	**Samples received on:**	24/07/2024
Your job number:	CRM.1027.189	**Samples instructed on/ Analysis started on:**	26/07/2024
Your order number:		**Analysis completed by:**	01/08/2024
Report Issue Number:	1	**Report issued on:**	01/08/2024
Samples Analysed:	3 water samples		

Signed:

Joanna Wawrzeczko
Senior 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

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

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 24-032958
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

Lab Sample Number				269358	269359	269360
Sample Reference				SW101	SW102	SW103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				18/07/2024	18/07/2024	18/07/2024
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**			
General Inorganics						
pH (L099)	pH Units	N/A	ISO 17025	8.2	8.1	8
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	2.4	1.77	1.79
Speciated PAHs						
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01 ##	< 0.01 ##	< 0.01 ##
Fluorene	µg/l	0.01	ISO 17025	< 0.01 ##	< 0.01 ##	< 0.01 ##
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01 ##	< 0.01 ##	< 0.01 ##
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Total PAH						
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16
Heavy Metals / Metalloids						
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.32	0.27	0.26
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	1.5	2.1	0.7
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	< 0.5	1.3	< 0.5
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.2	0.2	0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	3.7	2.6	1.6
Boron (dissolved)	µg/l	10	ISO 17025	21	20	20
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0

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Analytical Report Number: 24-032958
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

Lab Sample Number				269358	269359	269360
Sample Reference				SW101	SW102	SW103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				18/07/2024	18/07/2024	18/07/2024
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**			
Petroleum Hydrocarbons						
TPH - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC10 - EC12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aliphatic >EC12 - EC16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aliphatic >EC16 - EC21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aliphatic >EC21 - EC35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aliphatic >EC5 - EC35 $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC10 - EC12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aromatic >EC12 - EC16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aromatic >EC16 - EC21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aromatic >EC21 - EC35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC35 $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10
VOCs						
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-032958
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

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-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	L012B	W	ISO 17025
Total organic carbon in water	Determination of total organic carbon in water by TOC/DOC NDIR analyser.Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices: SW, GW, PW, PrW (Al, Cu, Fe,Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Total petroleum hydrocarbons with carbon banding by GC-MS in water	Determination of total petroleum hydrocarbons in water by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L070B	W	NONE
BTEX and/or Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA 8260	L073B	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	W	ISO 17025
Total petroleum hydrocarbons by GC-MS HS in water	Determination of total petroleum hydrocarbons in water by GC-MS HS	In-house method	L088B	W	ISO 17025
pH at 20°C in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method	L099	W	ISO 17025

Analytical Report Number : 24-032958
Project / Site name: Ickleford Mill, Arlesey Road, Ickleford

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAH) in leachate by extraction in dichloromethane followed by GC-MS	In-house method based on USEPA 8270	L102B	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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

- Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

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Analytical Report Number : 24-034207

Project / Site name:	Ickleford Mill	**Samples received on:**	24/07/2024
Your job number:	CRM.1027.189	**Samples instructed on/ Analysis started on:**	02/08/2024
Your order number:	CRM.1027.189	**Analysis completed by:**	13/08/2024
Report Issue Number:	1	**Report issued on:**	13/08/2024
Samples Analysed:	14 soil samples		

Signed: Szwagrak

Joanna Szwagrzak
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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-034207
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276157	276158	276159	276160	276161
Sample Reference				WS101	WS103	WS103A	WS105	WS106
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.40	0.70	0.40	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	56.5
Moisture Content	%	0.01	NONE	13	14	12	20	8.5
Total mass of sample received	kg	0.1	NONE	1.3	1.3	1.3	1.3	1.3
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSO	DSO	DSO	DSO	DSO
Actinolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Amosite detected	Type	N/A	ISO 17025	-	-	-	-	-
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	-	-
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	-	-
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Tremolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	-	8.4	-	-	10.5
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	210	-	-	450
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	106	-	-	224
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.1	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.14	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.8	0.05	0.39
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.48	< 0.05	0.08
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	4.2	0.15	1.1
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	3.7	0.11	0.95
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.06	2.1	0.13	0.57
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2	0.06	0.71
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	2.3	0.08	0.79
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	1.1	< 0.05	0.38
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.1	0.07	0.63
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.1	0.07	0.37
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.29	< 0.05	0.13
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.1	0.07	0.4
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	22.4	0.8	6.5

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Analytical Report Number: 24-034207
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276157	276158	276159	276160	276161
Sample Reference				WS101	WS103	WS103A	WS105	WS106
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.40	0.70	0.40	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.6	10	19	6.5	18
Boron (water soluble)	mg/kg	0.2	MCERTS	2.9	1.1	1.9	2.9	1.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	22	21	19	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	8.4	25	8.4	92
Lead (aqua regia extractable)	mg/kg	1	MCERTS	33	15	92	12	51
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	19	21	17	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	45	51	110	38	100
Petroleum Hydrocarbons								
TPH (>EC5 - EC7) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC7 - EC8) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC8 - EC10) $_{HS\_1D\_TOTAL}$	mg/kg	0.02	MCERTS	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TPH (>EC10 - EC12) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (>EC12 - EC16) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
TPH (>EC16 - EC21) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	< 10	< 10	24	13	14
TPH (>EC21 - EC35) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	< 10	< 10	87	14	81
TPH (>EC35 - EC44) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	< 10	< 10	88	< 10	< 10
TPH Total >EC5 - EC44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	< 10	< 10	200	27	110

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-034207
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276162	276163	276164	276165	276166
Sample Reference				WS107	WS108	WS109	WS110	WS111
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.80	0.50	0.70	1.00
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	49.7	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	2.6	16	12	17
Total mass of sample received	kg	0.1	NONE	1.3	1.3	1.3	1.3	1.3
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	WEM	WEM	WEM	WEM
Actinolite detected	Type	N/A	ISO 17025	Not-detected	-	-	-	-
Amosite detected	Type	N/A	ISO 17025	Detected	-	-	-	-
Anthophyllite detected	Type	N/A	ISO 17025	Not-detected	-	-	-	-
Chrysotile detected	Type	N/A	ISO 17025	Not-detected	-	-	-	-
Crocidolite detected	Type	N/A	ISO 17025	Not-detected	-	-	-	-
Tremolite detected	Type	N/A	ISO 17025	Not-detected	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	Loose Fibres	-	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	-	-	-	7.9	8
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	480	77
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	-	241	38.5
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.09	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.49	0.27	0.13	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.12	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.2	0.73	0.45	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	1	0.7	0.38	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.68	0.35	0.28	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.79	0.4	0.23	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.79	0.49	0.34	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.44	0.24	0.11	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.7	0.47	0.27	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.39	0.28	0.17	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.14	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.4	0.37	0.2	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	7.27	4.3	2.56	< 0.80	< 0.80

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Analytical Report Number: 24-034207
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276162	276163	276164	276165	276166
Sample Reference				WS107	WS108	WS109	WS110	WS111
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.80	0.50	0.70	1.00
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	13	13	11	12
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9	2.3	1.3	3.8	2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	25	27	22	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	19	16	15	5.2	14
Lead (aqua regia extractable)	mg/kg	1	MCERTS	94	22	22	12	14
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	21	26	18	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.2	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	76	73	61	36	40
Petroleum Hydrocarbons								
TPH (>EC5 - EC7) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC7 - EC8) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC8 - EC10) $_{HS\_1D\_TOTAL}$	mg/kg	0.02	MCERTS	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TPH (>EC10 - EC12) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (>EC12 - EC16) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	4	MCERTS	24	4.5	< 4.0	< 4.0	< 4.0
TPH (>EC16 - EC21) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	77	28	< 10	< 10	< 10
TPH (>EC21 - EC35) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	390	400	< 10	< 10	< 10
TPH (>EC35 - EC44) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	75	810	< 10	< 10	< 10
TPH Total >EC5 - EC44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	590	1200	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number: 24-034207
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276167	276168	276169	276170
Sample Reference				WS112	WS113	WS114	WS115
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.30	0.40	0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**				
Stone Content	%	0.1	NONE	35.5	< 0.1	59.9	< 0.1
Moisture Content	%	0.01	NONE	7.6	8.6	6.3	9.2
Total mass of sample received	kg	0.1	NONE	1.3	1.3	1.3	1.3
Asbestos							
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EWS	EWS	EWS	EWS
Actinolite detected	Type	N/A	ISO 17025	-	-	-	-
Amosite detected	Type	N/A	ISO 17025	-	-	-	-
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	-
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	-
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	-
Tremolite detected	Type	N/A	ISO 17025	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-
General Inorganics							
pH (L099)	pH Units	N/A	MCERTS	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	-	-
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.07
Acenaphthene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.09	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.85	< 0.05	< 0.05	0.25
Anthracene	mg/kg	0.05	MCERTS	0.27	< 0.05	< 0.05	0.07
Fluoranthene	mg/kg	0.05	MCERTS	1.7	< 0.05	0.06	0.62
Pyrene	mg/kg	0.05	MCERTS	1.5	< 0.05	0.06	0.62
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.72	< 0.05	< 0.05	0.41
Chrysene	mg/kg	0.05	MCERTS	0.74	< 0.05	< 0.05	0.42
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.82	< 0.05	< 0.05	0.62
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.43	< 0.05	< 0.05	0.33
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.76	< 0.05	< 0.05	0.57
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.37	< 0.05	< 0.05	0.37
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05	0.06
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.49	< 0.05	< 0.05	0.44
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	8.82	< 0.80	< 0.80	4.89

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Analytical Report Number: 24-034207
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276167	276168	276169	276170
Sample Reference				WS112	WS113	WS114	WS115
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.30	0.40	0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	27	32	22
Boron (water soluble)	mg/kg	0.2	MCERTS	2.9	0.8	2	2.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	29	24	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	15	19	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	26	13	42	57
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	40	24	25
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.3	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	73	83	92	110
Petroleum Hydrocarbons							
TPH (>EC5 - EC7) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC7 - EC8) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC8 - EC10) $_{HS\_1D\_TOTAL}$	mg/kg	0.02	MCERTS	< 0.02	< 0.02	< 0.02	< 0.02
TPH (>EC10 - EC12) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH (>EC12 - EC16) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
TPH (>EC16 - EC21) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	17	< 10	< 10	< 10
TPH (>EC21 - EC35) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	97	< 10	< 10	66
TPH (>EC35 - EC44) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	160	< 10	< 10	110
TPH Total >EC5 - EC44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	280	< 10	< 10	180

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Analytical Report Number : 24-034207
Project / Site name: Ickleford Mill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
276157	WS101	None Supplied	0.8	Brown clay and loam with gravel and vegetation
276158	WS103	None Supplied	0.4	Brown clay and loam with gravel and vegetation
276159	WS103A	None Supplied	0.7	Brown loam and sand with gravel and vegetation
276160	WS105	None Supplied	0.4	Brown clay and sand with gravel
276161	WS106	None Supplied	0.5	Brown loam and sand with gravel and vegetation
276162	WS107	None Supplied	1.9	Brown clay and sand with gravel
276163	WS108	None Supplied	0.8	Brown loam and gravel with vegetation and stones
276164	WS109	None Supplied	0.5	Brown clay and loam with vegetation
276165	WS110	None Supplied	0.7	Brown clay and sand with gravel
276166	WS111	None Supplied	1	Brown clay and loam with vegetation
276167	WS112	None Supplied	0.4	Brown sand with gravel and stones
276168	WS113	None Supplied	0.3	Brown clay and sand with gravel
276169	WS114	None Supplied	0.4	Brown loam with vegetation and stones
276170	WS115	None Supplied	0.3	Brown loam with gravel and vegetation

Analytical Report Number : 24-034207
Project / Site name: Ickleford Mill

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
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS

Analytical Report Number : 24-034207
Project / Site name: Ickleford Mill

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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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Analytical Report Number : 24-034208

Project / Site name:	Ickleford Mill	**Samples received on:**	24/07/2024
Your job number:	CRM.1027.189	**Samples instructed on/ Analysis started on:**	02/08/2024
Your order number:	CRM.1027.189	**Analysis completed by:**	13/08/2024
Report Issue Number:	1	**Report issued on:**	13/08/2024
Samples Analysed:	5 10:1 WAC samples		

Signed: Szwagrak

Joanna Szwagrzak
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

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

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Analytical Report Number: 24-034208
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276171	276172	276173	276174	276175
Sample Reference				WS101	WS103A	WS107	WS108	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.70	1.90	0.80	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	49.7	< 0.1
Moisture Content	%	0.01	NONE	13	12	14	2.6	16
Total mass of sample received	kg	0.1	NONE	1.3	1.3	1.3	1.3	0.8
General Inorganics								
pH (L005B)	pH Units	N/A	MCERTS	8.1	8.2	9.9	9.2	8.2
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1	2.8	1.4	3.1	1.1
Loss on Ignition @ 450°C	%	0.2	MCERTS	2.5	6.5	3.1	5.5	3.6
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	26	11	210	15	120
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.09	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.07	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.15	0.1	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.11	0.09	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	1.7	0.5	0.25	0.13
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.54	0.11	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.8	1.2	0.74	0.43
Pyrene	mg/kg	0.05	MCERTS	< 0.05	3.2	1	0.72	0.38
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	1.8	0.67	0.38	0.28
Chrysene	mg/kg	0.05	MCERTS	< 0.05	2	0.81	0.41	0.22
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	2.1	0.86	0.46	0.32
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	1	0.37	0.29	0.11
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	2	0.7	0.5	0.25
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.96	0.38	0.28	0.17
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.26	0.12	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.96	0.41	0.37	0.2
Coronene	mg/kg	0.05	NONE	< 0.05	0.27	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	20.7	7.44	-	2.48
Total WAC-17 PAHs	mg/kg	0.85	NONE	< 0.85	21	7.44	4.4	2.48
Petroleum Hydrocarbons								
Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	< 10	< 10	340	260	< 10
VOCs								
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total BTEX	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

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Analytical Report Number: 24-034208
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				276171	276172	276173	276174	276175
Sample Reference				WS101	WS103A	WS107	WS108	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.70	1.90	0.80	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Waste Acceptance Criteria Analytical Results

Report No:	**24-034208**						
					Client:	**ENZYGOGEO**	
Location	**Ickleford Mill**						
Lab Reference (Sample Number)	276171				**Landfill Waste Acceptance Criteria**		
					Limits		
Sampling Date	/ /				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS101						
Depth (m)	0.80						
Solid Waste Analysis							
TOC (%)**	1.0				3%	5%	6%
Loss on Ignition (%) **	2.5				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	8.1				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	26				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00382			0.0382	0.5	2	25
Barium *	0.00864			0.0864	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.00097			0.0097	0.5	10	70
Copper *	0.0036			0.036	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00539			0.0539	0.5	10	30
Nickel *	0.00092			0.0092	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0019			0.019	4	50	200
Chloride *	3.3			33	800	15000	25000
Fluoride*	0.12			1.2	10	150	500
Sulphate *	39			390	1000	20000	50000
TDS*	110			1100	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	17.6			176	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.3						
Dry Matter (%)	87						
Moisture (%)	13						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results

Report No:	**24-034208**						
					Client:	**ENZYGOGEO**	
Location	**Ickleford Mill**						
Lab Reference (Sample Number)	276172				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	/ /				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS103A						
Depth (m)	0.70						
Solid Waste Analysis							
TOC (%)**	2.8				3%	5%	6%
Loss on Ignition (%) **	6.5				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	21.0				100	--	--
pH (units)**	8.2				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	11				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00139			0.0139	0.5	2	25
Barium *	0.0116			0.116	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0019			0.019	0.5	10	70
Copper *	0.0069			0.069	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.00098			0.0098	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0034			0.034	4	50	200
Chloride *	2.5			25	800	15000	25000
Fluoride*	0.43			4.3	10	150	500
Sulphate *	5.9			59	1000	20000	50000
TDS*	62			620	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	13.3			133	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.3						
Dry Matter (%)	88						
Moisture (%)	12						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

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This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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The results included within the report are representative of the samples submitted for analysis.

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Waste Acceptance Criteria Analytical Results

Report No:	**24-034208**						
					Client:	**ENZYGOGEO**	
Location	**Ickleford Mill**						
Lab Reference (Sample Number)	276173				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	/ /				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS107						
Depth (m)	1.90						
Solid Waste Analysis							
TOC (%)**	1.4				3%	5%	6%
Loss on Ignition (%) **	3.1				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	340				500	--	--
Total PAH (WAC-17) (mg/kg)	7.44				100	--	--
pH (units)**	9.9				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	210				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0207			0.207	0.5	2	25
Barium *	0.0199			0.199	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.00081			0.0081	0.5	10	70
Copper *	0.025			0.25	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.0145			0.145	0.5	10	30
Nickel *	0.0074			0.074	0.4	10	40
Lead *	0.0038			0.038	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0034			0.034	4	50	200
Chloride *	48			480	800	15000	25000
Fluoride*	0.20			2.0	10	150	500
Sulphate *	220			2200	1000	20000	50000
TDS*	140			1400	4000	60000	100000
Phenol Index (Monohydric Phenols) *	0.021			0.21	1	-	-
DOC	18.9			189	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.3						
Dry Matter (%)	86						
Moisture (%)	14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Waste Acceptance Criteria Analytical Results

Report No:	**24-034208**						
					Client:	**ENZYGOGEO**	
Location	**Ickleford Mill**						
Lab Reference (Sample Number)	276174				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	/ /				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS108						
Depth (m)	0.80						
Solid Waste Analysis							
TOC (%)**	3.1				3%	5%	6%
Loss on Ignition (%) **	5.5				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	260				500	--	--
Total PAH (WAC-17) (mg/kg)	4.40				100	--	--
pH (units)**	9.2				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	15				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00343			0.0343	0.5	2	25
Barium *	0.00709			0.0709	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.00060			0.0060	0.5	10	70
Copper *	0.010			0.10	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00101			0.0101	0.5	10	30
Nickel *	0.00094			0.0094	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0032			0.032	4	50	200
Chloride *	2.7			27	800	15000	25000
Fluoride*	0.21			2.1	10	150	500
Sulphate *	23			230	1000	20000	50000
TDS*	79			790	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	12.9			129	500	800	1000
Leach Test Information							
Stone Content (%)	49.7						
Sample Mass (kg)	1.3						
Dry Matter (%)	97						
Moisture (%)	2.6						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Waste Acceptance Criteria Analytical Results

Report No:	**24-034208**						
					Client:	**ENZYGOGEO**	
Location	**Ickleford Mill**						
Lab Reference (Sample Number)	276175				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	/ /				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS109						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.1				3%	5%	6%
Loss on Ignition (%) **	3.6				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	2.48				100	--	--
pH (units)**	8.2				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	120				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.00100			< 0.0100	0.5	2	25
Barium *	0.0160			0.160	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0020			0.020	0.5	10	70
Copper *	0.0081			0.081	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00130			0.0130	0.5	10	30
Nickel *	0.0037			0.037	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0068			0.068	4	50	200
Chloride *	3.2			32	800	15000	25000
Fluoride*	0.50			5.0	10	150	500
Sulphate *	3.0			30	1000	20000	50000
TDS*	62			620	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	17.0			170	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.8						
Dry Matter (%)	84						
Moisture (%)	16						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Analytical Report Number : 24-034208
Project / Site name: Ickleford Mill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
276171	WS101	None Supplied	0.8	Brown clay and loam with gravel and vegetation
276172	WS103A	None Supplied	0.7	Brown loam and sand with gravel and vegetation
276173	WS107	None Supplied	1.9	Brown clay and sand with gravel
276174	WS108	None Supplied	0.8	Brown loam and gravel with vegetation and stones
276175	WS109	None Supplied	0.5	Brown clay and loam with vegetation

Analytical Report Number : 24-034208
Project / Site name: Ickleford Mill

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
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	NONE

Analytical Report Number : 24-034208
Project / Site name: Ickleford Mill

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
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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Analytical Report Number : 24-034759

Project / Site name:	Ickleford Mill	**Samples received on:**	24/07/2024
Your job number:	CRM.1027.189	**Samples instructed on/ Analysis started on:**	02/08/2024
Your order number:	CRM.1027.189	**Analysis completed by:**	12/08/2024
Report Issue Number:	1	**Report issued on:**	12/08/2024
Samples Analysed:	5 soil samples		

Signed: Szwagrak

Joanna Szwagrzak
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

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

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Analytical Report Number: 24-034759
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				279166	279167	279168	279169	279170
Sample Reference				WS101	WS103	WS107	WS107	WS108
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.65	2.30	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	39.6	< 0.1	59.6	< 0.1	49.7
Moisture Content	%	0.01	NONE	6.9	16	13	16	6.5
Total mass of sample received	kg	0.1	NONE	0.5	0.4	0.5	0.4	0.5
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSO	DSO	DSO	DSO	DSO
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.07	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.05	< 0.05	0.08	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.56	1.2	0.67	0.3
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.13	0.38	0.12	0.07
Fluoranthene	mg/kg	0.05	MCERTS	0.07	0.72	2	1.1	0.91
Pyrene	mg/kg	0.05	MCERTS	0.06	0.58	1.8	0.9	0.86
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.08	0.31	0.81	0.57	0.49
Chrysene	mg/kg	0.05	MCERTS	0.07	0.29	0.85	0.52	0.52
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.1	0.3	0.88	0.55	0.74
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.15	0.44	0.36	0.25
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.26	0.8	0.54	0.58
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.06	0.14	0.39	0.28	0.32
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.09	0.08	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.08	0.15	0.46	0.33	0.4
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	3.64	10.1	6.14	5.44

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Analytical Report Number: 24-034759
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				279166	279167	279168	279169	279170
Sample Reference				WS101	WS103	WS107	WS107	WS108
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.65	2.30	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25	11	19	14	10
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	1.4	4.4	1.9	2.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26	21	33	24	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	35	11	22	12	18
Lead (aqua regia extractable)	mg/kg	1	MCERTS	26	17	58	22	32
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30	21	24	23	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	180	49	84	63	69
Petroleum Hydrocarbons								
TPH (>EC5 - EC7) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC7 - EC8) $_{HS\_1D\_TOTAL}$	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (>EC8 - EC10) $_{HS\_1D\_TOTAL}$	mg/kg	0.02	MCERTS	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TPH (>EC10 - EC12) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	130	2.4	< 2.0
TPH (>EC12 - EC16) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	4	MCERTS	< 4.0	14	550	13	< 4.0
TPH (>EC16 - EC21) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	< 10	20	1500	32	12
TPH (>EC21 - EC35) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	MCERTS	20	20	550	180	240
TPH (>EC35 - EC44) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	< 10	< 10	26	41	560
TPH Total >EC5 - EC44 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	35	61	1200	270	810

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-034759
Project / Site name: Ickleford Mill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
279166	WS101	None Supplied	0.5	Brown gravelly sand with stones
279167	WS103	None Supplied	0.5	Brown clay with gravel
279168	WS107	None Supplied	0.65	Brown gravelly clay with stones
279169	WS107	None Supplied	2.3	Brown clay with gravel
279170	WS108	None Supplied	0.5	Brown sand with gravel and vegetation

Analytical Report Number : 24-034759
Project / Site name: Ickleford Mill

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
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS

Analytical Report Number : 24-034759
Project / Site name: Ickleford Mill

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
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS

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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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Analytical Report Number : 24-035012

Project / Site name:	Ickleford Mill	**Samples received on:**	07/08/2024
Your job number:	CRM-1027-189	**Samples instructed on/ Analysis started on:**	07/08/2024
Your order number:	CRM-1027-189	**Analysis completed by:**	16/08/2024
Report Issue Number:	1	**Report issued on:**	16/08/2024
Samples Analysed:	10 water samples		

Signed:

Claire Bancroft
Customer Service Advisor
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.

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 24-035012
Project / Site name: Ickleford Mill

Your Order No: CRM-1027-189

Lab Sample Number				280181	280182	280183	280184	280185
Sample Reference				WS101	WS103	WS105	WS107	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.15	1.40	1.60	1.72	2.10
Date Sampled				07/08/2024	07/08/2024	06/08/2024	06/08/2024	06/08/2024
Time Taken				0915	0809	1602	1233	1140
Analytical Parameter (Water Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
General Inorganics								
Alkalinity as $CaCO_3$	mgCaCO3/l	3	ISO 17025	250	220	430	410	430
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	15	23	35	110	26
BOD (Biochemical Oxygen Demand) (Total) - PL (L086B)	mg/l	1	ISO 17025	4.1	5.7	10	7.5	13
Hardness - Total	mgCaCO3/l	1	ISO 17025	824	523	384	198	459
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	0.12	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.07	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.13	< 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	0.07	< 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
Total PAH								
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16	0.39	< 0.16
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.48	2.9	8.3	10.6	7.91
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	< 0.2	< 0.2	< 0.2	1.3	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	3	< 0.5	< 0.5	1	< 0.5
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	0.4	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	9.5	2.4	7.3	10	< 0.5
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	1.5	< 0.6	9.5	< 0.6
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	5.5	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	12	5.6	3	2.4	0.8
Boron (dissolved)	µg/l	10	ISO 17025	140	56	170	120	37
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

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Analytical Report Number: 24-035012
Project / Site name: Ickleford Mill

Your Order No: CRM-1027-189

Lab Sample Number				280181	280182	280183	280184	280185
Sample Reference				WS101	WS103	WS105	WS107	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.15	1.40	1.60	1.72	2.10
Date Sampled				07/08/2024	07/08/2024	06/08/2024	06/08/2024	06/08/2024
Time Taken				0915	0809	1602	1233	1140
Analytical Parameter (Water Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPH - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC10 - EC12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC12 - EC16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC16 - EC21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC21 - EC35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC5 - EC35 $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC10 - EC12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC12 - EC16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC16 - EC21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC21 - EC35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC35 $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-035012
Project / Site name: Ickleford Mill

Your Order No: CRM-1027-189

Lab Sample Number				280186	280187	280188	280189	280190
Sample Reference				WS110	WS111	BH01	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.85	1.95	12.20	2.10	1.71
Date Sampled				06/08/2024	06/08/2024	07/08/2024	06/07/2028	06/08/2024
Time Taken				1259	1344	1024	1422	1140
Analytical Parameter (Water Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
General Inorganics								
Alkalinity as $CaCO_3$	mgCaCO3/l	3	ISO 17025	280	400	110	270	350
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	17	16000	23	22	32
BOD (Biochemical Oxygen Demand) (Total) - PL (L086B)	mg/l	1	ISO 17025	4.4	3.3	8.3	5.1	5.5
Hardness - Total	mgCaCO3/l	1	ISO 17025	426	445	494	322	417
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
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								
Arsenic (dissolved)	µg/l	0.15	ISO 17025	5.23	2.62	1.94	3.73	5.47
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	< 0.2	< 0.2	0.3	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	0.8	2.6	1.8	1	< 0.5
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	0.2	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	13	3.6	25	10	21
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	7.8	9.9	< 0.6	1.2
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.3	1.5	2.9	0.2	1.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	11	5	4.2	2.5	2.6
Boron (dissolved)	µg/l	10	ISO 17025	61	87	110	110	120
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

4041

Analytical Report Number: 24-035012
Project / Site name: Ickleford Mill

Your Order No: CRM-1027-189

Lab Sample Number				280186	280187	280188	280189	280190
Sample Reference				WS110	WS111	BH01	BH03	BH04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.85	1.95	12.20	2.10	1.71
Date Sampled				06/08/2024	06/08/2024	07/08/2024	06/07/2028	06/08/2024
Time Taken				1259	1344	1024	1422	1140
Analytical Parameter (Water Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPH - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aliphatic >EC10 - EC12 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC12 - EC16 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC16 - EC21 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC21 - EC35 $_{EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic >EC5 - EC35 $_{HS+EH\_1D\_AL\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH - Aromatic >EC10 - EC12 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC12 - EC16 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC16 - EC21 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC21 - EC35 $_{EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >EC5 - EC35 $_{HS+EH\_1D\_AR\_MS}$	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Benzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-035012
Project / Site name: Ickleford Mill

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-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	L012B	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices: SW, GW, PW, PrW (Al, Cu, Fe,Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	ISO 17025
Chemical Oxygen Demand in water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065	W	ISO 17025
Total petroleum hydrocarbons with carbon banding by GC-MS in water	Determination of total petroleum hydrocarbons in water by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L070B	W	NONE
BTEX and/or Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA 8260	L073B	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	W	ISO 17025
Alkalinity in water (by discreet analyser)	Determination of Alkalinity by discrete analyser (colorimetry). Accredited matrices: SW,PW, GW,FSE,LL	In-house method based on MEWAM & USEPA Method 310.2	L082B	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW	In-house method based on standard method 5210B	L086B	W	ISO 17025
Total petroleum hydrocarbons by GC-MS HS in water	Determination of total petroleum hydrocarbons in water by GC-MS HS	In-house method	L088B	W	ISO 17025

Analytical Report Number : 24-035012
Project / Site name: Ickleford Mill

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAH) in leachate by extraction in dichloromethane followed by GC-MS	In-house method based on USEPA 8270	L102B	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).
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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Analytical Report Number : 24-035270

Project / Site name:	Ickleford Mill	**Samples received on:**	07/08/2024
Your job number:	CRM.1027.189	**Samples instructed on/ Analysis started on:**	08/08/2024
Your order number:	CRM.1027.189	**Analysis completed by:**	16/08/2024
Report Issue Number:	1	**Report issued on:**	16/08/2024
Samples Analysed:	7 soil samples		

Signed:

Dominika Liana
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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-035270
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				281441	281442	281443	281444	281445
Sample Reference				WS114	BH103	BH103	BH103	BH103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.75	2.75	6.00	9.00
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	9.6	17	16	11	12
Total mass of sample received	kg	0.1	NONE	0.8	1.3	0.8	0.8	1

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.2	8.4	8.3	8.1	8
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	27	370	220	590	890
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	13.4	184	110	294	443

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number: 24-035270
Project / Site name: Ickleford Mill
Your Order No: CRM.1027.189

Lab Sample Number				281446	281447
Sample Reference				BH103	BH103
Sample Number				None Supplied	None Supplied
Depth (m)				15.00	20.00
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	16
Total mass of sample received	kg	0.1	NONE	1.1	1.1
General Inorganics					
pH (L099)	pH Units	N/A	MCERTS	8.2	8.4
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	1100	590
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	543	297

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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

Analytical Report Number : 24-035270
Project / Site name: Ickleford Mill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
281441	WS114	None Supplied	0.5	Brown loam and sand with gravel and vegetation
281442	BH103	None Supplied	1.75	Brown clay
281443	BH103	None Supplied	2.75	Brown clay
281444	BH103	None Supplied	6	Brown clay
281445	BH103	None Supplied	9	Brown clay
281446	BH103	None Supplied	15	Brown clay
281447	BH103	None Supplied	20	Brown clay

Analytical Report Number : 24-035270
Project / Site name: Ickleford Mill

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
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Appendix 4 – Geotechnical Testing

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

i2 Analytical Ltd
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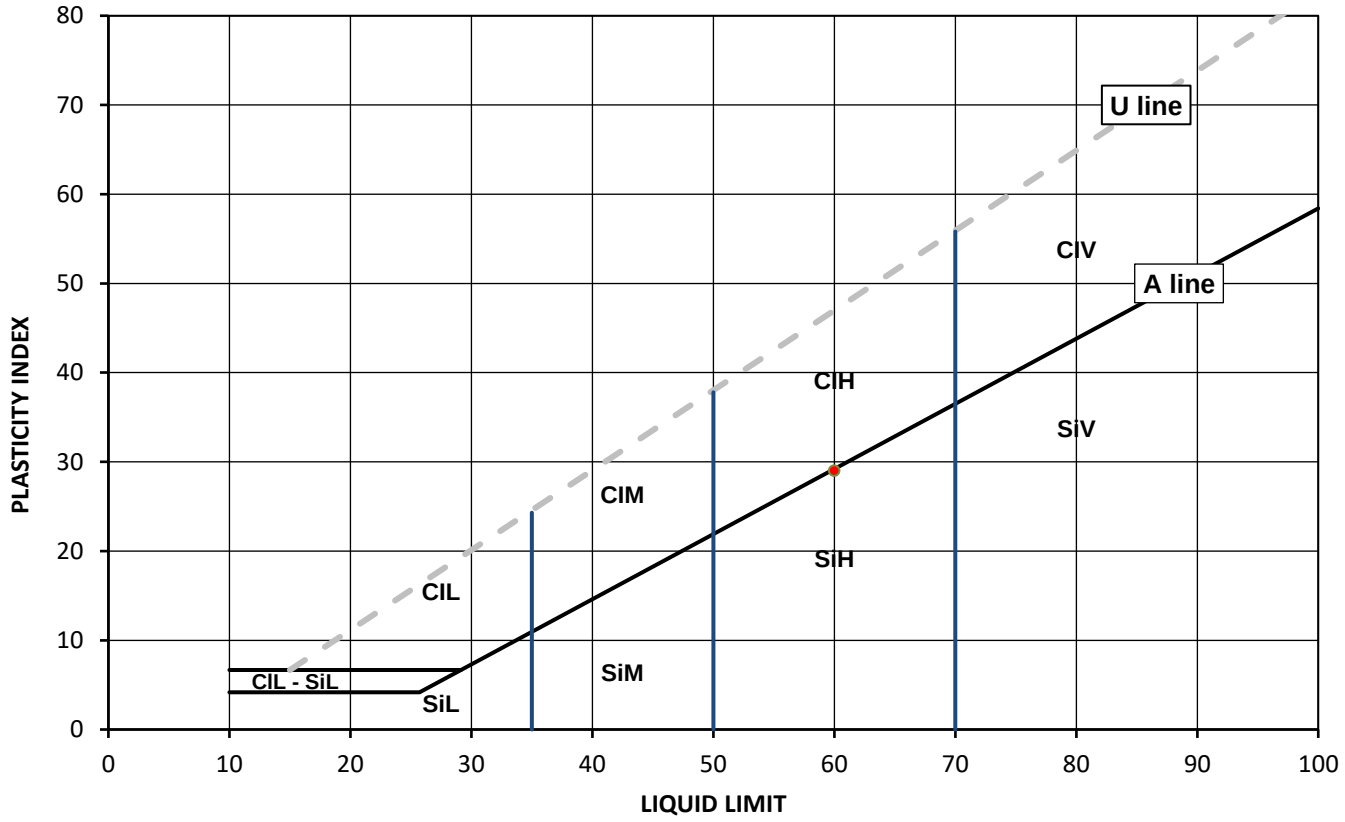
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281416	Depth Top [m]:	0.50
Hole No.:	WS103A	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown slightly gravelly slightly silty CLAY		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
21.5	60	1.018	31	29	-0.31	1.31	69



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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 360.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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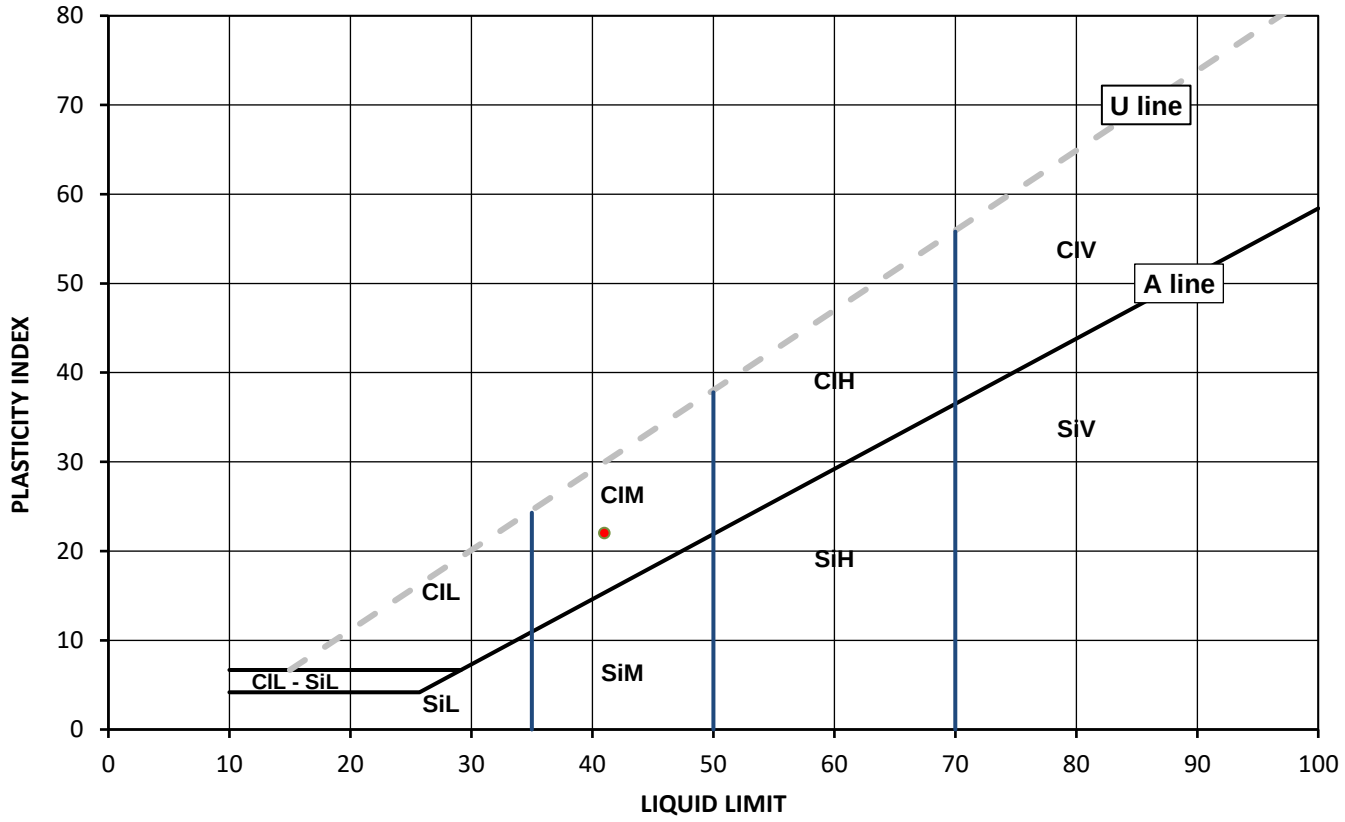
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281420	Depth Top [m]:	0.50
Hole No.:	WS113	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown very gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
12.3	41	1.058	19	22	-0.32	1.32	39



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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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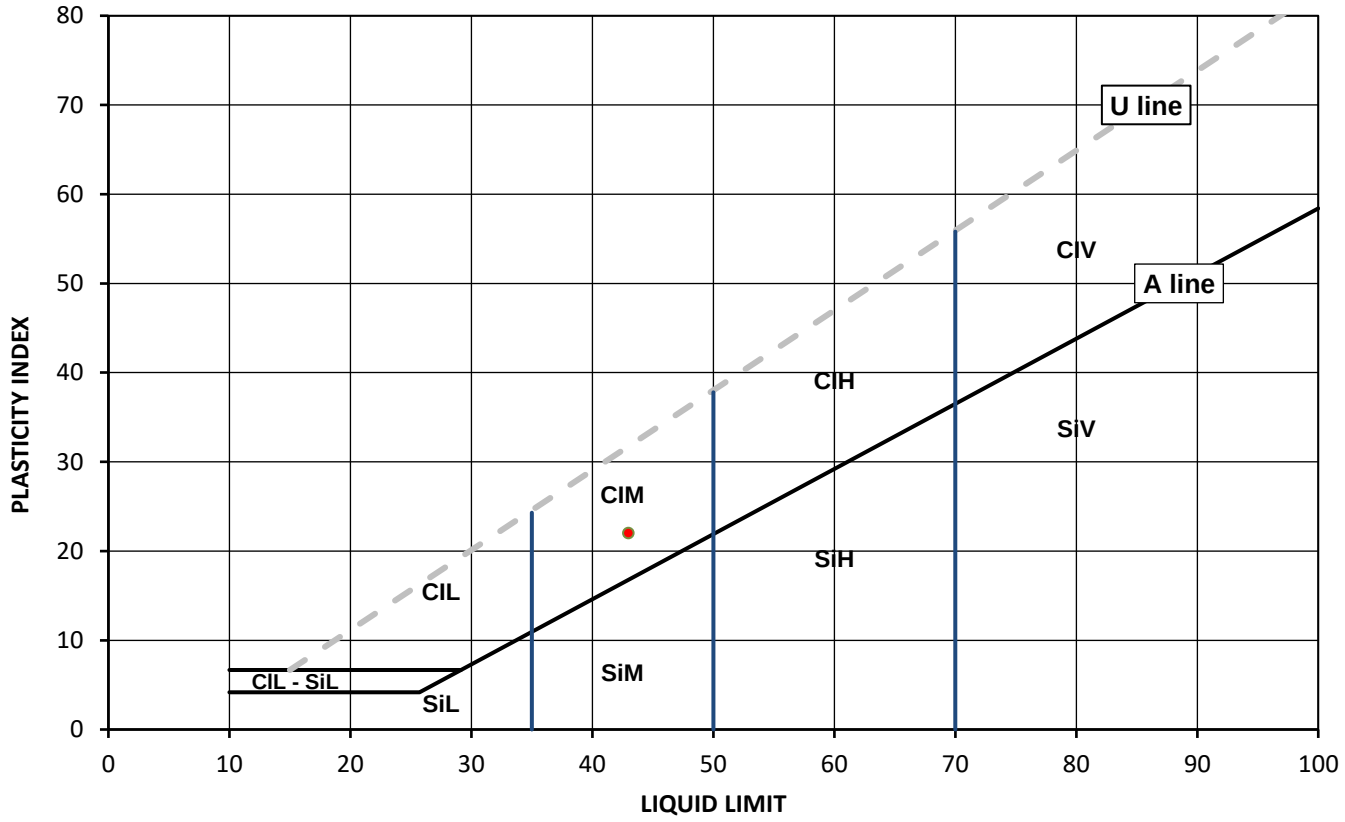
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281422	Depth Top [m]:	0.50
Hole No.:	WS115	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
12.1	43	0.984	21	22	-0.41	1.41	71



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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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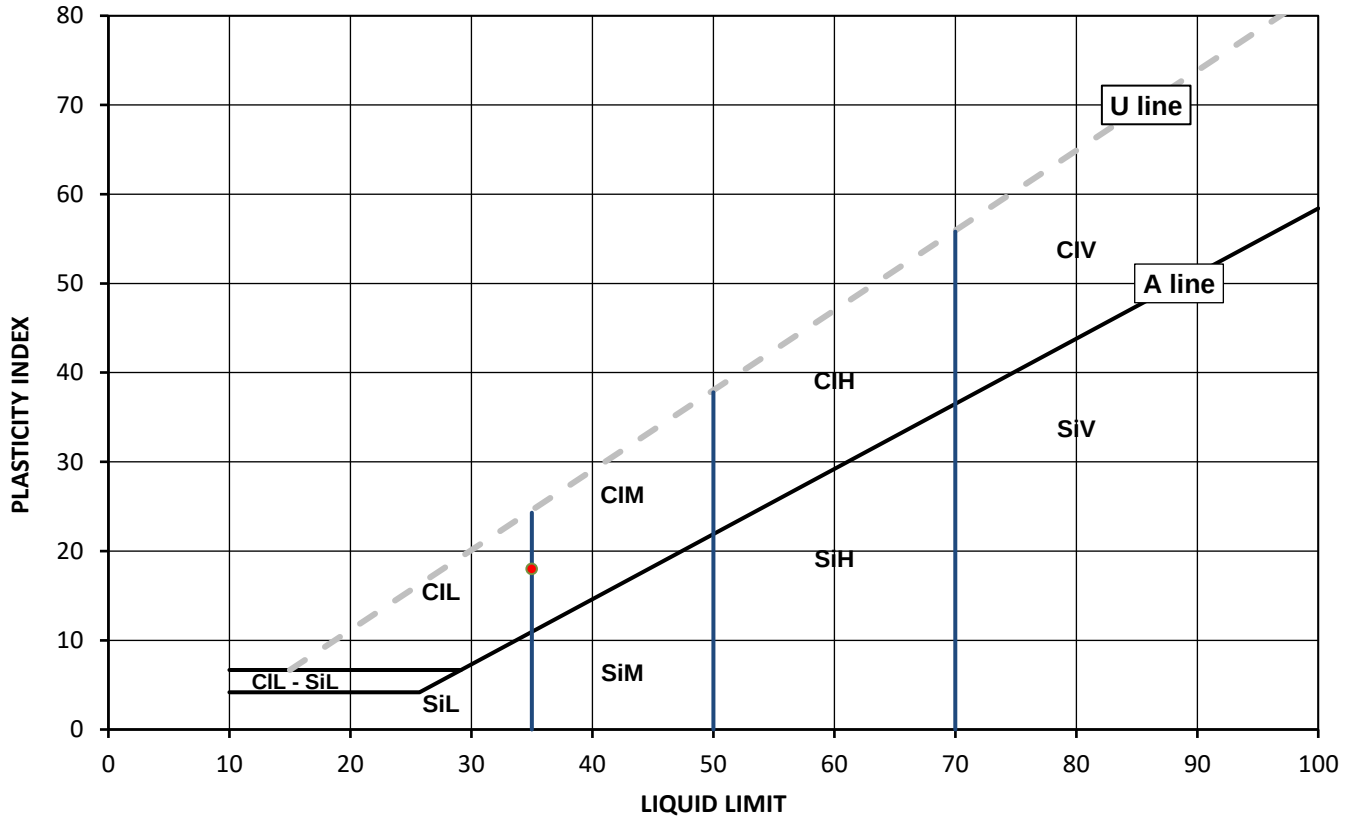
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281426	Depth Top [m]:	6.00
Hole No.:	BH103	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
15.4	35	1.000	17	18	-0.11	1.11	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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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Date Reported: 22/08/2024

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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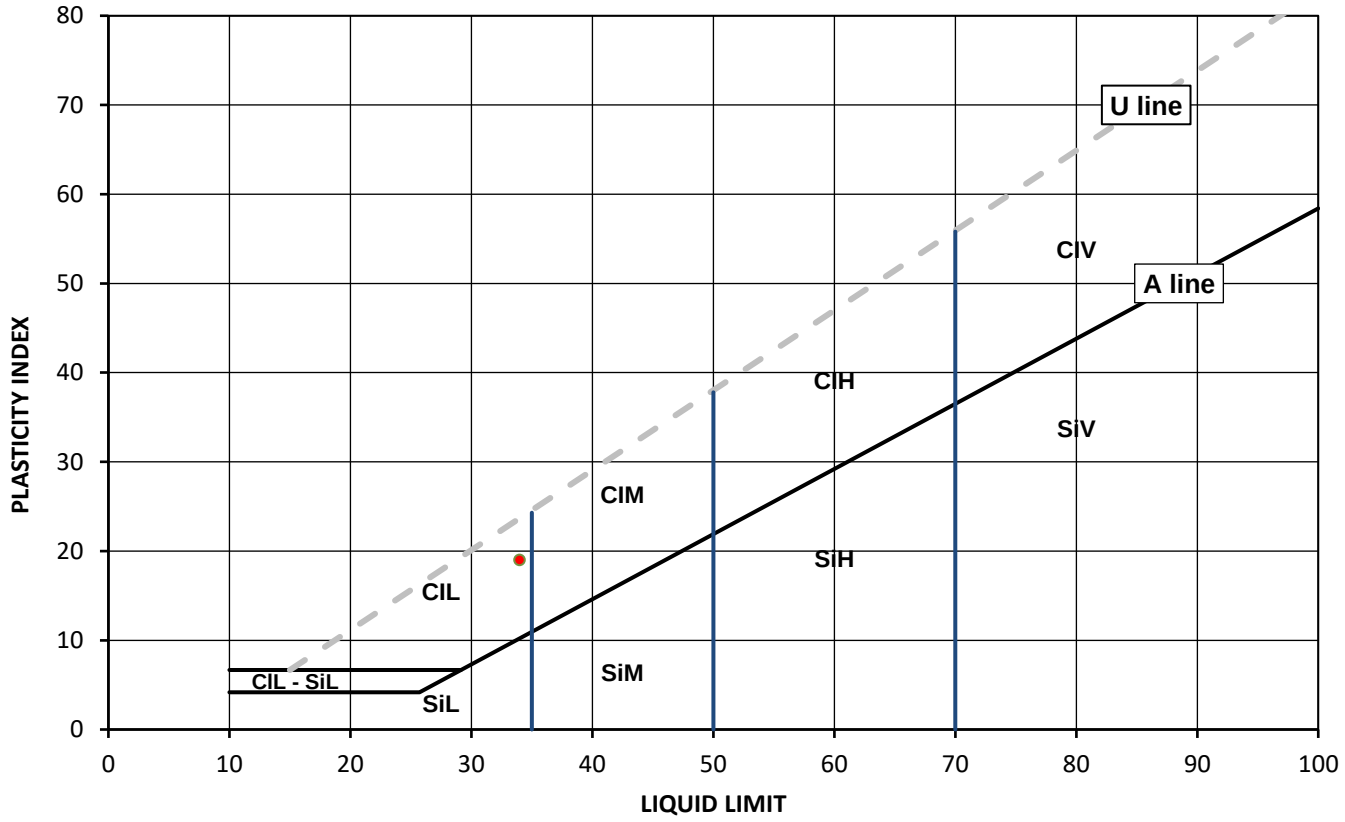
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281427	Depth Top [m]:	11.00
Hole No.:	BH103	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly very sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
16.5	34	1.042	15	19	0.11	0.89	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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 360.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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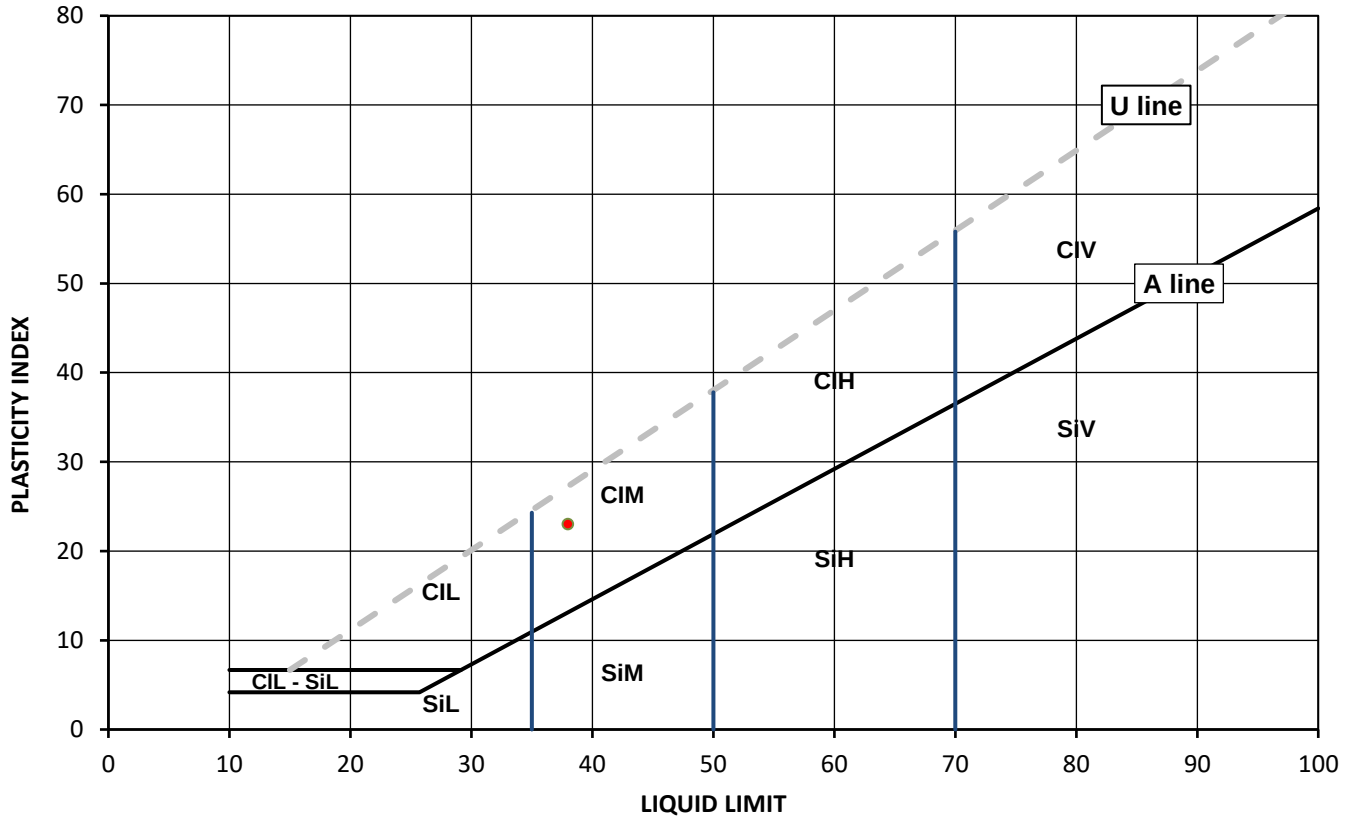
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281428	Depth Top [m]:	18.00
Hole No.:	BH103	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
16.4	38	1.058	15	23	0.04	0.96	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)

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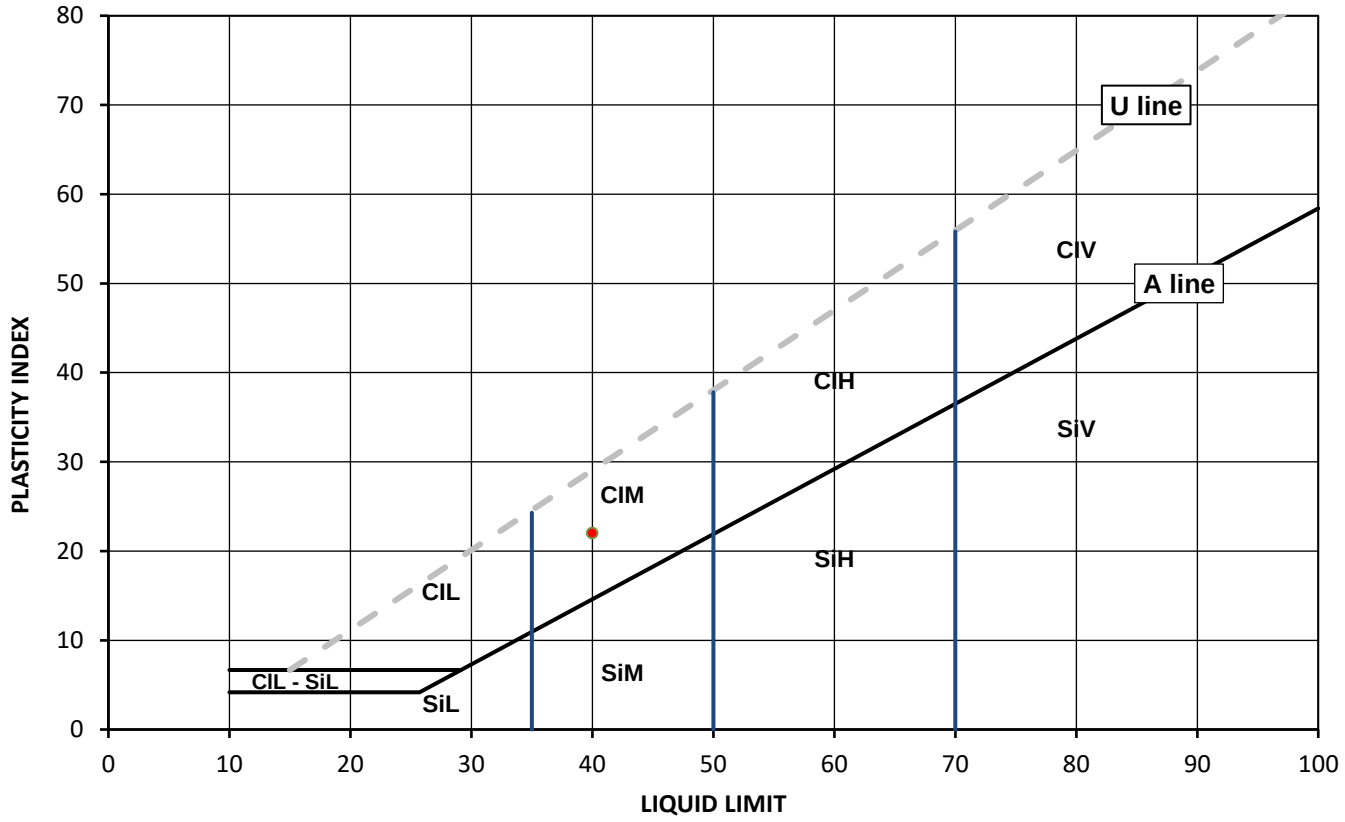
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Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281429	Depth Top [m]:	2.00
Hole No.:	BH102A	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark brown slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
17.4	40	0.984	18	22	-0.05	1.05	80



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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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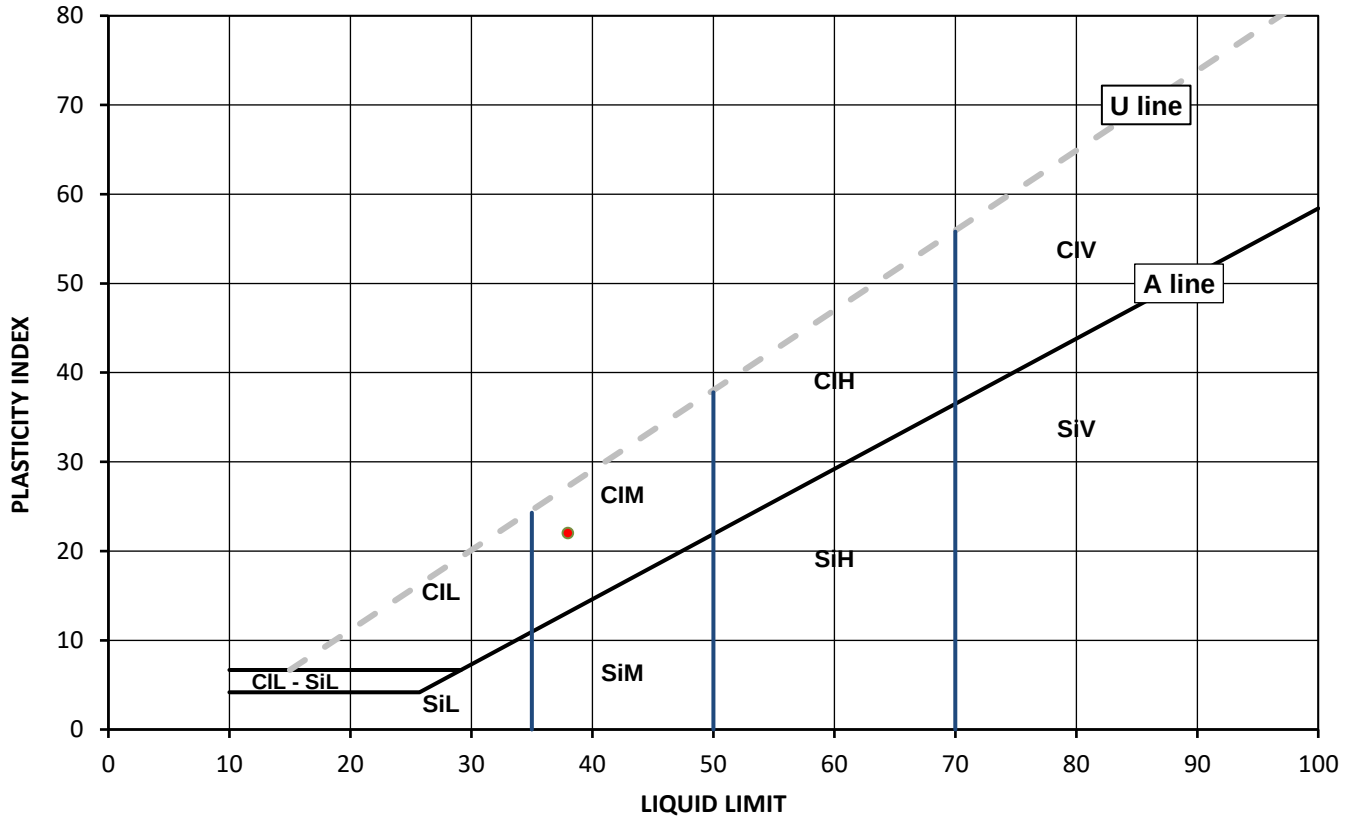
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Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281430	Depth Top [m]:	3.75
Hole No.:	BH102A	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
15.5	38	1.023	16	22	0.00	1.00	99



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)

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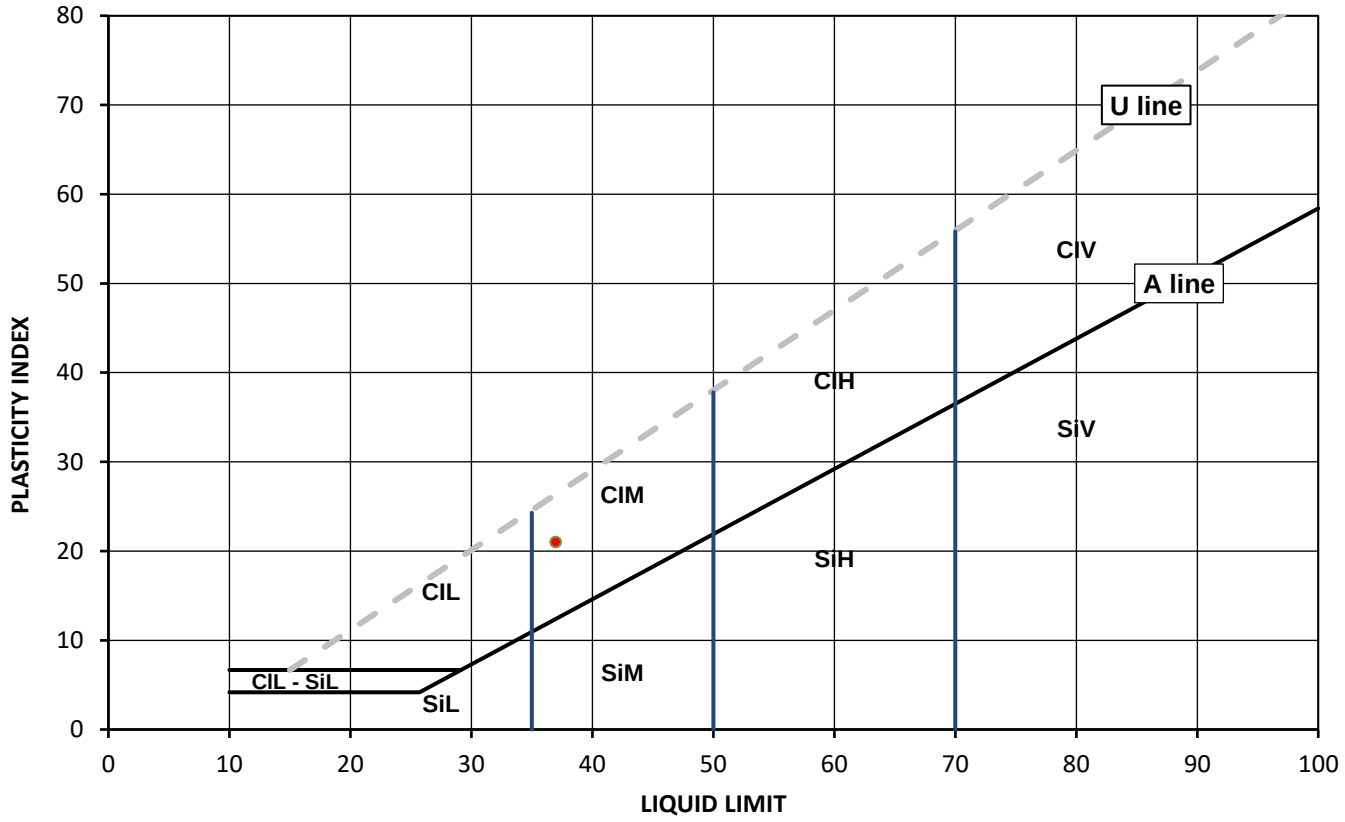
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Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281431	Depth Top [m]:	9.00
Hole No.:	BH102A	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
18.2	37	1.039	16	21	0.10	0.90	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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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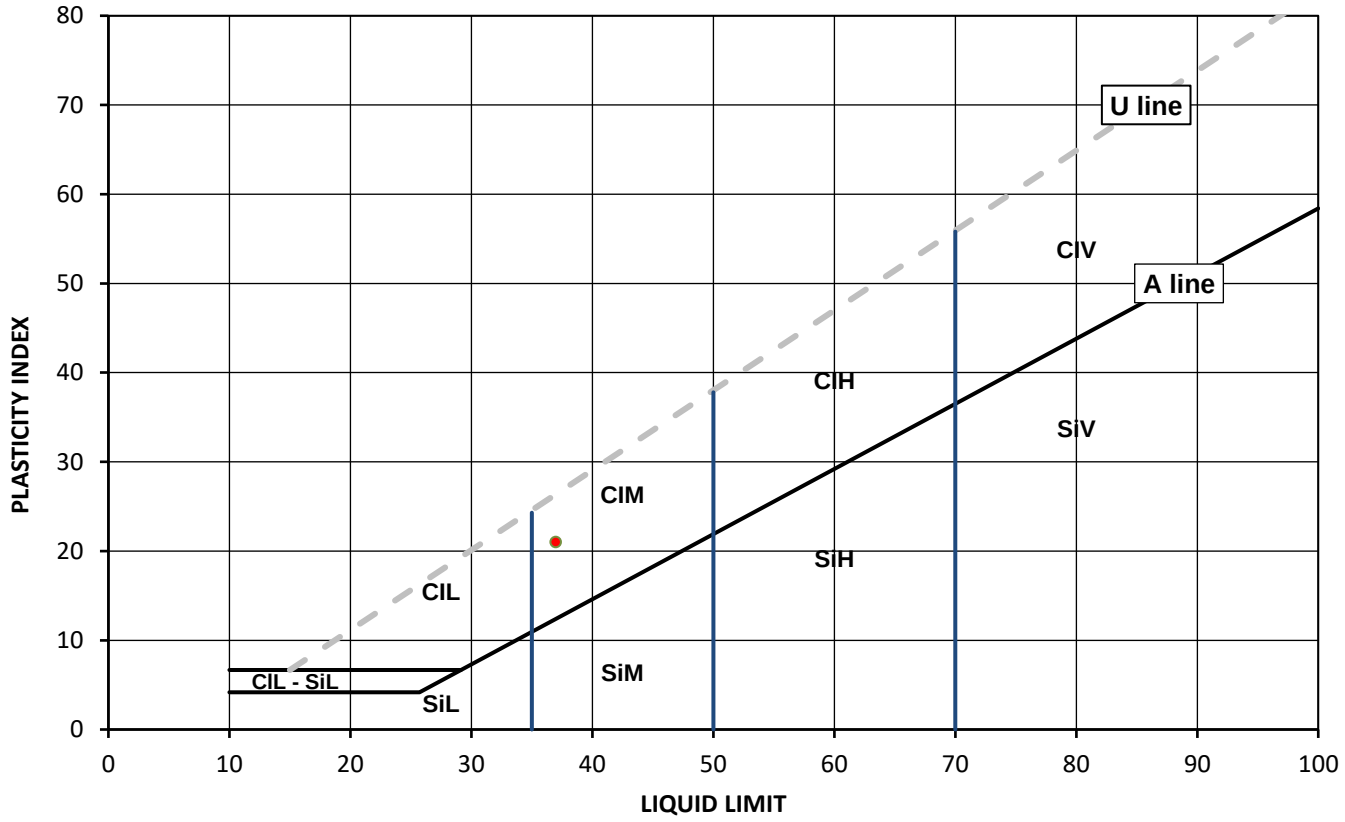
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Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281432	Depth Top [m]:	12.50
Hole No.:	BH102A	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
21.7	37	1.039	16	21	0.29	0.71	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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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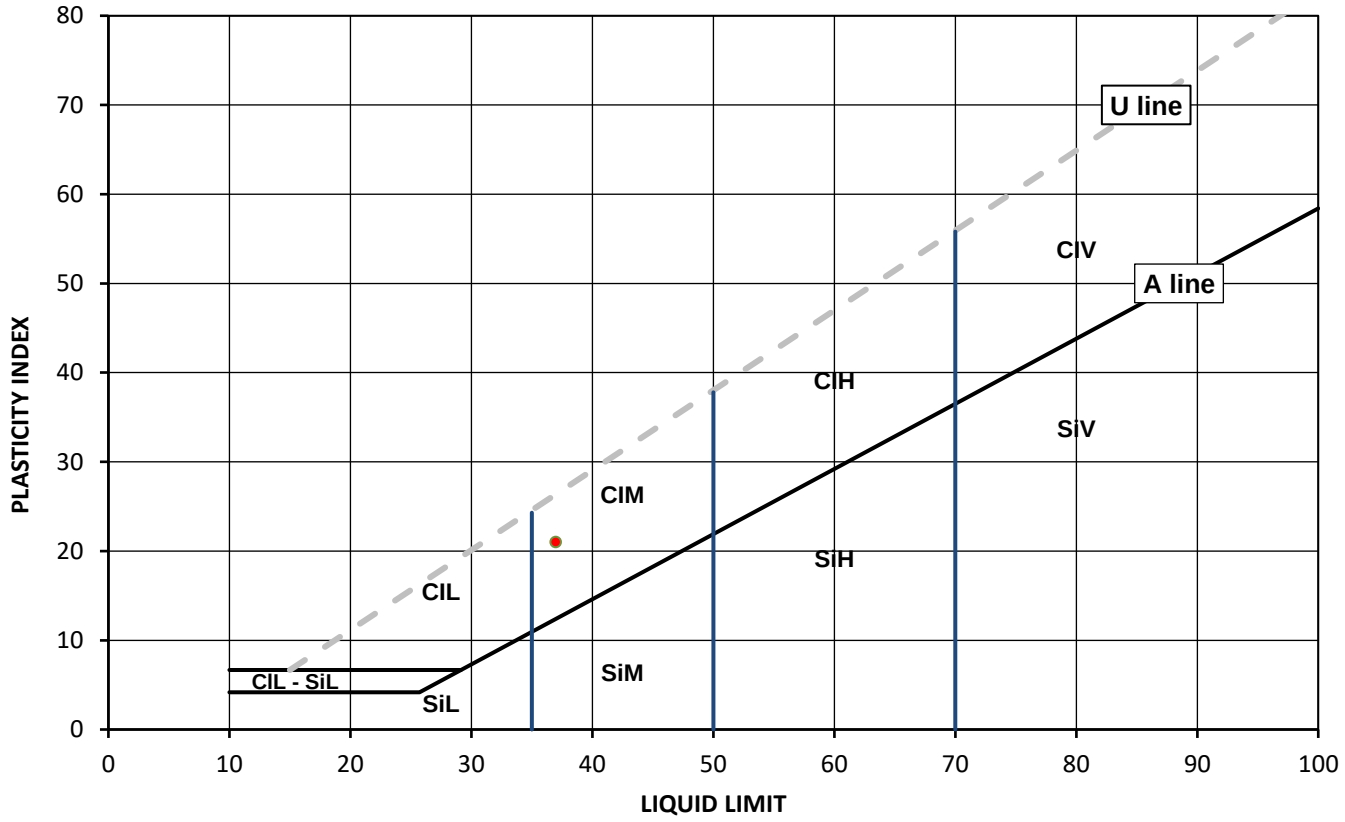
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Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281433	Depth Top [m]:	20.00
Hole No.:	BH102A	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
16.2	37	1.039	16	21	0.00	1.00	60



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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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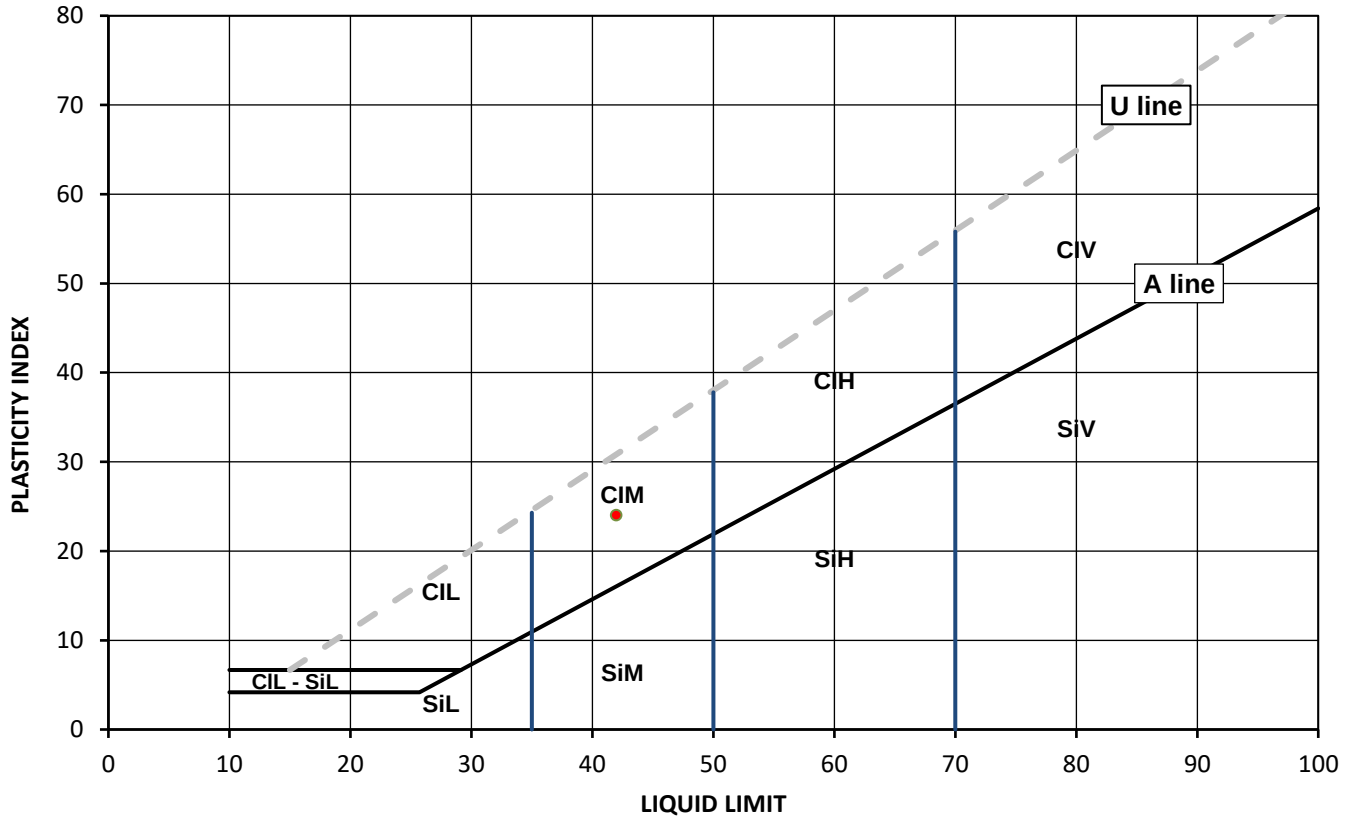
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		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281434	Depth Top [m]:	3.00
Hole No.:	BH104	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
17.2	42	1.000	18	24	-0.04	1.04	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)

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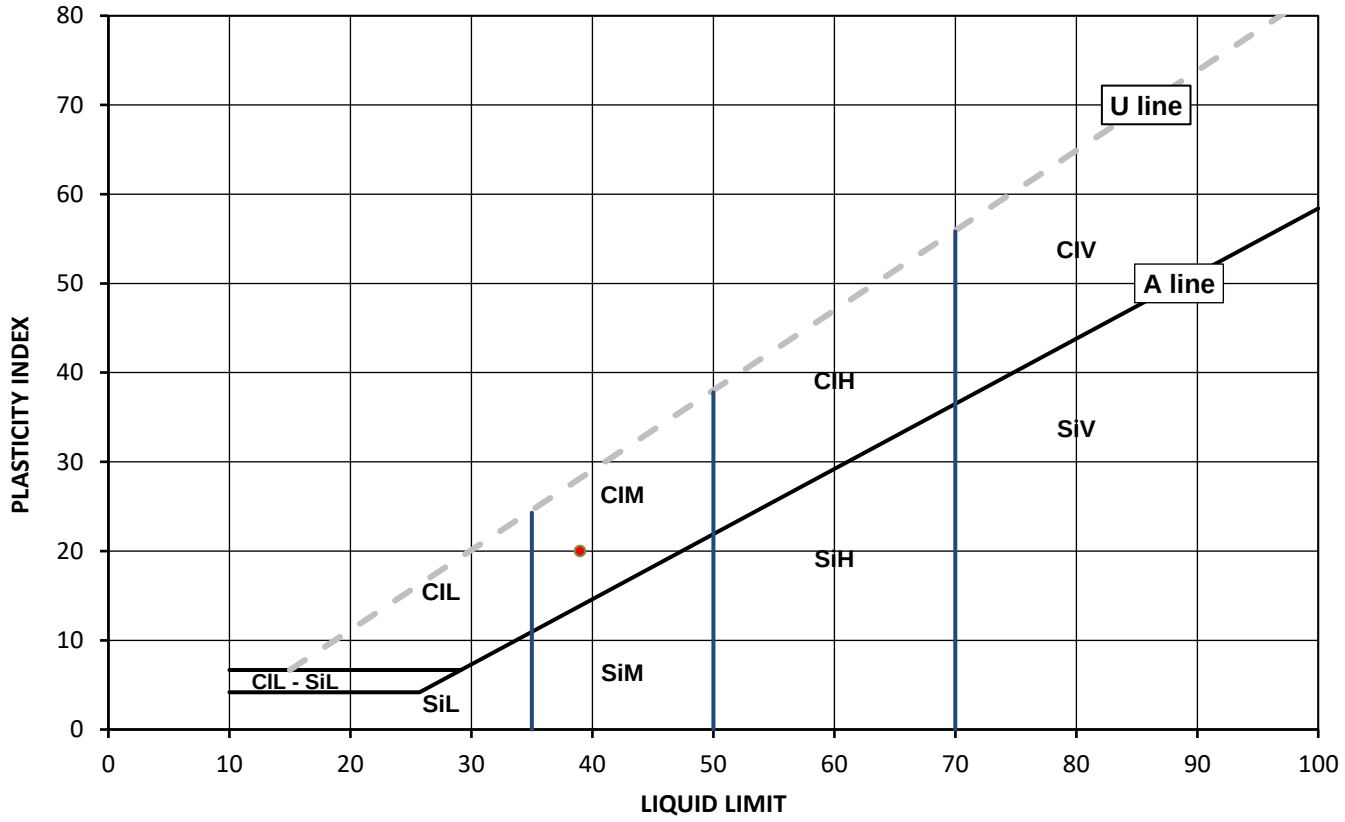
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		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281436	Depth Top [m]:	1.75
Hole No.:	BH101	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
18.5	39	1.039	19	20	0.00	1.00	62



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)

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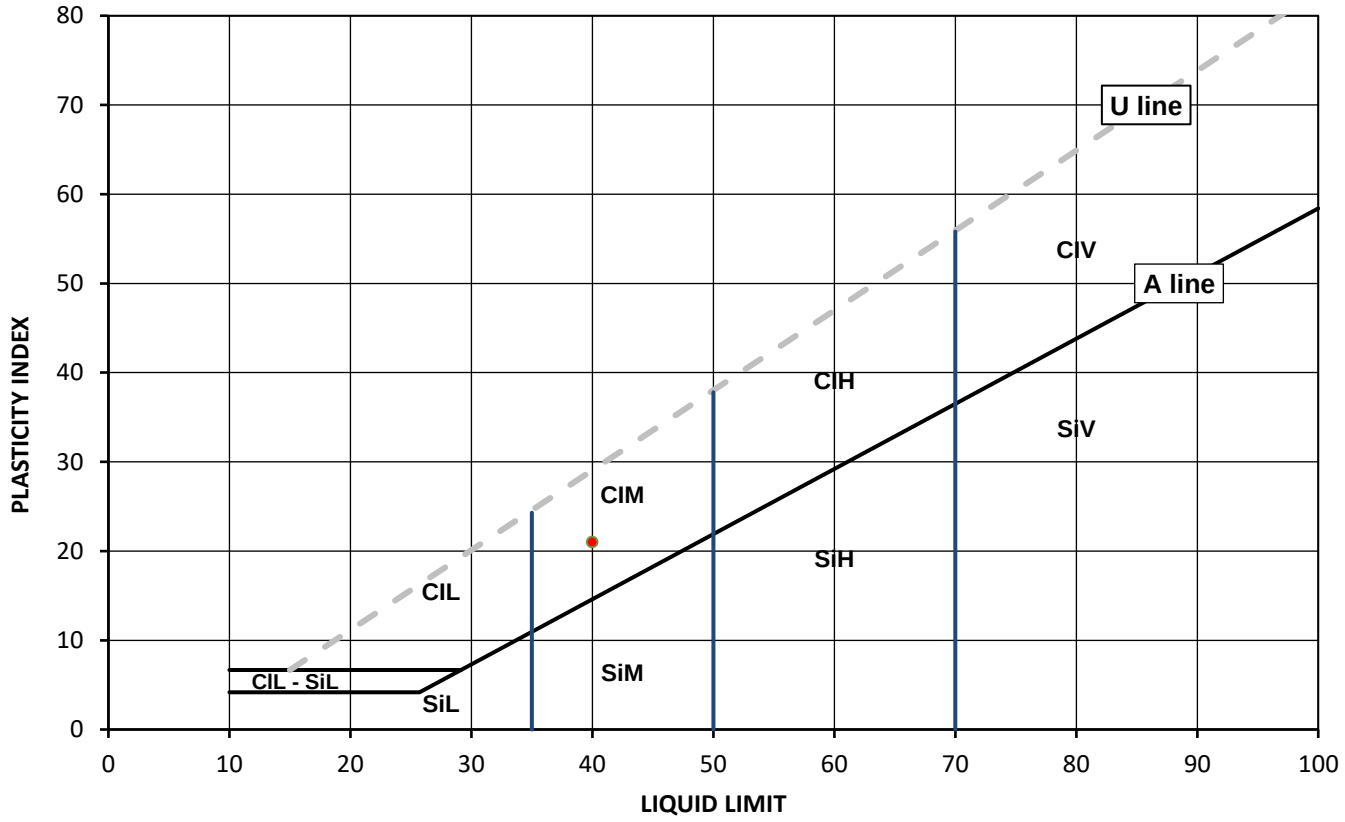
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Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281437	Depth Top [m]:	2.75
Hole No.:	BH101	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
17.9	40	1.039	19	21	-0.05	1.05	82



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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 360.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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

4041

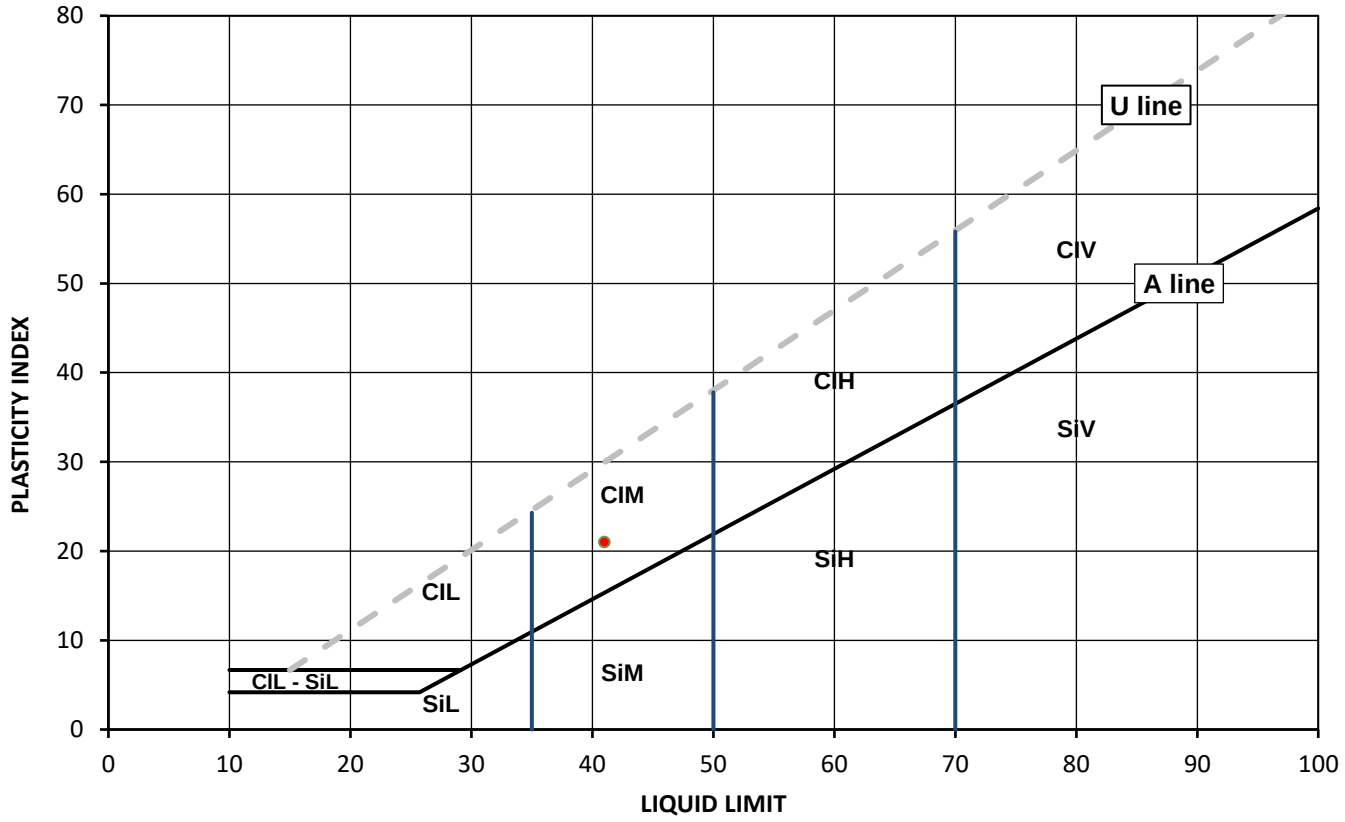
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281438	Depth Top [m]:	8.00
Hole No.:	BH101	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Dark grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after washing to remove >0.425 mm;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
16.0	41	1.039	20	21	-0.19	1.19	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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 360.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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

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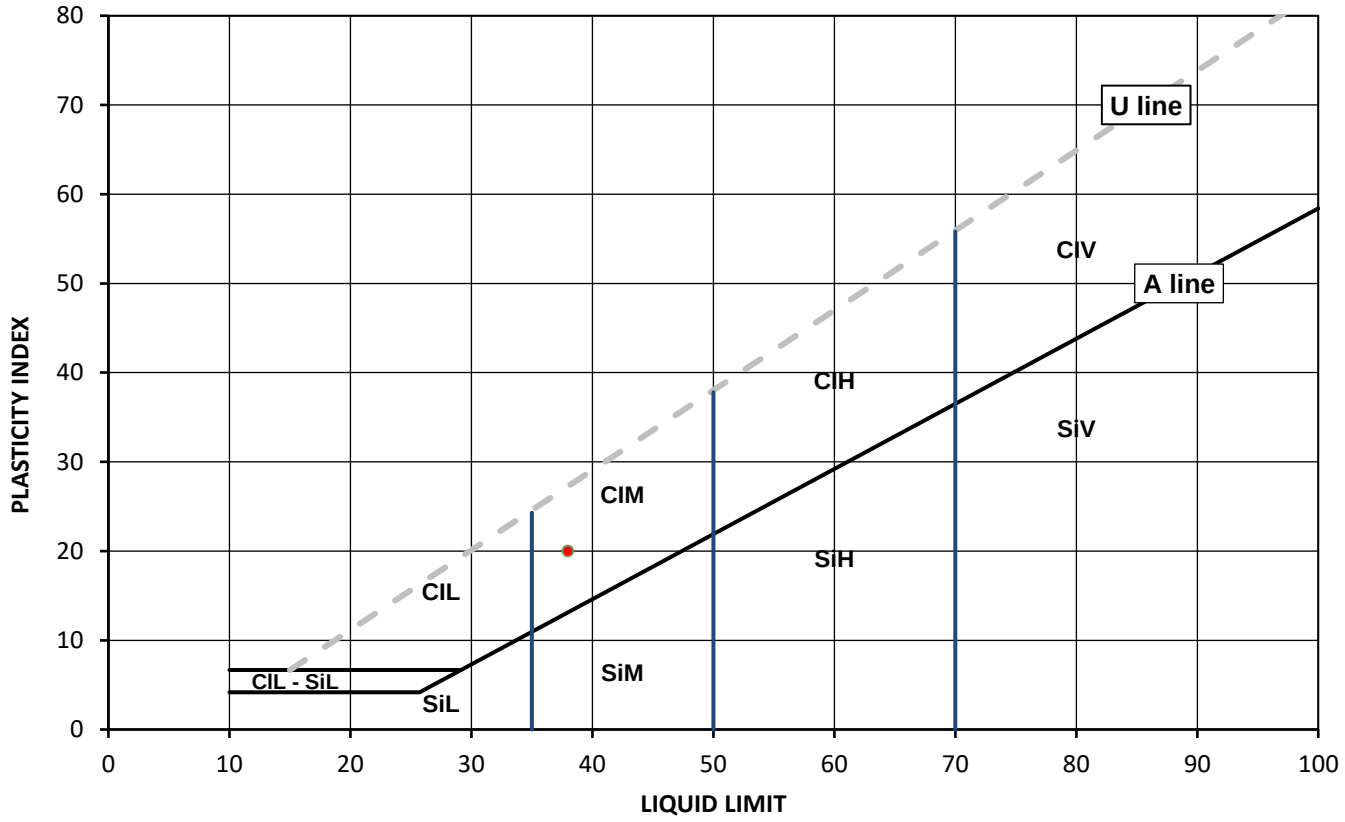
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281440	Depth Top [m]:	15.00
Hole No.:	BH101	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
16.3	38	1.039	18	20	-0.10	1.10	92



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 EN 17892-1: 2014; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 360.12

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

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

4041

Tested in Accordance with:

BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6. Correlation Factor by Clayton C.R.I and Jukes A.W (1978). W by BS EN ISO 17892-1:2014+A1:2022.

Client: Enzygo Geoenvironmental Ltd
Client Address: The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA
Contact: Richard Hamilton
Site Address: Ickleford Mill

Client Reference: CRM.1027.189
Job Number: 24-035269-1
Date Sampled: Not Given
Date Received: 07/08/2024
Date Tested: 13/08/2024
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	W	Liquid & Plastic Limit							Density		
		Reference	Depth Top m	Depth Base m	Type			%	% Passing 425um %	WL* %	Correlation Factor	Wp %	Ip %	Cone type	Sample Preparation	bulk Mg/m3	dry Mg/m3	PD Mg/m3
281422	WS115	Not Given	0.50	Not Given	B	Brown slightly gravelly sandy CLAY	Atterberg 1 Point	12.1	71	43	0.984	21	22	80g/30 deg	W			
281420	WS113	Not Given	0.50	Not Given	B	Brown very gravelly sandy CLAY	Atterberg 1 Point	12.3	39	41	1.058	19	22	80g/30 deg	W			
281416	WS103A	Not Given	0.50	Not Given	B	Brown slightly gravelly slightly silty CLAY	Atterberg 1 Point	21.5	69	60	1.018	31	29	80g/30 deg	W			
281428	BH103	Not Given	18.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	16.4	89	38	1.058	15	23	80g/30 deg	W			
281429	BH102A	Not Given	2.00	Not Given	U	Dark brown slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	17.4	80	40	0.984	18	22	80g/30 deg	W			
281430	BH102A	Not Given	3.75	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	15.5	99	38	1.023	16	22	80g/30 deg	W			
281431	BH102A	Not Given	9.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	18.2	95	37	1.039	16	21	80g/30 deg	W			
281432	BH102A	Not Given	12.50	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	21.7	86	37	1.039	16	21	80g/30 deg	W			
281427	BH103	Not Given	11.00	Not Given	D	Brownish grey slightly gravelly very sandy CLAY with fragments of chalk	Atterberg 1 Point	16.5	83	34	1.042	15	19	80g/30 deg	W			
281426	BH103	Not Given	6.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	15.4	91	35	1.000	17	18	80g/30 deg	R			

Note: # Non accredited; NP - Non plastic; N - Tested in natural condition, R - Tested after >0.425mm removed by hand, W - Tested after washing to remove >425mm; * - One point liquid limit corrected as per the report Correlation Factor by Clayton C.R.I and Jukes A.W (1978)

Comments:

Signed:

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024 **GF 361.14**

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

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

4041

Tested in Accordance with:

BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6. Correlation Factor by Clayton C.R.I and Jukes A.W (1978). W by BS EN ISO 17892-1:2014+A1:2022.

Client: Enzygo Geoenvironmental Ltd

Client Address: The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA

Contact: Richard Hamilton

Site Address: Ickleford Mill

Client Reference: CRM.1027.189
Job Number: 24-035269-1
Date Sampled: Not Given
Date Received: 07/08/2024
Date Tested: 13/08/2024
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	W	Liquid & Plastic Limit							Density		
		Reference	Depth Top m	Depth Base m	Type			%	% Passing 425um %	WL* %	Correlation Factor	Wp %	Ip %	Cone type	Sample Preparation	bulk Mg/m3	dry Mg/m3	PD Mg/m3
281433	BH102A	Not Given	20.00	Not Given	D	Brownish grey gravelly sandy CLAY	Atterberg 1 Point	16.2	60	37	1.039	16	21	80g/30 deg	W			
281434	BH104	Not Given	3.00	Not Given	U	Dark grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	17.2	90	42	1.000	18	24	80g/30 deg	W			
281436	BH101	Not Given	1.75	Not Given	D	Brownish grey gravelly sandy CLAY	Atterberg 1 Point	18.5	62	39	1.039	19	20	80g/30 deg	W			
281437	BH101	Not Given	2.75	Not Given	D	Brown slightly gravelly sandy CLAY	Atterberg 1 Point	17.9	82	40	1.039	19	21	80g/30 deg	W			
281438	BH101	Not Given	8.00	Not Given	U	Dark grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	16.0	90	41	1.039	20	21	80g/30 deg	W			
281440	BH101	Not Given	15.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk	Atterberg 1 Point	16.3	92	38	1.039	18	20	80g/30 deg	R			

Note: # Non accredited; NP - Non plastic; N - Tested in natural condition, R - Tested after >0.425mm removed by hand, W - Tested after washing to remove >425mm; * - One point liquid limit corrected as per the report Correlation Factor by Clayton C.R.I and Jukes A.W (1978)

Comments:

Signed:

Katarzyna Kozieł
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024 **GF 361.14**

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS EN ISO 17892-1:2014+A1:2022, BS 1377-2: 2022, clause 4.1

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

4041

Client: Enzygo Geoenvironmental Ltd

Client Address: The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA

Contact: Richard Hamilton

Site Address: Ickleford Mill

Client Reference: CRM.1027.189

Job Number: 24-035269-1

Date Sampled: Not Given

Date Received: 07/08/2024

Date Tested: 13/08/2024

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											
		Reference	Depth Top m	Depth Base m	Type			%											
281436	BH101	Not Given	1.75	Not Given	D	Brownish grey gravelly sandy CLAY		18.5											
281437	BH101	Not Given	2.75	Not Given	D	Brown slightly gravelly sandy CLAY		17.9											
281438	BH101	Not Given	8.00	Not Given	U	Dark grey slightly gravelly sandy CLAY with fragments of chalk		16.0											
281440	BH101	Not Given	15.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		16.3											
281429	BH102A	Not Given	2.00	Not Given	U	Dark brown slightly gravelly sandy CLAY with fragments of chalk		17.4											
281430	BH102A	Not Given	3.75	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		15.5											
281431	BH102A	Not Given	9.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		18.2											
281432	BH102A	Not Given	12.50	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		21.7											
281433	BH102A	Not Given	20.00	Not Given	D	Brownish grey gravelly sandy CLAY		16.2											
281426	BH103	Not Given	6.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		15.4											

Comments:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 126.18

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS EN ISO 17892-1:2014+A1:2022, BS 1377-2: 2022, clause 4.1

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

4041

Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	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											
		Reference	Depth Top	Depth Base	Type														
			m	m				%											
281427	BH103	Not Given	11.00	Not Given	D	Brownish grey slightly gravelly very sandy CLAY with fragments of chalk		16.5											
281428	BH103	Not Given	18.00	Not Given	D	Brownish grey slightly gravelly sandy CLAY with fragments of chalk		16.4											
281434	BH104	Not Given	3.00	Not Given	U	Dark grey slightly gravelly sandy CLAY with fragments of chalk		17.2											
281416	WS103A	Not Given	0.50	Not Given	B	Brown slightly gravelly slightly silty CLAY		21.5											
281420	WS113	Not Given	0.50	Not Given	B	Brown very gravelly sandy CLAY		12.3											
281422	WS115	Not Given	0.50	Not Given	B	Brown slightly gravelly sandy CLAY		12.1											

Comments:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 126.18

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS EN ISO 17892-4:2016, BS 1377-2:2022 cl. 10

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

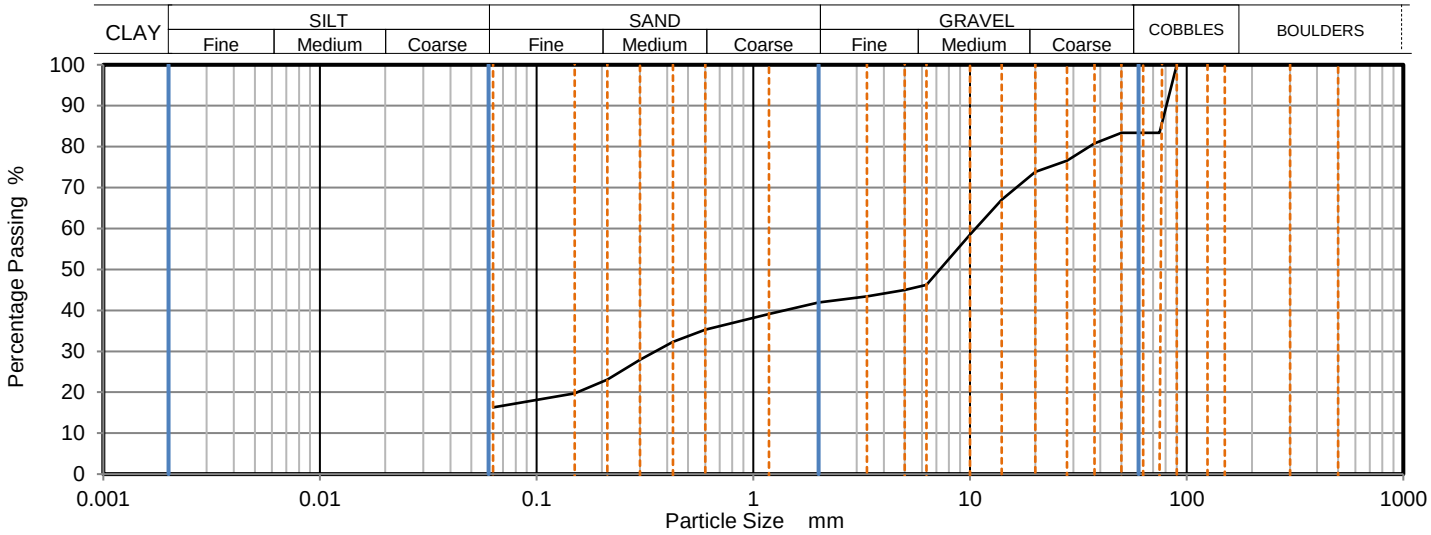
4041

Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281417	Depth Top [m]:	0.50
Hole No.:	WS106	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown gravelly slightly sandy CLAY with fragments of bricks		
Sample Preparation:	Sample was quartered, oven dried at 106.3 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	83		
63	83		
50	83		
37.5	81		
28	77		
20	74		
14	67		
10	59		
6.3	46		
5	45		
3.35	43		
2	42		
1.18	39		
0.6	35		
0.425	32		
0.3	28		
0.212	23		
0.15	20		
0.063	16		

Sample Proportions	% dry mass
Very coarse	17.00
Gravel	41.00
Sand	26.00
Fines <0.063 mm	16.00

Grading Analysis		
D100	mm	90
D60	mm	10.6
D30	mm	0.354
D10	mm	
Uniformity Coefficient		170
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS EN ISO 17892-4:2016 Table 1.

Signed: Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 366.11

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS EN ISO 17892-4:2016, BS 1377-2:2022 cl. 10

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

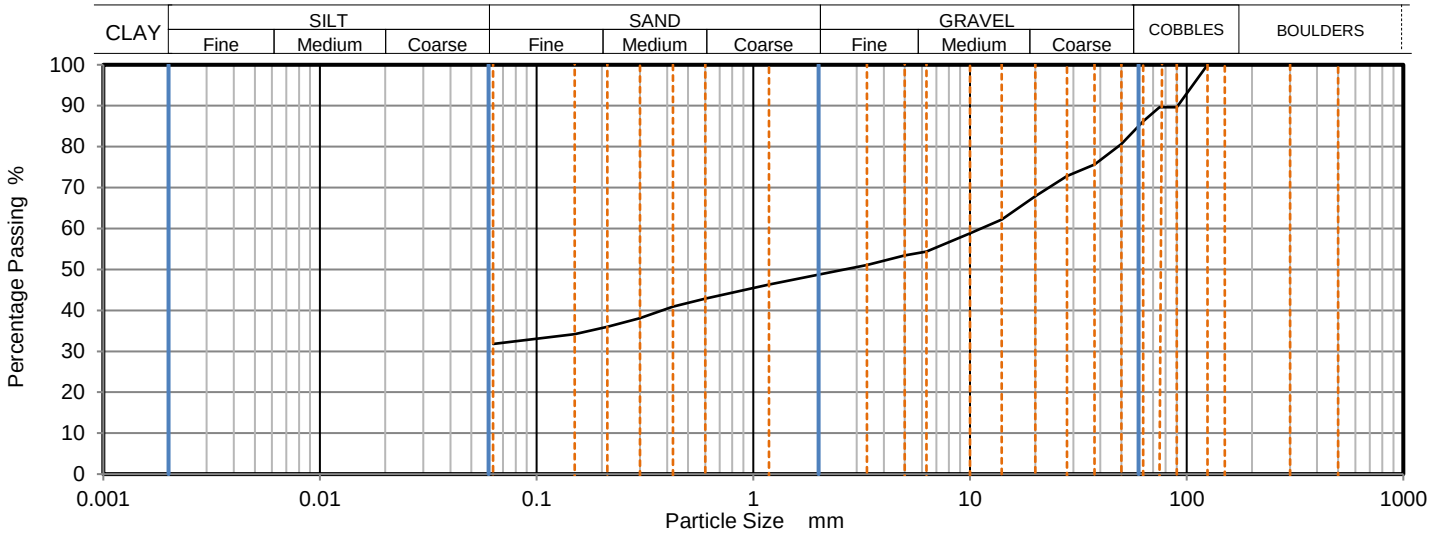
4041

Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281423	Depth Top [m]:	0.50
Hole No.:	BH103	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown gravelly slightly sandy CLAY with cobbles		
Sample Preparation:	Sample was quartered, oven dried at 108.8 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	90		
75	90		
63	86		
50	81		
37.5	76		
28	73		
20	68		
14	62		
10	59		
6.3	54		
5	53		
3.35	51		
2	49		
1.18	46		
0.6	43		
0.425	41		
0.3	38		
0.212	36		
0.15	34		
0.063	32		

Sample Proportions	% dry mass
Very coarse	14.00
Gravel	37.00
Sand	17.00
Fines <0.063 mm	32.00

Grading Analysis		
D100	mm	125
D60	mm	11.3
D30	mm	
D10	mm	
Uniformity Coefficient		180
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS EN ISO 17892-4:2016 Table 1.

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 366.11

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS EN ISO 17892-4:2016, BS 1377-2:2022 cl. 10

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

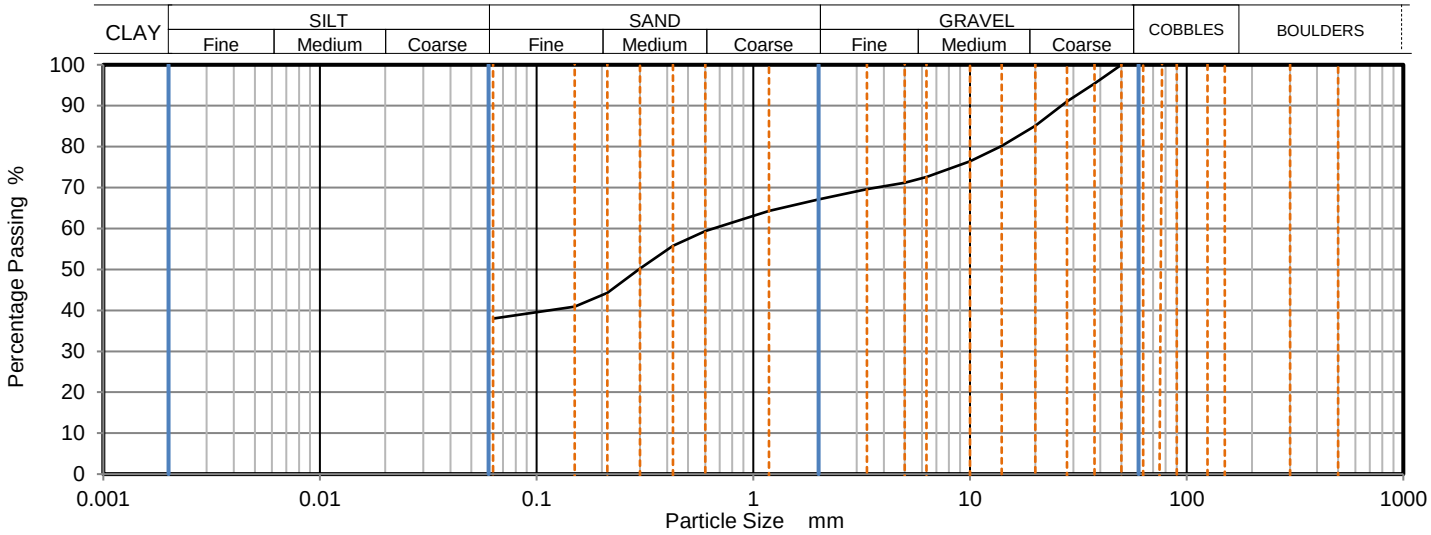
4041

Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281424	Depth Top [m]:	1.00
Hole No.:	BH103	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.8 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	91		
20	85		
14	80		
10	76		
6.3	73		
5	71		
3.35	70		
2	67		
1.18	64		
0.6	59		
0.425	56		
0.3	50		
0.212	44		
0.15	41		
0.063	38		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	33.00
Sand	29.00
Fines <0.063 mm	38.00

Grading Analysis		
D100	mm	50
D60	mm	0.648
D30	mm	
D10	mm	
Uniformity Coefficient		10
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 366.11

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS EN ISO 17892-4:2016, BS 1377-2:2022 cl. 10

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

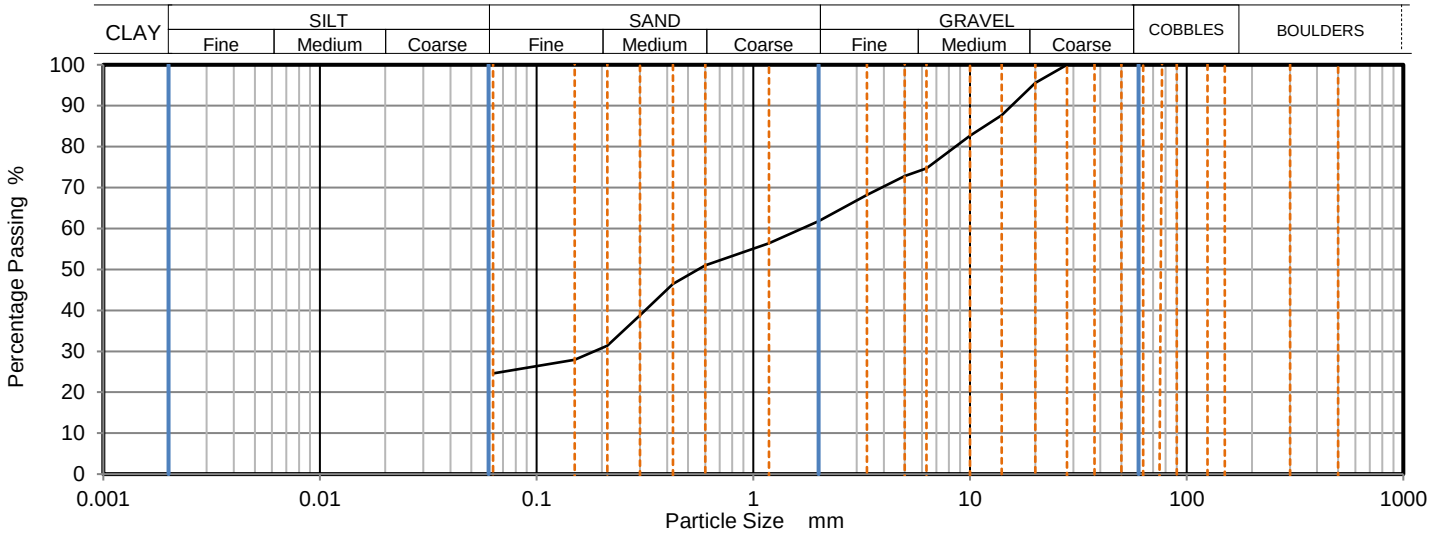
4041

Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	13/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	281435	Depth Top [m]:	1.00
Hole No.:	BH104	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Yellowish brown gravelly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 108.8 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	96		
14	88		
10	83		
6.3	75		
5	73		
3.35	68		
2	62		
1.18	56		
0.6	51		
0.425	47		
0.3	39		
0.212	31		
0.15	28		
0.063	25		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	38.00
Sand	37.00
Fines <0.063 mm	25.00

Grading Analysis		
D100	mm	28
D60	mm	1.67
D30	mm	0.185
D10	mm	
Uniformity Coefficient		27
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 366.11

4041

SUMMARY REPORT

DETERMINATION OF BULK DENSITY - IMMERSION IN FLUID METHOD

Tested in Accordance with: BS EN ISO 17892-2: 2014: Clause 5.2

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

Environmental Science

Client: Enzygo Geoenvironmental Ltd
Client Address: The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA
Contact: Richard Hamilton
Site Address: Ickleford Mill

Client Reference: CRM.1027.189
Job Number: 24-035269-1
Date Sampled: Not Given
Date Received: 07/08/2024
Date Tested: 14/08/2024
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	Bulk density	Dry density	WC	Preparation		
		Reference	Depth Top m	Depth Base m	Type			Mg/m3	Mg/m3	%			
281425	BH103	Not Given	2.75	Not Given	D	Brownish grey with silty CLAY with fragmets of chalk		2.03	1.68	21.0			
281427	BH103	Not Given	11.00	Not Given	D	Brownish grey slightly gravelly very sandy CLAY with fragments of chalk		2.16	1.86	16.1			

Note: WC - Water Content by BS EN ISO 17892-1

Comments:

Signed: Katarzyna Koziel
Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 165.13

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-2:2022 Cl. 15

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

4041

Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM.1027.189
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	24-035269-1
		Date Sampled:	Not Given
		Date Received:	07/08/2024
Contact:	Richard Hamilton	Date Tested:	19/08/2024
Site Address:	Ickleford Mill	Sampled By:	Not Given

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

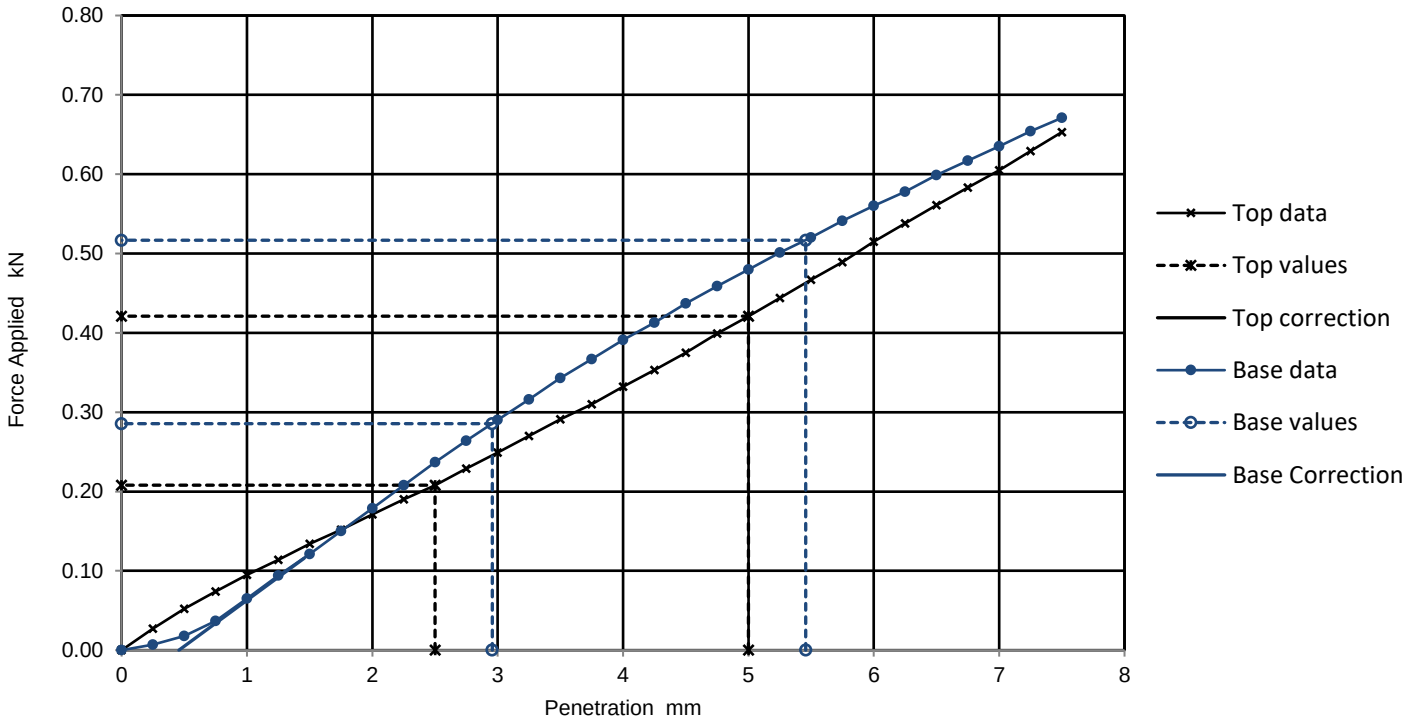
Test Results:

Laboratory Reference:	281424	Depth Top [m]:	1.00
Hole No.:	BH103	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown 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	15 %	Dry density after soaking	Mg/m3
Initial Specimen details — Bulk density	2.07 Mg/m3	Surcharge applied	8 kg
Dry density	1.75 Mg/m3		4.9 kPa
Water content	19 %		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Water Content %
TOP	No	1.6	2.1	2.1		19
BASE	Yes	2.2	2.6	2.6		18

Remarks:

Test/ Specimen specific remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 593.1

SUMMARY REPORT

DETERMINATION OF UNDRAINED SHEAR STRENGTH USING HAND VANE APPARATUS

Tested in Accordance with: In-house Method G074*

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

Environmental Science

Client: Enzygo Geoenvironmental Ltd

Client Address: The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA

Contact: Richard Hamilton

Site Address: Ickleford Mill

Client Reference: CRM.1027.189

Job Number: 24-035269-1

Date Sampled: Not Given

Date Received: 07/08/2024

Date Tested: 13/08/2024

Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Shear Vane Reading 1	Shear Vane Reading 2	Shear Vane Reading 3	Shear Vane Reading 4	Shear Vane Reading Average	Tv	Sample Preparation
		Reference	Depth Top m	Depth Base m	Type			kPa	kPa	kPa	kPa	kPa	kPa	
281438	BH101	Not Given	8.00	Not Given	U	Dark grey slightly gravelly sandy CLAY with fragments of chalk		140	124	144	148	139		Sample was whole tested, tested as received
281439	BH101	Not Given	11.00	Not Given	U	Dark grey slightly gravelly CLAY with fragments of chalk		UTP	UTP	UTP	UTP	UTP		Sample was whole tested, tested as received
281429	BH102A	Not Given	2.00	Not Given	U	Dark brown slightly gravelly sandy CLAY with fragments of chalk		87	58	74	116	84		Sample was whole tested, tested as received
281434	BH104	Not Given	3.00	Not Given	U	Dark grey slightly gravelly sandy CLAY with fragments of chalk		92	100	91	116	100		Sample was whole tested, tested as received

Note: UTP - Unable To Penetrate; *Guideline for Hand Held Shear Vane Test, New Zealand Geotechnical Society INC, August 2001

Comments:

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist

for and on behalf of i2 Analytical Ltd

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Date Reported: 22/08/2024

GF 150.14

Appendix 5 – Contamination Assessment Reference Values

Determinant	Units	GAC Value Residential					
		With Plant Uptake			Without Plant Uptake		
Arsenic	mg/kg	37			40		
Cadmium	mg/kg	11			85		
Chromium	mg/kg	910			910		
Chromium VI	mg/kg	6			6		
Lead	mg/kg	200			310		
Mercury	mg/kg	40			56		
Nickel	mg/kg	180			180		
Selenium	mg/kg	250			430		
Copper	mg/kg	2400			7100		
Zinc	mg/kg	3700			40000		
Cyanide	mg/kg	791			800		
SOM	%	1	2.5	6	1	2.5	6
Phenol	mg/kg	120	200	380	440	690	1200
Napthalene	mg/kg	2.3	5.6	13	2.3	5.6	13
Acenaphtylene	mg/kg	170	420	920	2900	4600	6000
Acenaphthene	mg/kg	210	510	1100	3000	4700	6000
Flourene	mg/kg	170	400	860	2800	3800	4500
Phenanthrene	mg/kg	95	220	440	1300	1500	1500
Anthracene	mg/kg	2400	5400	11000	31000	35000	37000
Fluoranthene	mg/kg	280	560	890	1500	1600	1600
Pyrene	mg/kg	620	1200	2000	3700	3800	3800
Benzo(a)Anthracene	mg/kg	7.2	11	13	11	14	15
Chrysene	mg/kg	15	22	27	30	31	32
Benzo(b)Flouranthene	mg/kg	2.6	3.3	3.7	3.9	4.0	4.0
Benzo(k)Flouranthene	mg/kg	77	93	100	110	110	110
Benzo(a)Pyrene	mg/kg	2.2	2.7	3.0	3.2	3.2	3.2
Indeno(123-cd)Pyrene	mg/kg	27	36	41	45	46	46
Dibenzo(a,h)Anthracene	mg/kg	0.24	0.28	0.3	0.31	0.32	0.32
Benzo(ghi)Perylene	mg/kg	320	340	350	360	360	360
TPH C_5-C_6 Aliphatic	mg/kg	**42**	**78**	**160**	**42**	**78**	**160**
TPH C_6-C_8 Aliphatic	mg/kg	**100**	**230**	**530**	**100**	**230**	**530**
TPH C_8-C_{10} Aliphatic	mg/kg	**27**	**65**	**150**	**27**	**65**	**150**
TPH C_{10}-C_{12} Aliphatic	mg/kg	130	330	760	**130**	**330**	**770**
TPH C_{12}-C_{16} Aliphatic	mg/kg	1100	2400	4300	**1100**	2400	4400
TPH C_{16}-C_{35} Aliphatic	mg/kg	65000	92000	110000	65000	92000	110000
TPH C_{35}-C_{44} Aliphatic	mg/kg	65000	92000	110000	65000	92000	110000
TPH C_5-C_7 Aromatic	mg/kg	70	140	300	370	690	1400
TPH C_7-C_8 Aromatic	mg/kg	130	290	660	860	1800	3900
TPH C_8-C_{10} Aromatic	mg/kg	34	83	190	47	110	270
TPH C_{10}-C_{12} Aromatic	mg/kg	**74**	**180**	**380**	250	590	1200
TPH C_{12}-C_{16} Aromatic	mg/kg	**140**	**330**	**660**	1800	**2300**	**2500**
TPH C_{16}-C_{21} Aromatic	mg/kg	**260**	**540**	**930**	**1900**	**1900**	**1900**
TPH C_{21}-C_{35} Aromatic	mg/kg	**1100**	**1500**	**1700**	**1900**	**1900**	**1900**
TPH C_{35}-C_{44} Aromatic	mg/kg	**1100**	**1500**	**1700**	**1900**	**1900**	**1900**
Benzene	mg/kg	0.087	0.17	0.37	0.38	0.70	1.4
Toluene	mg/kg	130	290	660	880	1900	3900
Ethylebenzene	mg/kg	47	110	260	83	190	440
Xylene	mg/kg	56	130	310	79	180	430

Determinant	Units	GAC Value					
		Residential POS			Commercial		
Arsenic	mg/kg	79			640		
Cadmium	mg/kg	120			190		
Chromium	mg/kg	1500			8600		
Chromium VI	mg/kg	7.7			33		
Lead	mg/kg	630			2330		
Mercury	mg/kg	120			1100		
Nickel	mg/kg	230			980		
Selenium	mg/kg	1100			12000		
Copper	mg/kg	12000			68000		
Zinc	mg/kg	81000			730000		
Cyanide	mg/kg	N/A			16200		
SOM	%	1	2.5	6	1	2.5	6
Phenol	mg/kg	440	690	1300	440	690	1300
Napthalene	mg/kg	4900	4900	4900	190	460	1100
Acenaphtylene	mg/kg	15000	15000	15000	83000	97000	100000
Acenaphthene	mg/kg	15000	15000	15000	84000	97000	100000
Flourene	mg/kg	9900	9900	9900	63000	68000	71000
Phenanthrene	mg/kg	3100	3100	3100	22000	22000	23000
Anthracene	mg/kg	74000	74000	74000	520000	540000	540000
Fluoranthene	mg/kg	3100	3100	3100	23000	23000	23000
Pyrene	mg/kg	7400	7400	7400	54000	54000	54000
Benzo(a)Anthracene	mg/kg	29	29	29	170	170	180
Chrysene	mg/kg	57	57	57	350	350	350
Benzo(b)Flouranthene	mg/kg	7.1	7.2	7.2	44	44	45
Benzo(k)Flouranthene	mg/kg	190	190	190	1200	1200	1200
Benzo(a)Pyrene	mg/kg	5.7	5.7	5.7	35	35	36
Indeno(123-cd)Pyrene	mg/kg	82	82	82	500	510	510
Dibenzo(a,h)Anthracene	mg/kg	0.57	0.57	0.58	3.5	3.6	3.6
Benzo(ghi)Perylene	mg/kg	640	640	640	3900	4000	4000
TPH C_5-C_6 Aliphatic	mg/kg	570000	590000	600000	**3200**	**5900**	**12000**
TPH C_6-C_8 Aliphatic	mg/kg	600000	610000	620000	**7800**	**17000**	**40000**
TPH C_8-C_{10} Aliphatic	mg/kg	13000	13000	13000	**2000**	**4800**	**11000**
TPH C_{10}-C_{12} Aliphatic	mg/kg	13000	13000	13000	**9700**	**23000**	47000
TPH C_{12}-C_{16} Aliphatic	mg/kg	13000	13000	13000	59000	82000	90000
TPH C_{16}-C_{35} Aliphatic	mg/kg	250000	250000	250000	1600000	1700000	1800000
TPH C_{35}-C_{44} Aliphatic	mg/kg	250000	250000	250000	1600000	1700000	1800000
TPH C_5-C_7 Aromatic	mg/kg	**56000**	**56000**	**56000**	26000	46000	86000
TPH C_7-C_8 Aromatic	mg/kg	**56000**	**56000**	**56000**	56000	110000	180000
TPH C_8-C_{10} Aromatic	mg/kg	**5000**	**5000**	**5000**	3500	8100	17000
TPH C_{10}-C_{12} Aromatic	mg/kg	**5000**	**5000**	**5000**	16000	28000	**34000**
TPH C_{12}-C_{16} Aromatic	mg/kg	**5100**	**5100**	**5000**	**36000**	**37000**	**38000**
TPH C_{16}-C_{21} Aromatic	mg/kg	**3800**	**3800**	**3800**	**28000**	**28000**	**28000**
TPH C_{21}-C_{35} Aromatic	mg/kg	**3800**	**3800**	**3800**	**28000**	**28000**	**28000**
TPH C_{35}-C_{44} Aromatic	mg/kg	**3800**	**3800**	**3800**	**28000**	**28000**	**28000**
Benzene	mg/kg	72	72	73	27	47	90
Toluene	mg/kg	56000	56000	56000	56000	110000	180000
Ethylebenzene	mg/kg	24000	24000	25000	5700	13000	27000
Xylene	mg/kg	41000	42000	43000	5900	14000	30000

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Determinant	Units	GAC Value					
		Park POS			Allotments		
Arsenic	mg/kg	170			43		
Cadmium	mg/kg	532			1.9		
Chromium	mg/kg	33000			18000		
Chromium VI	mg/kg	220			1.8		
Lead	mg/kg	1300			80		
Mercury	mg/kg	240			19		
Nickel	mg/kg	3400			230		
Selenium	mg/kg	1800			88		
Copper	mg/kg	44000			520		
Zinc	mg/kg	170000			620		
Cyanide	mg/kg						
SOM	%	1	2.5	6	1	2.5	6
Phenol	mg/kg	440	690	1300	23	42	83
Napthalene	mg/kg	1200	1900	3000	4.1	10	24
Acenaphtylene	mg/kg	29000	30000	30000	28	69	160
Acenaphthene	mg/kg	29000	30000	30000	34	85	200
Flourene	mg/kg	20000	20000	20000	27	67	160
Phenanthrene	mg/kg	6200	6200	6300	15	38	90
Anthracene	mg/kg	150000	150000	150000	380	950	2200
Fluoranthene	mg/kg	6300	6300	6400	52	130	290
Pyrene	mg/kg	15000	15000	15000	110	270	620
Benzo(a)Anthracene	mg/kg	49	56	62	2.9	6.5	13
Chrysene	mg/kg	93	110	120	4.1	9.4	19
Benzo(b)Flouranthene	mg/kg	13	15	16	0.99	2.1	3.9
Benzo(k)Flouranthene	mg/kg	370	410	440	37	75	130
Benzo(a)Pyrene	mg/kg	11	12	13	0.97	2.0	3.5
Indeno(123-cd)Pyrene	mg/kg	150	170	180	9.5	21	39
Dibenzo(a,h)Anthracene	mg/kg	1.1	1.3	1.4	0.14	0.27	0.43
Benzo(ghi)Perylene	mg/kg	1400	1500	1600	290	470	640
TPH C_5-C_6 Aliphatic	mg/kg	95000	130000	180000	730	1700	3900
TPH C_6-C_8 Aliphatic	mg/kg	150000	220000	320000	2300	5600	13000
TPH C_8-C_{10} Aliphatic	mg/kg	14000	18000	21000	320	770	1700
TPH C_{10}-C_{12} Aliphatic	mg/kg	21000	23000	24000	2200	4400	7300
TPH C_{12}-C_{16} Aliphatic	mg/kg	25000	25000	26000	11000	13000	13000
TPH C_{16}-C_{35} Aliphatic	mg/kg	450000	480000	490000	260000	270000	270000
TPH C_{35}-C_{44} Aliphatic	mg/kg	450000	480000	490000	260000	270000	270000
TPH C_5-C_7 Aromatic	mg/kg	**76000**	**84000**	**92000**	**13**	**27**	**57**
TPH C_7-C_8 Aromatic	mg/kg	**87000**	**95000**	**100000**	**22**	**51**	**120**
TPH C_8-C_{10} Aromatic	mg/kg	**7200**	**8500**	**9300**	**8.6**	**21**	**51**
TPH C_{10}-C_{12} Aromatic	mg/kg	**9200**	**9700**	**10000**	**13**	**31**	**74**
TPH C_{12}-C_{16} Aromatic	mg/kg	**10000**	**10000**	**10000**	**23**	**57**	**130**
TPH C_{16}-C_{21} Aromatic	mg/kg	**7600**	**7700**	**7800**	**46**	**110**	**260**
TPH C_{21}-C_{35} Aromatic	mg/kg	**7800**	**7800**	**7900**	**370**	**820**	**1600**
TPH C_{35}-C_{44} Aromatic	mg/kg	**7800**	**7800**	**7900**	**370**	**820**	**1600**
Benzene	mg/kg	90	100	110	0.017	0.034	0.075
Toluene	mg/kg	87000	95000	100000	22	51	120
Ethylebenzene	mg/kg	17000	22000	27000	16	39	91
Xylene	mg/kg	17000	23000	31000	28	67	160

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GAC gqvap Threshold Values

Determinant	Unit	SoBRA Values GAC (gwvap)	
		Residentiaal	Commercial
Benzene	ug/l	210	20000
Ethylbenzene	ug/l	10000	960000
Isopropylbenzene	ug/l	850	86000
Propylbenzene	ug/l	2700	240000
Styrene	ug/l	8800	810000
Toluene	ug/l	230000	21000000
TPH Aliphatic (EC5 – EC6)	ug/l	1900	190000
TPH Aliphatic (EC6 – EC8)	ug/l	1500	150000
TPH Aliphatic (EC8 – EC10)	ug/l	57	5700
TPH Aliphatic (EC10– EC12)	ug/l	37	3600
TPH Aromatic (EC5 – EC7)	ug/l	210000	20000000
TPH Aromatic (EC7 – EC8)	ug/l	220000	21000000
TPH Aromatic (EC8 – EC10)	ug/l	1900	190000
TPH Aromatic (EC10– EC12)	ug/l	6800	660000
TPH Aromatic (EC12– EC16)	ug/l	39000	3700000
M Xylene	ug/l	9500	940000
O Xylene	ug/l	12000	1100000
P Xylene	ug/l	9900	980000
1.2.4. Trimethylbenzene	ug/l	24	2200
Acenaphthene	ug/l	170000	15000000
Acenaphthylene	ug/l	220000	20000000
Fluorene	ug/l	210000	18000000
Napthalene	ug/l	220	23000
1,1,1,2-Tetrachloroethane	ug/l	240	22,000
1,1,1-Trichloroethane	ug/l	3,000	290,000
1,1,2,2-Tetrachloroethane	ug/l	1,600	150,000
1,1,2-Trichloroethane	ug/l	520	49,000
1,1-Dichloroethane	ug/l	2,700	260,000
1,1-Dichloroethene	ug/l	160	16,000
1,2,3,4-Tetrachlorobenzene	ug/l	240	*31,000*
1,2,3,5-Tetrachlorobenzene	ug/l	7.0	600
1,2,3-Trichlorobenzene	ug/l	35	3,100
1,2,4,5-Tetrachlorobenzene	ug/l	8.1	*700*
1,2,4-Trichlorobenzene	ug/l	68	7,200
1,2-Dichlorobenzene	ug/l	2,000	*220,000*
1,2-Dichloroethane	ug/l	8.9	850
1,2-Dichloropropane	ug/l	22	2,600
1,3,5-Trichlorobenzene	ug/l	7.4	660
1,3-Dichlorobenzene	ug/l	31	2,800
1,4-Dichlorobenzene	ug/l	5,000	*460,000*
Bromobenzene	ug/l	220	20,000
Bromodichloromethane	ug/l	17	1,600
Bromoform (Tribromomethane)	ug/l	3,100	400,000
Chlorobenzene	ug/l	98	15,000
Chloroethane	ug/l	10,000	1,000,000
Chloroethene (VinylChloride)	ug/l	0.62	63
Chloromethane	ug/l	14	1,400
cis-1,2-Dichloroethene	ug/l	130	13,000
Dichloromethane	ug/l	3,300	370,000
Hexachlorobenzene	ug/l	*16*	*1,400*
Hexachlorobutadiene	ug/l	1.7	230
Hexachloroethane	ug/l	8.5	740
Pentachlorobenzene	ug/l	140	*12,000*
Tetrachloroethene	ug/l	34	4,600
Tetrachloromethane (CarbonTetrachloride)	ug/l	5.3	770
trans-1,2-Dichloroethene	ug/l	160	16,000
Trichloroethene	ug/l	5.7	530
Trichloromethane(Chloroform)	ug/l	790	85,000
Mercury, elemental	ug/l	1.1	*95*
Methyl tertiary butyl ether(MTBE)	ug/l	83,000	7,800,000

Controlled Waters Assessment Reference Values

Determinant	Unit	EQS Freshwater						UK DWS	WHO
Hardness	mg/l	0-50	50-100	100-150	150-200	200-250	>250		
Arsenic	ug/l	50						10	10
Boron	ug/l	2000						1000	0.3
Cadmium	ug/l	5						5	3
Chromium	ug/l	2	10	10	20	20	20	50	50
Lead	ug/l	4	10	10	20	20	20	10	10
Mercury	ug/l	1						1	1
Selenium	ug/l							10	10
Copper	ug/l	0.5	3	3	3	8	12	20000	2000
Nickel	ug/l	8	20	20	40	40	40	20	70
Zinc	ug/l	8	15	15	50	50	50	5000	3000
Sulphate	mg/l	400						250	250
PAH	ug/l							0.1	
Anthracene	ug/l	0.02							
Naphthalene	ug/l	10							
Benzo(a)Pyrene	ug/l	0.03							0.01
Fluoranthene	ug/l	0.02							
Benzene	ug/l	30						1	10
Toluene	ug/l	50							
Ethylebenzene	ug/l	20							
Xylene	ug/l	30							
$C_5 – C_6$ Aliphatic	ug/l								15000
$C_6 – C_8$ Aliphatic	ug/l								15000
$C_8 – C_{10}$ Aliphatic	ug/l								300
$C_{10} – C_{12}$ Aliphatic	ug/l								300
$C_{12} – C_{16}$ Aliphatic	ug/l								300
$C_{16} – C_{36}$ Aliphatic	ug/l								N/A
$C_6 – C_7$ Aromatic	ug/l								10
$C_7 – C_8$ Aromatic	ug/l	50							10
$C_8 – C_{10}$ Aromatic	ug/l	20							300
$C_{10} – C_{12}$ Aromatic	ug/l								1000
$C_{12} – C_{16}$ Aromatic	ug/l								1000
$C_{16} – C_{21}$ Aromatic	ug/l								90
$C_{21} – C_{35}$ Aromatic	ug/l								90



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Appendix H – SuDS Maintenance Strategy

Superstructures

SuDS Drainage Inspection & Maintenance Strategy Report











Project Name:	Ickleford Mill
Project Ref:	SS25355
Document Ref:	25355-SUS-ZZ-XX-T-C-00002
Status:	Preliminary
Revision:	01
Date:	20/02/2026
Client:	The Hill Group

Revision	Date	Description	Author	Reviewed	Approved
01	20/02/2026	Preliminary	GW	LL	GW

Introduction

This document has been prepared to provide a maintenance methodology for the surface water drainage elements proposed for this development. If any discrepancies from manufacturers guidance are encountered, the proprietary system guidance should be adopted.

The drainage networks are comprised of permeable paving, gullies, swales, connecting pipe networks, manholes, inspection chambers, attenuation basin and downstream defender. Refer to drawing 25355-SUS-ZZ-XX-D-C-00010 for the proposed surface water drainage layout.

In accordance with CIRIA C625 it is recommended a private SuDS maintenance agreement is undertaken as a simple contract between the property owner and the maintenance provider (the maintainer). It is to facilitate continuing maintenance of the SuDS within private ownership. The maintenance requirements are in accordance with the CIRIA C753 SuDS Manual 2015 and product manufacturer's requirements.

The maintenance of drainage systems will be the responsibility of the project developer or by an appointed maintenance company and as such an appropriate maintenance regime should be implemented as stated below:

Manholes, Inspection Chambers, Pipe Work, Drainage Channels & Gullies

The surface water drainage system should be inspected and maintained periodically, primarily to check for silt sedimentation within the system or ingress of any detritus or debris which would decrease system performance.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove manhole and chamber covers to sewers and flow control on network. Inspect assets to ensure water is flowing freely and that the water flow route is unobstructed. Remove debris and silt as required.	Half Yearly Undertake an inspection after leaf fall in autumn
Remedial Actions	Re-line or replace pipework if unable to clear blockages by jetting.	As required
Monitoring	Inspect chambers for build-up of silt and debris	Half yearly

Permeable Paved Areas

The following table sets out the recommended maintenance actions and frequency for porous paved area. These areas should not be used as storage areas for topsoil, sand, etc. without the use of a protective layer. The neglect of these areas is likely to reduce the efficiency of the means of drainage.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over entire surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this more likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements.
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the surface	As required
	Remedial works to any depressions, rutting and cracked considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Inspect for evidence of poor operation and/or weed growth -if required, take remedial action	Three-monthly, 48 hours after large storms in the first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor inspection chambers	Annually

Attenuation Basin / Swales

The following table sets out the recommended maintenance actions and frequency for the attenuation basin and swales.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and runoff access routes	Monthly (during growing season) or as required
	Cut grass – meadow grass in and around basin	Half-yearly
	Manage other vegetation and remove nuisance plants	Annually, or as required.
	Inspect inlets and outlets for blockages, and clear if required	Monthly
	Inspect embankments, structures, pipework etc. for evidence of physical damage	Monthly (for first year) then annually or as required
	Tidy all dead growth before start of growing season	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune or trim any nearby trees and remove cuttings from basin	Every 2 years, or as required
	Remove sediment from inlets, outlets and main basin	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial Actions	Repair or replace inlets, outlets or control structures to design detail	As required
	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap (if required)	As required
	Relevel uneven surfaces and reinstate design levels	As required
Monitoring	Inlets, outlets pipes and structures for damage	Annually
	For sediment at the base of the structures	Monthly or as required.

Downstream Defender (*SPEL Smartceptor*)

These are manufactured products to provide a treatment to the surface water by removing specific pollutants. The products specified to be installed: SPEL Smartceptor 200 Series.

In the event of a spillage, the separator should be emptied. Emptying should be undertaken by a registered waste removal company, experienced in separator emptying.

Every five years, the separator should be emptied and given a general inspection to test its integrity and performance, after which the separator must be refilled with clean water.

A detailed log should be kept up when the separator has been inspected, maintained, emptied and serviced, along with records of any specific events relating to the system such as cleaning, spillages.

Failure to carry out the maintenance may result in pollution of the environment.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation.	Monthly for 3 months, then annually.
	Change the filter media.	As recommended by manufacturer.
	Remove sediment, oil grease and floatables.	As necessary – indicated by system inspections or immediately following significant spill.
Remedial Actions	Replace malfunctioning parts or structures.	As required.
Monitoring	Inspect for evidence of poor operation.	Biannually
	Inspect filter media and establish appropriate replacement frequencies.	Biannually
	Inspect sediment accumulation rates and establish removal frequencies.	Monthly during first half year of operation, then every six months.

Appendix I – LLFA Pre-App Response

Growth & Environment

George Westgarth
Principal Civil Engineer
Superstructures
george@super-structures.co.uk

Lead Local Flood Authority
Hertfordshire County Council
Post Point CHN215
Farnham House
Six Hills Way, Stevenage
Hertfordshire SG1 2FQ
www.hertfordshire.gov.uk

Contact: SuDS and Watercourses Team
FRMConsultations@hertfordshire.gov.uk

Your ref: Pre-app advice
Date: 27 January 2026

Dear George

RE: Pre app advice, Ickleford Mill, Arlesey Road, Ickleford, Hitchin, SG5 3UN. Redevelopment of 3.5ha brownfield site to a 55 residential unit development

Thank you for meeting with us yesterday to discuss the drainage strategy for the above development of 55 residential units at the Ickleford Mill site.

As discussed, we would like to advise the following:

1. **Source Control Measures.** We recommend consideration is given to providing further source control measures on the site, such as tree pits, and maximising the use of permeable paving. This would help the development *meet Standard 2: management of everyday rainfall (interception)*, under the *National Standards for sustainable drainage systems, June 2025,* where the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems. We welcome your agreement to investigate additional source control measures further, particularly in the northern area of the site, which is shown to be at a low to medium risk of surface water flooding. We understand the roads on site will not be adopted, which may improve the feasibility of source control SuDS.

2. **Discharge rates –** we are pleased that the overall discharge rate will be restricted to greenfield run off rates. Supporting greenfield calculations should be submitted alongside any future application.

3. **Access road drainage.** We understand an ACO drain will be provided on the access road, which is being improved. We highly recommend consideration is given to additional attenuation, as well as the provision of a gravel strip, to improve the treatment train and lessen pollutants entering the surface waters.

4. **Detention basin.** We would like to see consideration given to increase the multi-functionality of the detention basin to enable it to be used and enjoyed as a recreational, biodiversity and landscape asset, thus providing wider benefits to the future users of the site. We understand that you will discuss options with your Landscape Design team. We would recommend side slopes of 1 in 4 are provided at some points, even if this is not possible for the whole of the basin, which would improve its functionality.

5. **Land Drainage Consent.** The erection of flow control structures or any culverting of an ordinary watercourse requires consent from the appropriate authority, which in this instance is Hertfordshire Lead Local Flood Authority and the Local Council (if they have specific land drainage bylaws). It is advised to discuss proposals for any works at an early stage of proposals. As discussed, if clear span footbridges are proposed, these are unlikely to require consent. If there is any removal of weirs, obstruction from a headwall, or de-culverting, these are likely to require consent under Section 23 of the Land Drainage Act 1991.

6. **De-culverting.** The impact of such works should be assessed. We are in principle highly supportive of de-culverting, but there are multiple recorded instances of property flooding just downstream of the site on Laurel Way from 2024 due to the River Oughton flooding, thus it is important that the impact of any weir removal or de-culverting is fully understood.

7. **Foul Pumping Station**. The location of this should not require Land Drainage Consent as we understand it to be further than 5 metres away from the ordinary watercourse. Access to the ordinary watercourse must not be prohibited.

8. **Reserved Matters.** It was understood that the Reserved Matters application will be submitted in late January / early February.

9. **Post-meeting note (calculations).** The correct rainfall data (currently FEH2013 or FEH2022 rainfall data) and calculation methods should be used in all calculations, along with conservative design parameters. Additionally, CV values of 1 should be applied within the design.

10. **IDB.** Please note that while we are the consenting authority for Land Drainage Consent at this site, it is near the Bedfordshire and River Ivel IDB, who may be interested in the proposal and the impact of any changes to culverts upstream of their area. The IDB's jurisdiction begins where Bedford Road is bridged over the River Oughton.

I trust this is useful. Please let me know if you have any questions.

Yours sincerely

Deborah Craig
Flood and Water Officer
Growth and Environment

Annex

The following documents have been reviewed.

- Preliminary Drainage Strategy, Ickleford Mill. Prepared by Superstructures. Reference 25355-SUS-XX-XX-DR-C-00010, Revision P01. Date 12.11.2025

- Proposed Site Layout, Ickleford Mill. Prepared by Hill Residential Limited. Drawing No. 185-PA-103 Rev No. Gv1. Date June 2025.