GROUND INVESTIGATION REPORT WIGGS FARM, WOOD ROAD, BATTRAM

TE1808-TE-00-XX-RP-GE-002-V05

13 MAY 2025

FINAL

Prepared for:

Barberry Bardon Ltd

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DOCUMENT CONTROL

Report No. :	TE1808-TE-00-XX-RP-GE-002-V05
Report Status:	FINAL
Project Engineer:	George Foster
Date of Issue:	13/05/2025

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Version No.	Description of Issue / Revision	Date of Issue	Author	Reviewed By	Approved By
1	Draft – ground gas monitoring on-going	07/03/2025	George Foster	Stuart Milne	Sean Lee
2	Updated with outstanding chemical test results. Ground gas monitoring on-going	13/03/2025	Stuart Milne	Sean Lee	Sean Lee
3	Final – ground gas results included	22/04/2025	George Foster	Stuart Milne	Sean Lee
4	Updated drawing	28/04/2025	Stuart Milne	Sean Lee	Sean Lee
5	Updated Client details	13/05/2025	Stuart Milne	Sean Lee	Sean Lee

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EXECUTIVE SUMMARY

Introduction	Tier Environmental was commissioned by Barberry Bardon Ltd to undertake a Ground Investigation at the proposed Project Excellence, Wood Road Development. The purpose of the investigation was to determine the nature and extent of soil, bedrock and groundwater beneath the site for the purposes of environmental and geotechnical assessment.
Proposed land use	Under current proposals the development will comprise a single warehouse unit with associated hardstanding, parking, roadways and infrastructure. Areas of proposed soft landscaping are located around the northern, southern and eastern borders. Retaining walls are also proposed along the south-western site boundary and locally within the east.
Site location and surrounding land uses	Project Excellence, Wood Road Development, Battram (nearest postcode) LE67 1FH. The site is set within a rural area with agricultural land uses surrounding the site. Wood Road provides the northern and western boundary and Station Road is on the eastern edge of site. Adjacent to site, beyond Wood Road in the northeast, is Pall-Ex distribution premises comprising a large warehouse unit along with associated hardstanding and roadways. To the southeast is the village of Bagworth, with residential properties lying approximately 250m from site. To the west is the village of Battram with a play park and properties lying approximately 130m from site.
Site history	Since 1881 Bagworth Brick and Pipe works are shown to the southeast of site and have encroached on the south-eastern area of site by the 1929 plan, possibly as a clay pit, with an access track or rail line and tunnel passing beneath Station Road. The brick works is no longer present by 1966 and associated pits have possibly been infilled. A conveyor system is recorded to have run along the southern site boundary between the colliery to the southwest and a bunker at the main line railway to the east. The conveyor passes under Wood Road along the site boundary before passing northeast through the easternmost part of the site where it is shown to pass under Station Road. This is no longer shown by 1994 although associated infrastructure may remain on site. Two ponds are constructed in the east of the site present from circa 2000, no ponds are recorded on historic mapping in these locations. Pertinent surrounding features include the Nailstone Colliery and Ellistown Brick Works as well as the both the Leicester and Burton on Trent Railway that originally ran to the east of site north/south and the mineral railway that ran across the northern edge of site. From the mid-2000s residential development took place to the southeast of site within Bagworth village.
Potential contaminative features	On-site Made Ground associated with possible historical infilling in the east of the site where the former clay pit of the Bagworth Brick and Pipe works encroached onto the site.
Mining and quarrying	Based on the information supplied by the Coal Authority reviewed in the Preliminary Risk Assessment i.e. no recorded mine entries, no recorded shallow workings and the shallowest recorded workings at approximately 90m bgl, it is considered that historic coal mining represents a low risk to the proposed development. The area where Bagworth Brick Works surface extraction took place is situated in the southeast of site. Based upon current layout proposals it is unlikely that the development would be affected by the former Bagworth Brick Works. This should be reviewed once development plans have been finalised.
Previous investigations	Tier Environmental completed a Preliminary Risk Assessment Report in February 2024 (Ref: TE1808-TE-00-XX-RP-GE-001-V02) which produced a preliminary conceptual site model for the site and informed intrusive investigation requirements.
Fieldwork	The ground investigation was conducted over 7 No. days between 28th January and 25th February 2025 and comprised: • Machine excavated trial pits (TP01 to TP22) to depths of 1.60m to 4.30m bgl to confirm the shallow ground conditions across the site. • Window sample boreholes (WS01 to WS12) to depths of 2.42m to 5.45m bgl to conduct *in situ* geotechnical tests and facilitate soil sampling. • Hand excavated trial pits (HDP01 to HDP04) to depths of 0.50m to 1.20m bgl to confirm the shallow ground conditions along the proposed secondary route of the foul sewer and to facilitate soil sampling for geoenvironmental parameters. • Slit trenches (ST05 to ST18) to depths of 0.60m to 1.50m bgl to expose, record and survey existing surface water sewer, due to be diverted. • Dynamic Cone Penetrometer tests (DCP01 to DCP04) to depths of 0.94m to 0.98m bgl to obtain CBR values for the proposed access road.
Laboratory testing	Samples of soil and groundwater were submitted for analysis of a range of metal, other inorganic and organic components including asbestos. Geotechnical testing was scheduled on selected samples. All testing was undertaken at accredited laboratories.
Ground conditions	The site is covered by topsoil across the majority of the site. Localised Made Ground was recorded in TP02, TP03, TP21 and WS06 in the east of the site, and WS10 in the south, to depths of up to 1.00m bgl. Further Made Ground was recorded in HDP01 to HDP04 in the east of the site to circa 0.75m bgl.

	Natural soils of weathered Edwalton Member bedrock were recorded in all locations as generally either a stiff Clay or very weak Siltstone. Localised softer clays were encountered in WS02 on the western edge of the proposed footprint, TP11 from 2.60m, WS04 and WS09.
Ground stability	Trial pits were recorded to be stable throughout the investigation. Shoring will be required for excavations deeper than 1.2m bgl and shallow groundwater may contribute to collapse of excavation sides.
Foundations and floor slabs	The site will be subject to a significant degree of reprofiling with a small area of cut in the southwest and extensive fill, from 0.50m up to 5.0m, across the remainder of the site towards the northeast. With this in mind, it is likely that foundations in the southwest of the building (WS01, WS08, TP13) will be sited directly onto the weathered bedrock at circa 1m bgl, with pads designed for bearing capacities of 85kPa (for the firm clays), 170kPa for the stiff clays and 240kPa for the siltstone. Areas of fill in the north and east of the building could be reengineered to facilitate bearing, for possibly 50kPa to 75kPa dependent on compaction, but given the localised softer clays encountered across site and to achieve higher bearing capacities (to reduce pads sizes) and reduce total and differential settlements, alternative measures may need to be considered, including lime/cement stabilisation of the engineered fill. There is also a potential for differential settlements across transition zones between bedrock and engineered fill which should be taken into consideration with foundation and floor slab designs. Alternatively, and in light of the variability of the ground conditions at anticipated founding depths, the proposed regrading works and to minimise foundation sizes, vibro stone columns or Controlled Modulus Columns/rigid inclusions could be considered by the contractor dependent on wider commercial considerations. This would bear through the engineered fill and into the underlying soils where soft clays are present. Bearing capacities for the foundations and floor slab should be subject to verification testing during earthworks. Consideration should also be given to slope stability for the design angles of proposed slopes. An Earthworks Specification will be required and all re-engineered soils should be emplaced in accordance with MCHW Series 600.
CBR tests	A total of 4 No. Dynamic Cone Penetrometer (DCP) tests were completed along the proposed route of the access road in the east of the site. DCPs were completed adjacent to trial pits for confirmation of the soil profile. All results recorded generally low CBR values of <5%, with some >5% in DCP01 from 0.45m bgl, DCP02 between 0.28m and 0.40m, and DSCP04 at 0.45m and 0.70m bgl. The highest values were recorded in DCP01 with generally consistently low values recorded in DCP03. Given the presence of CBR values of <2.5%, in accordance with the Department for Transport Interim Advice Note 73/06 these are considered unsuitable for pavement foundations and must be improved likely by removal and replacement of soil. The road will be subject to a degree of fill, and the depths of CBR values should be considered against proposed new levels.
Sulphate class	The conclusion of the assessment is that a DS-2 and ACEC Class AC-3z should be adopted for Made Ground, however this is being driven by localised elevated sulphates, and low pH in 1 No. location (HDP02) in the south east of the site within an area of proposed sewer realignment. A DS-1 and ACEC Class AC-1 may be more appropriate for buried concrete design purposes within Made Ground elsewhere on site, and a DS-1 and ACEC Class AC-2z should be considered for natural ground driven by low pH values.
Contamination – human health	No measured soil concentrations of potential contaminants of concern have been reported in excess of Generic Assessment Criteria (GACs) protective of human health appropriate to the proposed land use. On this basis, it is not considered that the site represents a potential risk to end-users. Of the 12 No. samples submitted for asbestos screening, 2 No. were returned positive for asbestos in TP10 at 0.10m and WS10 at 0.50m for chrysotile fibre bundles at 0.003% w/w and <0.001% w/w respectively.
Contamination – controlled waters	From a conceptual site model perspective the Oadby Member is Secondary Undifferentiated Aquifer, and the Edwalton Member bedrock is a Secondary B Aquifer, part of the Sidmouth Mudstone Formation. The site is not with a Source Protection Zone and there are no potable water abstractions within 2km of the site, and no non-potable abstractions within 1km. The nearest surface water feature is an unnamed stream 19m SE which forms part of a wider local drainage network, with no flow to nearby significant rivers with 250m. Based upon the site topography it is inferred that groundwater flow direction is towards the southeast. As a result, the controlled waters sensitivity is considered to be low. Measured groundwater concentrations of cadmium, copper, nickel, zinc, benzo(a)pyrene and fluoranthene have been reported in excess of the WQS protective of the controlled waters environment by either the same order of magnitude or one orders of magnitude. Given the marginal nature of these exceedances, the potential for significant dilution between the site and any significant surface water features, the absence of any potable/non potable abstractions within close proximity to the site, low sensitivity of the controlled waters environment, and the fact that the site will incorporate buildings / hardstanding and a dedicated drainage system that shall reduce infiltration rates through the soils, these measured concentrations are not considered to present a risk to the controlled waters environment.
Gas protection	A Gas Screening Value of 0.0042 l/hr has been calculated, derived using the maximum recorded carbon dioxide concentration of 4.2 %v/v and, in the absence of positive measurable flow, a flow rate of 0.1 l/hr. Assessment of this gas screening value alone places the site in a Characteristic Situation 1 – very low risk scenario in accordance with CIRIA C665 for which ground gas protection measures are not required.

Radon requirements	Basic radon protection measures are not currently required for the proposed development on this site. In addition to the above, basements represent areas that are more at risk because the walls are in contact with the ground as well as the floor. This, coupled with reduced natural ventilation below ground level, increases the risk of elevated radon levels. All basements are therefore considered under BR 211 to be at increased risk of elevated levels of radon regardless of geographic location. Currently, no basements or converted cellars / basements are proposed for the development and therefore no additional consideration of potential increased risk needs to be made; however, this should be revisited in the event that the proposals change to include for a basement.
Waste soils classification	Basic waste characterisation has determined that Made Ground soils are non-hazardous. WAC testing was not completed as part of this investigation as it is proposed that there will be a cut/fill balance on the site. It is anticipated that natural soils will be suitable for disposal to an inert landfill.
Materials re-use	Subject to volumetric cut and fill requirements all of Made Ground materials and all of natural soil materials and may be considered chemically suitable for potential re-use subject to careful management and placement of materials and in line with an appropriate end-of-waste protocol such as WRAP Quality Protocol for Aggregates from Inert Waste, U1 Exemption or a Materials Management Plan in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). Suitability for re-use would also be subject to confirmation of the geotechnical suitability depending on whether the materials are to be re-used in load bearing areas. This would need to be detailed in a supporting document. Please note that any previously landfilled or mining waste materials may not be appropriately subject to consideration under DoWCoP and may not be re-used under DoWCoP unless sufficient lines of evidence and agreement with the local Environment Agency Waste Team can be sought beforehand. In addition, Section 13.3 of this report includes statements with respect to re-use of excavated and stockpiled clean naturally occurring soils within the site and re-use on other sites. These statements are designed to provide a clear intention to reuse any clean, naturally occurring soils derived from future excavations at this site (which may also include temporary future stockpiling these materials).
Outline remediation strategy & recommendations	The detection of asbestos in WS10 at 0.50m bgl is within a distinct Made Ground population which could be segregated during earthworks and re-used under the building footprint. The asbestos recorded in TP10 is within topsoil. The majority of the Topsoil will be removed from site during the regrading works, with only a small volume retained for reuse in the proposed soft landscaping. Confirmatory asbestos screening of the site wide Topsoil should be undertaken prior to removal from site to confirm suitability for reuse on other development sites.
Further Works	• An Earthworks Specification will be required and all re-engineered soils should be emplaced in accordance with MCHW Series 600. • Asbestos Management Plan • MMP for reuse of Made Ground (excludes natural soils) • CPTs for ground improvement design • TP10 delineation and asbestos DQRA to reuse TP10 on site • Rotary borehole to assist design for the SW retaining wall

1. INTRODUCTION

Tier Environmental was commissioned by Barberry Bardon Ltd to undertake a Land Contamination Risk Management (LCRM) Ground Investigation for an area of land referred to as Project Excellence, located off Wood Road, Battram, Coalville, LE67 1GE (the "site").

The title of this report is in accordance with that described in the Land Contamination Risk Management guidance (available at https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm) which has superseded CLR 11:

Stage 1:

- LCRM Tier 2 Generic Quantitative Risk Assessment Report

1.1. Proposed Development

Under current proposals the development will comprise a single warehouse unit with associated hardstanding, parking, roadways and infrastructure. Retaining walls are also proposed along the south-western site boundary and locally within the east. Areas of proposed soft landscaping are located around the northern, southern and eastern borders, as presented in Appendix A. As such, in accordance with the *'Updated technical background to the CLEA model'* (Environment Agency, 2009) and *'Suitable 4 Use Levels'* (LQM / CIEH 2015) the proposed generic land use for this development is industrial.

1.2. Previous Reports

The following previous reports have been produced by Tier Environmental:

- A Preliminary Risk Assessment Report for Wiggs Farm, Wood Road Development, Battram (Ref: TE1808-TE-00-XX-RP-GE-001-V02 dated February 2024).
- A Service Trenching Technical Note (Ref: TE1808-TE-00-XX-TN-GE-001-V01, dated March 2025).

1.3. Objectives

Taking into account the proposed development of the site, the objectives of this appraisal were:

- To determine current ground and groundwater conditions;
- To further investigate potential areas of former infilling within the site boundary;
- To determine the potential risks to human health and the wider environment;
- To provide a preliminary waste soils classification;
- To determine potential risks posed to the site from hazardous ground gases and / or vapours;
- To provide preliminary outline remedial measures to manage any identified risks;
- To provide preliminary geotechnical parameters to inform an earthworks exercise, and recommend floor slab, road and foundation design; and,
- To identify any abnormal cost sources.

1.4. Assumptions

The following assumptions are made in this report:

- It is assumed that ground levels will not change significantly from those described in this report or as shown on proposed development drawings. If this is not the case, then amendments to the recommendations made in this report may be required.
- The ground investigation has been designed with due consideration of known or suspected constraints (including underground services and access constraints).
- Any references to observations of suspected asbestos-containing materials are for information only and should be verified by a suitably qualified asbestos specialist and/or confirmed by laboratory analysis.
- The use of the term 'Topsoil' within this report is based on a visual identification only and that these materials have not been classified in accordance with BS3882:2015.
- The use of the terms ‘shallow’ and ‘deep’ within this report (from a geotechnical perspective) assume *typically* between ground level to circa 3.00m below ground level (bgl) for ‘shallow’ and greater than 3.00m bgl regarded as ‘deep’.
- The comments and opinions presented in this report are based on the findings of the desk study and ground conditions encountered during intrusive investigation works performed by Tier Environmental and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report.
- Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of the findings is conjectural and given for guidance only. Confirmation of intermediate ground conditions should be undertaken if deemed necessary.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview.

Site name	Project Excellence, Wood Road Development, Battram
Site address	Project Excellence, Wood Road Development, Battram (nearest postcode) LE67 1FH. A site location plan is included as Drawing No. TE1808-TE-00-XX-GE-DR-001-V01 within Appendix A.
National Grid Reference (NGR)	443687 309605
Approximate site area	22.07 ha
Site shape	Irregular in shape.
Current land use on the site	The majority of the site currently comprises a former arable field belonging to Wiggs Farm. A deciduous woodland is situated in the northern area. 3 No. overhead power lines intersect the site running east west and SW to NE. The electricity poles in the west of the site were noted to be sub vertical, and conversations with the landowner implied this was due to subsidence caused by the collapse of coal workings. This area was also sloped. Small piles of construction materials, and a stockpile of unknown materials are located in the southeast of the site likely associated with Wiggs Farm and the pond construction. The area to the east has been reduced since the issue of the Preliminary Risk Assessment by Tier Environmental, which now only includes an area for the proposed access road off Station Road. This area mostly comprises an access route used by the public, and overhead powerlines. A surface water sewer oriented northwest to southeast runs into the centre of the site and veers off to the east at a junction in the centre of the site. This sewer leads into a ditch along the eastern boundary of the field.
Surrounding land uses	The site is set within a rural area with agricultural land uses surrounding the site. Wood Road provides the northern and western boundary and Station Road provides the eastern edge of site. Adjacent to site, beyond Wood Road in the northeast is Pall-Ex distribution premises, comprising of a large warehouse unit along with associated hardstanding and roadways. Immediately southwest of the site is a small industrial estate, comprising a recycling area and commercial space selling livestock feed, belonging to Wiggs Farm.
General topography and ground levels	The site is generally situated at between 151m and 163m AOD. The site slopes gently towards the southeast, and areas in the northeast slope southwards. The area of the proposed access road in the east generally slopes to the west.

An aerial photograph (from the Groundsure report) of the site and site boundary is shown overleaf. Relevant site photographs are presented in Appendix G.

Figure 2.1 Recent Aerial Photograph from Groundsure

3. PREVIOUS INVESTIGATION FINDINGS

The following previous pertinent report pertaining to this site have been made available:

- Tier Environmental – 'Preliminary Risk Assessment Report for Wiggs Farm, Wood Road Development, Battram' (Report reference: TE1808-TE-00-XX-RP-GE-001-V02 dated February 2024).

Table 3.1 Tier Environmental 2024 Preliminary Risk Assessment Report Summary

Introduction	Tier Environmental was commissioned by Barberry Bardon Ltd to undertake a desk study and Phase I Preliminary Risk Assessment of the proposed commercial / industrial development at Wiggs Farm, Wood Road Development, Battram. The purpose of this investigation was to establish land use history and review the available information to determine the geoenvironmental setting of the site and develop a preliminary conceptual site model with due consideration of potential soil and groundwater contamination, hazardous ground gases and mining.
Proposed land use	It is proposed that the site will be developed as singular warehouse for distribution purposes. Preliminary development layouts suggest the plot will stand to the west of the site with parking and hardstanding to the east of the plot and an entrance off Station Road. Land in the far east of the site will remain undeveloped.
Site location and surrounding land uses	Project Excellence, Wood Road Development, Battram (nearest postcode) LE67 1FH. The site is set within a rural area with agricultural land uses surrounding the site. Wood Road provides the northern and western boundary and Station Road is on the eastern edge of site. Adjacent to site, beyond Wood Road in the northeast, is Pall-Ex distribution premises comprising a large warehouse unit along with associated hardstanding and roadways. To the southeast is the village of Bagworth, with residential properties lying approximately 250m from site. To the west is the village of Battram with a play park and properties lying approximately 130m from site.
Site history	Since 1881 Bagworth Brick and Pipe works are shown to the southeast of site and have encroached on the southeastern area of site by the 1929, possibly as a clay pit, with an access track or rail line and tunnel passing under Station Road. The brick works is no longer present by 1966 and associated pits have possibly been infilled. A conveyor system is recorded to have run along the southern site boundary between the colliery to the southwest and a bunker at the main line railway to the east. The conveyor passes under Wood Road along the site boundary before passing northeast through the easternmost part of the site where it is shown to pass under Station Road. This is no longer in use by 1994 though associated infrastructure may remain on site. Two ponds are constructed in the east of the site present from circa 2000, no ponds are recorded on historic mapping in these locations. Pertinent surrounding features include the Nailstone colliery and Ellistown Brick Works as well as the both the Leicester and Burton on Trent Railway that originally ran to the east of site north/south and the Mineral Railway that ran across the northern edge of site. From the mid-2000s residential development took place to the southeast of site within Bagworth village.
Geology, Hydrogeology and Hydrology	The Groundsure report records the southeast of the site to comprise 'infilled ground', likely to be in association with the former Bagworth Brick works/clay pit. There is a moderate risk of compressibility and uneven settlement within the area of artificial ground. There are also records of large areas of Made Ground and Landscaped Ground within 10-500m of site The site, along the western and northern boundary, is shown to be underlain by the Oadby Member – Diamicton (Secondary Undifferentiated Aquifer), recorded in the order of approximately 9-18m in BGS boreholes. The solid geology beneath the site is shown to be the Edwalton Member – Mudstone (Secondary B Aquifer), part of the Sidmouth Mudstone Formation. The Edwalton Member is underlain by Coal Measures which are recorded on nearby BGS boreholes recorded from between 85-120m bgl. The site is not with a Source Protection Zone. There are no potable water abstractions within 2km of the site, and no non-potable abstractions within 1km. The nearest surface water feature is an unnamed stream 19m SE which forms part of a wider local drainage network, with no flow to nearby significant rivers with 250m. Based upon the site topography it is inferred that groundwater flow direction is towards the southeast. As a result, the controlled waters sensitivity is considered to be low.
Ground Gases	There is the potential historical infilling in the east of the site associated with infilling of the clay pits in the 1960s.There are no active landfills near to site though a number of historical landfill records, active between 1970-1990, are present including 18m west, 25m north west and 159m east, and licensed waste sites associated with soil production 23m south in circa 2012.
Radon Requirements	Basic radon protection measures are not currently required for the proposed development on this site.
Ecological Sensitivity	The site is within a Nitrate Vulnerable Zone associated with the River Trent.

	Two ponds situated to the east of the site are both in use for carp fishing with the northern most being used a fish nursey and the southern pond being actively fished. A Preliminary Ecological Appraisal (PEA) and a Biodiversity Net Gain (BNG) report are currently being prepared by a third party and reference should be made to these documents with respect to ecological considerations.
Potential contaminative features	On site Made Ground associated with possible historical infilling in the east of the site where the former clay pit of the Bagworth Brick and Pipe works encroached onto site. Possible Made Ground/buried infrastructure associated with a historic success tunnel for the clay pit and coal conveyor system and road underpass/access tracks in the east of the site.
Mining and quarrying	Based on the information supplied by the Coal Authority, presented in Appendix C, i.e. no recorded mine entries, no recorded shallow workings and the shallowest recorded workings at approximately 90m bgl, it is considered that historic coal mining represents a low risk to the proposed development. A copy of the Subsidence Claims Report for the adjacent Wiggs Farm area to the southwest of the site has been requested. This PRA will be updated upon receipt of this report and may affect our conclusions above. The area where Bagworth Brick Works surface extraction took place is situated in the southeast of site. Based upon current layout proposals it is unlikely that the development would be affected by the former Bagworth Brick Works. This should be reviewed once development plans have been finalised.
Unexploded Ordnance	From the historical and anecdotal evidence, the site wasn't a target for bombing historically. Thus, the UXO risk is considered to be low.
Waste Soils Classification	Based on the history of the site and the anticipated potential contaminants of concern it is considered possible that hazardous waste soil materials may be present beneath some areas of the site, notably to the east of site where possible infilling has occurred; however, this will be subject to confirmatory investigation, sampling, laboratory analysis and waste classification in accordance with the Guidance on the Classification and Assessment of Waste (WM3).
Materials re-use	Subject to volumetric fill requirements and a future assessment of suitability of re-use (both chemically and geotechnically), some materials may be considered for potential re-use in line with an appropriate end-of-waste protocol such as WRAP Quality Protocol for Aggregates from Inert Waste, U1 Exemption or a Materials Management Plan in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). **Please note that any previously landfilled or mining waste materials may not be appropriately subject to consideration under DoWCoP and may not be re-used under DoWCoP unless sufficient lines of evidence and agreement with the local Environment Agency Waste Team can be sought beforehand**.

4. GROUND GAS CONCEPTUAL SITE MODEL CONSIDERATION

4.1. Potential Ground Gas Sources and Gas Generation Potential

BS 8576:2013 outlines the importance of determining the ***gas generation potential*** on a given site by examining the potential source's characteristics, such as the type of waste or organic content, that could produce hazardous gases like methane or carbon dioxide. However, ***risk assessment is a separate step***, which considers pathways and receptors, using factors like Gas Screening Values (GSV) to estimate potential exposure and impact on receptors.

As such, it is important to delineate "generation potential" (linked to source characteristics) from "risk" (dependent on exposure likelihood and receptor sensitivity).

Tier Environmental has used material type descriptions and generation potential designations alongside the risk of lateral migration determinations from a combination of BS 8576:2013 and The Local Authority Guide to Ground Gas, CIEH (2008) and assessed their presence or otherwise for this site in the table below.

For further information of current site use, current surrounding land use, site history and surrounding land use history please refer to the Preliminary Risk Assessment.

Table 4.1 Potential Ground Gas Source Generation Potential (from BS 8576:2013 and The Local Authority Guide to Ground Gas, CIEH (2008))

BS 8576:2013 Generation Potential of Source		**Risk of Lateral Migration (from The Local Authority Guide to Ground Gas, CIEH (2008))**	**Potential On-Site Source?**	**Potential Off-Site Source?**
Generation Potential	**Material Types**			
Very low	Natural carbonate soil and strata, e.g. chalk and limestone.	Negligible	Yes, the bedrock geology (Edwalton Member) comprises variably dolomitic siltstone	Yes, the bedrock geology (Edwalton Member) comprises variably dolomitic siltstone
	Natural soil strata with a low degradable organic content, e.g. alluvium	Negligible	No	No
	In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s.	Negligible	No	No
	Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste).	Negligible	Yes, the potentially infilled land associated with the former brick works	Yes, the potentially infilled land associated with the former brick works
	Mine workings shallow or shaft (where there is clear evidence that they are flooded). (Gas in coal is historically generated and is trapped or adsorbed so the actual current generation rate is very low but it accumulates in workings and large volumes can be emitted very quickly.)	Variable – depends on extent of workings, geology and hydrogeology	No, shallowest seam is 35m bgl	No
	Inert landfill sites. (Lack of regulation in the past means that most sites are never entirely inert – they can include timber, plasterboard and even domestic refuse and consequently care is needed when assessing such sites. They might require a higher risk classification.)	Low	No	Yes, Battram Landfill Site A and Site B (18m W and 25m NW respectively) both took inert waste, last recorded in 1990.
	Hydrocarbon impacted soils (anaerobic degradation)	Negligible	No	No
Very low / low	Natural soil strata with a high degradable organic content (DOC) e.g. peat (note: gas in peat is historically generated and is trapped or adsorbed in the soil so the actual current generation rate is very low)	Negligible	No	No
Low *	Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt. No food or other easily degradable waste).	Negligible	No	No
	Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates).	Very low	No	No
	Landfill 1945 to mid 1960s (see also “moderate”).	Low/moderate – depends on geology	No	No
Moderate	Sewage sludge / cess pits.	Very low	No	No
	Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years).	Variable – depends on extent of workings, geology and hydrogeology	No	No
	Landfill 1945 to mid 1960s (this could also be “low” or, if disturbed, “high”).	Low/moderate – depends on geology	No	No
High	Landfill mid 1960s to early 1990s.	Moderate to very high	No	Yes, Battram Landfill Site A and B, located 18m west and 25m NW respectively, operated between 1970 and 1990.
	Mine workings – unflooded – less than 50 years since last worked.	Variable – depends on extent of workings, geology and hydrogeology	No, unable to determine if the deep coal workings are unflooded, however there are no mine shafts recorded nearby and the cohesive soils above will act as a buffer for any ground gases generated as a result of mining. These workings were last worked in 1989.	No, unable to determine if the deep coal workings are unflooded, however there are no mine shafts recorded nearby and the cohesive soils above will act as a buffer for any ground gases generated as a result of mining. These workings were last worked in 1989.
Very High	Municipal landfill sites.	Moderate to very high or Low (assuming site has engineered containment systems)	No	No
	Landfill early 1990s onwards.	Low (assuming site has engineered containment systems)	No	No

Notes - * Higher TOCs might not always indicate high degradability. For example, coke breeze can contain up to 51% TOC but only 4% DOC. In this case, the assessor should estimate what proportion of the TOC is degradable.

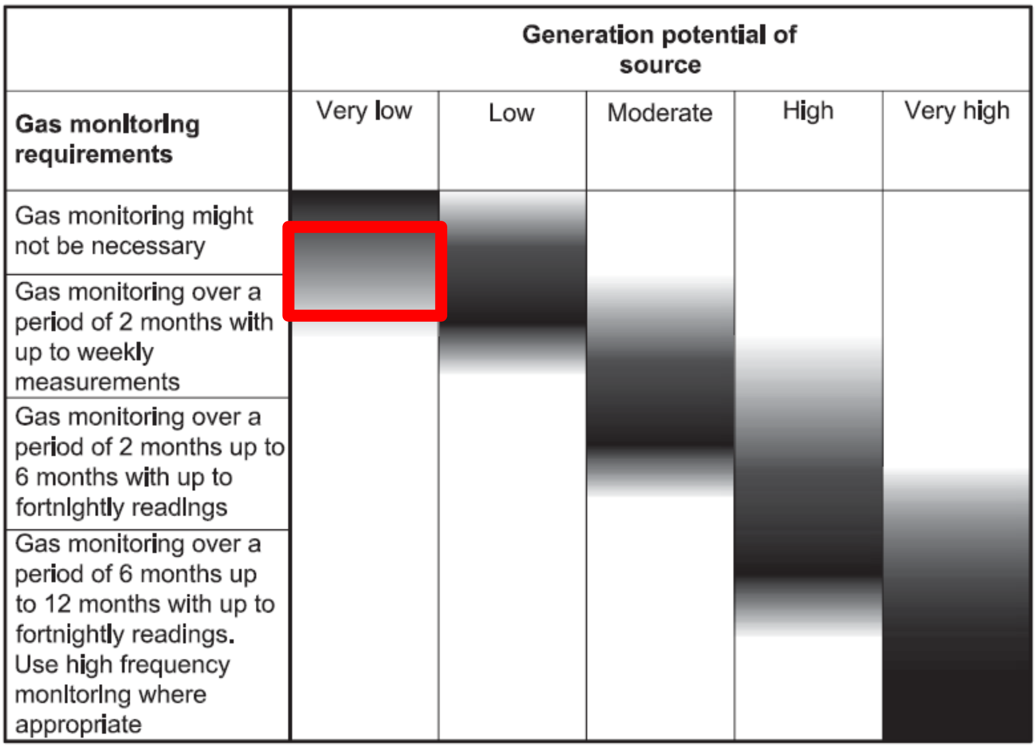
4.2. Appropriate Level of Ground Gas Monitoring

It can be seen from Table 4.1 that potential on-site ground gas sources have been identified that have a very low gas generation potential.

BS 8576:2013

In accordance with Section 8.7 from BS 8576:2013, the decision matrix below derived from Figure 6 in the British Standard has been used to determine the appropriate level of gas monitoring for the site. The extent of gas monitoring that is required is based on the generation potential of the source(s) determined in Table 4.1, i.e. what is the risk that large volumes of gas can be generated and can credibly migrate to pose a credible hazard to the identified receptors? The British Standard also describes that it might be appropriate to take into account the sensitivity of the receptor, the existence of site-specific migration pathways and mechanisms that could affect migration, such as groundwater level movements when determining the gas monitoring requirements.

Figure 4.1 Decision Matrix For Initial Monitoring (Extracted from Figure 6 in BS 8576:2013)



	Generation potential of source				
Gas monitoring requirements	Very low	Low	Moderate	High	Very high
Gas monitoring might not be necessary					
Gas monitoring over a period of 2 months with up to weekly measurements					
Gas monitoring over a period of 2 months up to 6 months with up to fortnightly readings					
Gas monitoring over a period of 6 months up to 12 months with up to fortnightly readings. Use high frequency monitoring where appropriate					

NOTE The darker the section on the matrix, the more likely it is that monitoring is needed.

Note from BS 8576:2013: There could be occasions when "low potential" sites require more monitoring than those with a higher gas generation potential. On a site where there are high gas concentrations and/or flow rates this can become apparent following a single round of monitoring and further monitoring is unlikely to alter the assessment of potential risks. On the other hand, some sites with low gas concentrations and/or flow rates are more susceptible to changes in atmospheric pressure, etc. and therefore require a longer period of monitoring in order to assess the potential risks with confidence.

An assessment has been made as to whether a potential off-site source of gas warrants additional consideration based on its distance from site, local geology and whether the risk of lateral migration gas migration is high enough. In turn it has been assessed whether doing so merits increasing the proposed periods of monitoring. A potential off-site source of ground gas is the Battram Landfill Site A & B, located 18m west and 25m north west, respectively. These present a very low to high ground gas generation potential however due to the underlying geology comprising the cohesive Edwalton member and Glacial Till, the risk of lateral migration is low, despite the proximity to site.

On the basis of the above, it is not considered that the off-site sources, in the context of the conceptual site model are such that they warrant an increase to the proposed period of monitoring.

CIRIA C665

Additionally, due consideration has been made of Tables 5.5a and 5.5b in CIRIA C665 which offers guidance on "typical/idealized" monitoring periods and frequencies for gas monitoring based on proposed land use, sensitivity, and the gas generation potential of the source.

Table 4.2 and Table 4.3 demonstrate how, in accordance with CIRIA C665, the periods and frequency of monitoring have been selected for the site.

Table 4.2 From Table 5.5a CIRIA C665 - Typical/idealised periods of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
	2	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
Sensitivity of development	**Low (commercial)**	1 month	2 months	3 months	6 months	12 months
	Moderate (flats)	2 months	3 months	6 months	12 months	24 months
	High (residential with gardens)	3 months[1]	6 months	6 months	12 months[1]	24 months

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over “high”, “medium” or “low” generation potential of source.

Table 4.3 From Table 5.5b CIRIA C665 - Typical/idealised frequency of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
		Very Low	**Low**	**Moderate**	**High**	**Very High**
Sensitivity of development	**Low (commercial)**	4	6	6	12	12
	Moderate (flats)	6	6	9	12	24
	High (residential with gardens)	6[1]	9	12	24[1]	24

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over “high”, “medium” or “low” generation potential of source.

Consideration of High Frequency (Continuous) Gas Monitoring

Table 4.4 below has been prepared in order to assess whether high frequency (continuous) gas monitoring should be considered for the site.

Table 4.4 Factors Considered for High Frequency (Continuous) Gas Monitoring

Factors	Tier Environmental Assessment
Are there any mineshafts on site?	No
Are there any recently closed mining workings on or near to the site?	Yes The coal workings beneath the site were last worked in 1989 and the geology underlying the site comprises the cohesive Edwalton member. As such, and with the absence of any mineshafts on site, it is not considered that a viable pathway exists.
Are there any landfills on or near to the site where large volumes of gases could be emitted (see Table 4.1 for definitions of generation potential of different landfill types)	Yes Battram Landfill Site A & B, located 18m west and 25m NW respectively, operated between 1970 and 1990 and took inert and industrial waste. Due to the underlying geology comprising the cohesive Edwalton member and Glacial Till, the risk from migrating gas onto site is considered low.
Is there any previous gas monitoring that indicates a higher gas regime than expected from the conceptual model?	No.
Is the site in an area where there may be tidal influence on the groundwater (and therefore the gas regime may fluctuate)?	No
Are there time constraints that may trigger the requirement for continuous gas monitoring?	No
Are there any sensitive receptors that may warrant additional continious gas monitoring?	No

Overall Determination

Based on the above, a monitoring regime of 4 No. visits over 2 months is considered appropriate.

4.3. Potential Pathways

Table 4.5 below summarises potential pathways identified as relevant to the site.

Table 4.5 Potential Ground Gas Pathways Identified

Potential Pathways	Present On / Beneath the Site?	Present Between Potential Off Site Source And The Site?
Permeable strata	Yes, potential infilled ground associated with the former brickworks in the east may be permeable	Yes, potential infilled ground associated with the former brickworks in the east may be permeable
Ingress into confined spaces (e.g. basements)	No	No
Fractures or joints in rock	Yes, well-connected fractures are described as the main flow mechanism for any limited groundwater within the bedrock strata	Yes, well-connected fractures are described as the main flow mechanism for any limited groundwater within the bedrock strata

Utility services or ducts – existing	Yes, an underground surface water sewer runs through the centre of the site	No
Utility services or ducts – future / proposed as part of development	Yes, the aforementioned surface water sewer is due to be rerouted around the edge of the proposed warehouse	No
Foundation structures (e.g. vibro stone columns) either pre-existing or proposed	No	No
Drainage systems (including culverts)	Yes, an underground surface water sewer runs through the centre of the site	No
Mine workings / voids / coal seams	No	No
Mine shafts	No	No
Other future construction created pathways	No	No

4.4. Receptors

The proposed land use comprises a singular warehouse unit with associated hardstanding, parking and roadways. The receptors on site include site end users and construction/maintenance workers. As such, a ground gas risk assessment is required for the site to determine the ground gas regime and provide advice relating to any remediation methods (if required).

5. PRELIMINARY CONCEPTUAL SITE MODEL

Based on the information provided in the preliminary desk study, a combined preliminary conceptual site model and conceptual exposure model was developed for the proposed future land use. This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors. In assessing the likely contaminants of concern present at the site, reference has also been made to Defra and Environment Agency supporting documentation. A preliminary qualitative risk assessment has also been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.

The potential pollutant linkages identified and the qualitative risk assessment for these are presented in Table 5.1 below. The terms used in the preliminary qualitative risk assessment are defined in Appendix I. It must be noted that the whole area to the east, leading to Station Road was included in the preliminary risk assessment, however updated proposed site plans indicate the site boundary covers a much smaller area in the east, for the proposed access road off Station Road.

5.1. Uncertainties

The following uncertainties exist in the preliminary conceptual model:

- The presence of any features unrecorded by the historic maps.
- Any unrecorded geological features.
- Any unrecorded pollution events during the site’s history.

Table 5.1 Preliminary Assessment of Potential Pollutant Linkages (Continued on Next Page).

Justification / Comments
• The majority of the site currently comprises a former arable field belonging to Wiggs Farm. A deciduous woodland is situated in the northern area. 3 No. overhead power lines intersect the site running east west and SW to NE. The electricity poles in the west of the site were noted to be sub vertical, and conversations with the landowner implied this was due to subsidence caused by the collapse of coal workings. This area was also sloped. Small piles of construction materials, and a stockpile of unknown materials are located in the southeast of the site likely associated with Wiggs Farm and the pond construction. The area to the east has been reduced since the issue of the Preliminary Risk Assessment by Tier Environmental, which now only includes an area for the proposed access road off Station Road. This area mostly comprises an access route used by the public, and overhead powerlines. • Since 1881 Bagworth Brick and Pipe works are shown to the southeast of site and have encroached on the southeastern area of site by the 1929, possibly as a clay pit, with an access track or rail line and tunnel passing under Station Road. The brick works is no longer present by 1966 and associated pits have possibly been infilled. A conveyor system is recorded to have run along the southern site boundary between the colliery to the southwest and a bunker at the main line railway to the east. The conveyor passes under Wood Road along the site boundary before passing northeast through the easternmost part of the site where it is shown to pass under Station Road. This is no longer in use by 1994 though associated infrastructure may remain on site. Two ponds are constructed in the east of the site present from circa 2000, no ponds are recorded on historic mapping in these locations. • Pertinent surrounding features include the Nailstone colliery and Ellistown Brick Works as well as the both the Leicester and Burton on Trent Railway that originally ran to the east of site north/south and the Mineral Railway that ran across the northern edge of site. From the mid-2000s residential development took place to the southeast of site within Bagworth village. • The Groundsure report records the southeast of the site to comprise ‘infilled ground’, likely to be in association with the former Bagworth Brick works/clay pit. There is a moderate risk of compressibility and uneven settlement within the area of artificial ground. There are also records of large areas of Made Ground and Landscaped Ground within 10-500m of site • The site, along the western and northern boundary, is shown to be underlain by the Oadby Member – Diamicton (Secondary Undifferentiated Aquifer), recorded in the order of approximately 9-18m in BGS boreholes. The solid geology beneath the site is shown to be the Edwalton Member – Mudstone (Secondary B Aquifer), part of the Sidmouth Mudstone Formation. The Edwalton Member is underlain by Coal Measures which are recorded on nearby BGS boreholes recorded from between 85-120m bgl. • The site is not with a Source Protection Zone. There are no potable water abstractions within 2km of the site, and no non-potable abstractions within 1km. The nearest surface water feature is an unnamed stream 19m SE which forms part of a wider local drainage network, with no flow to nearby significant rivers with 250m. Based upon the site topography it is inferred that groundwater flow direction is towards the southeast. As a result, the controlled waters sensitivity is considered to be low. • There is the potential for land infilling in the east of the site associated with infilling of the clay pits in the 1960s. There are no active landfills near to site though a number of historical landfill records, active between 1970-1990, are present including 18m west, 25m northwest and 159m east, and licensed waste sites associated with soil production 23m south in circa 2012... The radon designation shows less than 1% of properties above the action Level. • The site is within a Nitrate Vulnerable Zone associated with the River Trent. Two ponds situated to the east of the site are both in use for carp fishing with the northern most being used a fish nursey and the southern pond being actively fished. A Preliminary Ecological Appraisal (PEA) and a Biodiversity Net Gain (BNG) report are currently being prepared by a third party and reference should be made to these documents with respect to ecological considerations. • Coal Authority records indicate the property lies within the potential zone of influence of recorded workings in 9 seam(s) of coal. The most recent underground working in the area was in 1989 and lie between 35 metres and 225 metres. Further liaison with the Coal Authority should be completed about shallow coal mining information contained within the searches.

Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
Anticipated Made Ground in the southeastern area of the site, in association with the former Bagworth Brick and Pipe Works and coal conveyor system.	Metals PAHs pH Hexavalent chromium Acids Alkalis	Direct contact, dust inhalation and ingestion	Future site users (commercial)	Medium	Unlikely	Low Risk
			Adjacent site users (commercial/residential)	Medium	Unlikely	Low Risk
			Construction, site investigation, demolition and future maintenance workers	Medium	Low Likelihood	Moderate / Low Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial/residential)	Medium	Unlikely	Low Risk
		Migration via water pipes	Future site users (commercial)	Medium	Unlikely	Low Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary (Undifferentiated) Aquifer associated with Oadby Member – Diamicton (Secondary Undifferentiated Aquifer)	Mild	Low Likelihood	Low Risk
			Aquifer 2 - Secondary B Aquifer associated with Edwalton Member – Mudstone (Secondary B Aquifer)	Medium	Low Likelihood	Moderate / Low Risk
			Unnamed inland river located approximately 19m southeast	Medium	Low Likelihood	Moderate / Low Risk
	TPH / BTEX / MTBE Phenols	Vapour inhalation, direct contact, dust inhalation and ingestion	Future site users (commercial)	Medium	Unlikely	Low Risk
			Adjacent site users (commercial/residential)	Medium	Unlikely	Low Risk
			Construction, site investigation, demolition and future maintenance workers	Medium	Low Likelihood	Moderate / Low Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial/residential)	Medium	Unlikely	Low Risk
		Migration via water pipes	Future site users (commercial)	Medium	Unlikely	Low Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary (Undifferentiated) Aquifer associated with Oadby Member – Diamicton (Secondary Undifferentiated Aquifer)	Mild	Low Likelihood	Low Risk
			Aquifer 2 - Secondary B Aquifer associated with Edwalton Member – Mudstone (Secondary B Aquifer)	Medium	Low Likelihood	Moderate / Low Risk
			Unnamed inland river located approximately 19m southeast	Medium	Unlikely	Low Risk
	Asbestos	(Dust migration and) dust inhalation	Future site users (commercial)	Medium	Unlikely	Low Risk
			Adjacent site users (commercial/residential)	Medium	Unlikely	Low Risk
			Construction, site investigation, demolition and future maintenance workers	Medium	Low Likelihood	Moderate / Low Risk
Potentially infilled ground located in the southeastern part of the site, in association with the former Bagworth Brick and Pipe Works, and nearby off-site landfills.	Hazardous ground gasses (methane, carbon dioxide, hydrogen sulphide, carbon monoxide and depleted oxygen)	Inhalation (indoor and outdoor)	Future site users (commercial)	Severe	Unlikely	Moderate / Low Risk
			Adjacent site users (commercial/residential)	Severe	Unlikely	Moderate / Low Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Unlikely	Moderate / Low Risk
		Migration of hazardous ground gases from beneath the site to adjacent sites along services or other preferential conduits	Adjacent site users (commercial/residential)	Severe	Unlikely	Moderate / Low Risk
		Migration of ground gas / explosion	Buildings and services	Severe	Unlikely	Moderate / Low Risk

For definition of the terms used in the qualitative risk assessment, please see Appendix I.

6. FIELDWORK

The information contained in this report is limited to areas of land accessible during the ground investigation within the site boundary, as indicated on the site plan, presented in Appendix A as Drawing No. TE1808-TE-00-XX-GE-DR-003-V02.

Tier Environmental scoped the intrusive ground investigation using guidance presented in:

- BS 10175:2011+A2:2017;
- Land Contamination Risk Management (LCRM) - https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm;
- BS 5930:2015+A1:2020;
- BS EN 1997:2004 and 2007.

Tier Environmental's standard strata description criteria are compliant with the above guidance.

6.1. Scope of Ground Investigation

The ground investigation was conducted over 7 No. days between 28th January and 25th February 2025 and was supervised by a suitably qualified Tier Environmental engineer. Table 6.1 below provides a summary of the exploratory holes completed and rationale. Exploratory hole locations are presented on Drawing No. TE1808-TE-00-XX-GE-DR-003-V02.

Table 6.1 Scope of Ground Investigation and Rationale

Exploratory Hole Type	Exploratory Hole Reference	Exploratory Hole Depths (m bgl)	Rationale
Trial pits	TP01 to TP22	1.60m to 4.30m	To confirm the shallow ground conditions across the site, relatively shallow groundwater presence and rate of inflow, stability of excavations, and to enable shallow soil sampling for geotechnical and geoenvironmental parameters.
Window sample boreholes	WS01 to WS12	2.42m to 5.45m	To confirm the shallow ground conditions across the site, conduct *in situ* geotechnical tests, facilitate soil sampling for geotechnical and geoenvironmental parameters and installation of gas and groundwater monitoring wells.
Hand dug pits	HDP01 to HDP04	0.50-1.20m	To confirm the shallow ground conditions for proposed underground services, and to facilitate soil sampling for geoenvironmental parameters.
Slit trenches	ST05 to ST18	0.60m to 1.50m	To expose, record and survey existing surface water sewer, due to be rerouted.
Dynamic Cone Penetrometer tests (DCP)	DCP01 to DCP04	0.94-0.98m	To obtain CBR values for the proposed access road.

The only constraints encountered during the site works was the presence of overhead power lines and underground land drains. The overhead power lines required the repositioning of WS04 further north.

Table 6.2 Scope of Monitoring Installations

Exploratory Hole Location	Strata Targeted	Slotted Response Zone (m bgl)	Rationale
WS01	Weathered Edwalton Member	1.00 to 3.00	Targeting shallow groundwater monitoring body.
WS05	Weathered Edwalton Member	1.00 to 4.00	Targeting shallow groundwater monitoring body.
WS07	Weathered Edwalton Member	1.00 to 4.00	Targeting slope.
WS12	Weathered Edwalton Member	1.00 to 3.00	Targeting slope.

Trial pits were backfilled with arisings in approximate reverse order and left slightly mounded to allow for future settlement; these are likely to settle below existing ground level with time and be unsuitable for trafficking over.

Depths and accurate descriptions of strata and groundwater observations made during investigation works, together with details of the samples recovered, are presented on the Engineer’s exploratory hole records in Appendix B.

6.2. Geoenvironmental Testing

Sampling and QA/QC protocols are presented in Appendix M. Tier Environmental’s schedule of chemical laboratory testing is presented in Table 6.3.and Table 6.4. The testing was carried out by Element Materials Technology, a UKAS and MCerts (where appropriate for soils analysis) accredited laboratory.

Human Health and Preliminary Waste Classification Laboratory Testing

Based upon the conclusions of the preliminary risk assessment, Tier Environmental scheduled chemical laboratory testing on selected soil samples. The purpose of the testing was to:

- Determine the concentration and spatial distribution of potential contaminants of the topsoil and Made Ground;
- Determine the chemical composition and properties of the shallow natural soils;
- Undertake a *preliminary* soils waste classification.

Table 6.3 Schedule of Chemical Testing for Human Health Risk Assessment and Preliminary Waste Soils Assessment.

Laboratory analysis	Topsoil	Made Ground 1	Made Ground 2	Made Ground 3	Made Ground 4	Weathered Edwalton Member
Tier Environmental soil suite*	9	1	1	1	1	2
Asbestos screen	8		1	1	1	0
Speciated TPH / BTEX / MTBE	9	?	1	1	1	2

*For definition of Tier Environmental analytical suites, please see Appendix M. NA - not applicable.

Controlled Waters Laboratory Testing

Based upon the conclusions of the preliminary risk assessment, Tier Environmental scheduled chemical laboratory testing on selected groundwater samples. The purpose of the testing was to determine the risk to controlled waters.

Table 6.4 Schedule of Chemical Testing for Controlled Waters Risk Assessment.

Laboratory analysis	Groundwater
Tier Environmental groundwater suite*	2
Speciated TPH / BTEX / MTBE	2

*For definition of Tier Environmental analytical suites, please see Appendix M. NA - not applicable.

6.3. Geotechnical Testing

Geotechnical laboratory testing was scheduled by Tier Environmental on selected samples as presented in Table 6.5. The testing was performed by Murray Rix, a UKAS accredited laboratory. Test certificates including details of appropriate testing standards are presented in Appendix E and discussed in Section 8, below.

Table 6.5 Geotechnical Laboratory Testing Schedule.

Test	Stratum type	Number of tests	Rationale
1. General			
Moisture content	Natural Soils (Cohesive Weathered Edwalton Member)	10	a) Assist with the determination of consistency of soil with depth. b) Assess desiccation of soils. c) Suitability of materials for reuse within earthworks.
2. Classification			
Atterberg limit	Natural Soils (Cohesive Weathered Edwalton Member)	10	a) Volume change potential. b) Plasticity assessment (comply with Eurocode 7 description) c) Consistency Index. d) Determine soil type (e.g., clay/silt). e) Use as an empirical guide to soil shear strength
Particle size distribution (wet/dry sieve)	MG5	1	a) Classify soils for earthworks purposes. b) Establish type of soil (comply with Eurocode 7 description).
	Natural Soils (Cohesive Weathered Edwalton Member)	3	
	Unweathered Bedrock (Edwalton Member)	2	
3. Chemical tests			
BRE SD1 suite inclusive of pH, water soluble sulphate, acid soluble sulphate, total sulphur, chloride and nitrate, and magnesium	MG1	1	Determine correct class of concrete for both natural and made ground with specific tests for sites potentially containing sulphides (e.g., pyrites) or at low ph.
	MG2	1	
	MG3	1	
	MG4	1	
	Natural Soils (Cohesive Weathered Edwalton Member)	18	
	Natural Soils (Granular Weathered Edwalton Member)	1	
	Unweathered Bedrock (Edwalton Member)	2	

Test	**Stratum type**	**Number of tests**	**Rationale**
4. Compaction			
2.5 kg rammer dry density/moisture content relationship test	MG5	1	Establish maximum dry density and optimum moisture content of materials to assess suitability for reuse within earthworks
	Natural Soils (Cohesive Weathered Edwalton Member)	10	
	Unweathered Bedrock (Edwalton Member)	1	
Particle density	Natural Soils (Cohesive Weathered Edwalton Member)	5	Used to calculate 0%, 5% and 10% air voids lines on dry density moisture content relationship plots.
	Unweathered Bedrock (Edwalton Member)	1	

7. GROUND CONDITIONS

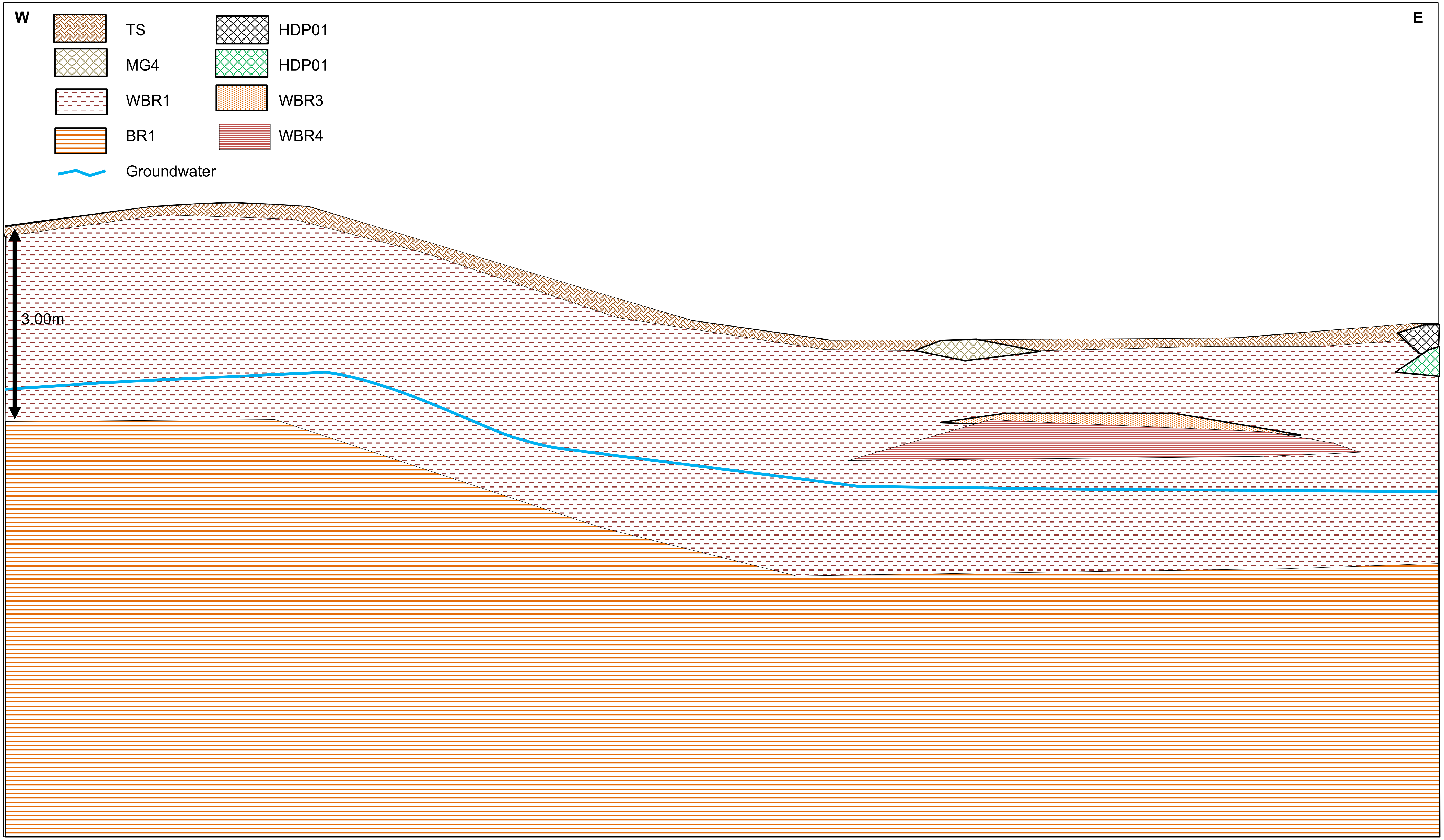
The following section provides a summary of the ground conditions encountered during the ground investigation including strata profile, obstructions and visual / olfactory evidence of contamination. Exploratory hole logs are provided in Appendix B.

7.1. Strata Profile

Figure 7.1 Schematic Drawing of Ground Conditions

presented below provide a schematic summary of the ground conditions beneath the site. The distinct populations of strata identified have been numbered and correspond with the more detailed descriptions below.

Figure 7.1 Schematic Drawing of Ground Conditions



7.2. Strata Descriptions

Possible Made Ground – MG1

Locations encountered	TP02
Depths encountered from top of stratum (range)	0.26m to 0.38m bgl
Depths encountered to base of stratum (range)	0.70m bgl
Thickness (range)	0.32m to 0.44m
Spatial location on site	Localised, half way along the proposed access road in the east
General description	Brown silty gravelly clayey Sand with quartzite, chert and carbonaceous mudstone. Localised Possible Made Ground potentially associated with the former brick works.

Made Ground – MG2

Locations encountered	TP21
Depths encountered from top of stratum (range)	0.44m bgl
Depths encountered to base of stratum (range)	0.70m bgl
Thickness (range)	0.26m
Spatial location on site	Localised, western portion of proposed access road in the east. Localised Made Ground possibly associated with the former brick works.
General description	Black sandy Silt with coal, carbonaceous mudstone and slate.

Made Ground – MG3

Locations encountered	WS06
Depths encountered from top of stratum (range)	0.45m bgl
Depths encountered to base of stratum (range)	0.85m bgl
Thickness (range)	0.40m
Spatial location on site	Localised, near to the western portion of the proposed access road in the east.
General description	Stiff yellowish brown Clay, encountered overlying gravel of dolerite, suggesting an underground drain.

Made Ground – MG4

Locations encountered	WS10
Depths encountered from top of stratum (range)	Ground level
Depths encountered to base of stratum (range)	0.75m bgl
Thickness (range)	0.75m
Spatial location on site	Localised, in the southern part of the site.

General description	Dark brown mottled red brown Clay with chert, quartzite, brick, slate, coal and mudstone.

Topsoil – TS

Locations encountered	TP01, TP02, TP04-TP20, TP22, WS01-WS05, WS07-WS09, WS11, WS12
Depths encountered from top of stratum (range)	Ground level
Depths encountered to base of stratum (range)	0.20m to 0.70m bgl
Thickness (range)	0.20m to 0.70m
Spatial location on site	Widespread across the site.
General description	Dark brown gravelly silty Clay with quartzite, siltstone, carbonaceous mudstone and chert.

Weathered Bedrock – WBR1

Cohesive Weathered Edwalton Member	
Locations encountered	TP01-TP22, WS01-WS12
Depths encountered from top of stratum (range)	0.20m to 2.70m bgl
Depths encountered to base of stratum (range)	0.70m to 3.90m bgl
Thickness (range)	0.40m to greater than 4.12m
Spatial location on site	Widespread across the site, reported to be thickest in the north and east.
General description	Orange/red brown/light brown/light grey/green grey/yellow brown sandy silty Clay (sometimes friable) with dolomitic siltstone, mudstone, quartzite, calcite, gypsum, chert and flint.

Weathered Bedrock – WBR2

Granular Weathered Edwalton Member	
Locations encountered	WS06
Depths encountered from top of stratum (range)	4.50m bgl
Depths encountered to base of stratum (range)	Base not proven
Spatial location on site	Localised, near to the western part of the proposed access road to the east.
General description	Loose brown silty Sand.

Weathered Bedrock – WBR3

Weathered Edwalton Member (Siltstone/Sandstone)	
Locations encountered	TP05, TP07, TP08, TP16, TP17, TP20, TP21, WS01, WS02, WS08, WS09, WS12
Depths encountered from top of stratum (range)	0.70m to 2.60m bgl
Depths encountered to base of stratum (range)	1.20m to 2.90m bgl

Thickness	0.10 to 0.65m
Spatial location on site	Widespread across the site, thickest in the south west.
General description	Extremely weak to very weak blue grey/green grey (sometimes dolomitic) Siltstone. In TP07 extremely weak greenish grey Sandstone was encountered.

Weathered Bedrock – WBR4

Weathered Edwalton Member (Mudstone)	
Locations encountered	TP16, TP17, TP20, WS08, WS12
Depths encountered from top of stratum (range)	1.60m to 2.60m bgl
Depths encountered to base of stratum (range)	2.40m to 3.60m bgl
Thickness (range)	0.25m to 1.45m
Spatial location on site	In the adjacent field to the south and the south western corner.
General description	Extremely weak red brown Mudstone

Bedrock – BR1

Edwalton Member (Siltstone, Mudstone and Sandstone)	
Locations encountered	TP03-TP09, TP12-TP14, TP16-TP17, TP19, TP20, TP22, WS01, WS03, WS04, WS08, WS11 and WS12
Depths encountered from top of stratum (range)	1.20m to 3.90m bgl
Depths encountered to base of stratum (range)	Base not encountered
Spatial location on site	Widespread across the site
Description of dip	Horizontal bedding was observed in the weathered profile in TP20 and as gradually dipping north in TP09, also in the weathered profile.
General description	Generally extremely weak to very weak green grey/blue grey/light grey (sometimes dolomitic) Siltstone. In TP19, WS08, WS09, WS10, the bedrock was extremely weak red brown and black Mudstone. In TP21 the bedrock was weak yellow brown Sandstone.

7.3. Route of Proposed Foul Sewer

Additional hand excavated pits (HDP01 to HDP04) were completed along the line of a proposed foul line in the east of the site.

HDP01 to HDP04 recorded similar soils of a dark brown gravelly Clay with quartzite, glass and flint to circa 0.25m bgl and a black clayey Sand with coal, brick, clinker and charcoal ash to between 0.55m and 0.75m bgl over natural Clays. Natural soils were only confirmed in HDP01. HDP02 and HDP03 also recorded cobbles of concrete at shallow depths, and HDP03 recorded a soft grey clay from 0.55-1.20m bgl.

Soils generally comprised Made Ground and pits were located in the vicinity of where a historic landfill is shown to intersect the site however no soils were identified as distinctly landfill materials.

7.4. Obstructions

The following potential underground services were encountered during the ground investigation works.

Table 7.1 Underground Services Summary Table

Exploratory Hole	Underground Service	Depth (m bgl)	Orientation	Notes
TP05	Land drain	0.45	NE-SW	
TP08	Land drain	0.95	NW-SE	
TP09	Land drain	0.45	NW-SE	
TP10	Drain	0.50	E-W	
TP13	Land drain	0.50	N-S	
TP14	Ballast	0.40	n/a	Ballast encountered therefore extended pit northwards
TP15	Land drain	1.60	N-S	
WS06	Ballast	0.85	n/a	

7.5. Buried Services

A sewer line runs through the centre of the site and was subject to targeted slit trenching 9ST05 to ST18) to expose and survey in the route. This survey is summarised in a separate report.

7.6. Visual and Olfactory Evidence of Contamination

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

7.7. Groundwater Observations During Fieldwork

Table 7.2 below provides a summary of the groundwater observations during the fieldworks. Further information of groundwater observed is presented in the exploratory hole logs in Appendix B.

Table 7.2 Field Observations of Groundwater.

Exploratory hole	Strike (m bgl)	Formation	Observations
TP01	1.30	Cohesive Weathered Edwalton Member	Observed as a slight seepage. This groundwater is considered to be continuous and perched.
TP02	2.70	Cohesive Weathered Edwalton Member	Observed as a slight seepage.
TP11	1.70	Cohesive Weathered Edwalton Member	Observed as a slight seepage.
	3.80		Observed as a slight seepage.
TP17	2.90 and rose to 2.75 after 40 minutes	Weathered Edwalton Member (Mudstone)	Observed as a moderate ingress initially, with standing water encountered as the pit progressed.
TP19	2.30	Cohesive Weathered Edwalton Member	Observed as a slight seepage.
TP21	0.50	MG2	Observed as a slight seepage.

Exploratory hole	Strike (m bgl)	Formation	Observations
TP22	0.45	Cohesive Weathered Edwalton Member	Observed as a fast ingress.
WS01	3.00	Unweathered Bedrock	Possible shallow groundwater body
WS04	2.00	Cohesive Weathered Edwalton Member	Possible shallow groundwater body
WS07	2.00	Cohesive Weathered Edwalton Member	Possible shallow groundwater body
WS08	2.40	Weathered Edwalton Member (Siltstone)	Possible shallow groundwater body
WS09	2.20	Cohesive Weathered Edwalton Member	Observed as a moderate seepage. Possible shallow groundwater body
WS10	1.00	Former Topsoil Horizon	Possible shallow groundwater body

7.8. Groundwater Monitoring

Table 7.3 below provides a summary of the groundwater monitoring results conducted to date. A total of 4 No. visits have been carried out on 25th February, 10th March, 27th March and 15th April .

Table 7.3 Groundwater Monitoring Results Summary

Exploratory hole	Response Zone (m bgl)	Depth range (m bgl)	Formation	Observations
WS01	1.00 to 3.00	Dry	Bedrock	Well and surrounding area flooded on the first visit – bung removed causing high surface water ingress
WS05	1.00 to 4.00	1.44 to 2.70	Bedrock	None
WS07	1.00 to 4.00	1.38 to 3.71	Bedrock	None
WS12	1.00 to 3.00	2.88 to 3.00	Bedrock	None

8. PRELIMINARY GEOTECHNICAL ASSESSMENT

A preliminary geotechnical assessment will be included in the final version of this report.

8.1. Determination of pH and Water-Soluble Sulphate

Consideration of Chloride and Nitrate

In accordance with BRE SD1 for ground suspected of containing mineral acids of industrial origin, a determination must be made as to whether Chloride (Cl) and Nitrate (NO3) need to be analysed. In the event that they do, and elevated concentrations of Cl and NO3 are reported, this may indicate that hydrochloric and nitric acids (HCl and HNO3) are present. The effect of these acids on concrete is likely to be similar to that of sulfuric acid; so, for classification purposes, their chemically equivalent sulphate concentration should be calculated and added to any actual soluble sulphate present (as SO4 mg/l) in the respective samples: SO4 equivalent of Cl = Cl x 1.35mg/l SO4 equivalent of NO3 = NO3 x 0.77mg/.l

Firstly a determination has been made as to whether a significant number of reported pH values are lower than pH 5.5. If they are, then amounts of chloride and nitrate (NO3) should also be determined (in mg/l) in addition to sulphate content.

The conclusion of this assessment is that a significant number of pH values are **not** lower than pH 5.5 and so no further consideration of Chloride (Cl) and Nitrate (NO3) needs to be conducted.

Consideration of Magnesium Levels

In accordance with BRE SD1, when the water soluble sulphate concentration or groundwater sulphate concentration is greater than 3000mg/l, an additional consideration of the level of magnesium is required.

In this instance, no reported concentrations of water soluble sulphate or sulphate in groundwater have been reported above 3,000mg/l and therefore no further consideration of magnesium has been made.

In accordance with BRE SD1, there is no need to take magnesium levels into account for natural ground – the ‘m’ suffix Design Sulphate Classes only apply to brownfield locations. This is because, in natural ground conditions in the UK, magnesium levels are invariably well below values that may significantly affect concrete.

Sulphide Bearing / Pyritic Ground Assessment

In accordance with ‘Concrete in aggressive ground’ Special Digest 1:2005 (Third Edition), Tier Environmental has first sought to establish whether the site lies within an area where pyrite bearing natural ground exists that could result in additional sulphate being converted from sulphides (particularly pyrite) during enabling works, earthworks and/or construction activities.

Firstly, the site location has been plotted on the extracted figure from BRE SD1 that shows the Principal Sulphate and Sulphide Bearing Strata in England and Wales, as shown on Figure 8.1 below.

Figure 8.1 Site Location Plotted on Principal Sulphate and Sulphide Bearing Strata in England and Wales (Extracted from BRE SD1)

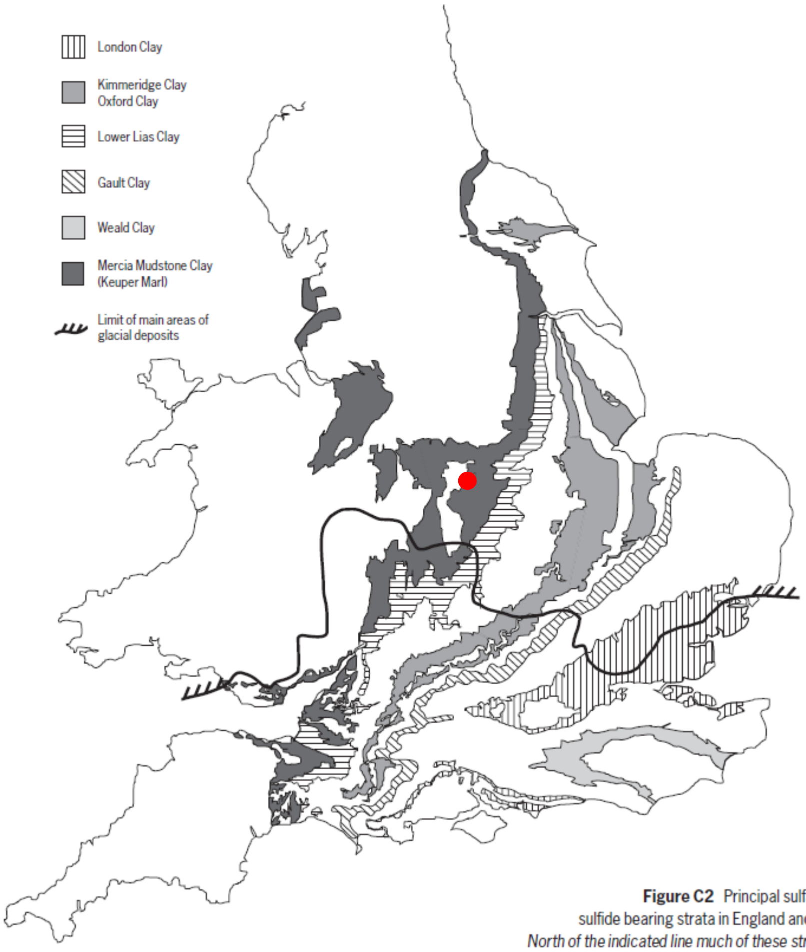


Figure C2 Principal sulfate and sulfide bearing strata in England and Wales
North of the indicated line much of these strata are covered by glacial deposits which, if partly derived from the indicated strata, may also contain sulfates and sulfides

Secondly, an assessment has been made of the site's location relative to coal mining areas of Great Britain on the figure below. This has been done because these represent areas where sulphate bearing coal mining wastes and metal processing slags are most likely to be encountered.

Figure 8.2 Site Location Plotted Relative to Coal Mining Areas of Great Britain (Extracted from BRE SD1)

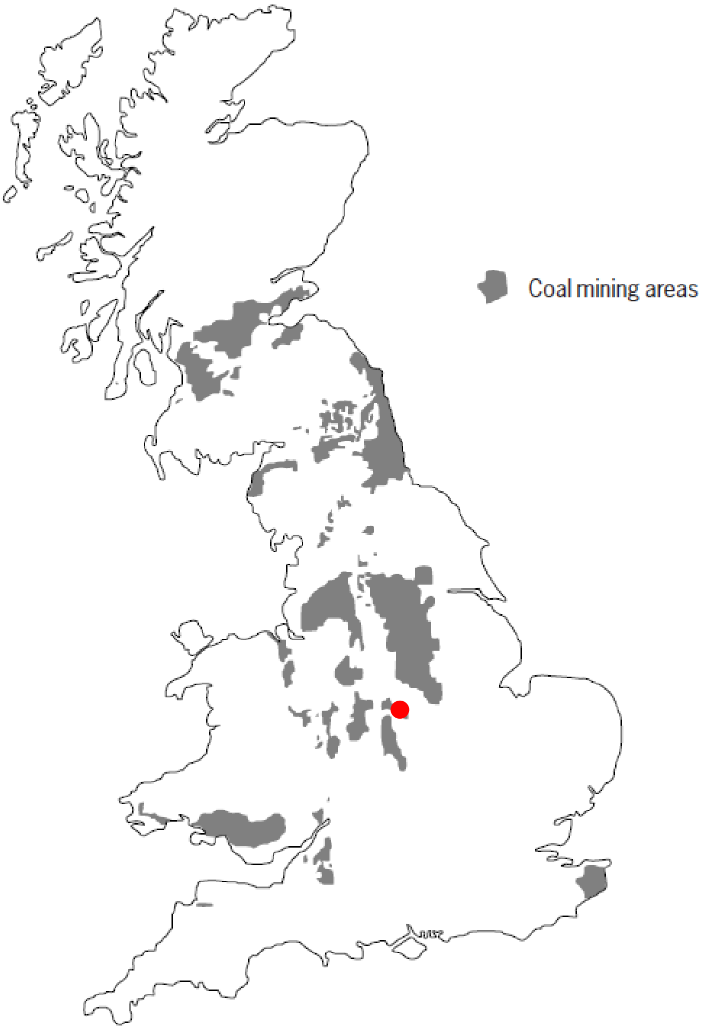


Figure C3 Coal mining areas of Great Britain where sulfate bearing, coal mining wastes and metal processing slags are most likely to be encountered

The table below has been developed to determine whether, based on the above assessment whether there is a possibility of sulphides in the ground (e.g. pyritic ground):

Table 8.1 Assessment for Potential Sulphide Bearing (e.g. Pyritic) Ground

Question 1:	**Question 2:**	**Question 3 (only relevant if answer to Question 2 is 'Yes'):**	**Question 4:**	**Conclusion of Assessment for Potential Sulphide Bearing Ground**
From Figure 8.1, Does the Site Lie Within a Principal Sulphate and Sulphide Bearing Area?	**From Figure 8.1, Does the Site Lie North of the Black Line Indicating Extent of Glacial Deposits ?**	**Is it considered that the Glacial Deposits beneath the Site are Derived from Principal Sulphate and Sulphide Bearing Strata (even if the answer to Question 1 is 'No')?**	**From Figure 8.2, Does the Site Lie Within a Coal Mining Area?**	
Yes	Yes	Yes	Yes	The conclusion of the assessment is that there **is** the potential for sulphide (e.g. pyritic) bearing ground and further assessment of this is required in accordance with BRE SD-1.

Oxidisable Sulphides Calculation

The table below has been prepared in order to further assess, based on the laboratory data, whether there is likely to be pyrite present which may oxidise if the ground is disturbed:

Table 8.2 Oxidisable Sulphides Calculations

Exploratory Hole Location	**Depth (m bgl)**	**Total Sulphur (TS) Concentration (%)**	**Calculated Total Potential Sulphate (TPS) (%)***	**Acid-Soluble Sulfate (AS) Concentration (%)**	**Calculated Oxidisable Sulphides (OS) (%)#**
Made Ground					
TP02	0.40	0.01	0.03	0.01	0.02
TP21	0.50	0.24	0.72	0.06	**0.66**
WS06	0.50	0.01	0.03	0.01	0.02
WS10	0.50	0.04	0.12	0.04	0.08
HDP01	0.50	0.22	0.66	0.04	**0.62**
HDP02	0.50	0.35	1.05	0.47	**0.58**
HDP03	1.00	3.3	9.9	0.18	**9.72**
Bedrock					
TP13	0.50	0.02	0.06	0.01	0.05
TP12	0.80	0.02	0.06	0.02	0.04
TP11	0.70	0.01	0.03	0.01	0.02
TP19	1.00	0.02	0.06	0.02	0.04
TP08	0.40	0.03	0.09	0.02	0.07
TP08	2.00	0.01	0.03	0.03	0
TP07	0.60	0.04	0.12	0.04	0.08
TP10	1.15	0.02	0.06	0.02	0.04
TP15	0.70	0.02	0.06	0.01	0.05
TP06	2.20	0.01	0.03	0.01	0.02
TP09	0.80	0.02	0.06	0.01	0.05
TP04	0.60	0.02	0.06	0.01	0.05

Exploratory Hole Location	Depth (m bgl)	Total Sulphur (TS) Concentration (%)	Calculated Total Potential Sulphate (TPS) (%)*	Acid-Soluble Sulfate (AS) Concentration (%)	Calculated Oxidisable Sulphides (OS) (%)#
TP05	0.40	0.02	0.06	0.02	0.04
TP20	3.20	0.01	0.03	0.03	0
WS05	1.60	0.01	0.03	0.01	0.02
WS06	4.00	0.01	0.03	0.02	0.01
WS06	5.00	0.01	0.03	0.02	0.01
WS06	1.00	0.01	0.03	0.02	0.01
WS07	3.00	0.02	0.06	0.02	0.04
WS12	1.95	0.01	0.03	0.03	0

Note: * TPS = = 3 x total sulphur (TS % S). # OS = TPS - AS

Conclusion

A determination has been made as to whether the calculated Oxidisable Sulphides (%) are “*greater than 0.3% for a significant number of samples*”, in accordance with BRE SD1. The conclusion of this assessment is that a significant number of samples are **not** in excess of 0.3% with respect to calculated Oxidisable Sulphides (%).

This does **not** indicate the presence of pyrite (which would otherwise oxidise if ground were disturbed) and in which case the design sulphate class may be determined solely on soil and groundwater sulphate concentrations and pH in accordance with BRE SD-1.

However, a number of Made Ground samples in the vicinity of HDP01 to HDP03 ***are*** in excess of 0.3% and there total potential sulphate should be taken into consideration.

Design Sulphate Classification

Representative samples of the soils and groundwater encountered during the Tier Environmental ground investigations, were tested to determine their pH and concentrations of water-soluble sulphate (SO_4^{2-}). The results are presented in Appendix C and Appendix D and summarised in Table 8.3 below. It is assumed that the site is a ‘brownfield’ site, and the groundwater is ‘mobile’ in accordance with BRE SD1.

The conclusion of the assessment is that a DS-2 and ACEC Class AC-3z should be adopted for Made Ground, however this is being driven by localised elevated sulphates, and low pH in 1 No. location (HDP02) in the south east of the site within an area of proposed sewer realignment. A DS-1 and ACEC Class AC-1 may be more appropriate for buried concrete design purposes within Made Ground elsewhere on site, and a DS-1 and ACEC Class AC-2z should be considered for natural ground driven by low pH values, with due consideration of the sub-sections above (which include consideration of chloride, nitrate, magnesium and potential for sulphide bearing (e.g. pyritic) ground).

Whilst no evidence of gross hydrocarbon contamination has been observed at the site, it is a concrete specialist should review the TPH results and ground conditions summary within this report to ensure appropriate concrete design against retardation / degradation due to hydrocarbons.

Table 8.3 Results of Soil pH Testing and Water-Soluble Sulphate Determination

Exploratory Hole Location	Depth (m bgl)	pH	Water-soluble sulphate (mg/l)	Design sulphate class	ACEC sulphate class
TOPSOIL					
TP11	0.10	6.42	7.6	5-9 No. results so mean of the highest two values	<10 No. results so lowest value used as the characteristic value:
TP19	0.10	8.34	8.6		
TP20	0.20	6.61	9.6		

Exploratory Hole Location	Depth (m bgl)	pH	Water-soluble sulphate (mg/l)	Design sulphate class	ACEC sulphate class
TP07	0.20	7.13	2.2	used as characteristic value: **9.5mg/l DS-1**	**6.45 AC-1**
TP10	0.10	6.97	9.4		
TP06	0.20	6.73	3.2		
TP09	0.20	7	5.3		
TP01	0.10	6.79	3.9		
MADE GROUND					
TP03	0.10	6.9	10	5-9 No. results so mean of the highest two values used as characteristic value: **788mg/l DS-2**	<10 No. results so lowest value used as the characteristic value: **4.39 AC-1 AC3z**
TP02	0.40	6.96	4.7		
TP21	0.50	7.29	20.6		
WS06	0.50	7.4	6.7		
WS10	0.50	7.94	33.9		
HDP01	0.50	7.57	18.6		
HDP02	0.50	4.39	1009		
HDP03	1.00	8.79	568		
HDP04	0.40	7.7	31		
BEDROCK					
TP13	0.50	7.64	9.9	>10 No. results so mean of the highest 20% of values used as the characteristic value: **36.2mg/l DS-1**	>10 No. results so mean of the lowest 20% of values used as the characteristic value: **5.49 AC2z**
TP12	0.80	7.88	56.8		
TP11	0.70	7.3	17.5		
TP19	1.00	5.12	21.7		
TP08	0.40	7.21	10		
TP08	2.00	8.13	17		
TP07	0.60	7.2	7.8		
TP10	1.15	5.09	28.8		
TP15	0.70	7.14	8		
TP06	2.20	6.27	14.7		
TP09	0.80	7.66	7.8		
TP04	0.60	7.91	23.1		
TP05	0.40	8.38	9.3		
TP20	3.20	8.5	10		
WS05	1.60	6.88	20.4		
WS06	1.00	7.06	28		
WS06	4.00	7.03	26		
WS06	5.00	7.51	39		
WS07	3.00	7.6	20		
WS12	1.95	8.24	20		
GROUNDWATER					
WS05	n/a	7.68	27	**DS-1**	**AC-1**
WS07	n/a	7.33	94		

ACEC - Aggressive Chemical Environment for Concrete (see BRE, 2005).

8.2. Geotechnical Parameters

The data obtained during the Ground Investigation has been assessed for the recorded soil and rock types in order to provide characteristic values in order to aid the final foundation design.

Soil Classification

Cohesive Soils

A total of 9 No. samples of weathered bedrock were submitted for Moisture content and Atterberg Limit testing. Results are summarised in Table 8.4 below.

Table 8.4 Soil Classification Test Results

Location	Depth (m bgl)	MC (%)	LL (%)	PL (%)	PI (%) (Mod.)	Class	Volume Change Potential	Consistency Index
TP14	2.00	18.2	34	16	16.3	Low	Low	0.86
TP13	1.70	17.1	36	15	18.4	Medium	Low	0.90
WS02	1.20	20.5	38	19	15.2	Medium	Low	0.92
WS03	1.20	17.3	37	17	17.0	Medium	Low	0.98
WS04	1.20	15.5	38	15	17.4	Medium	Low	0.97
WS05	1.20	17.8	36	16	16.6	Medium	Low	0.91
WS10	2.00	29.2	47	23	22.8	Medium	Medium	0.74
WS12	1.20	15.2	40	14	23.9	Medium	Medium	0.95
WS07	3.00	19.5	33	15	15.6	Low	Low	0.75
WS09	1.20	16.1	39	13	24.4	Medium	Medium	0.88

ND - Not determined; MC - Moisture content, LL - Liquid limit, PL - Plastic limit, PI - Plasticity index.

Consistency index (CI) is obtained from Atterberg limits and used as a scientific means of determining consistency of clays over and above an engineer merely sticking a thumb in (CI = (mc-LL)/PI)) using unmodified PI).

Results indicated soils are of generally medium, locally low, plasticity but would be classed as having a generally low and worst case medium volume change potential.

Granular Soils

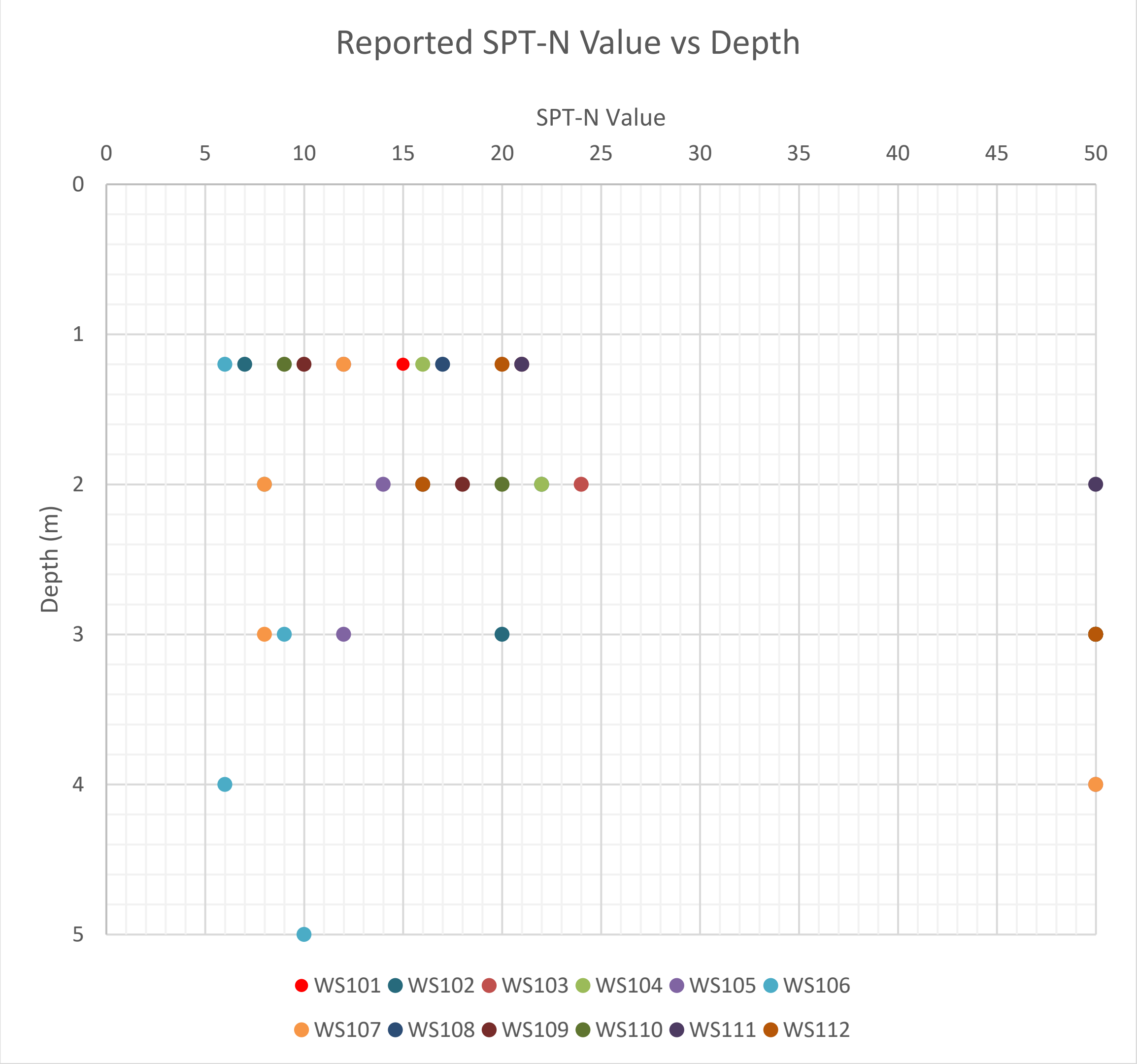
A total of 6 No. Particle Size Distribution tests were completed on the shallow weathered bedrock soils to determine classification in accordance with MCHW Series 600 Table 6. Results are summarised below and suggest results could be used as general cohesive fill.

Location	Depth (m bgl)	Soil	MCHW Class
TP20	3.20	Silty slightly sandy gravelly CLAY	2C, 7A
TP03	0.40	Silty sandy slightly gravelly CLAY	2A, 2B, 7A
TP02	0.40	Silty sandy gravelly CLAY	2C, 7A
WS12	1.95	Silty slightly sandy gravelly CLAY	2C, 7A
WS07	1.20	Silty slightly sandy slightly gravelly CLAY	2A, 2B, 7A
WS08	1.00-1.45	Silty very sandy CLAY	2A, 2B, 7A

Standard Penetration Testing

Standard Penetration Tests (SPT) were carried out in all of the boreholes. The results of Standard Penetration Tests undertaken across site at 1.20m bgl range from N=6 to N-=21 indicating soft to stiff cohesive soils; locations WS106, WS102 and WS110 recorded the lowest values. Strength generally increase with depth though WS106 recorded a week profile throughout not exceeding N=10 and suggesting perhaps a deeper weathering profile of the bedrock in this location. This hole falls beyond the proposed building footprint. WS02 is the only location with a lower N value at 1.20m of N=7 which falls in the footprint, though is within an area that will be subject to cut and therefore the true founding depth will likely be closer to 2m bgl. A number of locations refused (N=>50) within shallow bedrock between 2m-4m bgl.

Figure 8.3 SPT N value vs reduced depth



Foundation Recommendations

The site is underlain by topsoil across the majority of the site. Localised Made Ground was recorded in TP02, TP03, TP21 and WS06 in the east of the site, and WS10 in the south, to depths of up to 1.00m bgl. Further Made Ground was recorded in HDP01 to HDP04 in the east of the site to circa

0.75m bgl. Natural soils of weathered Edwalton Member bedrock were recorded in all locations as generally either a stiff Clay or very weak Siltstone. Localised softer clays were encountered in WS02 on the western edge of the proposed footprint, TP11 from 2.60m, WS04 and WS09.

The site will be subject to a significant degree of reprofiling with a small area of cut in the southwest and extensive fill, from 0.50m up to 5.0m, across the remainder of the site towards the northeast. With this in mind, it is likely that foundations in the southwest of the building (WS01, WS08, TP13) will be sited directly onto the weathered bedrock at circa 1m bgl, with pads designed for bearing capacities of 85kPa (for the firm clays), 170kPa for the stiff clays and 240kPa for the siltstone. Table 8.5 below provides ground conditions for the site taking into account cut or fill levels and provides shear strengths where applicable.

Table 8.5 Ground Conditions Across Building Footprint

Location	Footprint Area	Cut/Fill (m)	Shear Strength at 1.00m below formation level (kPa)	Eestimated Bearing Capacity 1.00m below formation level (kPa)
WS02	West	-0.125 to +1.25m	40	60
WS08	West	-2.87 to -1.25m	Bedrock	>240
WS01	West	-4.25 to -2.87m	Bedrock	>240
WS03	North	+1.25 to +2.65	Fill greater than 1.0m	50-75
WS05	North	+1.25 to +2.65	Fill greater than 1.0m	50-75
WS11	East	+1.25 to +2.65	Fill greater than 1.0m	50-75
WS04	South	-0.125 to +1.25m	82	120
WS09	South	-1.50 to -0.125m	88	120
TP06	External hardstanding	-0.125 to +1.25m	100	N/A
TP15	External hardstanding	-0.125 to +1.25m	100	N/A
TP211	External hardstanding	-1.50 to -0.125m	200	N/A
WS10	External hardstanding	-1.50 to -0.125m	100	170

Areas of fill in the north and east of the building could be reengineered to facilitate bearing, for possibly 50kPa to 75kPa dependent on compaction, but given the localised softer clays encountered across site and to achieve higher bearing capacities (to reduce pads sizes) and reduce total and differential settlements, alternative measures may need to be considered, including lime/cement stabilisation of the engineered. There is also a potential for differential settlements across transition zones between bedrock and engineered fill which should be taken into consideration with foundation and floor slab designs.

Alternatively, and in light of the variability of the ground conditions at anticipated founding depths, the proposed regrading works and to minimise foundation sizes, vibro stone columns or Controlled Modulus Columns/rigid inclusions could be considered by the contractor dependent on wider commercial considerations. This would bear through the engineered fill and into the underlying soils where soft clays are present.

Bearing capacities for the foundations and floor slab should be subject to verification testing during earthworks. Consideration should also be given to slope stability for the design angles of proposed slopes. An Earthworks Specification will be required and all re-engineered soils should be emplaced in accordance with MCHW Series 600.

8.3. Floors

A ground bearing floor slab should be suitable for the development subject to proof rolling, the removal of any soft spots and localised deeper Made Ground which may be encountered, and implementation of a suitable capping layer to the desired specification.

8.4. Earthworks

The laboratory compaction tests undertaken during the recent ground investigation were assessed by comparing the results against criteria commonly used in earthworks to achieve an adequate density for engineered fills. The criteria indicate whether the samples could achieve in excess of 95% of Maximum Dry Density (MDD – a requirement often included in highways specifications) and whether they could be compacted to less than 5% air voids ratio.

Subject to screening, crushing (unlikely to be required) and other suitability considerations, the natural and Made Ground should be suitable for use as an engineered fill.

The suitability for compaction is highly dependent on the initial moisture content. Table 8.6 below indicates that some conditioning of the Till material will be required during the enabling works to reduce the moisture content. Where granular soils are to be reused as an engineered fill, it would be sensible to subject them to a confirmatory testing regime where they are required to achieve a compaction specification as an engineered fill.

Table 8.6 Summary of Compaction Test Results

Sample Reference and depth (m bgl)	Material description	Natural Moisture Content (NMC) (%)	Optimum Moisture Content (OMC) (%)	Maximum Dry Density (MDD) (Mg/m3)	Moisture Content at 95% MDD	Conditioning Required Prioir to Reuse?
TP14 2.00	Stiff sandy Clay.	18.2	19	1.79	21.7	No conditioning required
TP13 1.70	Stiff slightly gravelly sandy Clay.	17.1	18	1.77	21.3	No conditioning required
TP11 1.50	Stiff Clay	17.5	18	1.81	21.2	No conditioning required
TP19 3.00	Firm slightly gravelly Clay.	18.8	17	1.82	20.0	Yes – decrease moisture content
TP20 3.20	Siltstone (recovered as stiff clay)	18.4	17	1.84	20.0	No conditioning required
TP10 1.15	Stiff Clay	23.4	17	1.78	19.7	Yes – decrease moisture content
TP15 0.40	Stiff slightly gravelly sandy Clay.	18.7	19	1.80	22.2	No conditioning required
TP06 0.30	Stiff slightly gravelly sandy Clay.	20.3	15	1.78	19.0	Yes – decrease moisture content
TP01 0.40	Stiff slightly gravelly sandy Clay.	23.0	17	1.77	20.7	Yes – decrease moisture content
TP02 0.40	Possible Made Ground: Silty gravelly clayey Sand	14.0	16	1.81	19.3	Yes – increase moisture content
WS07 1.20	Firm slightly gravelly sandy Clay	21.3	16	1.88	19.4	Yes – decrease moisture content
WS06 1.00	Soft sandy Clay	16.5	16	1.88	17.2	No conditioning required

Conditioning by means of windrows or lime/cement binders are likely to be required as the natural moisture contents for several samples are close to the upper limit of the anticipated acceptance envelope. The addition of lime/cement binders will also increase the bearing capacity of proposed floor slabs and could also reduce the importation of stone/hardcore for external hardstanding areas and highways.

8.5. Groundworks, Excavation Stability and Groundwater Dewatering

In our opinion, there should be no particular difficulties in excavating the strata indicated in the boreholes utilising an appropriate and suitably sized mechanical excavator. Excavations into existing Made Ground and the underlying natural soils should be assumed to be unstable. No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 097 (1983) should be made to establish suitable means of support or battering of excavation sides.

It is recommended that all excavations to greater than 1.20 metres depth, or for shallower excavations where groundwater is encountered above this level are closely supported, especially where man entry is required. Alternatively, where space permits, the excavations might be battered back to an appropriate angle. Standing groundwater levels of between 1.38m and 2.88m were encountered in the boreholes during monitoring, with localised shallow seepages at 0.50m bgl. Should groundwater seepages occur, and water accumulate in shallow excavations it should be able to be removed by pumping from a filtered sump. However, groundwater control by more robust means, such as well pointing, may be required locally.

It should be noted that should deep footings be constructed as part of the development then we would recommend that the standpipes are monitored for groundwater levels for an extended period of time and take into consideration seasonal variations and periods of very wet weather to measure the fluctuation of the standing water levels. It should be noted that groundwater inflows and levels are likely to be subject to seasonal and climatic variations.

8.6. Pavements and Highways

A total of 4 No. Dynamic Cone Penetrometer (DCP) tests were completed along the proposed route of the access road in the east of the site. DCPs were completed adjacent to trial pits for confirmation of the soil profile.

All results recorded generally low CBR values of <5%, with some >5% in DCP01 from 0.45m bgl, DCP02 between 0.28m and 0.40m, and DSCP04 at 0.45m and 0.70m bgl. The highest values were recorded in DCP01 with generally consistently low values recorded in DCP03. Given the presence of CBR values of <2.5%, in accordance with the Department for Transport Interim Advice Note 73/06 these are considered unsuitable for pavement foundations and must be improved likely by removal and replacement of soil. The road will be subject to a degree of fill, and the depths of CBR values should be considered against proposed new levels.

Table 8.7 Dynamic Cone Penetrometer Testing Results

Depth (m bgl)	Equivalent CBR (%) Range
0.20-0.45	1.90-6.50
0.45-0.60	2.02-5.87
0.60-0.80	1.43-6.71
0.80-1.00	1.43-6.25

CBR values derived using this method are for preliminary assessment purposes only and should not be used for detailed design purposes. Once the design layout is known and demolition/remediation is complete, then *in situ* testing with plate bearing tests should be carried out to confirm CBR values.

9. HUMAN HEALTH RISK ASSESSMENT

Results of chemical analysis are presented in full in Appendix C. Groundwater results will be included in the final report

9.1. Data Interpretation Approach

The analytical data obtained were reviewed for completeness and consistency. The data for each sample type was then compiled, screened against the Generic Assessment Criteria (GACs) for a commercial/industrial land use and those potential contaminants of concern which were found to exceed the GACs were then subjected to detailed analysis as described below.

Previously, it was possible for results from soil (and leachate) samples to be subject to statistical assessment in accordance with a 2008 guidance document (CL:AIRE / CIEH Guidance on Comparing Soil Contamination Data with a Critical Concentration). This guidance has now been withdrawn and replaced with the following document:

- Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration (CL:AIRE 2020)

The purpose behind statistical assessment is ultimately to determine whether concentrations of contaminants are at levels that present potential risk to the future site users (and the wider environment if the statistical assessment is conducted on leachate test results).

The new guidance places even greater emphasis and reliance on the desk study being carried out first, appropriately detailed sampling strategies, collection and testing of samples for contamination and use of appropriate screening criteria.

The guidance requires an increased number of criteria to be met before a robust statistical assessment can be conducted and introduces the principle of the Central Limit Theorem (CLT); a key tool of statistics that is used in the comparison of confidence intervals with the critical concentration. A common ‘rule of thumb’ is that the CLT will apply provided your sample size is between 20 and 50.

On this basis, Tier Environmental considers that statistical assessment in accordance with the CL:AIRE 2020 guidance may not be applied in this instance given that the number of samples obtained is below 20 No. for any given identified soil population.

Due consideration of the ground conditions, distinct identifiable populations of soil and proposed development layout has been undertaken and, where appropriate, laboratory results associated with discrete populations or ‘hotspots’ have been assessed separately.

9.2. Selection of Generic Assessment Criteria (GAC)

In short, for the majority of the contaminants of concern, LQM/CIEH Suitable 4 Use Levels (S4ULs) published in 2015 have been adopted as GACs for a commercial/industrial land use; however, further details on the hierarchal approach for the selection of the GACs used as screening criteria for this assessment is provided in Appendix J.

These values are considered as appropriate screening criteria as they incorporate updated assumption exposures derived for the production of C4SLs but within the context of deriving screening criteria above which assessment of the risks or remedial action may be needed (i.e. within the context of the planning regime rather than Part 2A context for which C4SLs were derived).

For those potential contaminants of concern where the selected GAC is dependent on Soil Organic Matter content (SOM), an assumed SOM of 1% has been selected based on the most conservative approach.

9.3. Human Health Risk Assessment

No measured concentrations of potential contaminants of concern have been reported in excess of the respective GACs protective of human health for a commercial/industrial land use.

Measured Potential Contaminant of Concern Concentrations without Publicly Available GACs

No measured concentrations of potential contaminants of concern have been reported in excess of the laboratory method detection limit for which there are no current publicly available GACs.

Asbestos

Asbestos can be present in soil as fragments of bulk Asbestos Containing Materials (ACMs) (e.g. asbestos cement sheeting) and also as discrete asbestos fibres within the soil matrix. This investigation has carried out assessments to determine whether both bulk fragments and / or fibres are present in the soil at the site. The asbestos assessment commenced on site with inspection of the Made Ground by our suitably qualified supervising engineer for the presence of bulk ACMs.

During the fieldwork no suspected ACMs were identified.

Of the 12 No. of Made Ground samples submitted for asbestos screening, 2 No. were reported to contain asbestos. Those positive identifications are summarised in Table 9.1, below.

Table 9.1 Summary of Asbestos Assessment

Exploratory Hole Location	Depth (m bgl)	Location on Site Description	Soil Population	Asbestos Type	Quantification (% w/w)
Asbestos in Soil Samples					
TP10	0.10	Northwest	Topsoil	Chrysotile fibre bundles	<0.001
WS10	0.50	South	MG4	Chrysotile fibre bundles	0.003

Groundwater

Measured groundwater concentrations have been compared against the SOBRA GACS for a commercial land use for which there are no exceedances.

9.4. Utilities

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection.

9.5. Construction and Maintenance Workers

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

On the basis of the results obtained, the following potential exposure risks to construction and maintenance workers have been highlighted:

- Localised asbestos in Made Ground

As asbestos has been reported at concentrations potentially above 0.001% w/w (i.e. above ‘trace’ levels), the Control of Asbestos Regulations 2012 should be adhered to. A summary of complying with CAR: risk assessments, licensing and training is provided in Appendix O.

The detection of asbestos in WS10 at 0.50m bgl is within a distinct Made Ground population which could be segregated during earthworks and re-used under the building footprint. The asbestos recorded in TP10 is within topsoil. The majority of the Topsoil will be removed from site during the regrading works, with only a small volume retained for reuse in the proposed soft landscaping. Confirmatory asbestos screening of the site wide Topsoil should be undertaken prior to removal from site to confirm suitability for reuse on other development sites.

10.CONTROLLED WATERS RISK ASSESSMENT

10.1. Introduction

In order to assess whether there is a potentially unacceptable risk of pollution of controlled waters, samples of groundwater have been submitted for laboratory chemical analysis as per the summary presented in Table 6.4 within this report. Analytical data from groundwater testing undertaken by Tier Environmental have been evaluated against Water Quality Standard (WQS) values appropriate to the Conceptual Site Model.

In accordance with Part 2A of the Environmental Protection Act 1990, Tier Environmental has made regard to all of the WQS values that are relevant to the site and a judgment has been made against the most stringent of those relevant standards. Further details are provided, along with the approach for selection of TPH / BTEX WQS values, in Appendix K.

In some instances, the laboratory method detection limit is greater than the appropriate WQS value. In these instances, only measured concentrations in excess of the laboratory method detection limit have been considered likely to potentially represent a possible significant risk to controlled waters.

For those potential contaminants of concern for which the WQS values are dependent on hardness (e.g. cadmium EQS values), a hardness will be selected based on the reported values in the groundwater beneath the site.

10.2. Controlled Waters Environment Conceptual Site Model Summary

From a conceptual site model perspective the Oadby Member is Secondary Undifferentiated Aquifer, and the Edwalton Member bedrock is a Secondary B Aquifer, part of the Sidmouth Mudstone Formation. The site is not with a Source Protection Zone and there are no potable water abstractions within 2km of the site, and no non-potable abstractions within 1km. The nearest surface water feature is an unnamed stream 19m SE which forms part of a wider local drainage network, with no flow to nearby significant rivers with 250m. Based upon the site topography it is inferred that groundwater flow direction is towards the southeast. As a result, the controlled waters sensitivity is considered to be low.

10.3. Groundwater Testing

Table 10.1 below summarises the measured concentrations of contaminants of concern from groundwater samples at the site that have been reported in excess of the respective WQS values.

Table 10.1 Summary of Measured Concentrations of Dissolved Phase Groundwater Potential Contaminants of Concern in Excess of WQS Values

Potential Contaminant of Concern	Units	LoD*	WQS	Maximum Concentration	No. samples >WQS	Monitoring Well Location
Cadmium	ug/l	<0.03	0.08	0.12	1 of 2	WS07
Copper	ug/l	<1	1	3	1 of 2	WS07
Nickel	ug/l	<0.2	4	22.7	1 of 2	WS07
Zinc	ug/l	<3	10.9	14	1 of 2	WS07
Fluoranthene	ug/l	<0.005	0.0063	0.02	1 of 2	WS05
Benzo(a)pyrene	ug/l	<0.005	0.00017	0.008	1 of 2	WS05

* LOD= Laboratory Method Limit of Detection

Measured groundwater concentrations of cadmium, copper, nickel, zinc, benzo(a)pyrene and fluoranthene have been reported in excess of the WQS protective of the controlled waters environment by either the same order of magnitude or one orders of magnitude. Given the marginal nature of these exceedances, the potential for significant dilution between the site and any significant surface water features, the absence of any potable/non potable abstractions within close proximity to the site, low sensitivity of the controlled waters environment, and the fact that the site will incorporate buildings / hardstanding and a dedicated drainage system that shall reduce infiltration rates through the soils, these measured concentrations are not considered to present a risk to the controlled waters environment.

The EQS values for fluoranthene and benzo(a)pyrene are derived assuming bioaccumulation in fish and ultimately consumption of the fish by humans which is an exposure scenario that is not viable for this site given the absence of a nearby viable surface water body where this will scenario be realised. Subsequent sensitivity analysis has demonstrated that no measured soil leachate concentrations of fluoranthene and benzo(a)pyrene have been reported in excess of the respective Maximum Allowable Concentrations (MAC) EQS values for Inland Surface Waters Furthermore, the measured concentrations of cadmium and nickel are also below the less conservative MAC EQS values for Inland Surface Waters. As such, and in the absence of viable ‘bioaccumulation in fish and consumption of fish by humans’ scenario, it is therefore considered that the reported soil leachate concentrations of fluoranthene and benzo(a)pyrene do not present a potential risk to the controlled waters environment.

11.GROUND GAS RISK ASSESSMENT

11.1. Introduction

The ground gas risk assessment has been undertaken in accordance with the following guidance:

- BS 8485:2015+A1:2019;
- CIRIA C665, 2007;
- Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide Are Present, NHBC, 2007 (note that this is being withdrawn on 1st July 2025);
- A Pragmatic Approach to Ground Gas Risk Assessment RB17. CL:AIRE, 2012; and,
- Ground Gas Monitoring and 'Worst-Case' Conditions TB17, CL:AIRE, 2018

The ground gas risk assessment has been conducted with full consideration of the viable sources, pathways and receptors discussed in detail in Section 4 and included within the Preliminary Conceptual Site Model presented in Section5.

Ground gas monitoring was conducted in conjunction with groundwater monitoring (and sampling); however, it should be noted during the gas monitoring was conducted first, prior to any groundwater monitoring / sampling works. The monitoring well locations and construction were designed with due consideration of the proposed development layout and preliminary conceptual site model. Further information pertaining to monitoring wells is provided in Table 6.2.

11.2. Groundwater Conditions

BS 8576:2013 states *"Where practical and reasonable, the response zone for permanent gas monitoring wells should be located in an unsaturated zone. (Such a zone might exist below perched water tables and could form a migration pathway.) This is subject to intercepting all potential gas sources. For example, peat layers in alluvium might be below the groundwater table but pockets of gas can be trapped within the peat. In this case, it would be desirable for the well to penetrate below the groundwater. If there is doubt, it is useful to install wells with response zones above and below the water table."*

Each well was installed to capture a shallow groundwater body and target ground gases. Monitoring has recorded groundwater in 3 No. wells between 1.38m and 3.71m bgl (and a flooded well) and therefore each well has a response zone within an unsaturated zone.

11.3. Gas Monitoring Data Quality

The calibration certificate for the Geotech GA5000 unit used on site for the reported gas monitoring results in Appendix F, is also provided in Appendix F. Field checks were conducted to ensure accuracy during the monitoring events. The locations for the monitoring wells are considered adequate to assess the current ground gas regime.

Flow rates and gas concentrations were allowed to fully stabilise during the monitoring.

11.4. Ground Gas Monitoring Results

The full ground gas monitoring results from the installations are presented in Appendix F and summarised below:

Table 11.1 Ground Gas Monitoring Results Summary –4 No. Visits of Proposed Monitoring Programme of 4 No. Visits

Strata Targeted by Response Zone	Monitoring Well Reference	Maximum peak gas flow rate (l/h)	Maximum steady state gas flow (l/h)	Maximum peak CH_4 (%v/v)	Maximum steady state CH_4 (%v/v)	Maximum peak CO_2 (%v/v)	Maximum steady state CO_2 (%v/v)	Lowest O_2 recorded (%v/v)
WB	WS01	**-0.1**	***0.1***	***0.1***	***0.1***	1.5	1.5	**5.9**
WB	WS05	-0.3	*0.1*	*0.1*	*0.1*	2.3	2.3	17.6
WB	WS07	-0.1	*-0.1*	*0.1*	*0.1*	**4.2**	**4.2**	13.3
WB	WS12	-0.1	*-0.1*	*0.1*	*0.1*	2.1	2.1	7.8

Bold = maximum value reported across all visits.

For information: gas analyser instrument limits of detection are as follows: Methane 0.1% v/v, Carbon Dioxide 0.1% v/v, Oxygen 0.1% v/v, Hydrogen Sulphide 1ppm, Carbon Monoxide 1ppm and flow rate 0.1 l/hr

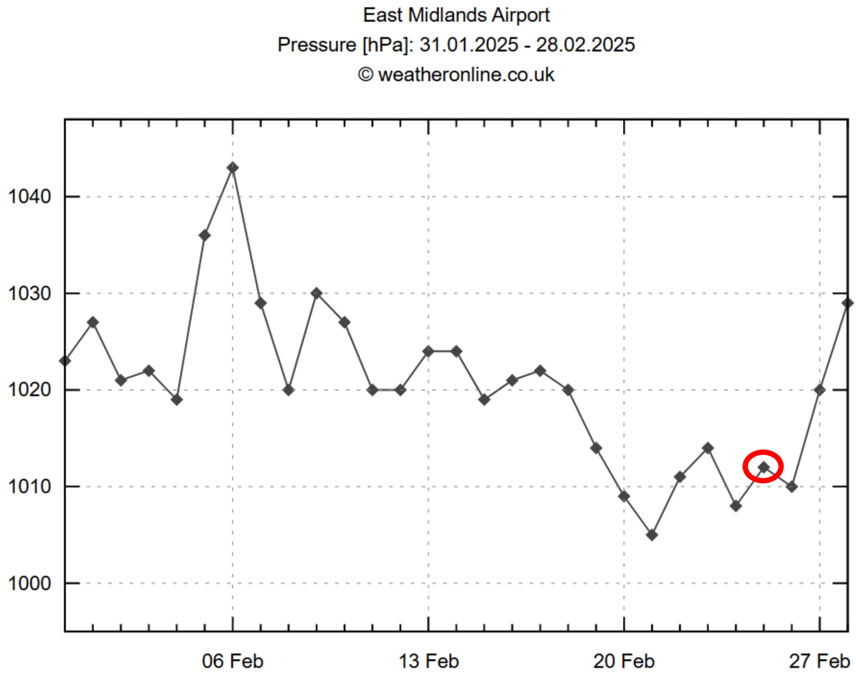
11.5. Ground Gas Risk Assessment

Section 4.2 of this report demonstrates how, in accordance with CIRIA C665, the periods and frequency of monitoring have been selected for the site.

The total atmospheric pressure range of the ground gas monitoring data included in this report was between 975 mbar and 997 mbar. This range covers low (<1000 mbar) atmospheric pressures. Monitoring events included periods of falling and rising pressure trends.

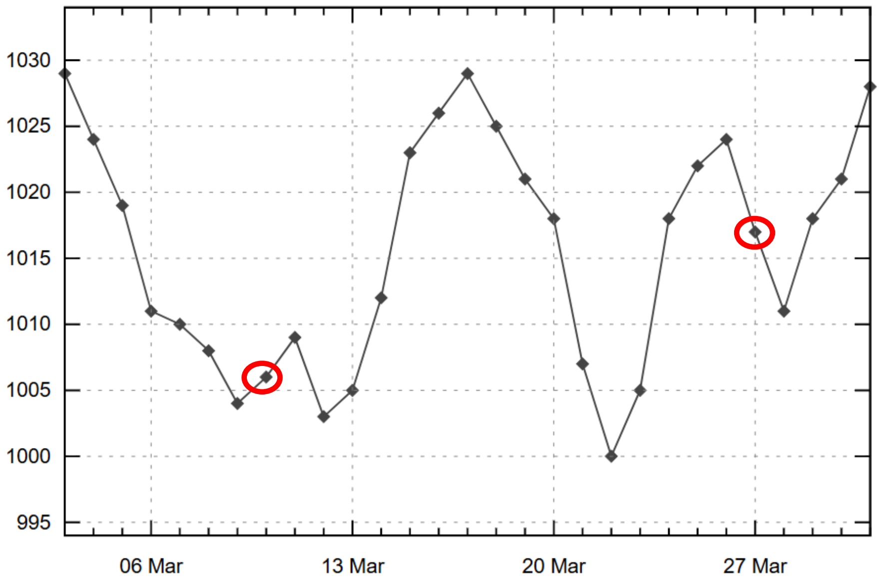
The pressure graphs information is from the *nearest* available weather station (relative to the site) and therefore indicative of *regional* pressure trends. The below does not represent direct atmospheric pressure conditions on the site.

Visit 1 – 25.02.25



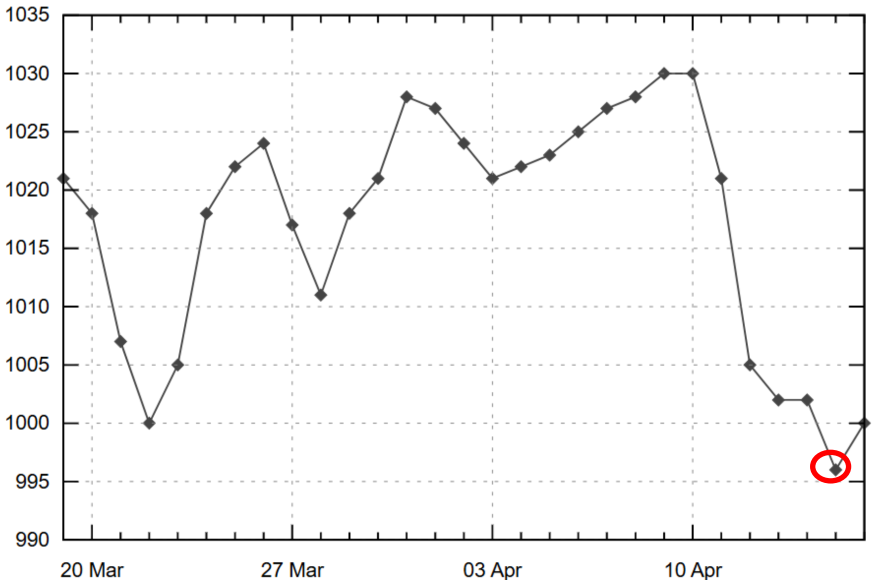
Visit 2 and 3 – 10.03.25 and 27.03.25

East Midlands Airport
Pressure [hPa]: 03.03.2025 - 31.03.2025
© weatheronline.co.uk



Visit 4 – 15.04.25

East Midlands Airport
Pressure [hPa]: 19.03.2025 - 16.04.2025
© weatheronline.co.uk



BS8576:2013 states that gas monitoring does not necessarily need to be carried out under worst case conditions. It does not necessarily need to be at low or falling atmospheric pressure, but rather should be continued until it is unlikely that additional data will change the interpretation of the data, the outcome of the risk assessment and proposed remedial actions. One of the main considerations is to assess whether gas flow rates or concentrations could possibly increase and thereby affect the risk assessment and hence the choice of protective measures. On the basis of the above results, Tier Environmental does not consider that additional data is necessary beyond that of the proposed monitoring regime.

Consideration of Groundwater Effects

An assessment has been made to determine whether groundwater levels beneath the site lie at a shallow depth at, or above, the plain section of the monitoring well or within cohesive strata. In those instances where shallow groundwater is located within the plain section of the monitoring well pipe or within cohesive strata this can result in 'groundwater pumping' or a 'piston effect' where the measured peak (and in some cases steady) flow rates reported at these monitoring well locations are significantly (and artificially) influenced by the pressures formed in the void above the groundwater in the plain section of the pipe or within the pipework installed within cohesive strata, as opposed to being truly representative of the ground gas flow rates. In such instances, this scenario can create 'artificial' negative and /or relatively high peak positive readings depending on whether the groundwater levels have increased or decreased in between monitoring events or since installation of the monitoring wells.

The results of the ground gas monitoring within this report have indicates that there have been no instances of artificial groundwater pumping.

In addition to the above, consideration has been made as to whether waterlogged ground or frozen ground conditions may have led to gas becoming trapped and then emitted into the monitoring wells causing a rapid gas release. One well was recorded to be flooded though which prevented gas monitoring.

The results of the ground gas monitoring have been assessed in accordance with the criteria specified for this site, which were derived as described in Appendix L.

Ground Gas Risk Assessment

Methodology

In accordance with Section 6.3.1 in BS 8485:2015 +A1:2019, the development of the GSV for the site or the zone follows a process in which:

1. borehole hazardous gas flow rates are calculated for each borehole standpipe for each monitoring event and included in a database;
2. the reliability of the measured gas flow rates and concentrations is assessed taking into account borehole construction, etc;
3. decisions are made as to whether to use peak gas flow rates or steady-state rates in each calculation;
4. decisions are made about how to deal with any temporal or spatial shortages in the data;
5. a decision is made about whether the site might be zoned or not; and
6. judgements are made about what GSV to use for design purposes taking all relevant information into account.

Subsequently to the above, the calculated borehole hazardous gas flow rates are considered to determine a Gas Screening Value (GSV) either for the site as a whole, or for site zones, if applicable.

Additionally, CIRIA C665 indicates that in the event that the reported methane concentrations are 'typically' >1% v/v and/or the reported carbon dioxide concentrations are 'typically' >5% then *consideration* should be made to increase the determination of the site to a Characteristic Situation 2 – Low Risk scenario.

Consideration of Peak Gas Flow Rates

In accordance with BS 8485:2015 +A1:2019 it may be appropriate to robustly discount *"peak instantaneous flows and negative flows that have been judged to be unrepresentative of a possible worst case".* In addition, it is stated that *"peak flow measurements might result in a disproportionately high gas hazard prediction, and assignment of an over-precautionary CS".*

Tier Environmental has conducted a review of the peak flow rates reported at the site. A maximum peak gas flow rate of -0.1X l/hr was reported at WS01, WS07 and WS12 on the 4th gas monitoring visit, and indeed all monitored wells recorded negative flow rates. It is possible this is attributed to water levels within a closed environment of cohesive soils and plain pipe. Measured steady state values of -0.1 l/hr were recorded in WS07 and WS12 on the 4th monitoring visit.

Consideration of Peak Ground Gas Concentrations

An assessment has been made as to whether peak flow rates or steady flow rates should be applied for the purposes of calculating the borehole hazardous gas flow rates.

Overall, based on the conceptual site model understanding of the site and with due consideration of the flow rates it is not considered that there is evidence of significant gas generation from the Made Ground. On this basis, it would be considered appropriate to discount peak gas concentrations from the borehole hazardous gas flow rate calculations, however steady gas concentrations are recorded to be the same as peak concentrations in this instance.

Borehole Hazardous Gas Flow Rates

Calculated borehole hazardous gas flow rates have been determined and are presented in Appendix F. In light of the above conclusions regarding whether peak or steady flow rates and peak or steady gas concentrations should be included within the borehole hazardous gas flow rate calculations, it shows that across the whole site in all deposit types the Borehole Hazardous Gas Flow Rates are below the limit for Characteristic Situation CS1

'Worst-Case' GSV Check Calculation – Carbon Dioxide and Methane

In accordance with BS8485, Tier Environmental has conducted a 'worst-case' check by calculating the Gas Screening Value (GSV) for the site:

> *"Irrespective of the apparent comprehensiveness of the dataset, the plausible worst case condition should be calculated for each hazardous gas by multiplying the maximum recorded flow in any standpipe in that strata (and zone) with the maximum gas concentration in any other standpipe in that strata (and zone), but discounting any peak instantaneous flows and negative flows that have been judged to be unrepresentative of a possible worst case."*

Therefore, the following process has been followed:

- the maximum reported methane or carbon dioxide concentration (whichever is highest) from any monitoring well and during any ground gas monitoring visit; and,
- the remaining maximum peak positive flow rate (after any negative flow rates or 'artificially' high flow rates have been discounted as described above) from any monitoring well and during any ground gas monitoring visit.

Table 11.2 Worst-Case GSV Check Calculation

Ground Gas	Maximum Reported Peak Concentration (% v/v)	Selected Concentration used in GSV Calculation (% v/v)		Maximum Appropriately Selected Gas Flow Rate (l/hr)		'Worst case' GSV (l/hr)
Methane (CH_4)	0.1	4.2	X	0.1	=	0.0042
Carbon dioxide (CO_2)	4.2					

CIRIA C665 provides two separate methods to 'characterise' a site that firstly requires the assessor to distinguish between two fundamental development 'situations':

- **Situation A** - Any development other than Situation B (e.g. factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements, etc) for which the **Modified Wilson and Card 'Characteristic Situation' classification system** is applied; and,
- **Situation B** - Low rise building with minimum ventilated under floor void (min 150mm) for which the **NHBC Traffic light classification system** is applied.

In this instance, as the site is due to be developed as a commercial unit, it shall be regarded as a 'Situation A' scenario for the purposes of the ground gas risk assessment.

Table 11.2 demonstrates that the site is placed in a Characteristic Situation 1 – Very Low Risk scenario on the basis of the 'worst case' GSV alone.

CIRIA C665 indicates that in the event that the reported methane concentrations are *'typically'* >1% v/v and/or the reported carbon dioxide concentrations are *'typically'* >5% then consideration should be made to increase the determination of the site to a Characteristic Situation 2 – Low Risk scenario.

In this instance, as no maximum peak or steady methane or carbon dioxide concentrations have been reported in excess of 1% v/v or 5% v/v respectively, the site can be reasonably classified as a Characteristic Situation 1 – Very Low Risk scenario for which no basic ground gas protection measures are required.

Carbon Monoxide and Hydrogen Sulphide

There is no current UK risk assessment guidance available for carbon monoxide and hydrogen sulphide derived from ground gases.

A maximum peak hydrogen sulphide concentration of 1 ppm has been reported which is below the workplace long term exposure limit (5ppm) and the workplace short term exposure limit (10ppm) published by the Health and Safety Executive (EH40/2005 Workplace Exposure Limits).

A maximum peak carbon monoxide concentration of 2ppm has been reported which is below the workplace long term exposure limit (30ppm) and the workplace short term exposure limit (200ppm) published by the Health and Safety Executive (EH40/2005 Workplace Exposure Limits) and below the WHO long term (24 hours) indoor exposure guideline value (5.68 ppm).

Considerations for Construction and Maintenance Workers

During engineering and construction activities, the ground gas data indicate that the following aspects are to be considered during the preparation of relevant site H&S plans, method statements and related documents, and appropriate working methods adopted:

- **Carbon dioxide concentrations in ground gas:** The measured CO2 concentrations in ground gas reported are elevated relative to background levels and could present an asphyxiation risk in excavations and other confined spaces. The Health & Safety Executive has published information defining safe occupational exposure levels for CO2 and the latest guidance must be consulted to determine whether the ground gas regime necessitates specific precautions during site works.

11.6. Radon Gas

Basic radon protection measures are not currently required for the proposed development on this site.

In addition to the above, basements represent areas that are more at risk because the walls are in contact with the ground as well as the floor. This, coupled with reduced natural ventilation below ground level, increases the risk of elevated radon levels. All basements are therefore considered under BR 211 to be at increased risk of elevated levels of radon regardless of geographic location.

Currently, no basements or converted cellars / basements are proposed for the development and therefore no additional consideration of potential increased risk needs to be made; however, this should be revisited in the event that the proposals change to include for a basement.

12.REVISED CONCEPTUAL SITE MODEL AND GENERIC QUANTITATIVE RISK ASSESSMENT OF POLLUTANT LINKAGES

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 4, has been revised in light of the ground investigation and the chemical analysis results presented above in Table 12.1, below.

A revised qualitative risk assessment has also been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.

Table 12.1 Revised Assessment of Potential Pollutant Linkages (Continued on Next Page).

Justification / Comments
• The site is underlain by topsoil across the majority of the site. Localised Made Ground was recorded in TP02, TP03, TP21 and WS06 in the east of the site, and WS10.in the south, to depths of up to 1.00m bgl. Further Made Ground was recorded in HDP01 to HDP04 in the east of the site to circa 0.75m bgl. Natural soils of weathered Edwalton Member bedrock were recorded in all locations as generally either a stiff Clay or very weak Siltstone. Localised softer clays were encountered in WS02 on the western edge of the proposed footprint, TP11 from 2.60m, WS04 and WS09. • No measured soil concentrations of potential contaminants of concern have been reported in excess of Generic Assessment Criteria (GACs) protective of human health appropriate to the proposed land use. On this basis , it is not considered that the site represents a potential risk to end-users. • Of the 12 No. samples submitted for asbestos screening, 2 No. were returned positive for asbestos in TP10 at 0.10m and WS10 at 0.50m for chrysotile fibre bundles at 0.003% w/w and <0.001% w/w respectively. • From a conceptual site model perspective the Oadby Member is Secondary Undifferentiated Aquifer, and the Edwalton Member bedrock is a Secondary B Aquifer, part of the Sidmouth Mudstone Formation. The site is not with a Source Protection Zone and there are no potable water abstractions within 2km of the site, and no non-potable abstractions within 1km. The nearest surface water feature is an unnamed stream 19m SE which forms part of a wider local drainage network, with no flow to nearby significant rivers with 250m. Based upon the site topography it is inferred that groundwater flow direction is towards the southeast. As a result, the controlled waters sensitivity is considered to be low. • Measured groundwater concentrations of cadmium, copper, nickel, zinc, benzo(a)pyrene and fluoranthene have been reported in excess of the WQS protective of the controlled waters environment by either the same order of magnitude or one orders of magnitude. Given the marginal nature of these exceedances, the potential for significant dilution between the site and any significant surface water features, the absence of any potable/non potable abstractions within close proximity to the site, low sensitivity of the controlled waters environment, and the fact that the site will incorporate buildings / hardstanding and a dedicated drainage system that shall reduce infiltration rates through the soils, these measured concentrations are not considered to present a risk to the controlled waters environment. • A Gas Screening Value of 0.0042 l/hr has been calculated, derived using the maximum recorded carbon dioxide concentration of 4.2 %v/v and, in the absence of positive measurable flow, a flow rate of 0.1 l/hr. Assessment of this gas screening value alone places the site in a Characteristic Situation 1 – very low risk scenario in accordance with CIRIA C665 for which ground gas protection measures are not required. • Basic radon protection measures are not currently required for the proposed development on this site.

Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
Localised asbestos in Made Ground (WS10) and Topsoil (TP10)	Asbestos	(Dust migration and) dust inhalation	Future site users (commercial)	Medium	Unlikely	Low Risk
			Adjacent site users (commercial/residential)	Medium	Unlikely	Low Risk
			Construction, site investigation, demolition and future maintenance workers	Medium	Low Likelihood	Moderate / Low Risk

For definition of the terms used in the qualitative risk assessment, please see Appendix I.

13.PRELIMINARY WASTE MATERIALS CLASSIFICATION

13.1. Introduction

If the site is to be redeveloped and materials are disposed off site, the material exported from the site to Landfill should be hauled by a register waste carrier in accordance with Duty of Care Regulations 1991 and the Hazardous Waste Regulations 2005.

There will be requirement for the waste producer to provide appropriate Waste Acceptance Criteria (WAC) testing of the Soils for disposal to ensure that the soils are appropriately classified and that the landfill is licensed to receive such soils. Mixing of hazardous and non-hazardous waste is not permitted. For any hazardous wastes, a consignment note shall be completed, signed, and retained by all parties involved. The consignment note shall state the volume of waste, a physical description of the material and statement of its chemical composition. The waste consignment notes shall be kept by the contractor for a period of at least two years. For non-hazardous wastes, a Waste Transfer Note (WTN) shall be completed. The WTN should be signed and a copies should be kept by the contractor for a period of at least two years. Finally, consignment notes and WTNs shall be shown to an enforcement officer from the local council or the Environment Agency, if asked.

Approach to Assessing Hazard Properties

Flammability and Oxidisability

For any samples flagged as possessing hazardous properties flammability and oxidisability, for which there are no thresholds, Tier Environmental has used professional judgment and on-site observations to decide whether the waste soil, as a whole, is likely to be flammable or oxidising. It should be noted that flammability/oxidisability alone are unlikely to result in a hazardous classification for waste soil.

Worst Case Metal Compounds

The choice of an appropriate worst case metal compound in soil has been made on the basis of the available lines of evidence. For example, if laboratory chemical analysis has demonstrated that no measured concentrations of hexavalent chromium have been reported in excess of the laboratory method detection limit, there it would be regarded as evidence of an absence of a soil source of hexavalent chromium. In such an instance, the worst case metal chromates may be replaced in favour of the next worst case metal compound.

pH

For samples that have been determined as hazardous based on pH alone and cement/concrete has been identified in the sample, Tier Environmental may assume that the high pH was due to the crushing process in the laboratory and is not representative of the waste as a whole. If further detailed determination of this is required then Tier Environmental recommend that such assessment is carried out on these results in a manner described in the AGS Waste Classification for Soils – A Practitioners' Guide (dated 2019):

- Consideration of the acid/alkali reserve to be conducted (as described in WM3 Appendix C4 and C8).
- If large enough, the cement/concrete fraction may be separated manually before testing. Waste concrete from construction and demolition which doesn't contain hazardous substances is non-hazardous (LoW code 17-01-01).
- If cement/concrete has been identified in the sample, a second analysis may be conducted on an 'as received' sample, avoiding the need for crushing before testing. The high pH is typically associated with the finer fractions of cement. If the 'as received' sample has an acceptable pH, this provides additional confidence that the high pH was due to the crushing process and is not representative of the waste as a whole.

Asbestos

With respect to asbestos, If the waste contains fibres that are free and dispersed then the waste will be hazardous if the waste as a whole contains 0.1% w/w or more asbestos in accordance with WM3. If the waste contains any identifiable pieces of suspected asbestos containing material (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then these pieces must be assessed separately. The waste is hazardous if the concentration of asbestos in the piece of asbestos containing material is 0.1% w/w or more. The waste shall then be regarded as a mixed waste and classified accordingly.

The following codes will then be assigned to the asbestos waste as appropriate:

- 17 06 05* Construction material containing asbestos.
- 17 06 01* Insulation material containing asbestos.

17 06 05* would normally be used in preference to 17 06 01* for the asbestos in asbestos contaminated soil and stones in accordance with WM3.

Tier Environmental Geoenvironmental engineers hold up to date UKATA Asbestos Awareness training certificates in order to demonstrate ‘competence’ that is required as described in WM3.

Flammable Liquid Waste

Tier Environmental consider that such a hazard property would apply if free phase product has been reported in the sample. As such, in those instances where materials are classified as hazardous based on this alone and no free phase product is encountered, it is considered that the materials may be regarded as being non-hazardous. Please note that the table below includes a column to show whether free phase product has been encountered within the sample location.

13.2. Preliminary Waste Materials Classification

Tier Environmental have assessed the chemical results in terms of basic waste characterisation of materials on site. This provides a preliminary assessment of whether a material is potentially non-hazardous or hazardous waste.

The results of this preliminary assessment are summarised in the following table.

Natural Soils / Bedrock

Representative samples of natural soils have been obtained during the investigation.

The results of basic waste characterisation are summarised in the table below.

Table 13.1 Preliminary Materials Waste Classification

Exploratory Hole Location	Sample Depth (m bgl)	Simplified Description of the Sample	Basic Waste Characterisation Result	Asbestos Presence, Type and Quantification	WAC Test Available?
TP11	0.10	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP19	0.10	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP20	0.20	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP08	0.40	Pale brown slightly gravelly Clay.	Non-Hazardous	Natural soil, not tested	No
TP07	0.20	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP10	0.10	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	Chrysotile fibre bundles at 0.003 % w/w	No
TP15	0.70	Reddish brown Clay.	Non-Hazardous	Natural soil, not tested	No
TP06	0.20	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP09	0.20	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP03	0.10	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP05	0.40	Reddish brown Clay.	Non-Hazardous	Natural soil, not tested	No
TP01	0.10	Topsoil: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	None detected	No
TP02	0.40	Possible Made Ground: Brown silty gravelly Sand.	Non-Hazardous	None detected	No
TP21	0.50	Made Ground: Black slightly gravelly sandy Silt.	Non-Hazardous	None detected	No
WS06	0.50	Yellowish brown Clay	Non-Hazardous	Natural soil, not tested	No
WS10	0.50	Made Ground: Dark brown slightly gravelly sandy Clay.	Non-Hazardous	Chrysotile fibre bundles at <0.001 % w/w	No

13.3. Materials Re-Use

Subject to volumetric fill requirements and a future assessment of suitability of re-use (both chemically and geotechnically), some materials may be considered for potential re-use in line with an appropriate end-of-waste protocol such as WRAP Quality Protocol for Aggregates from Inert Waste, U1 Exemption or a Materials Management Plan in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). Please note that any previously landfilled or mining waste materials may not be appropriately subject to consideration under DoWCoP and may not be re-used under DoWCoP unless sufficient lines of evidence and agreement with the local Environment Agency Waste Team can be sought beforehand.

Re-Use of Excavated and Stockpiled Clean Naturally Occurring Soils on Other Sites

In addition, Tier Environmental are aware that CL:AIRE is classing stockpiled clean, naturally occurring soils as waste, unless their final destination is identified in a Materials Management Plan, before they are excavated. However, Tier Environmental consider that any clean naturally occurring soils arising from enabling works, earthworks or construction activities would be regarded as an asset and the default assumption for this site (prior to excavation and stockpiling) is not the intention to discard these materials where they may be reasonably re-used on this, or another, development site. Stockpiling is a recognised, recommended means of safely storing soils. Whilst there may be advantages to leaving soils in-situ, stripping topsoil and subsoil prior to earthworks is a routine construction activity. Tier Environmental consider that it is not unreasonable to state that in the event that the developer owns another site where the construction phase is ongoing, soils can be transferred between their sites as an owned product and never become waste.

The above paragraph above is therefore considered a clear intention to reuse any clean, naturally occurring soils derived from excavations at this site (which may also include temporary stockpiling these materials). It is considered; however, that in addition to this the following must be adhered to:

- Reuse does need to occur within a ‘reasonable’ timeframe (12 No. months); and,
- If soils are transferred to a third party (another developer), there needs to be some contractual agreement in place, as in this situation it is important to have something in place confirming that surplus soils are required by the third party.

Re-Use of Excavated and Stockpiled Clean Naturally Occurring Soils Within The Site They Are Excavated From

Further to the above, where soils are naturally occurring, uncontaminated and re-used on the site they are excavated from, they fall outside of the Waste Framework Directive (WFD) i.e. they will not be classified as a waste Currently the CL:AIRE Definition of Waste Code of Practice states the following which appears to support this position: *“If the material is waste an Environmental Permit will be required to lawfully deposit or re-use it unless the material is “uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated”, which is excluded from waste regulation by the Waste Framework Directive (2008).”*

14.CONCLUSIONS AND RECOMMENDATIONS

14.1. Conclusions

- The site is underlain by topsoil across the majority of the site. Localised Made Ground was recorded in TP02, TP03, TP21 and WS06 in the east of the site, and WS10.in the south, to depths of up to 1.00m bgl. Further Made Ground was recorded in HDP01 to HDP04 in the east of the site to circa 0.75m bgl. Natural soils of weathered Edwalton Member bedrock were recorded in all locations as generally either a stiff Clay or very weak Siltstone. Localised softer clays were encountered in WS02 on the western edge of the proposed footprint, TP11 from 2.60m, WS04 and WS09.
- The site will be subject to a significant degree of reprofiling with a small area of cut in the southwest and extensive fill, from 0.50m up to 5.0m, across the remainder of the site towards the northeast. With this in mind, it is likely that foundations in the southwest of the building (WS01, WS08, TP13) will be sited directly onto the weathered bedrock at circa 1m bgl, with pads designed for bearing capacities of 85kPa (for the firm clays), 170kPa for the stiff clays and 240kPa for the siltstone. Areas of fill in the north and east of the building could be reengineered to facilitate bearing, for possibly 50kPa to 75kPa dependent on compaction, but given the localised softer clays encountered across site and to achieve higher bearing capacities (to reduce pads sizes) and reduce total and differential settlements, alternative measures may need to be considered, including lime/cement stabilisation of the engineered. There is also a potential for differential settlements across transition zones between bedrock and engineered fill which should be taken into consideration with foundation and floor slab designs.
- Alternatively, and in light of the variability of the ground conditions at anticipated founding depths, the proposed regrading works and to minimise foundation sizes, vibro stone columns or Controlled Modulus Columns/rigid inclusions could be considered by the contractor dependent on wider commercial considerations. This would bear through the engineered fill and into the underlying soils where soft clays are present. Bearing capacities for the foundations and floor slab should be subject to verification testing during earthworks. Consideration should also be given to slope stability for the design angles of proposed slopes. An Earthworks Specification will be required and all re-engineered soils should be emplaced in accordance with MCHW Series 600.
- The conclusion of the assessment is that a DS-2 and ACEC Class AC-3z should be adopted for Made Ground, however this is being driven by localised elevated sulphates, and low pH in 1 No. location (HDP02) in the south east of the site within an area of proposed sewer realignment. A DS-1 and ACEC Class AC-1 may be more appropriate for buried concrete design purposes within Made Ground elsewhere on site, and a DS-1 and ACEC Class AC-2z should be considered for natural ground driven by low pH values.
- No measured soil concentrations of potential contaminants of concern have been reported in excess of Generic Assessment Criteria (GACs) protective of human health appropriate to the proposed land use. On this basis , it is not considered that the site represents a potential risk to end-users. Of the 12 No. samples submitted for asbestos screening, 2 No. were returned positive for asbestos in TP10 at 0.10m and WS10 at 0.50m for chrysotile fibre bundles at 0.003% w/w and <0.001% w/w respectively.
- From a conceptual site model perspective the Oadby Member is Secondary Undifferentiated Aquifer, and the Edwalton Member bedrock is a Secondary B Aquifer, part of the Sidmouth Mudstone Formation. The site is not with a Source Protection Zone and there are no potable water abstractions within 2km of the site, and no non-potable abstractions within 1km. The nearest surface water feature is an unnamed stream 19m SE which forms part of a wider local drainage network, with no flow to nearby significant rivers with 250m. Based upon the site topography it is inferred that groundwater flow direction is towards the southeast. As a result, the controlled waters sensitivity is considered to be low.
- Measured groundwater concentrations of cadmium, copper, nickel, zinc, benzo(a)pyrene and fluoranthene have been reported in excess of the WQS protective of the controlled waters environment by either the same order of magnitude or one orders of magnitude. Given the marginal nature of these exceedances, the potential for significant dilution between the site and any significant surface water features, the absence of any potable/non potable abstractions within close proximity to the site, low sensitivity of the controlled waters

environment, and the fact that the site will incorporate buildings / hardstanding and a dedicated drainage system that shall reduce infiltration rates through the soils, these measured concentrations are not considered to present a risk to the controlled waters environment.

- A Gas Screening Value of 0.0042 l/hr has been calculated, derived using the maximum recorded carbon dioxide concentration of 4.2 %v/v and, in the absence of positive measurable flow, a flow rate of 0.1 l/hr. Assessment of this gas screening value alone places the site in a Characteristic Situation 1 – very low risk scenario in accordance with CIRIA C665 for which ground gas protection measures are not required.
- Basic radon protection measures are not currently required for the proposed development on this site.
- Basic waste characterisation has determined that Made Ground soils are non-hazardous. WAC testing was not completed as part of this investigation. It is anticipated that natural soils will be suitable for disposal to an inert landfill.

14.2. Recommendations

- The detection of asbestos in WS10 at 0.50m bgl is within a distinct Made Ground population which could be segregated during earthworks and re-used under the building footprint. The asbestos recorded in TP10 is within topsoil. The majority of the Topsoil will be removed from site during the regrading works, with only a small volume retained for reuse in the proposed soft landscaping. Confirmatory asbestos screening of the site wide Topsoil should be undertaken prior to removal from site to confirm suitability for reuse on other development sites.
- An Earthworks Specification will be required and all re-engineered soils should be emplaced in accordance with MCHW Series 600.
- Asbestos Management Plan
- MMP for reuse of Made Ground (excludes natural soils)
- CPTs for ground improvement design
- TP10 delineation and asbestos DQRA to reuse TP10 on site
- Rotary borehole to assist design for the SW retaining wall

15.REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other organisations for their comment and approval prior to undertaking any works on site.

It is recommended that conditions placed on any planning permission are discharged prior to commencement of site works.

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17.GLOSSARY OF TERMS

ACEC	Aggressive Chemical Environment for Concrete (classification)
aOD	Above Ordnance Datum
bgl	Below ground level
BGS	British Geological Survey
BRE	Building Research Establishment
CBR	California Bearing Ratio (test)
COMAH	Control of Major Accident Hazards (regulations)
Designated location	Site (and the ecosystem on that site) protected under national of international legislation. A potential ecological receptor to be considered as part of the assessment of land contamination. Example designated locations include SSSIs (q.v.), SACs (q.v.), national nature reserves, Ramsar sites and bird special protection areas.
DQA	Data Quality Assessment
DQO	Data Quality Objective
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standard
EQS	Environmental Quality Standard
GAC	Generic Assessment Criterion
GQA	General Quality Assessment (Environment Agency)
GSV	Gas Screening Value
HCV	Health Criteria Value
IPPC	Integrated Pollution Prevention and Control (regulations)
K_{OW}	Octanol-water partition coefficient
LEL	Lower Explosive Limit
LL	Liquid Limit
LoD	Limit of Detection (analytical)
LoQ	Limit of Quantification (analytical)
Mean Value Test	Statistical test (described in the CIEH Guidance) to estimate the mean value of a normally distributed population of data at a given level of confidence. Normally for contaminated land assessment, the 95th percentile (referred to as the 95%UCL or US95) is applied as a reasonable but conservative estimate of the mean concentration for comparison with the relevant assessment criteria.
Maximum Value Test	Statistical test (described in the CIEH Guidance) to identify whether an elevated concentration within a normally distributed data set forms part of the underlying population from which it has been sampled or whether it is an outlier (such as a localised area of contamination) that merits further consideration.
MC	Moisture Content
NGR	National Grid Reference
NIHHS	Notification of Installations Handling Hazardous Substances (regulations)
OS	Ordnance Survey
PI	Plasticity Index
PID	Photoionisation Detector
PL	Plastic Limit
ppm	Parts per million
ppmv	Parts per million by volume
QA	Quality Assurance
QC	Quality Control
SAC	Special Area of Conservation
SOM	Soil Organic Matter

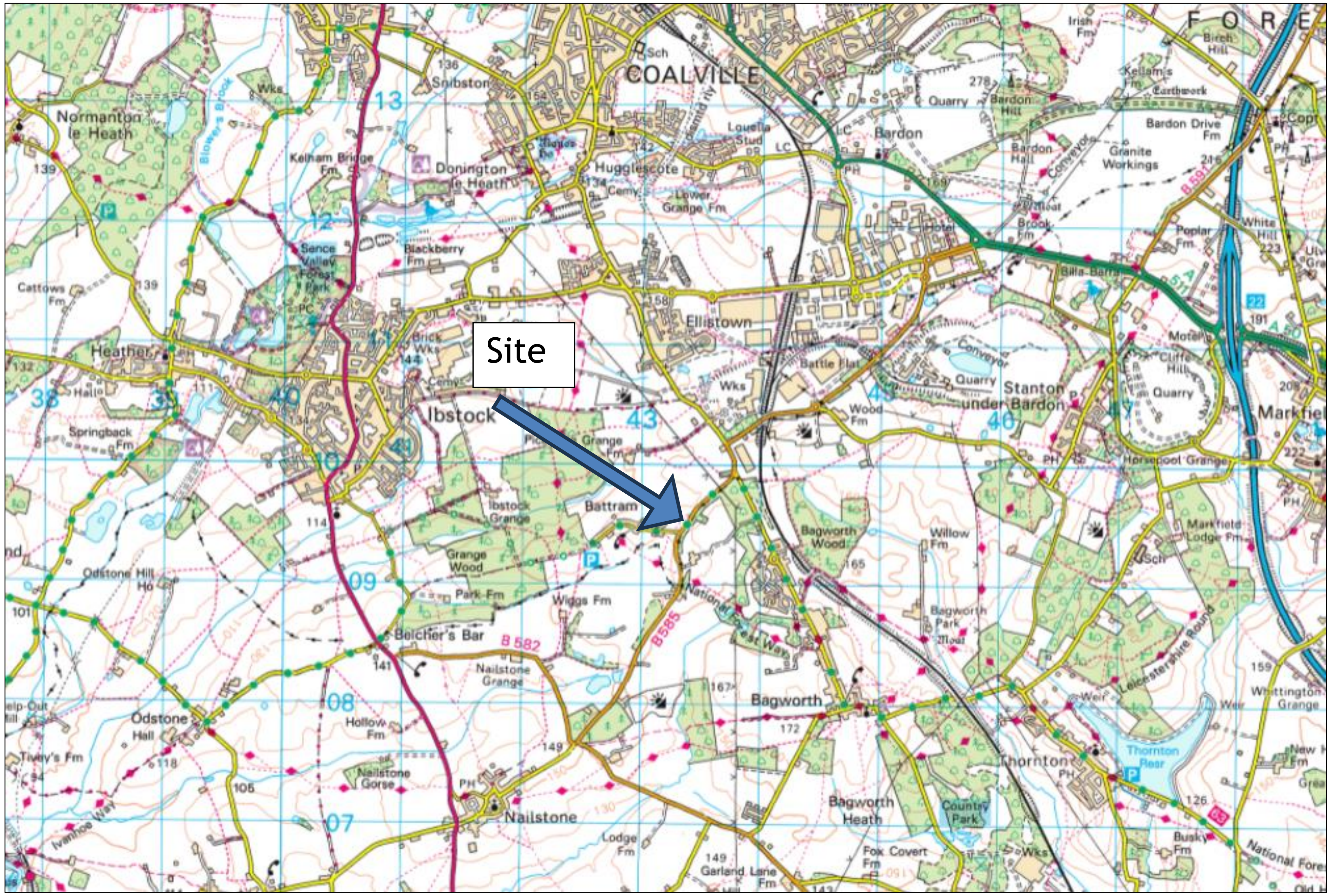
SPT	Standard Penetration Test
SPZ	Source Protection Zone (see Appendix K)
SSAC	Site-Specific Assessment Criterion
SSSI	Site of Special Scientific Interest
SVOC	Semi-Volatile Organic Compound
TEF	Toxicity Equivalent Factor
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average
US95	95th percentile estimate of the true mean value of a data population (also known as 95%UCL).
VOC	Volatile Organic Compound

APPENDIX A - DRAWINGS

TIER CONSULT GROUP

Site Location Plan

Contract Number:	TE1808
Contract:	Wiggs Farm, Wood Road, Battram
Client:	Barberry Bardon Ltd



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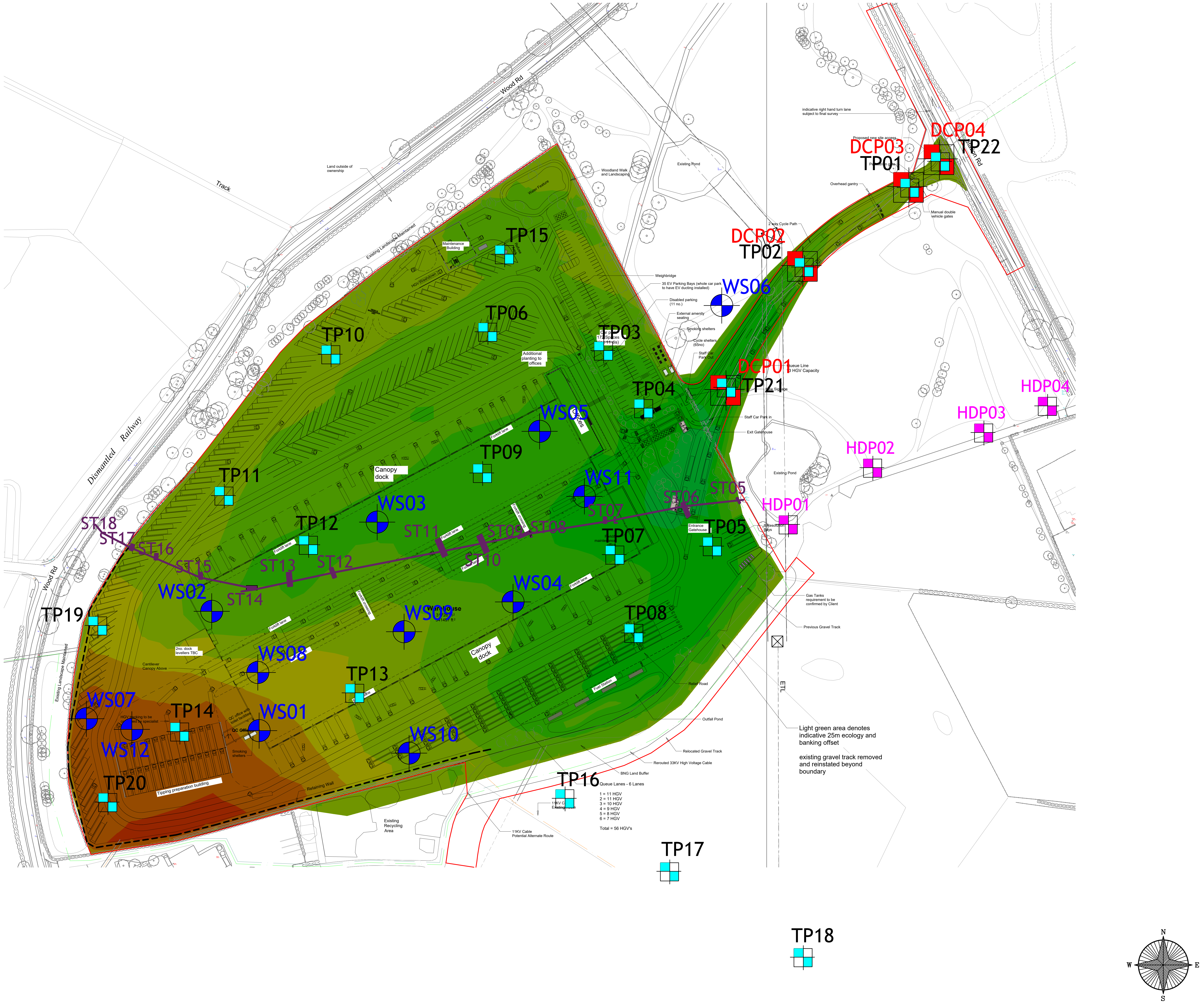


DO NOT SCALE

NOTES

- WINDOW SAMPLE LOCATION
- TRIAL PIT LOCATION
- HAND DUG PIT LOCATION
- DCP LOCATION
- SLIT TRENCH LOCATION TO CONFIRM LOCATION OF SURFACE WATER SEWER
- APPROXIMATE LOCATION SURFACE WATER SEWER

SURFACE LEVEL DATA

NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR
1	-7.000	-5.625	🟫
2	-5.625	-4.250	🟫
3	-4.250	-2.875	🟫
4	-2.875	-1.500	🟩
5	-1.500	-0.125	🟩
6	-0.125	1.250	🟩
7	1.250	2.625	🟩
8	2.625	4.000	🟩
9	4.000	5.375	🟩

Buildings	Overhead Cable
Wall	Concrete edge
Kerb line	Tarmac edge
Line marking	Grass verge
Drop kerb	Canopy/Overhang
Centre line	Verge
Bank Top	Bank Bottom

AX1 100.000 Station and Name Station Level

Tree / Bush / Sapling

Area of Undergrowth

Hedge

Rdge 0.00 Ridge Level

Eave 0.00 Eaves Level

Flat 0.00 Flat Roof Level

Gate

I/W Ht 1.2m Interwoven

Railing Ht 1.2m Iron Railings

Wire Fence Ht 2.0m Wire Mesh

P & R Ht 1.2m Post & Rail

P & W Ht 1.2m

IC	Inspection chamber	Boll	Bollard
PInv	Pipe invert	IB	Illuminated bollard
Gy	Gully	Bin	Rubbish bin
Dp	Down pipe	Vp	Vent pipe
Pipe	Pipe above ground	Grl	Ground light
MH	Manhole	Lbox	Letter box
WL	Water level	Sty	Stile
Fl	Flood light	IFL	Internal floor level
Lp	Lamp post	THL	Threshold level
Tp	Telegraph post	Sp	Sign post
Ep	Electricity post	TH	Trialhole
Tl	Traffic light	BH	Borehole
Bus	Bus stop	ELEC	Electric
Sv	Stop valve	BT	British Telecom
St	Stop tap	C'box	Control box
Er	Earth rod	IC	Inspection chamber
Wm	Water meter	R/wall	Retaining wall
Gv	Gas valve	UTL	Unable to lift
Av	Air valve	TCL	Tree canopy level
Wo	Wash out	G:	Girth
Re	Rodding eye	MB	Multi Bowl
BB	Belisha beacon	Stmp	Tree Stump

REV	DATE	BY	DESCRIPTION	CHK	APD
P3	13/05/2025	CS	ISSUED FOR INFORMATION	GF	GF
P2	28/04/2025	CS	ISSUED FOR INFORMATION	GF	GF
P1	04/02/2025	CS	ISSUED FOR INFORMATION	GF	GF

DRAWING STATUS:
INFORMATION

Tier Environmental Ltd.
Unit 5 Office Village
Sandpiper Court
Chester Business Park
Chester | CH4 9QZ

t: 01925 818 388

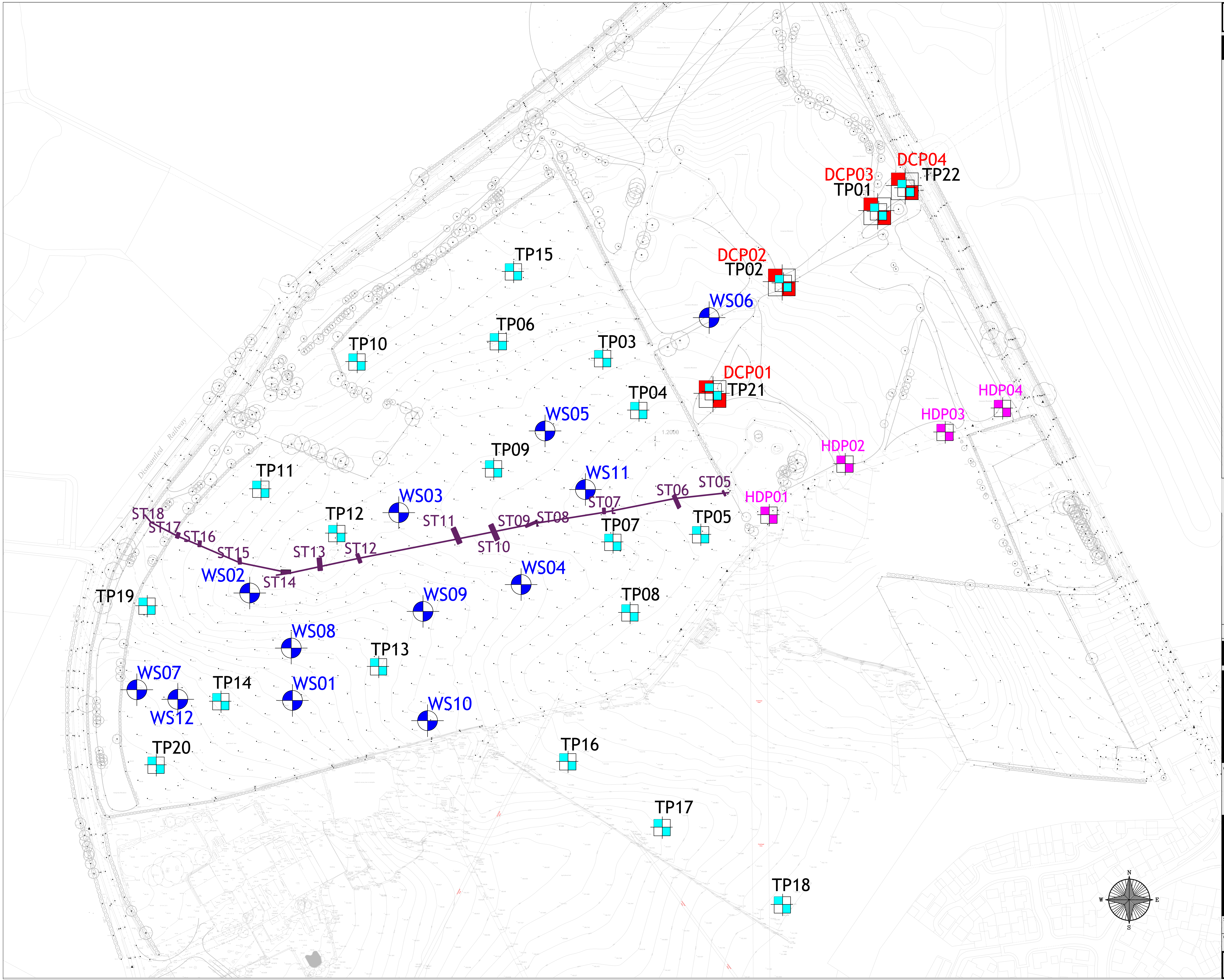
CLIENT:
BARBERRY BARDON LTD

PROJECT:
WIGGS FARM BATTRAM

TITLE:
EXPLORATORY HOLE LOCATION PLAN

SCALE @ SIZE:	CHECKED:	APPROVED:
NTS	GF	GF
CAD FILE:	DESIGN/DRAWN:	DATE:
–	CS	04/02/2025

PROJECT No:	DRAWING No:	REV:
TE1808	TE1808-TE-00-XX-DR-GE-005-V03	P3



DO NOT SCALE

NOTES

⊕	WINDOW SAMPLE LOCATION
🟦	TRIAL PIT LOCATION
🟪	HAND DUG PIT LOCATION
🟥	DCP LOCATION
/	SLIT TRENCH LOCATION TO CONFIRM LOCATION OF SURFACE WATER SEWER
—	APPROXIMATE LOCATION SURFACE WATER SEWER

REV	DATE	BY	DESCRIPTION	CHK	APD
P3	13/05/2025	CS	ISSUED FOR INFORMATION	SL	SL
P2	28.04.2025	CS	ISSUED FOR INFORMATION	SL	SL
P1	07.03.2025	CS	ISSUED FOR INFORMATION	SL	SL

DRAWING STATUS:
INFORMATION

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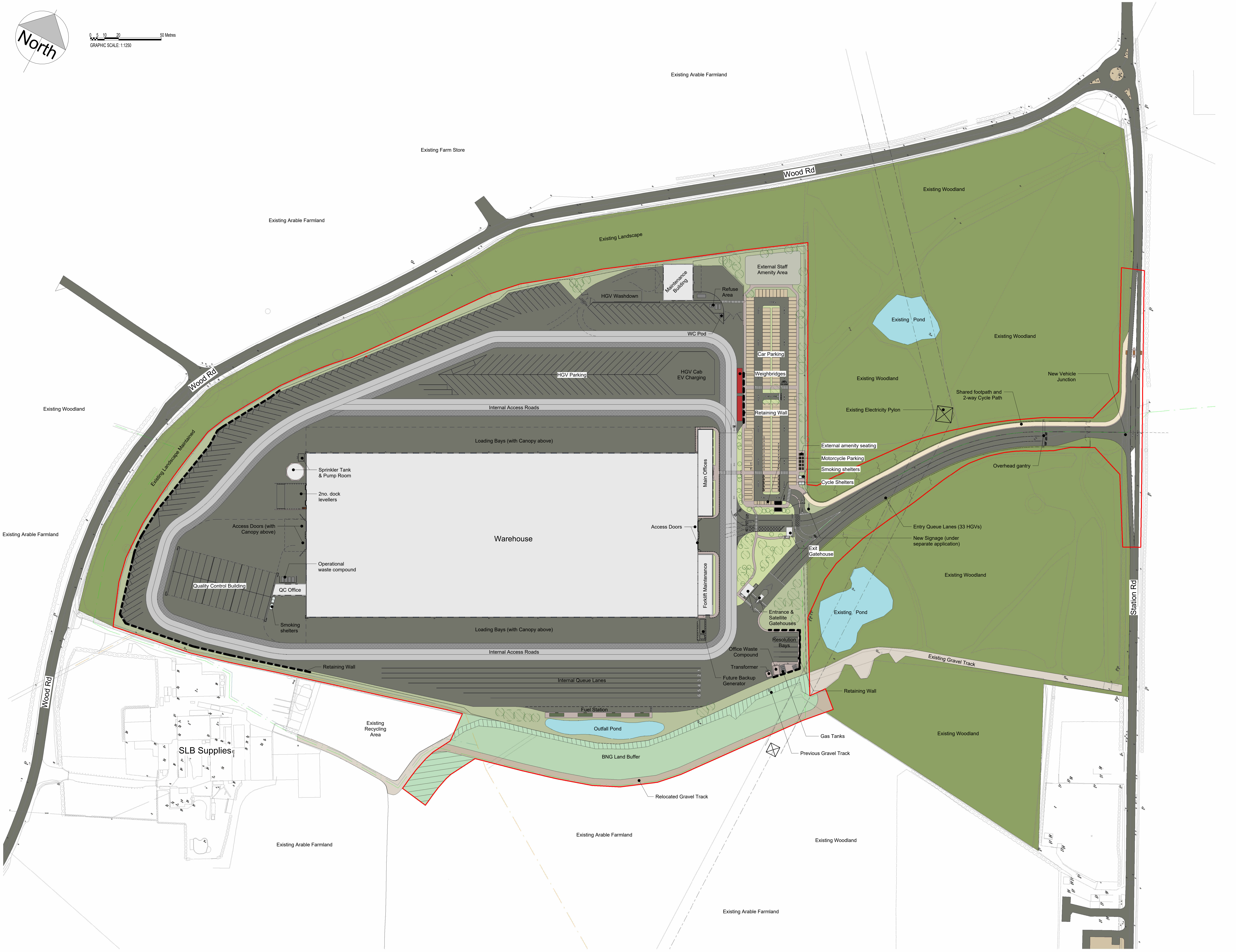
CLIENT:
BARBERRY BARDON LTD

PROJECT:
WIGGS FARM BATTRAM

TITLE:
EXPLORATORY HOLE LOCATION PLAN

SCALE @ SIZE: NTS	CHECKED: SL	APPROVED: SL
CAD FILE: –	DESIGN/DRAWN: CS	DATE: 07.03.2025
PROJECT No: TE1808	DRAWING No: TE1808-TE-00-XX-DR-GE-006-V03	REV: P3



Safety Health and Environmental Information A1

The following risks are identified as unusual or unfamiliar to a competent contractor

CONSTRUCTION

DEMOLITION RISKS (FUTURE)

It is assumed that all work will be carried out by a competent contractor working, where appropriate, to an approved method statement

Accommodation Schedule

Name	Area (m2)	Area (ft2)
Welfare Amenity	855 m²	9,198 ft²
Total Amenity	855 m²	9,198 ft²
North Canopy	4,961 m²	53,402 ft²
South Canopy	4,961 m²	53,402 ft²
Entrance Canopy	317 m²	3,411 ft²
Total Canopy Projection	10,239 m²	110,215 ft²
Forklift Maintenance - GIA	408 m²	4,396 ft²
In Gatehouse - GIA	35 m²	374 ft²
Office - Ground - GIA	608 m²	6,545 ft²
Office - First - GIA	588 m²	6,328 ft²
Office - Second - GIA	608 m²	6,547 ft²
Office - Third - GIA	608 m²	6,547 ft²
Out Gatehouse - GIA	16 m²	169 ft²
QC Office - GIA	170 m²	1,828 ft²
QC Building	2,422 m²	26,070 ft²
Satellite Gatehouse - GIA	4 m²	47 ft²
VMU - Ground - GIA	519 m²	5,585 ft²
VMU - First - GIA	103 m²	1,107 ft²
Warehouse - GIA	31,726 m²	341,497 ft²
Total GIA - All Floors	37,815 m²	407,040 ft²

Key:

🟨	Proposed GIA
🟦	Proposed External Canopies
🟩	Proposed Weflare Amenity Area
▭	Boundary

Area Schedule

Name	m2	ft2	Hectares	Acres
Total GEA - Ground Floor	36,646	394,454	3.66	9.06
Total GIA - All Floors	37,815	407,040	3.78	9.34
Gross Site Boundary			14.55	35.95

Underside of Haunch Heights (AFFL)

- Warehouse: 15.25m
- Forklift: 5m
- Main Offices: 15m
- VMU: 7.25m
- QC: 5.5m

Parking Quantities

Car Parking spaces - 201
including: 13 Disabled spaces / 10 Car Share / 20 EV Spaces
(whole car park to be passively ducted)

HGV External Parking Spaces - 156
(not including Loading Bays, Dock Levellers, Resolution Bays, HGV Cab Charging, Quality Control Building, Fuel Station, Weighbridge or Queue Lanes)

Canopy Dock Doors - 68

Level Access Doors - 2

Motorcycle Spaces - 6

Cycle Spaces - 48

Refer to DTA Transport assessment for vehicle parking quantities rationale associated with this bespoke scheme.

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Project Excellence

Proposed Site Plan - Orientated

Barberry Bardon Ltd

			DRAWING NO. 4092 - 06	
			REV	DATE FEB 25
PLANNING	DRN JDK	CHK ST	SCALE 1 : 1250 @ A1	

ISO 9001 REGISTERED FIRM
ISO 14001 REGISTERED FIRM

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THE Green REGISTER OF CONSTRUCTION PROFESSIONALS

APPENDIX B - EXPLORATORY HOLE LOGS

Trial Pit Log

Trialpit No
HDP01
Sheet 1 of 1

Project Name: Wiggs Farm
Project No. TE1808
Co-ords: 443814.33 - 309482.17
Level: 151.95
Date 25/02/2025

Location: Battram
Dimensions (m): 0.2 × 0.2
Depth 0.80
Scale 1:25

Client: Barberry Bardon Ltd
Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.27	151.68	▨	MADE GROUND: Grass over dark brown, slightly silty, slightly sandy, gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite, glass and flint. MADE GROUND
	0.50	ES		0.75	151.20	▨	MADE GROUND: Black, slightly gravelly, very clayey, fine to coarse SAND. Gravel is subangular, fine to coarse of coal, brick, clinker and charcoal ash. MADE GROUND
				0.80	151.15	— —	Stiff, orangish brown CLAY. WEATHERED EDWALTON MEMBER
							End of pit at 0.80 m

Remarks: 1) Hand dug pit to 0.80m bgl 2) No groundwater ingress encountered 3) Terminated at target depth 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Stability: Stable

Trial Pit Log

Trialpit No

HDP02

Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443869.90 - 309519.29 Level: 153.93		Date 25/02/2025
Location: Battram		Dimensions (m): Depth 0.60	0.3 0.3	Scale 1:25
Client: Barberry Bardon Ltd				Logged AM

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.26	153.67	▨	MADE GROUND: Grass over dark brown, slightly silty, gravelly, very cobbly, fine to coarse SAND. Gravel is subangular to subrounded, fine to coarse of burnt shale, concrete, plastic and quartzite. Cobbles are subangular of concrete (60mm x 40mm x 30mm) MADE GROUND
	0.50	ES		0.60	153.33	▨	MADE GROUND: Black, slightly gravelly, very clayey, fine SAND. Gravel is subangular, fine of siltstone. MADE GROUND

End of pit at 0.60 m

Remarks: 1) Hand dug pit to 0.60m bgl 2) No groundwater ingress encountered 3) Terminated due to hand auger and scissor shovels due to obtain sample 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings

Stability: Stable

Trial Pit Log

Trialpit No
HDP03
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443942.98 - 309542.66 Level: 156.33	Date 25/02/2025
Location: Battram		Dimensions (m): 0.3 x 0.3 Depth 1.20	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20	156.13	▨	MADE GROUND: Soft, black, slightly cobbly, slightly gravelly , very sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of brick, concrete and siltstone. Cobbles are subangular of concrete (60mm x 80mm x 50mm) MADE GROUND
▼				0.55	155.78	▨	MADE GROUND: Black, slightly clayey, slightly gravelly, very silty, fine to coarse SAND. Gravel is subrounded, fine of coal. MADE GROUND
	1.00	ES		1.20	155.13	▨	MADE GROUND: Soft, grey, slightly gravelly, silty CLAY. Gravel is subangular, fine of pyrite. MADE GROUND *Becoming firm at 0.65m*
							End of pit at 1.20 m

Remarks: 1) Hand dug pit to 1.20m bgl 2) Groundwater ingress encountered at 0.28m, observed as standing water 3) Terminated at target depth 4) No visual or olfactory evidence of contamination. 5) Backfilled with arisings.

Stability: Stable

Trial Pit Log

Trialpit No
HDP04
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443984.92 - 309560.19 Level: 157.37	Date 25/02/2025
Location: Battram		Dimensions (m): 0.3 × 0.3 Depth 0.50	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.12	157.24	▨	MADE GROUND: Grass over, soft, dark brown, slightly gravelly, silty CLAY with occasional rootlets. Gravel is angular, fine of brick. MADE GROUND
				0.32	157.04	▨	MADE GROUND: Reddish brown, gravelly, fine to coarse SAND. Gravel is angular to subangular, fine to coarse of burnt shale and brick. MADE GROUND
	0.40	ES		0.50	156.86	▨	MADE GROUND: Black, slightly cobbly, slightly gravelly, silty, fine to coarse SAND. Gravel is subangular, fine to medium of coal, carbonaceous mudstone and ash. Cobbles are subangular of dolomite siltstone. MADE GROUND
							End of pit at 0.50 m

Remarks: 1) Hand dug pit to 0.50m bgl 2) No groundwater ingress encountered 3) Terminated on cobble obstruction 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Stability: Stable

Trial Pit Log

Trialpit No
TP01
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443894.38 - 309703.90 Level: 159.78	Date 29/01/2025
Location: Battram		Dimensions (m): 2.4 × 0.7 Depth 2.85	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.26	159.52	▨	TOPSOIL: Grass over dark brown, slightly silty gravelly CLAY with frequent rootlets. Gravel is subrounded to subangular, fine to coarse of quartzite, siltstone and chert. TOPSOIL
▼	0.40	B		2.85	156.93	▨	Stiff, orangish brown, mottled reddish brown, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subrounded, fine to coarse of quartzite and flint. WEATHERED EDWALTON MEMBER *becoming very sandy at 1.20m* *subrounded cobble of dolomitic siltstone at 2.80m (240mm x 140mm x 210mm)*

End of pit at 2.85 m

Remarks: 1) Groundwater ingress encountered as a slight ingress at 1.30m bgl. 2) Terminated at target depth 3) No visual or olfactory evidence of contamination. 4) Backfilled with arisings. 5) PP 0.50m = 110kPa and 125kPA and at 1.10m = 140kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP02
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443824.82 - 309651.63 Level: 157.52	Date 29/01/2025
Location: Battram		Dimensions (m): 2.7 × 0.65 Depth 3.20	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	POSSIBLE MADE GROUND Grass over dark brown, slightly silty gravelly CLAY with frequent rootlets. Gravel is subrounded to subangular, fine to coarse of quartzite, siltstone and chert. POSSIBLE MADE GROUND
	0.40 0.40	B D		0.38	157.14	▨	POSSIBLE MADE GROUND: Brown, silty, gravelly, very clayey, fine to coarse SAND. Gravel is subrounded to subangular, fine to coarse of quartzite and chert. POSSIBLE MADE GROUND
				0.70	156.82	▨	Stiff, reddish brown, mottled light grey, slightly gravelly, very sandy CLAY. Sand is fine to coarse. Gravel is subrounded to subangular, fine to coarse of quartzite, dolomitic siltstone and flint. WEATHERED EDWALTON MEMBER
▼							
				3.20	154.32		End of pit at 3.20 m

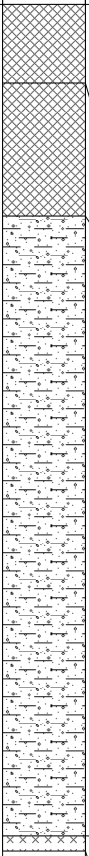
Remarks: 1) Groundwater ingress encountered as slight seepage at 2.70m 2) Terminated at target depth 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP Results - 0.80m = 100kPa, 1.75m = 150kPa, 2.50m = 100kPa

Stability: Stable

Trial Pit Log

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443692.77 - 309596.59 Level: 154.13	Trialpit No **TP03** Sheet 1 of 1 Date 29/01/2025
Location: Battram		Dimensions (m): 3.9 × 0.7 Depth 2.80	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.26	153.87		POSSIBLE MADE GROUND: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. POSSIBLE MADE GROUND
				0.70	153.43		POSSIBLE MADE GROUND: Pale grey, gravelly, very clayey, fine to coarse SAND. Gravel is rounded to subangular, fine to coarse of quartzite and carbonaceous mudstone. POSSIBLE MADE GROUND
	1.40	B		2.75	151.38		Stiff, orangish brown, mottled light grey, slightly gravelly, very sandy CLAY. Sand is fine to coarse. Gravel is rounded, fine to coarse of quartzite. WEATHERED EDWALTON MEMBER
				2.80	151.33		Very weak, greenish grey, dolomitic SILTSTONE EDWALTON MEMBER



End of pit at 2.80 m

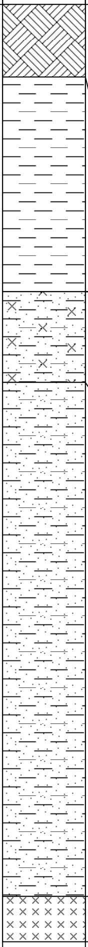
Remarks: 1) No groundwater ingress encountered. 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP result 0.80m = 100kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP04
Sheet 1 of 1

Project Name:	Wiggs Farm	Project No. TE1808	Co-ords: 443719.19 - 309558.66 Level: 153.18		Date 29/01/2025
Location:	Battram		Dimensions (m): 2.6 x 0.6		Scale 1:25
Client:	Barberry Bardon Ltd		Depth 3.10		Logged GF



Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Stratum Description
	Depth	Type	Results			
	0.10	ES		0.24	152.94	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.60	D		0.95	152.23	Stiff, reddish brown CLAY WEATHERED EDWALTON MEMBER
	1.00	D		1.25	151.93	Firm to stiff, greenish grey, slightly sandy, silty CLAY with frequent siltstone lithorelicts. Sand is fine. WEATHERED EDWALTON MEMBER *Cobble of subangular dolomitic siltstone at 0.95m (360mm x 330mm x 220mm)*
				2.95	150.23	Stiff, reddish brown, slightly sandy, friable CLAY. Sand is fine. WEATHERED EDWALTON MEMBER
				3.10	150.08	Extremely weak, bluish grey SILTSTONE EDWALTON MEMBER

End of pit at 3.10 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP Result 0.60m = 130kPa and 140kPa

Stability: Stable

Trial Pit Log

Trialpit No	**TP05**	Sheet 1 of 1	
Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443764.37 - 309467.84 Level: 151.89	Date 29/01/2025
Location: Battram		Dimensions (m): 4.1 × 0.7 Depth 2.10	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.25	151.64		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.30	ES					
	0.40	ES		0.35	151.54		Stiff, yellowish brown, slightly gravelly, sandy CLAY. Sand is fine to coarse, gravel is subrounded, fine to coarse of quartzite. WEATHERED EDWALTON MEMBER
							Very stiff, reddish brown CLAY WEATHERED EDWALTON MEMBER *becoming friable at 1.00m*
				1.05	150.84		Extremely weak, blue dolomitic SILTSTONE WEATHERED EDWALTON MEMBER
				1.60	150.29		Stiff, reddish brown, friable CLAY WEATHERED EDWALTON MEMBER
				2.00	149.89		Extremely weak, dolomitic SILTSTONE EDWALTON MEMBER
				2.10	149.79		End of pit at 2.10 m

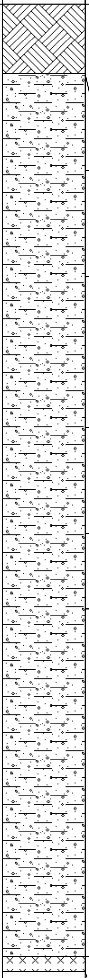
Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead. 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP result 0.60m = 220kPa and 275kPa 6) Land drain encountered at 0.45m bgl oriented NE-SW

Stability: Stable

Trial Pit Log

Trialpit No
TP06
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443616.54 - 309608.98 Level: 156.24	Date 29/01/2025
Location: Battram		Dimensions (m): 2.6 0.65 Depth 3.20	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.23	156.01		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.30	B					Stiff, yellowish brown, mottled greenish grey, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to rounded, fine to coarse of quartzite and chert. WEATHERED EDWALTON MEMBER *becoming reddish brown, mottled light grey and sandy at 0.55m* *subangular cobble of sandstone at 0.90m (150mm x 130mm x 190mm)* *subrounded cobble of chert at 1.40m (220mm x 110mm x 50mm)* *becoming very stiff at 1.75m* *subrounded cobble of sandstone at 2.00m (90mm x 80mm x 70mm)*
	2.20	D					
				3.15	153.09		
				3.20	153.04		Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER

End of pit at 3.20 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings 5) PP results 0.30m = 100kPa and 145kPa, 0.85m = 100kPa and 150kPa, 1.40m = 125Kpa and 220kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP07
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443700.24 - 309462.29 Level: 153.22	Date 28/01/2025
Location: Battram		Dimensions (m): 2.5 × 0.65 Depth 2.20	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.31	152.91		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
				0.45	152.77		Stiff, pale brown, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite, calcite and gypsum. WEATHERED EDWALTON MEMBER
	0.60	D		1.10	152.12		Stiff, reddish brown, mottled greenish grey CLAY WEATHERED EDWALTON MEMBER *becoming very stiff at 0.70m* *becoming friable at 0.85m bgl*
				1.65	151.57		Extremely weak, greenish grey SANDSTONE WEATHERED EDWALTON MEMBER
				2.10	151.12		Stiff, reddish brown, friable CLAY WEATHERED EDWALTON MEMBER
				2.20	151.02		Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER

End of pit at 2.20 m

Remarks: 1) No Groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP results 0.35m = 100kPa, 0.70m = 220kPa and 200kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP08
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443713.74 - 309410.43 Level: 152.42	Date 28/01/2025
Location: Battram		Dimensions (m): 2.7 × 0.6 Depth 2.40	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.35	152.07		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.40	ES					
				0.50	151.92		Stiff, pale brown, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite, calcite and gypsum. WEATHERED EDWALTON MEMBER
				1.10	151.32		Stiff, reddish brown, mottled greenish grey CLAY WEATHERED EDWALTON MEMBER *becoming friable at 1.00m bgl.*
				1.60	150.82		Extremely weak, greenish grey SILTSTONE WEATHERED EDWALTON MEMBER
	2.00	D					
				2.10	150.32		Stiff, reddish brown, friable CLAY WEATHERED EDWALTON MEMBER
				2.40	150.02		Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER

End of pit at 2.40 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) Land drain encountered at 0.95m bgl oriented NW-SE 6) PP result 0.70m = 110kPa

Stability: Stable

Trial Pit Log

Trialpit No	**TP09**
	Sheet 1 of 1
Project Name:	Wiggs Farm
Project No.	TE1808
Co-ords:	443613.04 - 309516.03
Level:	153.87
Date	29/01/2025
Location:	Battram
Dimensions (m):	4.3 0.7
Depth	2.30
Scale	1:25
Client:	Barberry Bardon Ltd
Logged	GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.28	153.59		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
				0.65	153.22		Stiff, pale grey, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is rounded, fine to coarse of quartzite. WEATHERED EDWALTON MEMBER
	0.80	D		2.20	151.67		Very stiff, reddish brown CLAY WEATHERED EDWALTON MEMBER *becoming friable at 1.10m*
				2.30	151.57		Extremely weak, pale grey, mottled greenish grey SILTSTONE EDWALTON MEMBER

End of pit at 2.30 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings 5) Land drain encountered at 0.45m bgl orientated NW-SE. Bedding plane observed at 0.50m to 0.80m bgl dipping approximately north

Stability: Stable

Trial Pit Log

Trialpit No
TP10
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443513.25 - 309594.14 Level: 158.49	Date 29/01/2025
Location: Battram		Dimensions (m): 2.5 × 0.65 Depth 3.40	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.20	158.29		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
				0.32	158.17		Stiff, yellowish brown, slightly gravelly, very sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and chert. WEATHERED EDWALTON MEMBER
	1.15 1.15	B D		3.40	155.09		Stiff, reddish brown mottled light grey CLAY WEATHERED EDWALTON MEMBER *Becoming very stiff at 1.70m*
							End of pit at 3.40 m

Remarks: 1) No groundwater ingress encountered 2) Terminated at target depth 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) Drain pipe encountered at 0.50m bgl on southern wall orientated east to west. 6) PP result at 0.35m = 100kPa, 1.70m = 170kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP11
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443442.95 - 309501.12 Level: 156.80	Date 28/01/2025
Location: Battram		Dimensions (m): 2.8 × 0.6 Depth 4.30	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.30	156.50		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.70	D					Stiff, reddish brown, mottled pale grey CLAY WEATHERED EDWALTON MEMBER
	1.50	B					
▼							
							becoming friable at 2.00m bgl
				2.20	154.60		
							Very stiff, dark reddish brown, mottled black, slightly gravelly CLAY. Gravel is subrounded, fine to coarse of dolomitic siltstone and gypsum. WEATHERED EDWALTON MEMBER
				2.60	154.20		
							Soft to firm, reddish brown, slightly gravelly, very sandy CLAY. Sand is fine to coarse. Gravel is subrounded, fine to coarse of gypsum and dolomitic siltstone. WEATHERED EDWALTON MEMBER
▼							
				4.30	152.50		End of pit at 4.30 m

Remarks: 1) Groundwater ingress encountered as slight seepage at 1.70m and 3.80m bgl 2) Terminated at target depth 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP results at 0.90m = 125kPa, 1.70m = 100kPa, 2.40m = 200kPa

Stability: Stable

Trial Pit Log

Trialpit No	**TP12**
Sheet 1 of 1	
Project Name:	Wiggs Farm
Project No.	TE1808
Co-ords:	443498.00 - 309468.72
Level:	154.09
Date	28/01/2025
Location:	Battram
Dimensions (m):	2.7 × 0.6
Depth	2.50
Scale	1:25
Client:	Barberry Bardon Ltd
Logged	GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
				0.31	153.78	—	Stiff, reddish brown CLAY. WEATHERED EDWALTON MEMBER
	0.80	D				—	
						—	*becoming friable at 1.40*
	1.50	D				—	
				2.30	151.79	×	Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER
				2.50	151.59		End of pit at 2.50 m

Depth scale: 1, 2, 3, 4, 5

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP results at 0.80m = 100kPa and 1.30m = 110kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP13
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443529.01 - 309371.26 Level: 157.36	Date 28/01/2025
Location: Battram		Dimensions (m): 2.4 × 0.6 Depth 2.90	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.25	157.11		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.50	ES					Stiff, pale grey, mottled reddish brown, slightly gravelly, sandy CLAY. Sand is fine to coarse. Gravel is subangular, fine to medium of mudstone. WEATHERED EDWALTON MEMBER
							becoming reddish brown at 1.00m bgl
	1.70	B					
				2.80	154.56		Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER
				2.90	154.46		End of pit at 2.90 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings 5) Land drain encountered at 0.50m bgl oriented north south. 6) PP result at 0.50m = 140kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP14
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443411.78 - 309347.33 Level: 160.48	Date 28/01/2025
Location: Battram		Dimensions (m): Depth 2.50 3	Scale 1:25
Client: Barberry Bardon Ltd			Logged 0.60

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES		0.29	160.19	▨	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
							Stiff, reddish brown, mottled pale grey, sandy CLAY. Sand is fine to medium. WEATHERED EDWALTON MEMBER *Becoming reddish brown at 1.00m* bgl *Becoming friable at 1.50m*
	2.00	B		2.40	158.08		
				2.50	157.98	×××	Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER
							End of pit at 2.50 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) Ballast encountered on southern pit wall therefore extended pit northwards. 6) PP result at 0.50m = 125kPa and 1.10m = 125kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP15
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443627.57 - 309660.02 Level: 157.78	Date 29/01/2025
Location: Battram		Dimensions (m): 2.4 0.65 Depth 3.20	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.26	157.52	▨	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.40 0.70	B ES		2.10	155.68	▨	Stiff, reddish brown, mottled pale grey, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to rounded, fine to coarse of siltstone and quartzite. WEATHERED EDWALTON MEMBER *becoming sandy at 1.40m* *becoming firm at 2.00m*
				2.55	155.23	▨	Soft, brown, slightly gravelly, slightly sandy, very silty CLAY. Sand is fine to coarse. Gravel is rounded, fine to medium of quartzite. WEATHERED EDWALTON MEMBER *cobble of dolomitic siltstone at 2.40m (230mm x 170mm x 50mm)*
				3.20	154.58	▨	Stiff, reddish brown, mottled light grey, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to rounded, fine to coarse of siltstone and quartzite. WEATHERED EDWALTON MEMBER *becoming very stiff at 3.00m*

End of pit at 3.20 m

Remarks: 1) No groundwater ingress encountered 2) Terminated at target depth 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings 5) Land drain encountered at 1.60m oriented north south 6) PP result at 0.70m = 100kPa, 1.75m = 145kPa, 3.00m = 220kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP16
Sheet 1 of 1

Project Name: Wiggs Farm
Project No. TE1808
Co-ords: 443667.31 - 309301.84
Level: 154.05
Date 03/02/2025

Location: Battram
Dimensions (m): 3.05 × 0.55
Depth 3.65
Scale 1:25

Client: Barberry Bardon Ltd
Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.21	153.84		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
							Stiff, reddish brown, mottled grey, slightly sandy CLAY. Sand is fine. WEATHERED EDWALTON MEMBER *becoming very stiff at 0.60m*
	0.80	ES					*becoming friable at 0.80m*
	1.00	D					
				1.80	152.25		Extremely weak to very weak, greenish grey dolomitic SILTSTONE WEATHERED EDWALTON MEMBER
				2.15	151.90		Extremely weak, reddish brown MUDSTONE. WEATHERED EDWALTON MEMBER
				3.60	150.45		Extremely weak to very weak, greenish grey dolomitic SILTSTONE EDWALTON MEMBER
				3.65	150.40		End of pit at 3.65 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead. 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP result at 0.60m = 175kPa and 170kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP17
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443736.22 - 309253.76 Level: 155.96	Date 03/02/2025
Location: Battram		Dimensions (m): 3 × 0.65 Depth 3.45	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Stratum Description
	Depth	Type	Results			
				0.23	155.72	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	0.40	ES				
	0.50	D		1.45	154.50	Very stiff, reddish brown, mottled grey, slightly sandy CLAY. Sand is fine. WEATHERED EDWALTON MEMBER *becoming friable at 0.80m*
				1.95	154.00	Extremely weak to very weak, greenish grey dolomitic SILTSTONE WEATHERED EDWALTON MEMBER
▼ ▽				3.30	152.66	Extremely weak, reddish brown MUDSTONE WEATHERED EDWALTON MEMBER
				3.45	152.50	Extremely weak to very weak, greenish grey dolomitic SILTSTONE EDWALTON MEMBER

End of pit at 3.45 m

1
2
3
4
5

Remarks: 1) Groundwater ingress encountered as moderate ingress at 2.90m bgl with standing water below and rising to 2.75m after 40mins 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) backfilled with arisings. 5) PP result at 0.70m = 180kPa and 200kPa

Stability: Stable

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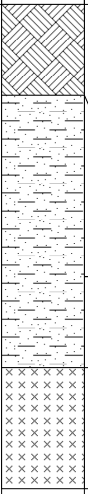
Trial Pit Log

Trialpit No
TP18
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443824.13 - 309197.25 Level: 152.05	Date 03/02/2025
Location: Battram		Dimensions (m): 3.2 × 0.65 Depth 1.60	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing		
	Depth	Type	Results
	0.10	ES	
	0.65	D	
	1.00	D	



Depth (m)	Level (m)	Stratum Description
0.30	151.75	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
1.20	150.85	Stiff, reddish brown, mottled grey, slightly sandy CLAY. Sand is fine. WEATHERED EDWALTON MEMBER *becoming friable at 0.90m*
1.60	150.45	Extremely weak to very weak, greenish grey dolomitic SILTSTONE EDWALTON MEMBER

End of pit at 1.60 m

Remarks: 1) No groundwater ingress encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP result at 0.65m = 100kPa and 125kPa

Stability: Stable

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Trial Pit Log

Trialpit No
TP19
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443359.81 - 309415.62 Level: 158.48	Date 28/01/2025
Location: Battram		Dimensions (m): 2.4 × 0.6 Depth 4.00	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.23	158.25	▨	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	1.00	D		1.90	156.58		Firm to stiff, reddish brown, mottled pale grey, slightly gravelly, sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded of quartzite, gypsum and flint. WEATHERED EDWALTON MEMBER *Subangular cobbles of dolomitic siltstone at 1.30m (280mm x 280mm x 110mm)*
▼	3.00	B		3.90	154.58		Firm, dark reddish brown, mottled black, slightly gravelly CLAY. Gravel is subrounded, fine to coarse of dolomitic siltstone and gypsum. WEATHERED EDWALTON MEMBER
				4.00	154.48		Extremely weak, reddish brown, mottled black MUDSTONE. EDWALTON MEMBER

End of pit at 4.00 m

Remarks: 1) Groundwater ingress encountered as slight seepage at 2.30m bgl 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings.

Stability: Stable

Trial Pit Log

Trialpit No	**TP20**
Sheet	1 of 1
Project Name:	Wiggs Farm
Project No.	TE1808
Co-ords:	443366.42 - 309299.35
Level:	162.41
Date	28/01/2025
Location:	Battram
Dimensions (m):	2.4 × 0.6
Depth	3.60
Scale	1:25
Client:	Barberry Bardon Ltd
Logged	GF

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	ES		0.29	162.12		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
	1.00	D		2.00	160.41		Very stiff, reddish brown, mottled pale grey CLAY WEATHERED EDWALTON MEMBER *Becoming friable at 1.50m bgl*
				2.50	159.91		Extremely weak to very weak, greenish grey SILTSTONE WEATHERED EDWALTON MEMBER
				3.20	159.21		Extremely weak reddish brown MUDSTONE WEATHERED EDWALTON MEMBER
	3.20	B		3.60	158.81		Extremely weak pale grey SILTSTONE EDWALTON MEMBER
							End of pit at 3.60 m

Remarks: 1) Groundwater ingress not encountered 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination 4) Backfilled with arisings. 5) PP result at 0.80m = 180kPa and 1.25m = 180kPa

Stability: Stable

Trial Pit Log

Trialpit No
TP21
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443773.63 - 309572.38 Level: 153.34	Date 03/02/2025
Location: Battram		Dimensions (m): 2.5 × 0.65 Depth 3.40	Scale 1:25
Client: Barberry Bardon Ltd			Logged GF

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.44	152.90	▨	MADE GROUND: Grass over dark brown, slightly silty, slightly sandy, slightly gravelly CLAY with frequent rootlets. Sand is fine to coarse. Gravel is subangular fine of coal. MADE GROUND
▼	0.50	ES		0.70	152.64	▨	MADE GROUND: Black, slightly gravelly, slightly clayey, very sandy SILT. Sand is fine to coarse. Gravel is angular to subangular, fine to medium of coal carbonaceous mudstone and slate. MADE GROUND
				1.80	151.54	⁘	Very stiff, reddish brown, mottled pale grey, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subrounded, fine to coarse of quartzite. WEATHERED EDWALTON MEMBER *becoming friable at 1.10m*
				2.25	151.09	×	Extremely weak, greenish grey dolomitic SILTSTONE WEATHERED EDWALTON MEMBER
				3.40	149.94	▤	Extremely weak, reddish brown MUDSTONE EDWALTON MEMBER

End of pit at 3.40 m

Remarks: 1) Groundwater ingress encountered at 0.50m as slight seepage. 2) Terminated at target depth 3) No visual or olfactory evidence of contamination. 4) Backfilled with arisings 5) PP result at 0.75m = 180kPa and 220kPa

Stability: Stable

Trial Pit Log

Trialpit No	**TP22**	Sheet 1 of 1	
Project Name:	Wiggs Farm	Project No.	TE1808
Co-ords:	443914.44 - 309721.18	Date	03/02/2025
Level:	160.46		
Location:	Battram	Dimensions (m):	3.5 × 0.7
Client:	Barberry Bardon Ltd	Depth	3.00
Scale	1:25	Logged	GF

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.34	160.12	▨	TOPSOIL: Grass over dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
▼				2.95	157.51	▨	Firm, yellowish brown, slightly sandy, slightly gravelly CLAY with frequent sand pockets. Sand is fine to coarse. Gravel is subrounded, fine to coarse of quartzite. WEATHERED EDWALTON MEMBER *Becoming reddish brown mottled green at 0.60m* *Cobble of subrounded flint at 2.60m (200mm x 80mm x 60mm)*
				3.00	157.46	▨	Weak, yellowish brown SANDSTONE EDWALTON MEMBER

End of pit at 3.00 m

Remarks: 1) Groundwater ingress encountered at 0.45m bgl as fast ingress 2) Terminated on rockhead 3) No visual or olfactory evidence of contamination. 4) Backfilled with arisings.

Stability: Stable

Borehole Log

			Borehole No. **WS01** Sheet 1 of 1
Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443465.90 - 309346.38	Hole Type WS
Location: Battram		Level: 159.43	Scale 1:25
Client: Barberry Bardon Ltd		Dates: 31/01/2025 -	Logged By GF

Well	Water Strikes	**Samples and In Situ Testing**			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
					0.23	159.20		Stiff, reddish brown, mottled pale grey CLAY. WEATHERED EDWALTON MEMBER
					0.70	158.73		Extremely weak, greenish grey, dolomitic SILTSTONE WEATHERED EDWALTON MEMBER
		1.10	D					
		1.20	SPTL		1.20	158.23		Stiff, reddish brown, friable CLAY WEATHERED EDWALTON MEMBER
		1.20	S	N=15 (2,2/3,3,4,5)				
		2.00	SPTL					
		2.00	S	N=24 (3,3/5,5,7,7)				
					2.80	156.63		Extremely weak, greenish grey, dolomitic SILTSTONE EDWALTON MEMBER
	▼	3.00	SPTL					
		3.00	S	N=50 (3,8/50 for 275mm)				
					3.43	156.00		End of borehole at 3.43 m

Remarks
1) Hand dug pit to 1.20m bgl 2) Groundwater ingress encountered at 3.00m 3) Terminated on refusal 4) No visual or olfactory evidence of contamination 5) Installed and backfilled.

Borehole Log

Borehole No.	**WS02**	Sheet 1 of 1	
Project Name:	Wiggs Farm	Project No. TE1808	
Co-ords:	443434.70 - 309424.94	Hole Type	WS
Location:	Battram		
Level:	154.92	Scale	1:25
Client:	Barberry Bardon Ltd		
Dates:	31/01/2025 -	Logged By	GF

Well	Water Strikes	Samples and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.25	154.66		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
								Soft, yellowish brown, mottled light grey, slightly gravelly, sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and flint. WEATHERED EDWALTON MEMBER
								Becoming reddish brown, mottled pale grey, slightly sandy at 1.00m
		1.20 1.20	SPTL S	N=7 (2,2/1,2,2,2)				
		1.80	D					
		2.00 2.00	SPTL S	N=22 (1,1/2,2,12,6)				
								Becoming stiff at 2.00m
					2.60	152.32		Weak, bluish grey dolomitic SILTSTONE. WEATHERED EDWALTON MEMBER
					2.70	152.22		Stiff, reddish brown, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to rounded, fine to coarse of quartzite, siltstone and sandstone. WEATHERED EDWALTON MEMBER
		3.00 3.00	SPTL S	N=20 (3,3/4,5,5,6)				
					3.45	151.46		End of borehole at 3.45 m

Remarks

1) Hand dug pit to 1.20m bgl 2) No groundwater ingress encountered 3) Terminated due to rod snapping 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Borehole Log

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443543.61 - 309483.66	Borehole No. **WS03** Sheet 1 of 1
Location: Battram		Level: 154.13	Hole Type WS
			Scale 1:25
Client: Barberry Bardon Ltd		Dates: 31/01/2025 -	Logged By GF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.28	153.85		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
								Stiff, reddish brown CLAY WEATHERED EDWALTON MEMBER
		1.20 1.20	SPTLS	N=21 (3,4/4,5,7,5)				
								Becoming friable at 1.30m
								Layer of greenish grey siltstone at 1.80m to 2.50m
		2.00 2.00	SPTLS	N=24 (3,3/6,6,5,7)				
		2.60	D					
					2.90	151.23		Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER
		3.00 3.00	SPTLS	N=50 (4,4/12,12,13,13)				
					3.45	150.68		End of borehole at 3.45 m

Remarks

1) Hand dug pit to 1.20m bgl 2) No groundwater ingress encountered 3) Terminated on refusal. 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Borehole Log

Borehole No.	**WS04**
	Sheet 1 of 1
Project Name:	Wiggs Farm
Project No.	TE1808
Co-ords:	443633.03 - 309431.10
Hole Type	WS
Location:	Battram
Level:	154.50
Scale	1:25
Client:	Barberry Bardon Ltd
Dates:	31/01/2025 -
Logged By	GF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.34	154.16		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
								Stiff, reddish brown, mottled pale grey, slightly sandy CLAY. Sand is fine. WEATHERED EDWALTON MEMBER
		1.00	D					
		1.20	SPTL					
		1.20	S	N=16 (3,3/3,4,4,5)				
								Layer of extremely weak, greenish grey siltstone at 1.50m to 1.70m
								Layer of extremely weak greenish grey siltstone at 1.80m to 2.10m.
	▼	2.00	SPTL					
		2.00	S	N=22 (5,4/4,5,6,7)				
					2.50	152.00		Extremely weak greenish grey SILTSTONE. EDWALTON MEMBER
		3.00	SPTL					
		3.00	S	50 (8,10/50 for 165mm)				
					3.32	151.18		End of borehole at 3.32 m

Remarks
1) Hand dug pit to 1.20m bgl 2) Groundwater ingress encountered at 2.00m 3) Terminated on refusal 4) No visual or olfactory evidence of contamination. 5) Backfilled with arisings.

Borehole Log

Project Name:	Wiggs Farm	Project No. TE1808	Borehole No. **WS05** Sheet 1 of 1
Co-ords:	443650.53 - 309543.41	Hole Type	WS
Location:	Battram	Level:	154.35
Scale	1:25		
Client:	Barberry Bardon Ltd	Dates:	31/01/2025 -
Logged By	GF		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.27	154.08		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
								Firm reddish brown, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite, siltstone and flint. WEATHERED EDWALTON MEMBER
		1.20	SPTL					
		1.20	S	N=12 (3,2/2,3,3,4)				
		1.60	D					
		2.00	SPTL					
		2.00	S	N=14 (3,4/3,3,4,4)				
		3.00	SPTL					
		3.00	S	N=12 (3,3/3,2,3,4)				
		4.00	SPTL					*Becoming very stiff at 4.00m*
		4.00	S	N=50 (3,4/50 for 235mm)				
					4.39	149.97		End of borehole at 4.39 m

Remarks

1) Hand dug pit to 1.20m bgl 2) No groundwater ingress encountered 3) Terminated on refusal 4) No visual or olfactory evidence of contamination 5) Installed and backfilled.

Borehole Log

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443770.44 - 309626.24	Borehole No. **WS06** Sheet 1 of 2
			Hole Type WS
Location: Battram		Level: 154.80	Scale 1:25
Client: Barberry Bardon Ltd		Dates: 31/01/2025 -	Logged By GF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
▨		0.50	ES		0.45	154.35	▨	MADE GROUND: Grass over, dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. MADE GROUND
▨					0.85	153.95	▨	MADE GROUND: Stiff, yellowish brown CLAY MADE GROUND
▨					1.00	153.80	▨	MADE GROUND: Dark green, angular, fine to coarse GRAVEL of dolerite MADE GROUND
▨		1.00 1.00 - 1.45 1.00 - 4.50 1.20 1.20	D B B SPTL S	N=6 (1,1/1,2,2,1)			▤	Soft, orangish brown, mottled light grey, very sandy CLAY. Sand is fine to coarse. WEATHERED EDWALTON MEMBER
▨		2.00 2.00	SPTL S	N=8 (2,2/2,3,1,2)			▤	
▨							▤	*Becoming reddish brown, mottled pale grey at 2.50m*
▨		3.00 3.00	SPTL S	N=9 (1,2/2,2,2,3)			▤	*Becoming firm at 3.00m*
▨		4.00 4.00	SPTL S	N=6 (1,1/1,1,2,2)			▤	*Becoming soft at 4.00m.*
▨					4.50	150.30	▤	
▨							▒	Loose, brown, silty, fine to coarse SAND WEATHERED EDWALTON MEMBER

Continued on next sheet

Remarks

1) Hand dug pit to 1.20m bgl 2) No groundwater ingress encountered 3) Terminated at target depth 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Borehole Log

Borehole No.	**WS06**	Sheet 2 of 2	
Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443770.44 - 309626.24	Hole Type WS
Location: Battram		Level: 154.80	Scale 1:25
Client: Barberry Bardon Ltd		Dates: 31/01/2025 -	Logged By GF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
▨		5.00 5.00	SPTL S	 N=10 (2,3/2,3,2,3)	5.45	149.35	▨	End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

1) Hand dug pit to 1.20m bgl 2) No groundwater ingress encountered 3) Terminated at target depth 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Borehole Log

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443352.20 - 309354.21	Borehole No. **WS07** Sheet 1 of 1 Hole Type WS
Location: Battram		Level: 161.70	Scale 1:25
Client: Barberry Bardon Ltd		Dates: 10/02/2025 -	Logged By GF

Water Strikes	Samples and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Stratum Description
						TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
				0.70	161.00	Firm, orangish brown mottled reddish brown, slightly gravelly, sandy CLAY. Sand is fine to coarse, Gravel is subrounded, fine to coarse of quartzite and siltstone. WEATHERED EDWALTON MEMBER
	1.20 1.20 1.20 - 4.00	SPTL S B	N=12 (2,2/3,3,3,3)			*becoming reddish brown and slightly sandy at 1.20m*
▼	2.00 2.00	SPTL S	N=8 (1,2/2,2,2,2)			
	3.00 3.00	SPTL S	N=8 (2,2/2,2,2,2)			
						becoming very sandy at 3.85m
	4.00 4.00	SPTL S	N=56 (7,8/13,13,14,16)			*becoming very stiff at 4.00m*
				4.45	157.25	End of borehole at 4.45 m

Remarks

1) Hand dug pit to 1.20m bgl 2) Groundwater ingress encountered at 2.00m 3) Terminated on refusal 4) No visual or olfactory evidence of contamination. 5) Installed and backfilled.

Borehole Log

Borehole No.
WS08
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443465.04 - 309384.67	Hole Type WS
Location: Battram		Level: 158.12	Scale 1:25
Client: Barberry Bardon Ltd		Dates: 10/02/2025 -	Logged By GF

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
					0.22	157.90		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
		1.20 1.20	SPTLS	N=17 (2,3/4,4,4,5)	1.60	156.52		Stiff, reddish brown, mottled grey CLAY WEATHERED EDWALTON MEMBER *becoming friable at 1.20m*
	▼	1.60 - 2.40 2.00 2.00	B SPTLS	 N=16 (2,2/2,3,5,6)	2.40	155.72		Extremely weak, reddish brown MUDSTONE WEATHERED EDWALTON MEMBER
					2.90	155.22		Extremely weak, bluish grey SILTSTONE WEATHERED EDWALTON MEMBER
		3.00		N=50 (12,13/50 for 280mm)	3.28	154.84		Extremely weak, reddish brown MUDSTONE EDWALTON MEMBER

End of borehole at 3.28 m

Remarks
1) Hand dug pit to 1.20m 2) Groundwater ingress encountered at 2.40m 3) Terminated on refusal 4) No visual or olfactory evidence of contamination 5) Backfilled with arsings.

Borehole Log

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443561.34 - 309411.49	Borehole No. **WS09** Sheet 1 of 1
Location: Battram		Level: 156.74	Hole Type WS
Client: Barberry Bardon Ltd		Dates: 10/02/2025 -	Scale 1:25
			Logged By GF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.27	156.46		TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
								Firm, reddish brown, mottled grey CLAY WEATHERED EDWALTON MEMBER
		1.20	SPTL					
		1.20	S	N=10 (2,2/2,2,3,3)				
		2.00	SPTL					
		2.00	S	N=18 (5,4/3,2,6,7)				
	▼							
		2.30 - 2.85	B		2.30	154.44		Extremely weak, greenish grey SILTSTONE WEATHERED EDWALTON MEMBER
					2.85	153.88		Extremely weak, reddish brown MUDSTONE EDWALTON MEMBER
		3.00	SPTL					
		3.00	S	50 (9,12/50 for 210mm)				
					3.36	153.38		End of borehole at 3.36 m

Remarks

1) Hand dug pit to 1.20m bgl 2) Groundwater ingress encountered at 2.20m as moderate seepage. 3) Terminated on refusal 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Borehole Log

			Borehole No. **WS10** Sheet 1 of 1
Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443564.63 - 309331.59	Hole Type WS
Location: Battram		Level: 155.57	Scale 1:25
Client: Barberry Bardon Ltd		Dates: 10/02/2025 -	Logged By GF

Well	Water Strikes	**Samples and In Situ Testing**			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.29	155.28		MADE GROUND: Dark brown, slightly gravelly, slightly sandy CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subangular, fine of quartzite, chert and brick. MADE GROUND	
		0.50	ES					MADE GROUND: Dark brown, mottled reddish brown, slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of chert, quartzite, slate, coal and mudstone. MADE GROUND	
					0.75	154.82		Soft brownish grey, slightly silty, slightly gravelly, very sandy CLAY with frequent relict rootlets. Sand is fine. Gravel is subrounded, medium of quartzite. FORMER TOPSOIL	
	▼								1
		1.20 1.20	SPTLS	N=9 (2,2/2,2,3,2)	1.20	154.37		Firm, reddish brown, mottled grey CLAY WEATHERED EDWALTON MEMBER	
		2.00 2.00	SPTLS	N=20 (3,4/4,5,5,6)				*becoming stiff at 2.00m*	2
		2.50 - 3.00	B		2.50	153.07		Extremely weak, reddish brown MUDSTONE EDWALTON MEMBER	
		3.00 3.00	SPTLS	N=50 (8,9/50 for 235mm)					3
					3.39	152.18		End of borehole at 3.39 m	
									4
									5

Remarks
1) Hand dug pit to 1.20m bgl 2) Groundwater ingress encountered at 1.00m 3) Terminated on refusal 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings

Borehole Log

Borehole No.
WS11
Sheet 1 of 1

Project Name:	Wiggs Farm	Project No. TE1808	Co-ords: 443680.01 - 309500.59	Hole Type WS
Location:	Battram		Level: 152.90	Scale 1:25
Client:	Barberry Bardon Ltd		Dates: 10/02/2025 -	Logged By GF

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
▨					0.24	152.66	▨	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
							┄	Stiff, reddish brown CLAY WEATHERED EDWALTON MEMBER
		1.20 1.20	SPTLS	N=21 (3,3/4,5,6,6)				*becoming friable at 1.20m*
					1.90	151.00	×	Extremely weak bluish grey SILTSTONE EDWALTON MEMBER
		2.00 2.00	SPTLS	N=50 (3,2/50 for 270mm)				
					2.42	150.48		End of borehole at 2.42 m

Remarks
1) Hand dug pit to 1.20m bgl 2) No groundwater ingress encountered 3) Terminated on refusal 4) No visual or olfactory evidence of contamination 5) Backfilled with arisings.

Borehole Log

Borehole No.
WS12
Sheet 1 of 1

Project Name: Wiggs Farm	Project No. TE1808	Co-ords: 443382.13 - 309347.21	Hole Type WS
Location: Battram		Level: 161.36	Scale 1:25
Client: Barberry Bardon Ltd		Dates: 10/02/2025 -	Logged By GF

Well	Water Strikes	Samples and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Stratum Description
					0.36	161.00	TOPSOIL: Dark brown, slightly gravelly, slightly sandy, slightly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of quartzite and carbonaceous mudstone. TOPSOIL
		1.20 1.20 1.50 - 2.60	SPTLS B	N=20 (4,4/4,5,5,6)	1.95	159.41	Stiff, reddish brown CLAY WEATHERED EDWALTON MEMBER *becoming friable at 1.30m* *Layer of extremely weak, greenish grey siltstone at 1.80m-1.90m*
		2.00 2.00	SPTLS	N=16 (3,2/4,4,3,5)	2.60	158.76	Extremely weak, greenish grey SILTSTONE WEATHERED EDWALTON MEMBER
					2.85	158.51	Extremely weak, reddish brown MUDSTONE WEATHERED EDWALTON MEMBER
		3.00 3.00	SPTLS	N=50 (4,6/50 for 280mm)	3.43	157.93	Extremely weak, greenish grey SILTSTONE EDWALTON MEMBER

End of borehole at 3.43 m

Remarks
1) Hand dug pit to 1.20m bgl 2) No groundwater ingress encountered 3) Terminated on refusal 4) No visual or olfactory evidence of contamination 5) Installed and backfilled.

APPENDIX C - GEOENVIRONMENTAL SOIL LABORATORY RESULTS

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Warrington Rd
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WA3 6AE

UKAS TESTING
4225

Attention :	George Foster
Date :	13th February, 2025
Your reference :	TE1808
Our reference :	Test Report 25/1641 Batch 1
Location :	Pallex Battram
Date samples received :	5th February, 2025
Status :	Final Report
Issue :	202502131151

Forty four samples were received for analysis on 5th February, 2025 of which twenty five 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 76.527 kg of CO2

Scope 1&2&3 emissions - 180.853 kg of CO2

Authorised By:

Sean Anglish
Project Coordinator

Client Name:	Tier Environmental	**Report :**	**Solid**
Reference:	TE1808		
Location:	Pallex Battram	**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub	
Contact:	George Foster		
EMT Job No:	25/1641		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	8-11	14	15-17	18	19-21	22	23-26	28-31	32-35	36			
Sample ID	TP13	TP12	TP11	TP11	TP19	TP19	TP20	TP08	TP07	TP07			
Depth	0.50	0.80	0.10	0.70	0.10	1.00	0.20	0.40	0.20	0.60			
COC No / misc													
Containers	V J T	T	V J T	T	J T	T	V J T	V J T	V J T	T			
Sample Date	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025			
Arsenic #	-	-	8.5	-	8.7	-	6.6	3.7	5.1	-	<0.5	mg/kg	TM30/PM15
Cadmium #	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM30/PM15
Chromium #	-	-	63.7	-	24.0	-	55.0	35.4	42.5	-	<0.5	mg/kg	TM30/PM15
Copper #	-	-	16	-	21	-	22	10	21	-	<1	mg/kg	TM30/PM15
Lead #	-	-	27	-	38	-	30	13	29	-	<5	mg/kg	TM30/PM15
Mercury #	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM30/PM15
Nickel #	-	-	13.2	-	14.1	-	21.1	22.7	30.3	-	<0.7	mg/kg	TM30/PM15
Selenium #	-	-	<1	-	1	-	<1	<1	<1	-	<1	mg/kg	TM30/PM15
Sulphur as S	0.02	0.02	-	0.01	-	0.02	-	0.03	-	0.04	<0.01	%	TM30/PM15
Total Sulphate as SO4 #	-	-	249	-	362	-	310	198	386	-	<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	<0.01	0.02	-	<0.01	-	0.02	-	0.02	-	0.04	<0.01	%	TM50/PM29
Zinc #	-	-	52	-	60	-	77	56	100	-	<5	mg/kg	TM30/PM15
Magnesium	NDP	0.0116	-	0.0020	-	0.0015	-	0.0024	-	NDP	<0.0001	g/l	TM30/PM20
Magnesium	0.0256	-	-	-	-	-	-	-	-	0.0147	<0.0001	g/l	TM30/PM60
PAH MS													
Naphthalene #	-	-	<0.04	-	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	-	<0.03	-	<0.03	-	<0.03	<0.03	<0.03	-	<0.03	mg/kg	TM4/PM8
Acenaphthene #	-	-	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	<0.05	mg/kg	TM4/PM8
Fluorene #	-	-	<0.04	-	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Phenanthrene #	-	-	<0.03	-	<0.03	-	<0.03	<0.03	<0.03	-	<0.03	mg/kg	TM4/PM8
Anthracene #	-	-	<0.04	-	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Fluoranthene #	-	-	0.07	-	0.07	-	0.07	<0.03	0.04	-	<0.03	mg/kg	TM4/PM8
Pyrene #	-	-	0.06	-	0.06	-	0.05	<0.03	<0.03	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	-	<0.06	-	<0.06	-	<0.06	<0.06	<0.06	-	<0.06	mg/kg	TM4/PM8
Chrysene #	-	-	0.05	-	<0.02	-	0.05	<0.02	<0.02	-	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	-	-	<0.07	-	<0.07	-	<0.07	<0.07	<0.07	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	-	<0.04	-	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	-	-	<0.04	-	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	-	<0.04	-	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	-	<0.04	-	<0.04	-	<0.04	<0.04	<0.04	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	<0.6	-	<0.6	-	<0.6	<0.6	<0.6	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	<0.02	-	<0.02	-	<0.02	<0.02	<0.02	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	86	-	93	-	95	93	93	-	<0	%	TM4/PM8

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster
EMT Job No: 25/1641

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.	8-11	14	15-17	18	19-21	22	23-26	28-31	32-35	36			
Sample ID	TP13	TP12	TP11	TP11	TP19	TP19	TP20	TP08	TP07	TP07			
Depth	0.50	0.80	0.10	0.70	0.10	1.00	0.20	0.40	0.20	0.60			
COC No / misc													
Containers	V J T	T	V J T	T	J T	T	V J T	V J T	V J T	T			
Sample Date	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025	28/01/2025			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025			
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	-	-	<0.2	-	<0.2	-	<0.2	<0.2	<0.2	-	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	-	-	<4	-	<4	-	<4	<4	<4	-	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	-	-	<7	-	<7	-	<7	<7	<7	-	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	-	-	<7	-	<7	-	<7	<7	<7	-	<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	-	-	<7	-	<7	-	<7	<7	<7	-	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	-	-	<26	-	<26	-	<26	<26	<26	-	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	-	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	-	-	<0.2	-	<0.2	-	<0.2	<0.2	<0.2	-	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	-	-	<4	-	<4	-	<4	<4	<4	-	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	-	-	<7	-	<7	-	<7	<7	<7	-	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	-	-	<7	-	<7	-	<7	<7	<7	-	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	-	-	<7	-	<7	-	<7	<7	<7	-	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH_CU+HS_1D_AR)	-	-	<26	-	<26	-	<26	<26	<26	-	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	-	-	<52	-	<52	-	<52	<52	<52	-	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	-	-	<5	-	<5	-	<5	<5	<5	-	<5	ug/kg	TM36/PM12
Benzene#	-	-	<5	-	<5	-	<5	<5	<5	-	<5	ug/kg	TM36/PM12
Toluene#	-	-	<5	-	<5	-	<5	<5	<5	-	<5	ug/kg	TM36/PM12
Ethylbenzene#	-	-	<5	-	<5	-	<5	<5	<5	-	<5	ug/kg	TM36/PM12
m/p-Xylene#	-	-	<5	-	<5	-	<5	<5	<5	-	<5	ug/kg	TM36/PM12
o-Xylene#	-	-	<5	-	<5	-	<5	<5	<5	-	<5	ug/kg	TM36/PM12
Total Phenols HPLC	-	-	<0.15	-	<0.15	-	<0.15	<0.15	<0.15	-	<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	23.7	17.7	17.2	22.7	24.5	15.3	30.8	17.0	22.7	19.8	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	<0.6	<0.6	-	<0.6	-	<0.6	-	<0.6	-	<0.6	<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE)#	<0.002	0.002	-	<0.002	-	<0.002	-	0.002	-	0.003	<0.002	g/l	TM38/PM20
Hexavalent Chromium#	-	-	<0.3	-	<0.3	-	<0.3	<0.3	<0.3	-	<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	<0.0025	<0.0025	-	<0.0025	-	<0.0025	-	<0.0025	-	0.0049	<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.0099	0.0568	0.0076	0.0175	0.0086	0.0217	0.0096	0.0100	0.0022	0.0078	<0.0015	g/l	TM38/PM20
Total Organic Carbon#	-	-	1.32	-	1.94	-	3.02	0.90	1.87	-	<0.02	%	TM21/PM24
pH#	7.64	7.88	6.42	7.30	8.34	5.12	6.61	7.21	7.13	7.20	<0.01	pH units	TM73/PM11

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: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster
EMT Job No: 25/1641

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.	37-40	41	42-45	46-49	50	51-54	55	56-59	64	69-71			
Sample ID	TP10	TP10	TP15	TP06	TP06	TP09	TP09	TP03	TP04	TP05			
Depth	0.10	1.15	0.70	0.20	2.20	0.20	0.80	0.10	0.60	0.40			
COC No / misc													
Containers	V J T	T	V J T	V J T	T	V J T	T	V J T	T	J T			
Sample Date	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025			
Arsenic #	7.9	-	5.4	7.1	-	6.2	-	8.2	-	3.1	<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM30/PM15
Chromium #	50.6	-	35.0	28.1	-	46.3	-	52.6	-	56.6	<0.5	mg/kg	TM30/PM15
Copper #	19	-	22	27	-	18	-	19	-	12	<1	mg/kg	TM30/PM15
Lead #	32	-	17	33	-	27	-	39	-	<5	<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	<0.1	<0.1	-	0.2	-	<0.1	-	<0.1	<0.1	mg/kg	TM30/PM15
Nickel #	13.1	-	22.3	15.0	-	20.7	-	14.9	-	48.4	<0.7	mg/kg	TM30/PM15
Selenium #	<1	-	1	<1	-	<1	-	2	-	<1	<1	mg/kg	TM30/PM15
Sulphur as S	-	0.02	0.02	-	<0.01	-	0.02	-	0.02	0.02	<0.01	%	TM30/PM15
Total Sulphate as SO4 #	313	-	103	329	-	321	-	446	-	195	<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	-	0.02	0.01	-	<0.01	-	0.01	-	0.01	0.02	<0.01	%	TM50/PM29
Zinc #	64	-	63	69	-	76	-	68	-	77	<5	mg/kg	TM30/PM15
Magnesium	-	0.0024	0.0011	-	0.0011	-	0.0039	-	0.0078	0.0072	<0.0001	g/l	TM30/PM20
Magnesium	-	-	-	-	-	-	-	-	-	-	<0.0001	g/l	TM30/PM60
PAH MS													
Naphthalene #	<0.04	-	<0.04	<0.04	-	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	-	<0.05	<0.05	-	0.08	-	<0.05	-	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	-	<0.04	<0.04	-	0.06	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	-	<0.03	<0.03	-	0.70	-	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	-	<0.04	<0.04	-	0.13	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.06	-	<0.03	0.05	-	0.67	-	0.05	-	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	0.05	-	<0.03	0.05	-	0.52	-	0.05	-	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	-	<0.06	<0.06	-	0.26	-	<0.06	-	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	0.04	-	<0.02	0.04	-	0.26	-	0.04	-	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	-	<0.07	<0.07	-	0.31	-	<0.07	-	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	-	<0.04	<0.04	-	0.17	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	-	<0.04	<0.04	-	0.11	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	-	<0.04	<0.04	-	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	-	<0.04	<0.04	-	0.12	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	-	<0.6	<0.6	-	3.4	-	<0.6	-	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	-	<0.05	<0.05	-	0.22	-	<0.05	-	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	-	<0.02	<0.02	-	0.09	-	<0.02	-	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	89	-	90	87	-	96	-	95	-	87	<0	%	TM4/PM8

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster
EMT Job No: 25/1641

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.	37-40	41	42-45	46-49	50	51-54	55	56-59	64	69-71			
Sample ID	TP10	TP10	TP15	TP06	TP06	TP09	TP09	TP03	TP04	TP05			
Depth	0.10	1.15	0.70	0.20	2.20	0.20	0.80	0.10	0.60	0.40			
COC No / misc													
Containers	V J T	T	V J T	V J T	T	V J T	T	V J T	T	J T			
Sample Date	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025	29/01/2025			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025			
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	-	<4	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	-	<7	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	-	<7	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	-	<7	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<26	-	<26	<26	-	<26	-	<26	-	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	-	<4	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	-	<7	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	<7	-	<7	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	<7	-	<7	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH_CU+HS_1D_AR)	<26	-	<26	<26	-	<26	-	<26	-	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	<52	-	<52	<52	-	<52	-	<52	-	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	<5	-	<5	<5	-	<5	-	<5	-	<5	<5	ug/kg	TM36/PM12
Benzene#	<5	-	<5	<5	-	<5	-	<5	-	<5	<5	ug/kg	TM36/PM12
Toluene#	<5	-	<5	<5	-	<5	-	<5	-	<5	<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	-	<5	<5	-	<5	-	<5	-	<5	<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	-	<5	<5	-	<5	-	<5	-	<5	<5	ug/kg	TM36/PM12
o-Xylene#	<5	-	<5	<5	-	<5	-	<5	-	<5	<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	-	<0.15	<0.15	-	<0.15	-	<0.15	-	<0.15	<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	23.4	18.7	15.2	28.6	17.9	20.0	21.3	23.0	22.6	17.7	<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	<0.6	<0.6	-	<0.6	-	<0.6	-	<0.6	<0.6	<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE)#	-	<0.002	<0.002	-	0.003	-	<0.002	-	<0.002	<0.002	<0.002	g/l	TM38/PM20
Hexavalent Chromium#	<0.3	-	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	-	0.0051	<0.0025	-	<0.0025	-	<0.0025	-	<0.0025	<0.0025	<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.0094	0.0288	0.0080	0.0032	0.0147	0.0053	0.0078	0.0100	0.0231	0.0093	<0.0015	g/l	TM38/PM20
Total Organic Carbon#	1.60	-	0.45	1.93	-	1.54	-	1.61	-	0.15	<0.02	%	TM21/PM24
pH#	6.97	5.09	7.14	6.73	6.27	7.00	7.66	6.90	7.91	8.38	<0.01	pH units	TM73/PM11

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Client Name: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster
EMT Job No: 25/1641

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.	72-75	80	85	101-104							LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	WS05	TP21									
Depth	0.10	0.40	1.60	0.50									
COC No / misc													
Containers	V J T	T	T	V J T									
Sample Date	29/01/2025	29/01/2025	31/01/2025	03/02/2025									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	05/02/2025	05/02/2025	05/02/2025	05/02/2025									
Arsenic #	8.8	4.0	-	11.2							<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	-	<0.1							<0.1	mg/kg	TM30/PM15
Chromium #	32.9	34.2	-	34.9							<0.5	mg/kg	TM30/PM15
Copper #	20	7	-	36							<1	mg/kg	TM30/PM15
Lead #	37	12	-	26							<5	mg/kg	TM30/PM15
Mercury #	0.2	0.1	-	0.2							<0.1	mg/kg	TM30/PM15
Nickel #	13.8	8.8	-	32.6							<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	-	2							<1	mg/kg	TM30/PM15
Sulphur as S	-	0.01	<0.01	0.24							<0.01	%	TM30/PM15
Total Sulphate as SO4 #	270	91	-	571							<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	-	<0.01	<0.01	0.06							<0.01	%	TM50/PM29
Zinc #	56	26	-	58							<5	mg/kg	TM30/PM15
Magnesium	-	0.0009	NDP	0.0054							<0.0001	g/l	TM30/PM20
Magnesium	-	-	0.0367	-							<0.0001	g/l	TM30/PM60
PAH MS													
Naphthalene #	<0.04	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	-	<0.03							<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	-	<0.05							<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.05	<0.03	-	0.11							<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.11	<0.03	-	0.11							<0.03	mg/kg	TM4/PM8
Pyrene #	0.09	<0.03	-	0.11							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.08	<0.06	-	<0.06							<0.06	mg/kg	TM4/PM8
Chrysene #	0.08	<0.02	-	0.09							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.09	<0.07	-	0.13							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	-	0.07							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	-	0.10							<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	-	0.7							<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.06	<0.05	-	0.09							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	<0.02	-	0.04							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	89	92	-	96							<0	%	TM4/PM8

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster
EMT Job No: 25/1641

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.	72-75	80	85	101-104							LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	WS05	TP21									
Depth	0.10	0.40	1.60	0.50									
COC No / misc													
Containers	V J T	T	T	V J T									
Sample Date	29/01/2025	29/01/2025	31/01/2025	03/02/2025									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	05/02/2025	05/02/2025	05/02/2025	05/02/2025									
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1	-	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1	-	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	-	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2	-	4.3							<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	<4	-	18							<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	<7	-	20							<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	19	<7	-	69							<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	<7	-	<7							<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<26	<26	-	111							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1	-	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1	-	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1	-	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2	-	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	<4	-	17							<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	<7	-	56							<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	<7	<7	-	268							<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	<7	<7	-	34							<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH_CU+HS_1D_AR)	<26	<26	-	375							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	<52	<52	-	486							<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	<5	<5	-	<5^{SV}							<5	ug/kg	TM36/PM12
Benzene#	<5	<5	-	<5^{SV}							<5	ug/kg	TM36/PM12
Toluene#	<5	<5	-	<5^{SV}							<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5	-	<5^{SV}							<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	<5	-	<5^{SV}							<5	ug/kg	TM36/PM12
o-Xylene#	<5	<5	-	<5^{SV}							<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	-	<0.15							<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	25.7	11.9	15.7	22.4							<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	<0.6	<0.6	<0.6							<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE)#	-	0.002	<0.002	0.003							<0.002	g/l	TM38/PM20
Hexavalent Chromium#	<0.3	<0.3	-	<0.3							<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	-	<0.0025	<0.0025	0.0034							<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.0039	0.0047	0.0204	0.0206							<0.0015	g/l	TM38/PM20
Total Organic Carbon#	2.41	0.31	-	23.10							<0.02	%	TM21/PM24
pH#	6.79	6.96	6.88	7.29							<0.01	pH units	TM73/PM11

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: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster
EMT Job No: 25/1641

Report : **Solid (Duplicate results)**

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	101-104											
Sample ID	TP21											
Depth	0.50											
COC No / misc												
Containers	V J T											
Sample Date	03/02/2025											
Sample Type	Soil											
Batch Number	1											
Date of Receipt	05/02/2025									LOD/LOR	Units	Method No.
Total Organic Carbon #	30.25									<0.02	%	TM21/PM24

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: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster

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). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

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

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
25/1641	1	TP11	0.10	17	Michael Reilly	10/02/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Michael Reilly	10/02/2025	**Asbestos Fibres**	NAD
					Michael Reilly	10/02/2025	**Asbestos ACM**	NAD
					Michael Reilly	10/02/2025	**Asbestos Type**	NAD
25/1641	1	TP19	0.10	21	Michael Reilly	10/02/2025	**General Description (Bulk Analysis)**	B4rown soil, stones
					Michael Reilly	10/02/2025	**Asbestos Fibres**	NAD
					Michael Reilly	10/02/2025	**Asbestos ACM**	NAD
					Michael Reilly	10/02/2025	**Asbestos Type**	NAD
25/1641	1	TP20	0.20	25	Miriam Silverlock	10/02/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	10/02/2025	**Asbestos Fibres**	NAD
					Miriam Silverlock	10/02/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	10/02/2025	**Asbestos Type**	NAD
25/1641	1	TP07	0.20	34	Michael Reilly	10/02/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Michael Reilly	10/02/2025	**Asbestos Fibres**	NAD
					Michael Reilly	10/02/2025	**Asbestos ACM**	NAD
					Michael Reilly	10/02/2025	**Asbestos Type**	NAD
25/1641	1	TP10	0.10	39	Miriam Silverlock	10/02/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	10/02/2025	**Asbestos Fibres**	Fibre Bundles
					Miriam Silverlock	10/02/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	10/02/2025	**Asbestos Type**	Chrysotile
					Remigiusz Blichowski	11/02/2025	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					Remigiusz Blichowski	11/02/2025	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					Remigiusz Blichowski	11/02/2025	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					Remigiusz Blichowski	11/02/2025	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					Remigiusz Blichowski	11/02/2025	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)
25/1641	1	TP06	0.20	48	Catherine Coles	10/02/2025	**General Description (Bulk Analysis)**	brown soil,stone
					Catherine Coles	10/02/2025	**Asbestos Fibres**	NAD
					Catherine Coles	10/02/2025	**Asbestos ACM**	NAD
					Catherine Coles	10/02/2025	**Asbestos Type**	NAD
25/1641	1	TP09	0.20	53	Miriam Silverlock	10/02/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	10/02/2025	**Asbestos Fibres**	NAD
					Miriam Silverlock	10/02/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	10/02/2025	**Asbestos Type**	NAD

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
25/1641	1	TP03	0.10	58	Miriam Silverlock	10/02/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	10/02/2025	**Asbestos Fibres**	NAD
					Miriam Silverlock	10/02/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	10/02/2025	**Asbestos Type**	NAD
25/1641	1	TP05	0.30	67	Catherine Coles	10/02/2025	**General Description (Bulk Analysis)**	brown soil,stone
					Catherine Coles	10/02/2025	**Asbestos Fibres**	NAD
					Catherine Coles	10/02/2025	**Asbestos ACM**	NAD
					Catherine Coles	10/02/2025	**Asbestos Type**	NAD
25/1641	1	TP21	0.50	103	Catherine Coles	10/02/2025	**General Description (Bulk Analysis)**	brown soil,stone
					Catherine Coles	10/02/2025	**Asbestos Fibres**	NAD
					Catherine Coles	10/02/2025	**Asbestos ACM**	NAD
					Catherine Coles	10/02/2025	**Asbestos Type**	NAD

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
25/1641	1	TP13	0.50	8-11	TM30/PM20	Insufficient sample for test
25/1641	1	TP07	0.60	36	TM30/PM20	Insufficient sample for test
25/1641	1	WS05	1.60	85	TM30/PM20	Insufficient sample for test

Notification of Deviating Samples

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex Battram
Contact: George Foster

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
25/1641	1	TP19	0.10	19-21	EPH	Sample received in inappropriate container
25/1641	1	TP02	0.40	80	EPH	Sample received in inappropriate container

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.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

EMT Job No.: 25/1641

SOILS and ASH

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. Asbestos samples are retained for 6 months.

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. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil 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 is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

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 for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

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 requirement of our Accreditation Body 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.
Laboratory records are kept for a period of no less than 6 years.

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.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 25/1641

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 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 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 8270D v5:2014 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 v2:1996 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.			AR	Yes
TM5	Modified 8015B v2:1996 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
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.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.	Yes		AD	Yes

EMT Job No: 25/1641

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 Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.			AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes

EMT Job No: 25/1641

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
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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 HSG 248 Second edition:2021, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes

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WA3 6AE

UKAS TESTING
4225

Attention :	Adrian Read
Date :	24th February, 2025
Your reference :	TE1808
Our reference :	Test Report 25/2250 Batch 1
Location :	Pallex, Battram
Date samples received :	14th February, 2025
Status :	Final Report
Issue :	202502241716

Two samples were received for analysis on 14th February, 2025 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 9.484 kg of CO2

Scope 1&2&3 emissions - 22.414 kg of CO2

Authorised By:

Bruce Leslie
Project Manager

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex, Battram
Contact: Adrian Read
EMT Job No: 25/2250

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.	1-3	4-6								LOD/LOR	Units	Method No.
Sample ID	WS06	WS10										
Depth	0.50	0.50										
COC No / misc												
Containers	V J T	V J T										
Sample Date	10/02/2025	10/02/2025										
Sample Type	Soil	Soil										
Batch Number	1	1										
Date of Receipt	14/02/2025	14/02/2025										
Arsenic#	5.8	7.8								<0.5	mg/kg	TM30/PM15
Cadmium#	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Chromium#	22.6	50.4								<0.5	mg/kg	TM30/PM15
Copper#	5	39								<1	mg/kg	TM30/PM15
Lead#	8	13								<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel#	7.3	55.0								<0.7	mg/kg	TM30/PM15
Selenium#	<1	<1								<1	mg/kg	TM30/PM15
Sulphur as S	0.01	0.04								<0.01	%	TM30/PM15
Total Sulphate as SO4#	80	393								<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	<0.01	0.04								<0.01	%	TM50/PM29
Zinc#	21	103								<5	mg/kg	TM30/PM15
Magnesium	0.0007	0.0047								<0.0001	g/l	TM30/PM20
PAH MS												
Naphthalene#	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene#	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene#	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene#	0.05	0.11								<0.03	mg/kg	TM4/PM8
Anthracene#	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.19	0.44								<0.03	mg/kg	TM4/PM8
Pyrene#	0.17	0.42								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	0.12	0.26								<0.06	mg/kg	TM4/PM8
Chrysene#	0.12	0.28								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	0.20	0.54								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene#	0.11	0.34								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.10	0.26								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene#	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene#	0.09	0.24								<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.2	2.9								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.14	0.39								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.06	0.15								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	106								<0	%	TM4/PM8

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex, Battram
Contact: Adrian Read
EMT Job No: 25/2250

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.	1-3	4-6											
Sample ID	WS06	WS10											
Depth	0.50	0.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	10/02/2025	10/02/2025											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	14/02/2025	14/02/2025									LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)[#]	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)[#]	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)[#]	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)[#]	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)[#]	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)[#]	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)[#]	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)[#]	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)[#]	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)[#]	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)[#]	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)[#]	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)[#]	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH_CU+HS_1D_AR)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	<52	<52									<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE[#]	<5	<5									<5	ug/kg	TM36/PM12
Benzene[#]	<5	<5									<5	ug/kg	TM36/PM12
Toluene[#]	<5	<5									<5	ug/kg	TM36/PM12
Ethylbenzene[#]	<5	<5									<5	ug/kg	TM36/PM12
m/p-Xylene[#]	<5	<5									<5	ug/kg	TM36/PM12
o-Xylene[#]	<5	<5									<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15									<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	9.2	19.8									<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	<0.6	<0.6									<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE)[#]	0.004	<0.002									<0.002	g/l	TM38/PM20
Hexavalent Chromium[#]	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	<0.0025	<0.0025									<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)[#]	0.0067	0.0339									<0.0015	g/l	TM38/PM20
Total Organic Carbon[#]	0.19	2.20									<0.02	%	TM21/PM24
pH[#]	7.40	7.94									<0.01	pH units	TM73/PM11

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: Tier Environmental
Reference: TE1808
Location: Pallex, Battram
Contact: Adrian Read

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). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

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

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
25/2250	1	WS06	0.50	3	Anthony Carman	19/02/2025	**General Description (Bulk Analysis)**	Brown Soil/Stones
					Anthony Carman	19/02/2025	**Asbestos Fibres**	NAD
					Anthony Carman	19/02/2025	**Asbestos ACM**	NAD
					Anthony Carman	19/02/2025	**Asbestos Type**	NAD
25/2250	1	WS10	0.50	6	Anthony Carman	19/02/2025	**General Description (Bulk Analysis)**	Brown Soil/Stones
					Anthony Carman	19/02/2025	**Asbestos Fibres**	Fibre Bundles
					Anthony Carman	19/02/2025	**Asbestos ACM**	NAD
					Anthony Carman	19/02/2025	**Asbestos Type**	Chrysotile
					Anthony Carman	20/02/2025	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					Anthony Carman	20/02/2025	**Total Detailed Gravimetric Quantification (% Asb)**	0.003 (mass %)
					Anthony Carman	20/02/2025	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	0.003 (mass %)
					Emily Smith	24/02/2025	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					Emily Smith	24/02/2025	**Asbestos Gravimetric & PCOM Total**	0.003 (mass %)

Client Name: Tier Environmental
Reference: TE1808
Location: Pallex, Battram
Contact: Adrian Read

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 25/2250						

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.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

SOILS and ASH

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. Asbestos samples are retained for 6 months.

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. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil 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 is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

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 for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

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 requirement of our Accreditation Body 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.
Laboratory records are kept for a period of no less than 6 years.

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.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 25/2250

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 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 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 8270D v5:2014 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 v2:1996 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.			AR	Yes
TM5	Modified 8015B v2:1996 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
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.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.	Yes		AD	Yes

EMT Job No: 25/2250

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 Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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.			AD	Yes
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.			AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

EMT Job No: 25/2250

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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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 HSG 248 Second edition:2021, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes

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4225

ISO 14001 Environmental Management CERTIFIED

Attention :	George Foster
Date :	11th March, 2025
Your reference :	TE1808
Our reference :	Test Report 25/3043 Batch 1
Location :	Pall-Ex, Battram
Date samples received :	27th February, 2025
Status :	Final Report
Issue :	202503111520

Seven samples were received for analysis on 27th February, 2025 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 23.24 kg of CO2

Scope 1&2&3 emissions - 54.923 kg of CO2

Authorised By:

Bruce Leslie

Project Manager

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster
EMT Job No: 25/3043

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.	1-4	5-8	9-12	13-16							LOD/LOR	Units	Method No.
Sample ID	HDP01	HDP02	HDP03	HDP04									
Depth	0.50	0.50	1.00	0.40									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	25/02/2025	25/02/2025	25/02/2025	25/02/2025									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	27/02/2025	27/02/2025	27/02/2025	27/02/2025									
Arsenic#	5.2	6.4	16.7	10.2							<0.5	mg/kg	TM30/PM15
Cadmium#	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Chromium#	27.5	24.0	20.8	32.2							<0.5	mg/kg	TM30/PM15
Copper#	29	78	90	14							<1	mg/kg	TM30/PM15
Lead#	12	37	30	14							<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Nickel#	22.4	22.8	46.8	13.8							<0.7	mg/kg	TM30/PM15
Selenium#	<1	2	2	1							<1	mg/kg	TM30/PM15
Sulphur as S	0.22	0.35	3.30$_{AA}$	-							<0.01	%	TM30/PM15
Total Sulphate as SO4#	420	4698	1846	685							<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	0.04	0.47	0.18	-							<0.01	%	TM50/PM29
Zinc#	36	24	25	16							<5	mg/kg	TM30/PM15
Magnesium	0.0065	0.1442$_{AA}$	0.0202	-							<0.0001	g/l	TM30/PM20
PAH MS													
Naphthalene#	0.08	0.12	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	0.04							<0.03	mg/kg	TM4/PM8
Acenaphthene#	<0.05	<0.05	<0.05	0.07							<0.05	mg/kg	TM4/PM8
Fluorene#	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Phenanthrene#	0.12	0.16	<0.03	0.49							<0.03	mg/kg	TM4/PM8
Anthracene#	<0.04	<0.04	<0.04	0.15							<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.09	0.13	<0.03	1.68							<0.03	mg/kg	TM4/PM8
Pyrene#	0.10	0.12	<0.03	1.63							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	<0.06	<0.06	<0.06	0.70							<0.06	mg/kg	TM4/PM8
Chrysene#	0.06	0.06	<0.02	0.74							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	0.13	0.10	<0.07	1.38							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene#	0.07	0.06	<0.04	0.76							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.06	<0.04	<0.04	0.49							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene#	<0.04	<0.04	<0.04	0.08							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene#	0.10	0.10	<0.04	0.61							<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	0.9	<0.6	8.8							<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.09	0.07	<0.05	0.99							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.04	0.03	<0.02	0.39							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	88	91	92	90							<0	%	TM4/PM8

Client Name:	Tier Environmental	**Report :**	**Solid**
Reference:	TE1808		
Location:	Pall-Ex, Battram	**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub	
Contact:	George Foster		
EMT Job No:	25/3043		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-4	5-8	9-12	13-16									
Sample ID	HDP01	HDP02	HDP03	HDP04									
Depth	0.50	0.50	1.00	0.40									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	25/02/2025	25/02/2025	25/02/2025	25/02/2025									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	27/02/2025	27/02/2025	27/02/2025	27/02/2025							LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)$^{\#}$	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)$^{\#}$	<0.1^{SV}	<0.1^{SV}	0.2^{SV}	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1^{SV}	<0.1^{SV}	0.1^{SV}	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)$^{\#}$	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)$^{\#}$	10	12	<4	24							<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)$^{\#}$	12	28	<7	33							<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)$^{\#}$	<7	53	<7	177							<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	<7	<7	80							<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<26	93	<26	314							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)$^{\#}$	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)$^{\#}$	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)$^{\#}$	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}	<0.1^{SV}							<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)$^{\#}$	<0.2	0.3	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)$^{\#}$	15	22	18	13							<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)$^{\#}$	38	60	28	88							<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)$^{\#}$	100	237	59	463							<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	27	100	48	187							<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH_CU+HS_1D_AR)	180	419	153	751							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	180	512	153	1065							<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE$^{\#}$	<5^{SV}	<5^{SV}	12^{SV}	<5^{SV}							<5	ug/kg	TM36/PM12
Benzene$^{\#}$	<5^{SV}	<5^{SV}	<5^{SV}	<5^{SV}							<5	ug/kg	TM36/PM12
Toluene$^{\#}$	<5^{SV}	<5^{SV}	<5^{SV}	<5^{SV}							<5	ug/kg	TM36/PM12
Ethylbenzene$^{\#}$	<5^{SV}	<5^{SV}	<5^{SV}	<5^{SV}							<5	ug/kg	TM36/PM12
m/p-Xylene$^{\#}$	<5^{SV}	<5^{SV}	7^{SV}	<5^{SV}							<5	ug/kg	TM36/PM12
o-Xylene$^{\#}$	<5^{SV}	<5^{SV}	<5^{SV}	<5^{SV}							<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15							<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	15.4	15.4	22.2	12.2							<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	<0.6	2.1	1.1	-							<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE)$^{\#}$	0.004	0.020	0.071	-							<0.002	g/l	TM38/PM20
Hexavalent Chromium$^{\#}$	<0.3	<0.3	<0.3	<0.3							<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	<0.0025	<0.0025	<0.0025	-							<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)$^{\#}$	0.0186	1.0971	0.5683	0.0314							<0.0015	g/l	TM38/PM20
Total Organic Carbon$^{\#}$	13.37	10.83	13.39	14.49							<0.02	%	TM21/PM24
pH$^{\#}$	7.57	4.39	8.79	7.70							<0.01	pH units	TM73/PM11

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: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster
EMT Job No: 25/3043

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	17-20	22-25											
Sample ID	WS07	WS05											
Depth	3.90	2.17											
COC No / misc													
Containers	V P G	V P G											
Sample Date	25/02/2025	25/02/2025											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	27/02/2025	27/02/2025									LOD/LOR	Units	Method No.
Dissolved Arsenic#	<0.9	<0.9									<0.9	ug/l	TM170/PM14
Dissolved Cadmium#	0.12	<0.03									<0.03	ug/l	TM170/PM14
Total Dissolved Chromium#	0.4	<0.2									<0.2	ug/l	TM170/PM14
Dissolved Copper#	3	<1									<1	ug/l	TM170/PM14
Dissolved Lead#	<0.4	<0.4									<0.4	ug/l	TM170/PM14
Dissolved Mercury#	<0.5	<0.5									<0.5	ug/l	TM170/PM14
Dissolved Nickel#	22.7	1.9									<0.2	ug/l	TM170/PM14
Dissolved Selenium#	<1.2	<1.2									<1.2	ug/l	TM170/PM14
Dissolved Zinc#	14	4									<3	ug/l	TM170/PM14
Total Hardness Dissolved (as CaCO3)	43	388									<1	mg/l	TM30/PM14
PAH MS													
Naphthalene#	<0.1	<0.1									<0.1	ug/l	TM4/PM30
Acenaphthylene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Acenaphthene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Fluorene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Phenanthrene#	<0.005	0.014									<0.005	ug/l	TM4/PM30
Anthracene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Fluoranthene#	<0.005	0.020									<0.005	ug/l	TM4/PM30
Pyrene#	<0.005	0.021									<0.005	ug/l	TM4/PM30
Benzo(a)anthracene#	<0.005	0.010									<0.005	ug/l	TM4/PM30
Chrysene#	<0.005	0.011									<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene#	<0.008	0.016									<0.008	ug/l	TM4/PM30
Benzo(a)pyrene#	<0.005	0.008									<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
PAH 16 Total#	<0.173	<0.173									<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	0.012									<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008									<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	80	78									<0	%	TM4/PM30
MTBE#	<5	<5									<5	ug/l	TM36/PM12
Benzene#	<5	<5									<5	ug/l	TM36/PM12
Toluene#	<5	<5									<5	ug/l	TM36/PM12
Ethylbenzene#	<5	<5									<5	ug/l	TM36/PM12
m/p-Xylene#	<5	<5									<5	ug/l	TM36/PM12
o-Xylene#	<5	<5									<5	ug/l	TM36/PM12

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster
EMT Job No: 25/3043

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	17-20	22-25											
Sample ID	WS07	WS05											
Depth	3.90	2.17											
COC No / misc													
Containers	V P G	V P G											
Sample Date	25/02/2025	25/02/2025											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	27/02/2025	27/02/2025									LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<10	<10									<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL)#	<10	<10									<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL)#	<10	<10									<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<5	<5									<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>C35-C40 (EH_CU_1D_AL)	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7 (HS_1D_AR)#	<10	<10									<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<10	<10									<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<10	<10									<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<5	<5									<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC35-EC40 (EH_CU_1D_AR)	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aromatics C5-40 (EH_CU+HS_1D_AR)	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total Phenols HPLC	<0.15	<0.15									<0.15	mg/l	TM26/PM0
Sulphate as SO4#	27.3	93.9									<0.5	mg/l	TM38/PM0
Total Ammonia as N#	<0.03	<0.03									<0.03	mg/l	TM38/PM0
pH#	7.33	7.68									<0.01	pH units	TM73/PM0

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster

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). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

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

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
25/3043	1	HDP01	0.50	4	Miriam Silverlock	05/03/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	05/03/2025	**Asbestos Fibres**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos Type**	NAD
25/3043	1	HDP02	0.50	8	Catherine Coles	05/03/2025	**General Description (Bulk Analysis)**	brown soil,sto ne
					Catherine Coles	05/03/2025	**Asbestos Fibres**	NAD
					Catherine Coles	05/03/2025	**Asbestos ACM**	NAD
					Catherine Coles	05/03/2025	**Asbestos Type**	NAD
25/3043	1	HDP03	1.00	12	Catherine Coles	05/03/2025	**General Description (Bulk Analysis)**	brown soil,stone
					Catherine Coles	05/03/2025	**Asbestos Fibres**	NAD
					Catherine Coles	05/03/2025	**Asbestos ACM**	NAD
					Catherine Coles	05/03/2025	**Asbestos Type**	NAD
25/3043	1	HDP04	0.40	16	Miriam Silverlock	05/03/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	05/03/2025	**Asbestos Fibres**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos Type**	NAD

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 25/3043						

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.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample ‘may’ be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 25/3043

SOILS and ASH

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. Asbestos samples are retained for 6 months.

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. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil 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 is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

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 for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

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 requirement of our Accreditation Body 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.
Laboratory records are kept for a period of no less than 6 years.

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.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
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

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 25/3043

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 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 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.				
TM4	Modified USEPA 8270D v5:2014 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.	Yes			
TM4	Modified USEPA 8270D v5:2014 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 8270D v5:2014 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 v2:1996 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 v2:1996 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.	Yes			
TM5	Modified 8015B v2:1996 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.			AR	Yes
TM5	Modified 8015B v2:1996 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	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				

EMT Job No: 25/3043

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
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
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.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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.			AD	Yes
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

EMT Job No: 25/3043

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
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.			AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

EMT Job No: 25/3043

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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma-Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

GECKI-A4CAB-CJZRZ

Report is invalid if pages are removed.

Job name

EMT-25-1641-Batch-1-202502131151

Description/Comments

Project

TE1808

Site

Pallex, Wood Road Development, Battram

Classified by

Name:
Adrian Read
Date:
21 Feb 2025 10:33 GMT
Telephone:
01925 818388

Company:
Tier Environmental
Suite 414
Chadwick House
Warrington
WA3 6AE

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	**Date**
Hazardous Waste Classification	03 Dec 2020
Most recent 3 year Refresher	05 Dec 2023

Next 3 year Refresher due by Dec 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Pallex, Wood Road Development, Battram

Post Code NA

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Proposed redevelopment of land

Description of the specific process, sub-process and/or activity that created the waste

Waste created during excavation of soils during development

Description of the waste

Made ground and/or natural soils

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP13-28/01/2025-0.50m		Non Hazardous		3
2	TP12-28/01/2025-0.80m		Non Hazardous		4
3	TP11-28/01/2025-0.10m		Non Hazardous		5
4	TP11-28/01/2025-0.70m		Non Hazardous		7
5	TP19-28/01/2025-0.10m		Non Hazardous		8
6	TP19-28/01/2025-1.00m		Non Hazardous		10
7	TP20-28/01/2025-0.20m		Non Hazardous		11
8	TP08-28/01/2025-0.40m		Non Hazardous		13
9	TP07-28/01/2025-0.20m		Non Hazardous		15
10	TP07-28/01/2025-0.60m		Non Hazardous		17
11	TP10-29/01/2025-0.10m		Non Hazardous		18
12	TP10-29/01/2025-1.15m		Non Hazardous		20
13	TP15-29/01/2025-0.70m		Non Hazardous		21
14	TP06-29/01/2025-0.20m		Non Hazardous		23
15	TP06-29/01/2025-2.20m		Non Hazardous		25
16	TP09-29/01/2025-0.20m		Non Hazardous		26
17	TP09-29/01/2025-0.80m		Non Hazardous		28
18	TP03-29/01/2025-0.10m		Non Hazardous		29
19	TP04-29/01/2025-0.60m		Non Hazardous		31
20	TP05-29/01/2025-0.40m		Non Hazardous		32
21	TP01-29/01/2025-0.10m		Non Hazardous		34
22	TP02-29/01/2025-0.40m		Non Hazardous		36
23	WS05-31/01/2025-1.60m		Non Hazardous		38
24	TP21-03/02/2025-0.50m		Potentially Hazardous	HP 3(i)	39

Related documents

#	Name	Description
1	EMT-25-1641-Batch-1-202502131151.HWOL	Element .hwol file used to populate the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read

Created date: 21 Feb 2025 10:33 GMT

Appendices

Classification of sample: TP13-28/01/2025-0.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP13-28/01/2025-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
23.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				7.64 pH		7.64 pH	7.64 pH		
				PH							
2	⚛	sulfur { sulfur }				0.02 %		0.0162 %	0.0162 %	✓	
		016-094-00-1	231-722-6	7704-34-9							
								Total:	0.0162 %		

Key

🟨	User supplied data
●	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

Classification of sample: TP12-28/01/2025-0.80m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP12-28/01/2025-0.80m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
17.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				7.88 pH		7.88 pH	7.88 pH		
				PH							
2	⚗	sulfur { sulfur }				0.02 %		0.017 %	0.017 %	✓	
		016-094-00-1	231-722-6	7704-34-9							
								Total:	0.017 %		

Key

🟨	User supplied data
●	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

Classification of sample: TP11-28/01/2025-0.10m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP11-28/01/2025-0.10m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
17.2% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.2% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				8.5	mg/kg	1.32	9.576	mg/kg	0.000958 %	✓	
		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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				63.7	mg/kg	2.27	123.378	mg/kg	0.0123 %	✓	
		024-017-00-8											
4		copper { dicopper oxide; copper (I) oxide }				16	mg/kg	1.126	15.37	mg/kg	0.00154 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
5		lead { lead chromate }			1	27	mg/kg	1.56	35.934	mg/kg	0.0023 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
6		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									
7		nickel { nickel chromate }				13.2	mg/kg	2.976	33.521	mg/kg	0.00335 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
8		selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
		028-031-00-5	239-125-2	15060-62-5									
9		zinc { zinc chromate }				52	mg/kg	2.774	123.085	mg/kg	0.0123 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
10	●	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		**<LOD**
				TPH									
11		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									
12		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
15		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]									

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number									
16	●	pH			PH		6.42	pH		6.42	pH	6.42 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
23	●	fluoranthene		205-912-4	206-44-0		0.07	mg/kg		0.0597	mg/kg	0.00000597 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.06	mg/kg		0.0512	mg/kg	0.00000512 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.05	mg/kg		0.0427	mg/kg	0.00000427 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
29		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
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
31		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
32	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
											Total:	0.0383 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP11-28/01/2025-0.70m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP11-28/01/2025-0.70m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
22.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1	●	pH				7.3	pH		7.3	pH	7.3 pH		
				PH									
2	⚛	sulfur { sulfur }				0.01	%		0.0081	%	0.00815 %	✓	
		016-094-00-1	231-722-6	7704-34-9									
										Total:	0.00815 %		

Key

🟨	User supplied data
●	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

Classification of sample: TP19-28/01/2025-0.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP19-28/01/2025-0.10m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
24.5% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 24.5% Dry Weight Moisture Correction applied (MC)

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU 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	9.226	mg/kg	0.000923 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				24	mg/kg	2.27	43.759	mg/kg	0.00438 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		21	mg/kg	1.126	18.991	mg/kg	0.0019 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	38	mg/kg	1.56	47.609	mg/kg	0.00305 %	✓	
6		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
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14.1	mg/kg	2.976	33.707	mg/kg	0.00337 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		1	mg/kg	2.554	2.051	mg/kg	0.000205 %	✓	
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		60	mg/kg	2.774	133.694	mg/kg	0.0134 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16	●	pH		PH		8.34	pH		8.34	pH	8.34 pH		
17		naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene	201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene	201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene	205-912-4	206-44-0		0.07	mg/kg		0.0562	mg/kg	0.00000562 %	✓	
24	●	pyrene	204-927-3	129-00-0		0.06	mg/kg		0.0482	mg/kg	0.00000482 %	✓	
25		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
26		chrysene 601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
27		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
28		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
29		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**
30	●	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		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**
32	●	benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
										Total:	0.0325 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP19-28/01/2025-1.00m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP19-28/01/2025-1.00m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
15.3% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15.3% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1	●	pH PH				5.12	pH		5.12	pH	5.12 pH		
2		sulfur { sulfur }				0.02	%		0.0173	%	0.0173 %	✓	
		016-094-00-1	231-722-6	7704-34-9									
										Total:	0.0173 %		

Key

🟨	User supplied data
●	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

Classification of sample: TP20-28/01/2025-0.20m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP20-28/01/2025-0.20m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
30.8% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 30.8% Dry Weight Moisture Correction applied (MC)

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number									
1	⚛	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		6.6	mg/kg	1.32	6.662	mg/kg	0.000666 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				55	mg/kg	2.27	95.451	mg/kg	0.00955 %	✓	
4	⚛	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22	mg/kg	1.126	18.937	mg/kg	0.00189 %	✓	
5	⚛	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	30	mg/kg	1.56	35.776	mg/kg	0.00229 %	✓	
6	⚛	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
7	⚛	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		21.1	mg/kg	2.976	48.012	mg/kg	0.0048 %	✓	
8	⚛	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
9	⚛	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		77	mg/kg	2.774	163.31	mg/kg	0.0163 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16	●	pH				6.61	pH		6.61	pH	6.61 pH		
				PH									
17		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
18	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-917-1	208-96-8									
19	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
			201-469-6	83-32-9									
20	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7									
21	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			201-581-5	85-01-8									
22	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			204-371-1	120-12-7									
23	●	fluoranthene				0.07	mg/kg		0.0535	mg/kg	0.00000535 %	✓	
			205-912-4	206-44-0									
24	●	pyrene				0.05	mg/kg		0.0382	mg/kg	0.00000382 %	✓	
			204-927-3	129-00-0									
25		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
26		chrysene				0.05	mg/kg		0.0382	mg/kg	0.00000382 %	✓	
		601-048-00-0	205-923-4	218-01-9									
27		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
28		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
29		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									
30	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
31		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									
32	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0411 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP08-28/01/2025-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP08-28/01/2025-0.40m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
17% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Dry Weight Moisture Correction applied (MC)

#		Determinand	EU 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		3.7 mg/kg	1.32	4.175 mg/kg	0.000418 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				35.4 mg/kg	2.27	68.682 mg/kg	0.00687 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		10 mg/kg	1.126	9.623 mg/kg	0.000962 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	13 mg/kg	1.56	17.331 mg/kg	0.00111 %	✓	
6		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
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22.7 mg/kg	2.976	57.745 mg/kg	0.00577 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		56 mg/kg	2.774	132.78 mg/kg	0.0133 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16	●	pH		PH		7.21	pH		7.21	pH	7.21 pH		
17		naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene	201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene	201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene	205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
24	●	pyrene	204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
25		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
26		chrysene 601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
27		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
28		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
29		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**
30	●	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		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**
32	●	benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
33	⚗	sulfur { sulfur } 016-094-00-1	231-722-6	7704-34-9		0.03	%		0.0256	%	0.0256 %	✓	
										Total:	0.0596 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP07-28/01/2025-0.20m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP07-28/01/2025-0.20m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
22.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22.7% Dry Weight Moisture Correction applied (MC)

#		Determinand	EU 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		5.1	mg/kg	1.32	5.488	mg/kg	0.000549 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				42.5	mg/kg	2.27	78.627	mg/kg	0.00786 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		21	mg/kg	1.126	19.269	mg/kg	0.00193 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	29	mg/kg	1.56	36.866	mg/kg	0.00236 %	✓	
6		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
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		30.3	mg/kg	2.976	73.497	mg/kg	0.00735 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		100	mg/kg	2.774	226.092	mg/kg	0.0226 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand				CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number									
16	●	pH			PH		7.13	pH		7.13	pH	7.13 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		0.04	mg/kg		0.0326	mg/kg	0.00000326 %	✓	
24	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
26		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
29		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**
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		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**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
											Total:	0.0482 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP07-28/01/2025-0.60m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP07-28/01/2025-0.60m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19.8% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 19.8% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1	●	pH 	 	 PH		7.2	pH		7.2	pH	7.2 pH		
2		sulfur { sulfur } 016-094-00-1	 231-722-6	 7704-34-9		0.04	%		0.0334	%	0.0334 %	✓	
										Total:	0.0334 %		

Key

	User supplied data
●	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

Classification of sample: TP10-29/01/2025-0.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP10-29/01/2025-0.10m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
23.4% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23.4% Dry Weight Moisture Correction applied (MC)

#		Determinand				CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7.9 mg/kg	1.32	8.453 mg/kg	0.000845 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				50.6 mg/kg	2.27	93.081 mg/kg	0.00931 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19 mg/kg	1.126	17.335 mg/kg	0.00173 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	32 mg/kg	1.56	40.449 mg/kg	0.00259 %	✓	
6		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
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		13.1 mg/kg	2.976	31.596 mg/kg	0.00316 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		64 mg/kg	2.774	143.878 mg/kg	0.0144 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16	●	pH				6.97	pH		6.97	pH	6.97 pH		
				PH									
17		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
18	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-917-1	208-96-8									
19	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
			201-469-6	83-32-9									
20	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7									
21	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			201-581-5	85-01-8									
22	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			204-371-1	120-12-7									
23	●	fluoranthene				0.06	mg/kg		0.0486	mg/kg	0.00000486 %	✓	
			205-912-4	206-44-0									
24	●	pyrene				0.05	mg/kg		0.0405	mg/kg	0.00000405 %	✓	
			204-927-3	129-00-0									
25		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
26		chrysene				0.04	mg/kg		0.0324	mg/kg	0.00000324 %	✓	
		601-048-00-0	205-923-4	218-01-9									
27		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
28		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
29		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									
30	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
31		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									
32	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
33		asbestos				<0.001	%		<0.001	%	<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:	0.0386 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP10-29/01/2025-1.15m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP10-29/01/2025-1.15m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
18.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				5.09 pH		5.09 pH	5.09 pH		
				PH							
2	⚛	sulfur { sulfur }				0.02 %		0.0168 %	0.0168 %	✓	
		016-094-00-1	231-722-6	7704-34-9							
								Total:	0.0168 %		

Key

	User supplied data
●	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

Classification of sample: TP15-29/01/2025-0.70m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP15-29/01/2025-0.70m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
15.2% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15.2% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		5.4	mg/kg	1.32	6.189	mg/kg	0.000619 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				35	mg/kg	2.27	68.967	mg/kg	0.0069 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22	mg/kg	1.126	21.501	mg/kg	0.00215 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	17	mg/kg	1.56	23.018	mg/kg	0.00148 %	✓	
6		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**
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22.3	mg/kg	2.976	57.613	mg/kg	0.00576 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		1	mg/kg	2.554	2.217	mg/kg	0.000222 %	✓	
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		63	mg/kg	2.774	151.711	mg/kg	0.0152 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		**<LOD**
11		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**
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
15		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**

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
16	●	pH				7.14 pH		7.14 pH	7.14 pH		
				PH							
17		naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3							
18	●	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			205-917-1	208-96-8							
19	●	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
			201-469-6	83-32-9							
20	●	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7							
21	●	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			201-581-5	85-01-8							
22	●	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			204-371-1	120-12-7							
23	●	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0							
24	●	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0							
25		benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3							
26		chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9							
27		benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2							
28		benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9							
29		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							
30	●	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5							
31		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							
32	●	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2							
33	⚛	sulfur { sulfur }				0.02 %		0.0174 %	0.0174 %	✓	
		016-094-00-1	231-722-6	7704-34-9							
								Total:	0.0549 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP06-29/01/2025-0.20m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP06-29/01/2025-0.20m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
28.6% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 28.6% Dry Weight Moisture Correction applied (MC)

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7.1	mg/kg	1.32	7.29	mg/kg	0.000729 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				28.1	mg/kg	2.27	49.601	mg/kg	0.00496 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		27	mg/kg	1.126	23.638	mg/kg	0.00236 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	33	mg/kg	1.56	40.026	mg/kg	0.00257 %	✓	
6		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
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		15	mg/kg	2.976	34.715	mg/kg	0.00347 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		69	mg/kg	2.774	148.846	mg/kg	0.0149 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number								
16	●	pH			PH		6.73	pH		6.73	pH	6.73 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
23	●	fluoranthene		205-912-4	206-44-0		0.05	mg/kg		0.0389	mg/kg	0.00000389 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.05	mg/kg		0.0389	mg/kg	0.00000389 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.04	mg/kg		0.0311	mg/kg	0.00000311 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
29		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
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
31		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
32	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
											Total:	0.0345 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP06-29/01/2025-2.20m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP06-29/01/2025-2.20m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
17.9% (dry weight correction)		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
		EU CLP index number	EC Number	CAS Number							
1	●	pH				6.27 pH		6.27 pH	6.27 pH		
				PH							
2	⚛	sulfur { sulfur }				<0.01 %		<0.01 %	<0.01 %		**<LOD**
		016-094-00-1	231-722-6	7704-34-9							
								Total:	0.01 %		

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

Classification of sample: TP09-29/01/2025-0.20m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	**TP09-29/01/2025-0.20m**	LoW Code:	
Moisture content:	**20%** (dry weight correction)	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% Dry Weight Moisture Correction applied (MC)

#		Determinand	EU 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		6.2 mg/kg	1.32	6.822 mg/kg	0.000682 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				46.3 mg/kg	2.27	87.584 mg/kg	0.00876 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		18 mg/kg	1.126	16.888 mg/kg	0.00169 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	27 mg/kg	1.56	35.096 mg/kg	0.00225 %	✓	
6		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.2 mg/kg	1.353	0.226 mg/kg	0.0000226 %	✓	
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		20.7 mg/kg	2.976	51.341 mg/kg	0.00513 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<**LOD**
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		76 mg/kg	2.774	175.696 mg/kg	0.0176 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<**LOD**
11		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**
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**
15		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**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16	●	pH		PH		7	pH		7	pH	7pH		
17		naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene	201-469-6	83-32-9		0.08	mg/kg		0.0667	mg/kg	0.00000667 %	✓	
20	●	fluorene	201-695-5	86-73-7		0.06	mg/kg		0.05	mg/kg	0.000005 %	✓	
21	●	phenanthrene	201-581-5	85-01-8		0.7	mg/kg		0.583	mg/kg	0.0000583 %	✓	
22	●	anthracene	204-371-1	120-12-7		0.13	mg/kg		0.108	mg/kg	0.0000108 %	✓	
23	●	fluoranthene	205-912-4	206-44-0		0.67	mg/kg		0.558	mg/kg	0.0000558 %	✓	
24	●	pyrene	204-927-3	129-00-0		0.52	mg/kg		0.433	mg/kg	0.0000433 %	✓	
25		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.26	mg/kg		0.217	mg/kg	0.0000217 %	✓	
26		chrysene 601-048-00-0	205-923-4	218-01-9		0.26	mg/kg		0.217	mg/kg	0.0000217 %	✓	
27		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.22	mg/kg		0.183	mg/kg	0.0000183 %	✓	
28		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.09	mg/kg		0.075	mg/kg	0.0000075 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.17	mg/kg		0.142	mg/kg	0.0000142 %	✓	
30	●	indeno[123-cd]pyrene	205-893-2	193-39-5		0.11	mg/kg		0.0917	mg/kg	0.00000917 %	✓	
31		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**
32	●	benzo[ghi]perylene	205-883-8	191-24-2		0.12	mg/kg		0.1	mg/kg	0.00001 %	✓	
										Total:	0.0419 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP09-29/01/2025-0.80m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP09-29/01/2025-0.80m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
21.3% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21.3% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1	●	pH				7.66	pH		7.66	pH	7.66 pH		
				PH									
2		sulfur { sulfur }				0.02	%		0.0165	%	0.0165 %	✓	
		016-094-00-1	231-722-6	7704-34-9									
										Total:	0.0165 %		

Key

🟨	User supplied data
●	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

Classification of sample: TP03-29/01/2025-0.10m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP03-29/01/2025-0.10m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
23% (dry weight correction)		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
		EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				8.2	mg/kg	1.32	8.802	mg/kg	0.00088 %	✓	
		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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				52.6	mg/kg	2.27	97.075	mg/kg	0.00971 %	✓	
		024-017-00-8											
4		copper { dicopper oxide; copper (I) oxide }				19	mg/kg	1.126	17.392	mg/kg	0.00174 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
5		lead { lead chromate }			1	39	mg/kg	1.56	49.458	mg/kg	0.00317 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
6		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									
7		nickel { nickel chromate }				14.9	mg/kg	2.976	36.054	mg/kg	0.00361 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
8		selenium { nickel selenate }				2	mg/kg	2.554	4.153	mg/kg	0.000415 %	✓	
		028-031-00-5	239-125-2	15060-62-5									
9		zinc { zinc chromate }				68	mg/kg	2.774	153.367	mg/kg	0.0153 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
10	●	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		**<LOD**
				TPH									
11		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									
12		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
15		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]									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number								
16	●	pH			PH		6.9	pH		6.9	pH	6.9 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.04	mg/kg		0.0325	mg/kg	0.00000325 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
29		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**
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		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**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
											Total:	0.0401 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP04-29/01/2025-0.60m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP04-29/01/2025-0.60m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
22.6% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22.6% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				7.91 pH		7.91 pH	7.91 pH		
				PH							
2	⚛	sulfur { sulfur }				0.02 %		0.0163 %	0.0163 %	✓	
		016-094-00-1	231-722-6	7704-34-9							
								Total:	0.0163 %		

Key

🟨	User supplied data
●	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

Classification of sample: TP05-29/01/2025-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP05-29/01/2025-0.40m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
17.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				3.1	mg/kg	1.32	3.477	mg/kg	0.000348 %	✓	
		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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				56.6	mg/kg	2.27	109.161	mg/kg	0.0109 %	✓	
		024-017-00-8											
4		copper { dicopper oxide; copper (I) oxide }				12	mg/kg	1.126	11.479	mg/kg	0.00115 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
5		lead { lead chromate }			1	<5	mg/kg	1.56	<7.799	mg/kg	<0.0005 %		<LOD
		082-004-00-2	231-846-0	7758-97-6									
6		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									
7		nickel { nickel chromate }				48.4	mg/kg	2.976	122.388	mg/kg	0.0122 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
8		selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5									
9		zinc { zinc chromate }				77	mg/kg	2.774	181.486	mg/kg	0.0181 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
10	●	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
				TPH									
11		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									
12		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
15		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]									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16	●	pH				8.38	pH		8.38	pH	8.38 pH		
				PH									
17		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
18	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-917-1	208-96-8									
19	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
			201-469-6	83-32-9									
20	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7									
21	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			201-581-5	85-01-8									
22	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			204-371-1	120-12-7									
23	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0									
24	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0									
25		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
26		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
27		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
28		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
29		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									
30	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
31		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									
32	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
33	⚛	sulfur { sulfur }				0.02	%		0.017	%	0.017 %	✓	
		016-094-00-1	231-722-6	7704-34-9									
										Total:	0.0658 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP01-29/01/2025-0.10m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP01-29/01/2025-0.10m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
25.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 25.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }											
		033-003-00-0	215-481-4	1327-53-3		8.8	mg/kg	1.32	9.243	mg/kg	0.000924 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }											
		024-017-00-8				32.9	mg/kg	2.27	59.414	mg/kg	0.00594 %	✓	
4		copper { dicopper oxide; copper (I) oxide }											
		029-002-00-X	215-270-7	1317-39-1		20	mg/kg	1.126	17.914	mg/kg	0.00179 %	✓	
5		lead { lead chromate }											
		082-004-00-2	231-846-0	7758-97-6	1	37	mg/kg	1.56	45.913	mg/kg	0.00294 %	✓	
6		mercury { mercury dichloride }											
		080-010-00-X	231-299-8	7487-94-7		0.2	mg/kg	1.353	0.215	mg/kg	0.0000215 %	✓	
7		nickel { nickel chromate }											
		028-035-00-7	238-766-5	14721-18-7		13.8	mg/kg	2.976	32.675	mg/kg	0.00327 %	✓	
8		selenium { nickel selenate }											
		028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
9		zinc { zinc chromate }											
		024-007-00-3	236-878-9	13530-65-9		56	mg/kg	2.774	123.59	mg/kg	0.0124 %	✓	
10	●	TPH (C6 to C40) petroleum group											
				TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11		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
12		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16	●	pH		PH		6.79	pH		6.79	pH	6.79 pH		
17		naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene	201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene	201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene	201-581-5	85-01-8		0.05	mg/kg		0.0398	mg/kg	0.00000398 %	✓	
22	●	anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene	205-912-4	206-44-0		0.11	mg/kg		0.0875	mg/kg	0.00000875 %	✓	
24	●	pyrene	204-927-3	129-00-0		0.09	mg/kg		0.0716	mg/kg	0.00000716 %	✓	
25		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.08	mg/kg		0.0636	mg/kg	0.00000636 %	✓	
26		chrysene 601-048-00-0	205-923-4	218-01-9		0.08	mg/kg		0.0636	mg/kg	0.00000636 %	✓	
27		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.06	mg/kg		0.0477	mg/kg	0.00000477 %	✓	
28		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.03	mg/kg		0.0239	mg/kg	0.00000239 %	✓	
29		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**
30	●	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		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**
32	●	benzo[ghi]perylene	205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
										Total:	0.0328 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP02-29/01/2025-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP02-29/01/2025-0.40m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
11.9% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	EU 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		4	mg/kg	1.32	4.72	mg/kg	0.000472 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				34.2	mg/kg	2.27	69.378	mg/kg	0.00694 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		7	mg/kg	1.126	7.043	mg/kg	0.000704 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	12	mg/kg	1.56	16.727	mg/kg	0.00107 %	✓	
6		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.121	mg/kg	0.0000121 %	✓	
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		8.8	mg/kg	2.976	23.406	mg/kg	0.00234 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		26	mg/kg	2.774	64.457	mg/kg	0.00645 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number									
16	●	pH			PH		6.96	pH		6.96	pH	6.96 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
24	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
26		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
29		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**
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		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**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
33	⚗	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		0.01	%		0.0089	%	0.00894 %	✓	
											Total:	0.0325 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS05-31/01/2025-1.60m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
WS05-31/01/2025-1.60m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
15.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15.7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1	●	pH				6.88	pH		6.88	pH	6.88 pH		
				PH									
2	⚛	sulfur { sulfur }				<0.01	%		<0.01	%	<0.01 %		**<LOD**
		016-094-00-1	231-722-6	7704-34-9									
										Total:	0.01 %		

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

Classification of sample: TP21-03/02/2025-0.50m

Potentially Hazardous Waste
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP21-03/02/2025-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
22.4% (dry weight correction)		Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

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"

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.0397%)

Determinands

Moisture content: 22.4% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11.2	mg/kg	1.32	12.081	mg/kg	0.00121 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				34.9	mg/kg	2.27	64.725	mg/kg	0.00647 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		36	mg/kg	1.126	33.114	mg/kg	0.00331 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	26	mg/kg	1.56	33.133	mg/kg	0.00212 %	✓	
6		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.2	mg/kg	1.353	0.221	mg/kg	0.0000221 %	✓	
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		32.6	mg/kg	2.976	79.27	mg/kg	0.00793 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		2	mg/kg	2.554	4.173	mg/kg	0.000417 %	✓	
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		58	mg/kg	2.774	131.455	mg/kg	0.0131 %	✓	
10		TPH (C6 to C40) petroleum group			TPH		486	mg/kg		397.059	mg/kg	0.0397 %	✓	
11		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**
12		benzene	601-020-00-8	200-753-7	71-43-2		<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
			EU CLP index number	EC Number	CAS Number							
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15		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
16	●	pH			PH		7.29 pH		7.29 pH	7.29 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
18	●	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	●	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	●	fluorene		201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
21	●	phenanthrene		201-581-5	85-01-8		0.11 mg/kg		0.0899 mg/kg	0.00000899 %	✓	
22	●	anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
23	●	fluoranthene		205-912-4	206-44-0		0.11 mg/kg		0.0899 mg/kg	0.00000899 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.11 mg/kg		0.0899 mg/kg	0.00000899 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.09 mg/kg		0.0735 mg/kg	0.00000735 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.09 mg/kg		0.0735 mg/kg	0.00000735 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.04 mg/kg		0.0327 mg/kg	0.00000327 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.07 mg/kg		0.0572 mg/kg	0.00000572 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
31		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
32	●	benzo[ghi]perylene		205-883-8	191-24-2		0.1 mg/kg		0.0817 mg/kg	0.00000817 %	✓	
33	⚛	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		0.24 %		0.196 %	0.196 %	✓	
									Total:	0.271 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
🟧	Potentially 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
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

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: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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 Acute 1; H400 , Aquatic Chronic 1; H410

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: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

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: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

● **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 Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

sulfur {sulfur}

Worse case compound

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(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (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 {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (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 v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2025.24.6453.11761 (25 Jan 2025)
HazWasteOnline Database: 2025.24.6453.11761 (25 Jan 2025)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
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 Waste 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
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024
GB MCL List v5.0 - version 5.0 of 26th June 2024

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

09H6X-H29YS-773WY

Report is invalid if pages are removed.

Job name

EMT-25-2250-Batch-1-202502241716

Description/Comments

Project

TE1808

Site

Pallex, Wood Road Development, Battram

Classified by

Name:
Adrian Read
Date:
25 Feb 2025 07:57 GMT
Telephone:
01925 818388

Company:
Tier Environmental
Suite 414
Chadwick House
Warrington
WA3 6AE

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	**Date**
Hazardous Waste Classification	03 Dec 2020
Most recent 3 year Refresher	05 Dec 2023

Next 3 year Refresher due by Dec 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Pallex, Wood Road Development, Battram **Post Code** LE67 1GE

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Proposed redevelopment of land

Description of the specific process, sub-process and/or activity that created the waste

Waste created during excavation of soils during development

Description of the waste

Made ground and/or natural soils

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS06-10/02/2025-0.50m		Non Hazardous		3
2	WS10-10/02/2025-0.50m		Non Hazardous		5

Related documents

#	Name	Description
1	EMT-25-2250-Batch-1-202502241716.HWOL	Element .hwol file used to populate the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read	Created date: 25 Feb 2025 07:57 GMT

Classification of sample: WS06-10/02/2025-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
WS06-10/02/2025-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
9.2% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.2% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		5.8	mg/kg	1.32	7.013	mg/kg	0.000701 %	✓	
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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				22.6	mg/kg	2.27	46.98	mg/kg	0.0047 %	✓	
4		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		5	mg/kg	1.126	5.155	mg/kg	0.000516 %	✓	
5		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	8	mg/kg	1.56	11.427	mg/kg	0.000733 %	✓	
6		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
7		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		7.3	mg/kg	2.976	19.896	mg/kg	0.00199 %	✓	
8		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
9		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		21	mg/kg	2.774	53.349	mg/kg	0.00533 %	✓	
10	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
11		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
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		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

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
16	●	pH									
				PH		7.4 pH		7.4 pH	7.4 pH		
17		naphthalene									
		601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene									
			205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene									
			201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
20	●	fluorene									
			201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene									
			201-581-5	85-01-8		0.05 mg/kg		0.0458 mg/kg	0.00000458 %	✓	
22	●	anthracene									
			204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene									
			205-912-4	206-44-0		0.19 mg/kg		0.174 mg/kg	0.0000174 %	✓	
24	●	pyrene									
			204-927-3	129-00-0		0.17 mg/kg		0.156 mg/kg	0.0000156 %	✓	
25		benzo[a]anthracene									
		601-033-00-9	200-280-6	56-55-3		0.12 mg/kg		0.11 mg/kg	0.000011 %	✓	
26		chrysene									
		601-048-00-0	205-923-4	218-01-9		0.12 mg/kg		0.11 mg/kg	0.000011 %	✓	
27		benzo[b]fluoranthene									
		601-034-00-4	205-911-9	205-99-2		0.14 mg/kg		0.128 mg/kg	0.0000128 %	✓	
28		benzo[k]fluoranthene									
		601-036-00-5	205-916-6	207-08-9		0.06 mg/kg		0.0549 mg/kg	0.00000549 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene									
		601-032-00-3	200-028-5	50-32-8		0.11 mg/kg		0.101 mg/kg	0.0000101 %	✓	
30	●	indeno[123-cd]pyrene									
			205-893-2	193-39-5		0.1 mg/kg		0.0916 mg/kg	0.00000916 %	✓	
31		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**
32	●	benzo[ghi]perylene									
			205-883-8	191-24-2		0.09 mg/kg		0.0824 mg/kg	0.00000824 %	✓	
33	⚗	sulfur { sulfur }									
		016-094-00-1	231-722-6	7704-34-9		0.01 %		0.0091 %	0.00916 %	✓	
								Total:	0.0287 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS10-10/02/2025-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
WS10-10/02/2025-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
19.8% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.8% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				7.8 mg/kg	1.32	8.596 mg/kg	0.00086 %	✓	
		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(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				50.4 mg/kg	2.27	95.499 mg/kg	0.00955 %	✓	
		024-017-00-8									
4		copper { dicopper oxide; copper (I) oxide }				39 mg/kg	1.126	36.652 mg/kg	0.00367 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
5		lead { lead chromate }			1	13 mg/kg	1.56	16.926 mg/kg	0.00109 %	✓	
		082-004-00-2	231-846-0	7758-97-6							
6		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							
7		nickel { nickel chromate }				55 mg/kg	2.976	136.64 mg/kg	0.0137 %	✓	
		028-035-00-7	238-766-5	14721-18-7							
8		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		**<LOD**
		028-031-00-5	239-125-2	15060-62-5							
9		zinc { zinc chromate }				103 mg/kg	2.774	238.512 mg/kg	0.0239 %	✓	
		024-007-00-3	236-878-9	13530-65-9							
10	●	TPH (C6 to C40) petroleum group				<52 mg/kg		<52 mg/kg	<0.0052 %		**<LOD**
				TPH							
11		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							
12		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2							
13		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3							
14	●	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4							
15		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]							

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16	●	pH			PH		7.94	pH		7.94	pH	7.94 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		0.11	mg/kg		0.0918	mg/kg	0.00000918 %	✓	
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		0.44	mg/kg		0.367	mg/kg	0.0000367 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.42	mg/kg		0.351	mg/kg	0.0000351 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.26	mg/kg		0.217	mg/kg	0.0000217 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.28	mg/kg		0.234	mg/kg	0.0000234 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.39	mg/kg		0.326	mg/kg	0.0000326 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.15	mg/kg		0.125	mg/kg	0.0000125 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.34	mg/kg		0.284	mg/kg	0.0000284 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.26	mg/kg		0.217	mg/kg	0.0000217 %	✓	
31		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**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		0.24	mg/kg		0.2	mg/kg	0.00002 %	✓	
33	⚗	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		0.04	%		0.0334	%	0.0334 %	✓	
34		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		0.003	%		0.0025	%	0.0025 %	✓	
											Total:	0.0943 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

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: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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 Acute 1; H400 , Aquatic Chronic 1; H410

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: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

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: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **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 Acute 1; H400 , Aquatic Chronic 1; H410

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(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (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 {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

sulfur {sulfur}

Worse case compound

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2025.24.6453.11761 (25 Jan 2025)
HazWasteOnline Database: 2025.24.6453.11761 (25 Jan 2025)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
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 Waste 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
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024
GB MCL List v5.0 - version 5.0 of 26th June 2024

APPENDIX D - GEOENVIRONMENTAL GROUNDWATER LABORATORY RESULTS

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

Tier Environmental
Suite 414, Chadwick House
Warrington Rd
Birchwood
Warrington
United Kingdom
WA3 6AE

4225

ISO 14001
Environmental
Management
CERTIFIED

Attention :	George Foster
Date :	11th March, 2025
Your reference :	TE1808
Our reference :	Test Report 25/3043 Batch 1
Location :	Pall-Ex, Battram
Date samples received :	27th February, 2025
Status :	Final Report
Issue :	202503111520

Seven samples were received for analysis on 27th February, 2025 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 23.24 kg of CO2

Scope 1&2&3 emissions - 54.923 kg of CO2

Authorised By:

Bruce Leslie
Project Manager

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster
EMT Job No: 25/3043

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.	1-4	5-8	9-12	13-16									
Sample ID	HDP01	HDP02	HDP03	HDP04									
Depth	0.50	0.50	1.00	0.40									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	25/02/2025	25/02/2025	25/02/2025	25/02/2025									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1							LOD/LOR	Units	Method No.
Date of Receipt	27/02/2025	27/02/2025	27/02/2025	27/02/2025									
Arsenic#	5.2	6.4	16.7	10.2							<0.5	mg/kg	TM30/PM15
Cadmium#	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Chromium#	27.5	24.0	20.8	32.2							<0.5	mg/kg	TM30/PM15
Copper#	29	78	90	14							<1	mg/kg	TM30/PM15
Lead#	12	37	30	14							<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Nickel#	22.4	22.8	46.8	13.8							<0.7	mg/kg	TM30/PM15
Selenium#	<1	2	2	1							<1	mg/kg	TM30/PM15
Sulphur as S	0.22	0.35	3.30$_{AA}$	-							<0.01	%	TM30/PM15
Total Sulphate as SO4#	420	4698	1846	685							<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	0.04	0.47	0.18	-							<0.01	%	TM50/PM29
Zinc#	36	24	25	16							<5	mg/kg	TM30/PM15
Magnesium	0.0065	0.1442$_{AA}$	0.0202	-							<0.0001	g/l	TM30/PM20
PAH MS													
Naphthalene#	0.08	0.12	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	0.04							<0.03	mg/kg	TM4/PM8
Acenaphthene#	<0.05	<0.05	<0.05	0.07							<0.05	mg/kg	TM4/PM8
Fluorene#	<0.04	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Phenanthrene#	0.12	0.16	<0.03	0.49							<0.03	mg/kg	TM4/PM8
Anthracene#	<0.04	<0.04	<0.04	0.15							<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.09	0.13	<0.03	1.68							<0.03	mg/kg	TM4/PM8
Pyrene#	0.10	0.12	<0.03	1.63							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	<0.06	<0.06	<0.06	0.70							<0.06	mg/kg	TM4/PM8
Chrysene#	0.06	0.06	<0.02	0.74							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	0.13	0.10	<0.07	1.38							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene#	0.07	0.06	<0.04	0.76							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.06	<0.04	<0.04	0.49							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene#	<0.04	<0.04	<0.04	0.08							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene#	0.10	0.10	<0.04	0.61							<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	0.9	<0.6	8.8							<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.09	0.07	<0.05	0.99							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.04	0.03	<0.02	0.39							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	88	91	92	90							<0	%	TM4/PM8

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster
EMT Job No: 25/3043

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.	1-4	5-8	9-12	13-16									
Sample ID	HDP01	HDP02	HDP03	HDP04									
Depth	0.50	0.50	1.00	0.40									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	25/02/2025	25/02/2025	25/02/2025	25/02/2025									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1							LOD/LOR	Units	Method No.
Date of Receipt	27/02/2025	27/02/2025	27/02/2025	27/02/2025									
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$							<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	$<0.1^{SV}$	$<0.1^{SV}$	0.2^{SV}	$<0.1^{SV}$							<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	$<0.1^{SV}$	$<0.1^{SV}$	0.1^{SV}	$<0.1^{SV}$							<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	10	12	<4	24							<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	12	28	<7	33							<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	53	<7	177							<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	<7	<7	80							<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<26	93	<26	314							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$							<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$							<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$	$<0.1^{SV}$							<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	0.3	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	15	22	18	13							<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	38	60	28	88							<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	100	237	59	463							<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	27	100	48	187							<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH_CU+HS_1D_AR)	180	419	153	751							<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	180	512	153	1065							<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	$<5^{SV}$	$<5^{SV}$	12^{SV}	$<5^{SV}$							<5	ug/kg	TM36/PM12
Benzene#	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$							<5	ug/kg	TM36/PM12
Toluene#	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$							<5	ug/kg	TM36/PM12
Ethylbenzene#	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$							<5	ug/kg	TM36/PM12
m/p-Xylene#	$<5^{SV}$	$<5^{SV}$	7^{SV}	$<5^{SV}$							<5	ug/kg	TM36/PM12
o-Xylene#	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$	$<5^{SV}$							<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15							<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	15.4	15.4	22.2	12.2							<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	<0.6	2.1	1.1	-							<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE)#	0.004	0.020	0.071	-							<0.002	g/l	TM38/PM20
Hexavalent Chromium#	<0.3	<0.3	<0.3	<0.3							<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	<0.0025	<0.0025	<0.0025	-							<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.0186	1.0971	0.5683	0.0314							<0.0015	g/l	TM38/PM20
Total Organic Carbon#	13.37	10.83	13.39	14.49							<0.02	%	TM21/PM24
pH#	7.57	4.39	8.79	7.70							<0.01	pH units	TM73/PM11

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: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster
EMT Job No: 25/3043

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	17-20	22-25											
Sample ID	WS07	WS05											
Depth	3.90	2.17											
COC No / misc													
Containers	V P G	V P G											
Sample Date	25/02/2025	25/02/2025											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	27/02/2025	27/02/2025									LOD/LOR	Units	Method No.
Dissolved Arsenic#	<0.9	<0.9									<0.9	ug/l	TM170/PM14
Dissolved Cadmium#	0.12	<0.03									<0.03	ug/l	TM170/PM14
Total Dissolved Chromium#	0.4	<0.2									<0.2	ug/l	TM170/PM14
Dissolved Copper#	3	<1									<1	ug/l	TM170/PM14
Dissolved Lead#	<0.4	<0.4									<0.4	ug/l	TM170/PM14
Dissolved Mercury#	<0.5	<0.5									<0.5	ug/l	TM170/PM14
Dissolved Nickel#	22.7	1.9									<0.2	ug/l	TM170/PM14
Dissolved Selenium#	<1.2	<1.2									<1.2	ug/l	TM170/PM14
Dissolved Zinc#	14	4									<3	ug/l	TM170/PM14
Total Hardness Dissolved (as CaCO3)	43	388									<1	mg/l	TM30/PM14
PAH MS													
Naphthalene#	<0.1	<0.1									<0.1	ug/l	TM4/PM30
Acenaphthylene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Acenaphthene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Fluorene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Phenanthrene#	<0.005	0.014									<0.005	ug/l	TM4/PM30
Anthracene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Fluoranthene#	<0.005	0.020									<0.005	ug/l	TM4/PM30
Pyrene#	<0.005	0.021									<0.005	ug/l	TM4/PM30
Benzo(a)anthracene#	<0.005	0.010									<0.005	ug/l	TM4/PM30
Chrysene#	<0.005	0.011									<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene#	<0.008	0.016									<0.008	ug/l	TM4/PM30
Benzo(a)pyrene#	<0.005	0.008									<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene#	<0.005	<0.005									<0.005	ug/l	TM4/PM30
PAH 16 Total#	<0.173	<0.173									<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	0.012									<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008									<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	80	78									<0	%	TM4/PM30
MTBE#	<5	<5									<5	ug/l	TM36/PM12
Benzene#	<5	<5									<5	ug/l	TM36/PM12
Toluene#	<5	<5									<5	ug/l	TM36/PM12
Ethylbenzene#	<5	<5									<5	ug/l	TM36/PM12
m/p-Xylene#	<5	<5									<5	ug/l	TM36/PM12
o-Xylene#	<5	<5									<5	ug/l	TM36/PM12

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster
EMT Job No: 25/3043

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	17-20	22-25											
Sample ID	WS07	WS05											
Depth	3.90	2.17											
COC No / misc													
Containers	V P G	V P G											
Sample Date	25/02/2025	25/02/2025											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	27/02/2025	27/02/2025									LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<10	<10									<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL)#	<10	<10									<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL)#	<10	<10									<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<5	<5									<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>C35-C40 (EH_CU_1D_AL)	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7 (HS_1D_AR)#	<10	<10									<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<10	<10									<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<10	<10									<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<5	<5									<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR)#	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC35-EC40 (EH_CU_1D_AR)	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aromatics C5-40 (EH_CU+HS_1D_AR)	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-40) (EH_CU+HS_1D_Total)	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total Phenols HPLC	<0.15	<0.15									<0.15	mg/l	TM26/PM0
Sulphate as SO4#	27.3	93.9									<0.5	mg/l	TM38/PM0
Total Ammonia as N#	<0.03	<0.03									<0.03	mg/l	TM38/PM0
pH#	7.33	7.68									<0.01	pH units	TM73/PM0

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: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster

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). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

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

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
25/3043	1	HDP01	0.50	4	Miriam Silverlock	05/03/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	05/03/2025	**Asbestos Fibres**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos Type**	NAD
25/3043	1	HDP02	0.50	8	Catherine Coles	05/03/2025	**General Description (Bulk Analysis)**	brown soil,sto ne
					Catherine Coles	05/03/2025	**Asbestos Fibres**	NAD
					Catherine Coles	05/03/2025	**Asbestos ACM**	NAD
					Catherine Coles	05/03/2025	**Asbestos Type**	NAD
25/3043	1	HDP03	1.00	12	Catherine Coles	05/03/2025	**General Description (Bulk Analysis)**	brown soil,stone
					Catherine Coles	05/03/2025	**Asbestos Fibres**	NAD
					Catherine Coles	05/03/2025	**Asbestos ACM**	NAD
					Catherine Coles	05/03/2025	**Asbestos Type**	NAD
25/3043	1	HDP04	0.40	16	Miriam Silverlock	05/03/2025	**General Description (Bulk Analysis)**	Brown soil, stones
					Miriam Silverlock	05/03/2025	**Asbestos Fibres**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos ACM**	NAD
					Miriam Silverlock	05/03/2025	**Asbestos Type**	NAD

Client Name: Tier Environmental
Reference: TE1808
Location: Pall-Ex, Battram
Contact: George Foster

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 25/3043						

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.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 25/3043

SOILS and ASH

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. Asbestos samples are retained for 6 months.

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. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil 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 is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

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 for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

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 requirement of our Accreditation Body 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.
Laboratory records are kept for a period of no less than 6 years.

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.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
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

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 25/3043

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 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 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.				
TM4	Modified USEPA 8270D v5:2014 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.	Yes			
TM4	Modified USEPA 8270D v5:2014 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 8270D v5:2014 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 v2:1996 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 v2:1996 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.	Yes			
TM5	Modified 8015B v2:1996 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.			AR	Yes
TM5	Modified 8015B v2:1996 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	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				

EMT Job No: 25/3043

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
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
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.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 degrees Celsius. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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.			AD	Yes
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

EMT Job No: 25/3043

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
TM36	Modified US EPA method 8015B v2:1996. 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 will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	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
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.			AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

EMT Job No: 25/3043

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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma-Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			

APPENDIX E - GEOTECHNICAL IN SITU FIELDWORK AND LABORATORY RESULTS

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 25/01552
Issue Number: 1 **Date:** 21 February, 2025

Client:
Murray Rix (Northern) Ltd
Andrew House
Hadfield Street
Dukinfield
Dukinfield
SK16 4QX

Project Manager: Enquires/Owain Davies
Project Name: TE 1808 - Pallex, Battram
Project Ref: N/A
Order No: 25/063
Date Samples Received: 11/02/25
Date Instructions Received: 18/02/25
Date Analysis Completed: 21/02/25

Approved by:

Richard Wong
Client Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
1247

Lab Sample ID	25/01552/1	25/01552/2	25/01552/3	25/01552/4	25/01552/5			**Units**	**Limit of Detection**	**Method ref**
Client Sample No	5017806	5017807	5017808	5017833	5017834					
Client Sample ID	TP20	TP08	TP10	WS06	WS06					
Depth to Top	3.20	2.00	1.15	4.00	5.00					
Depth To Bottom										
Date Sampled	28-Jan-25	28-Jan-25	28-Jan-25	28-Jan-25	28-Jan-25					
Sample Type	SOIL - B	SOIL - D	SOIL - B	SOIL - B	SOIL - B					
Sample Matrix Code	6A	6A	6A	5A	5					
% Stones >10mm$_A$	14.6	<0.1	<0.1	<0.1	<0.1			% w/w	0.1	A-T-044
pH BRE$_D^{M\#}$	8.50	8.13	5.42	7.03	7.51			pH	0.01	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	<1.00	<1.00	<1.00	<1.00	<1.00			mg/l	1	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D^{M\#}$	<7	<7	<7	<7	<7			mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	3.7	3.4	5.9	<0.4	<0.4			mg/l	0.4	A-T-026s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	<10	17	46	26	39			mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D^{M\#}$	0.03	0.03	0.03	<0.02	<0.02			% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	<0.01	0.01	<0.01	<0.01	<0.01			% w/w	0.01	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	7.6	9.2	4.3	13.6	16.2			mg/l	1	A-T-SOLMETS

Report Notes

General

- This report shall not be reproduced, except in full, without written approval from Envirolab.
- The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
- The results reported herein relate only to the material supplied to the laboratory.
- The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
- Analytical results reflect the quality of the sample at the time of analysis only.
- Opinions and Interpretations expressed are outside our scope of accreditation.
- A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
- If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
- Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.

Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). "TRACE" will be reported as a quantification result.

PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25^{0}C / 11550µS/cm @ 20^{0}C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Murray Rix (Northern) Ltd, Andrew House , Hadfield Street, Dukinfield , Dukinfield, SK16 4QX	**Project No:**	25/01552
		Date Received:	18/02/2025 (am)
Project:	TE 1808 - Pallex, Battram	**Cool Box Temperatures (°C):**	11.4
Clients Project No:	N/A		

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	25/01552/1	25/01552/2	25/01552/3	25/01552/4	25/01552/5
Client Sample No	5017806	5017807	5017808	5017833	5017834
Client Sample ID/Depth	TP20 3.20m	TP08 2.00m	TP10 1.15m	WS06 4.00m	WS06 5.00m
Date Sampled	28/01/25	28/01/25	28/01/25	28/01/25	28/01/25
A-T-024s	21/02/2025	21/02/2025	21/02/2025	21/02/2025	21/02/2025
A-T-026s	20/02/2025	20/02/2025	20/02/2025	20/02/2025	20/02/2025
A-T-028s	21/02/2025	21/02/2025	21/02/2025	21/02/2025	21/02/2025
A-T-031s	20/02/2025	20/02/2025	20/02/2025	20/02/2025	20/02/2025
A-T-033s	20/02/2025	20/02/2025	20/02/2025	20/02/2025	20/02/2025
A-T-044	20/02/2025	20/02/2025	20/02/2025	20/02/2025	20/02/2025
A-T-SOLMETS	21/02/2025	21/02/2025	21/02/2025	21/02/2025	21/02/2025

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number:	25/01664	
Issue Number:	1	**Date:** 25 February, 2025

Client: Murray Rix (Northern) Ltd
Andrew House
Hadfield Street
Dukinfield
Dukinfield
SK16 4QX

Project Manager:	Enquires/Owain Davies
Project Name:	TE1808 - Pallex, Battram
Project Ref:	N/A
Order No:	25/078
Date Samples Received:	20/02/25
Date Instructions Received:	20/02/25
Date Analysis Completed:	25/02/25

Approved by:

Gemma Berrisford
Deputy Client Services Supervisor

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
1247

Envirolab Job Number: 25/01664

Client Project Name: TE1808 - Pallex, Battram

Client Project Ref: N/A

Lab Sample ID	25/01664/1	25/01664/2	25/01664/3					Units	Limit of Detection	Method ref
Client Sample No	5021903	5021905	5021907							
Client Sample ID	WS07	WS12	WS06							
Depth to Top	3.00	1.95	1.00							
Depth To Bottom		2.60	4.50							
Date Sampled	11-Feb-25	11-Feb-25	11-Feb-25							
Sample Type	SOIL	SOIL - B	SOIL - B							
Sample Matrix Code	6A	6A	5A							
% Stones >10mm$_A$	<0.1	<0.1	<0.1					% w/w	0.1	A-T-044
pH BRE$_D^{M\#}$	7.60	8.24	7.06					pH	0.01	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	<1.00	<1.00	<1.00					mg/l	1	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D^{M\#}$	<14	<14	<14					mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	<0.4	1.3	<0.4					mg/l	0.4	A-T-026s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	<20	<20	28					mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D^{M\#}$	0.02	0.03	<0.02					% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	0.02	0.01	<0.01					% w/w	0.01	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	9.3	6.0	4.0					mg/l	1	A-T-SOLMETS

Report Notes

General

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IS	Insufficient Sample for analysis
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NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

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Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). “TRACE” will be reported as a quantification result.
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Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
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Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25^{0}C / 11550µS/cm @ 20^{0}C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Murray Rix (Northern) Ltd, Andrew House , Hadfield Street, Dukinfield , Dukinfield, SK16 4QX	**Project No:**	25/01664
		Date Received:	20/02/2025 (am)
Project:	TE1808 - Pallex, Battram	**Cool Box Temperatures (°C):**	14.1
Clients Project No:	N/A		

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	25/01664/1	25/01664/2	25/01664/3
Client Sample No	5021903	5021905	5021907
Client Sample ID/Depth	WS07 3.00m	WS12 1.95-2.60m	WS06 1.00-4.50m
Date Sampled	11/02/25	11/02/25	11/02/25
A-T-024s	24/02/2025	24/02/2025	24/02/2025
A-T-026s	24/02/2025	24/02/2025	24/02/2025
A-T-028s	24/02/2025	24/02/2025	24/02/2025
A-T-031s	24/02/2025	24/02/2025	24/02/2025
A-T-033s	24/02/2025	24/02/2025	24/02/2025
A-T-044	25/02/2025	25/02/2025	25/02/2025
A-T-SOLMETS	24/02/2025	24/02/2025	24/02/2025

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Tier Environmental Ltd

Address
Suite 513
Chadwick House
Warrington Road
Birchwood
WA3 6AE

Contract TE1808 -
Pallex, Battram

Job Number MRN 25010/15
Date of Issue 03 March 2025
Pages 1 of 20

Approved Signatories

S J Hutchings, O P Davies

Notes

1. All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
2. Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
3. Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.
4. Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.
5. The results included within the report are representative of the samples submitted for analysis.
6. This certificate should not be reproduced, except in full, without the express permission of the laboratory.

UKAS
TESTING
1580

Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

M U R R A Y   R I X
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

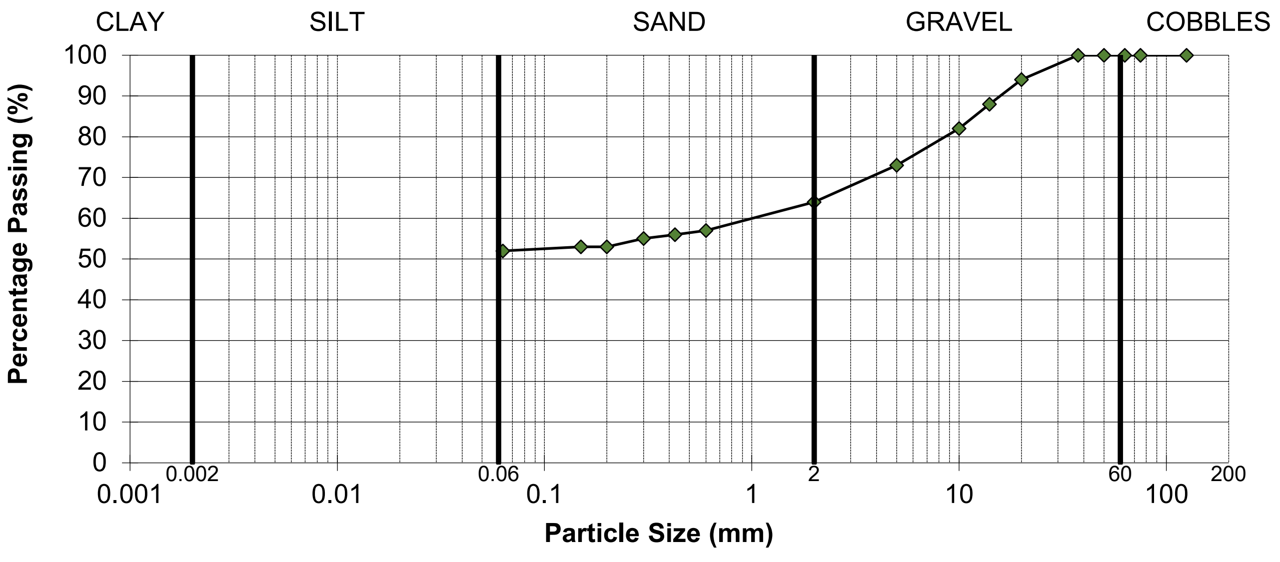
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP20 3.2 B	DATE SAMPLED	Not advised
LAB SAMPLE No	5017806	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy very gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	73	
75	100		2	64	
63	100		0.6	57	
50	100		0.425	56	
37.5	100		0.3	55	
20	94		0.2	53	
14	88		0.15	53	
10	82		0.063	52	



REMARKS
As received water content = 18.4%

SIGNED

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

M U R R A Y R I X
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

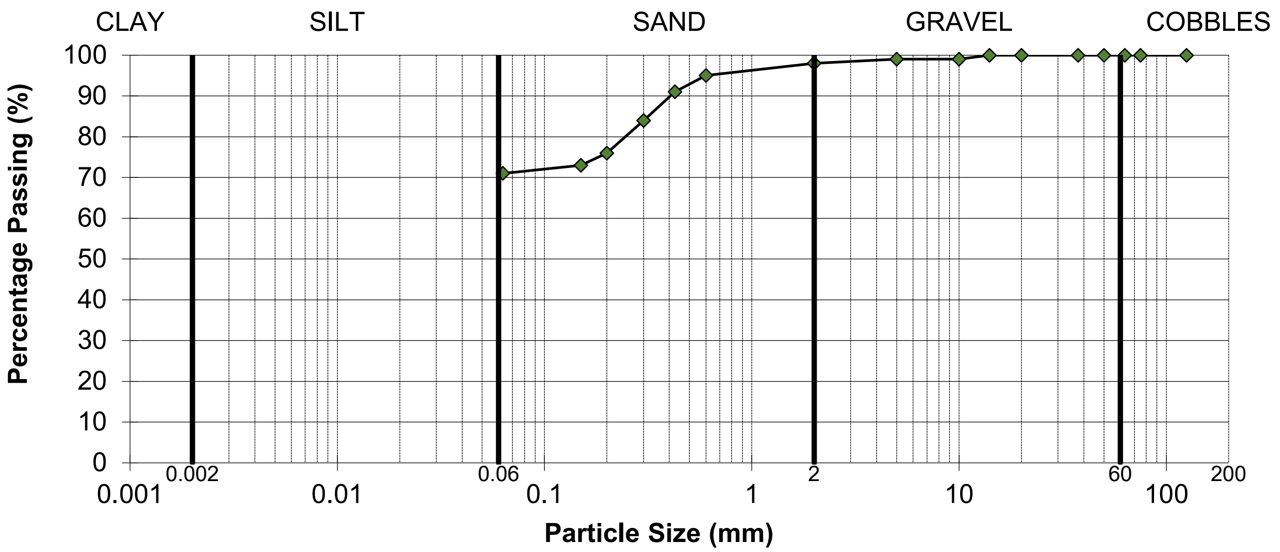
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP03 0.4 D	DATE SAMPLED	Not advised
LAB SAMPLE No	5017811	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	99	
75	100		2	98	
63	100		0.6	95	
50	100		0.425	91	
37.5	100		0.3	84	
20	100		0.2	76	
14	100		0.15	73	
10	99		0.063	71	



REMARKS
As received water content = 20.2%

SIGNED

NAME O.P. Davies BA (Hons) (Director / Head of Laboratory)

DATE 03-Mar-25

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

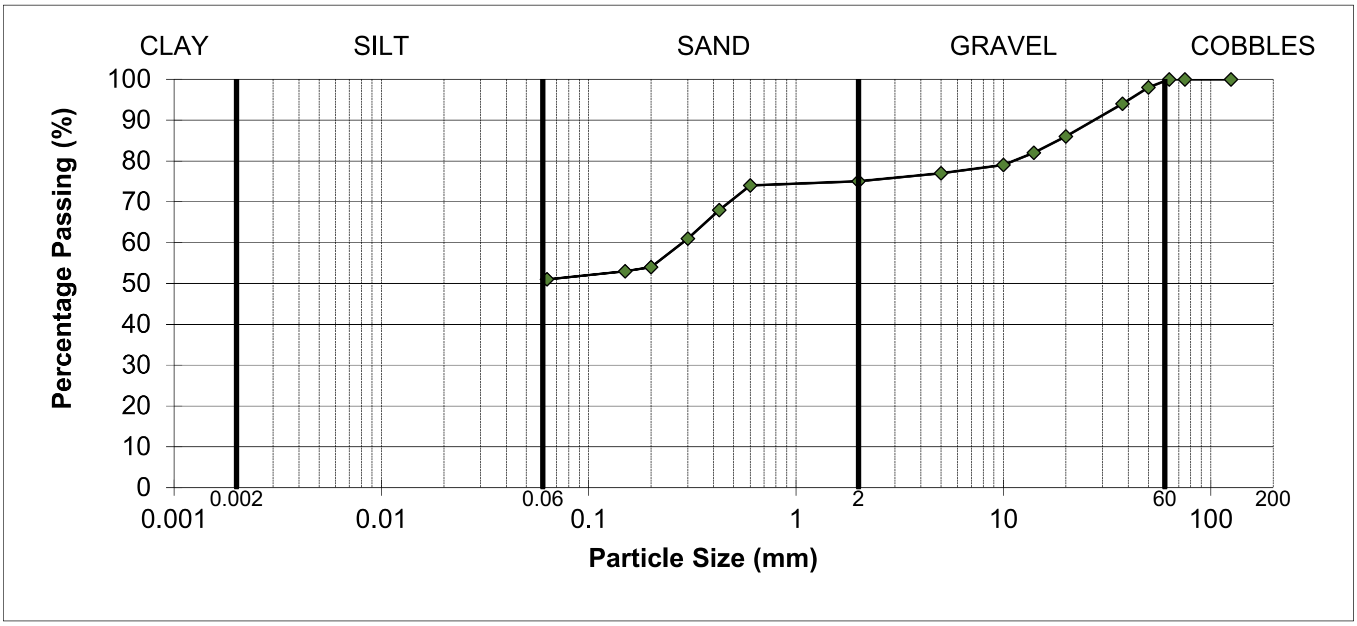
PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP02 0.4 B	DATE SAMPLED	Not advised
LAB SAMPLE No	5017814	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty sandy gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	77	
75	100		2	75	
63	100		0.6	74	
50	98		0.425	68	
37.5	94		0.3	61	
20	86		0.2	54	
14	82		0.15	53	
10	79		0.063	51	



REMARKS
As received water content = 14.0%

SIGNED

NAME	O.P. Davies BA (Hons) (Director / Head of Laboratory)	DATE	03-Mar-25

MURRAY RIX

UKAS
TESTING
1580

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

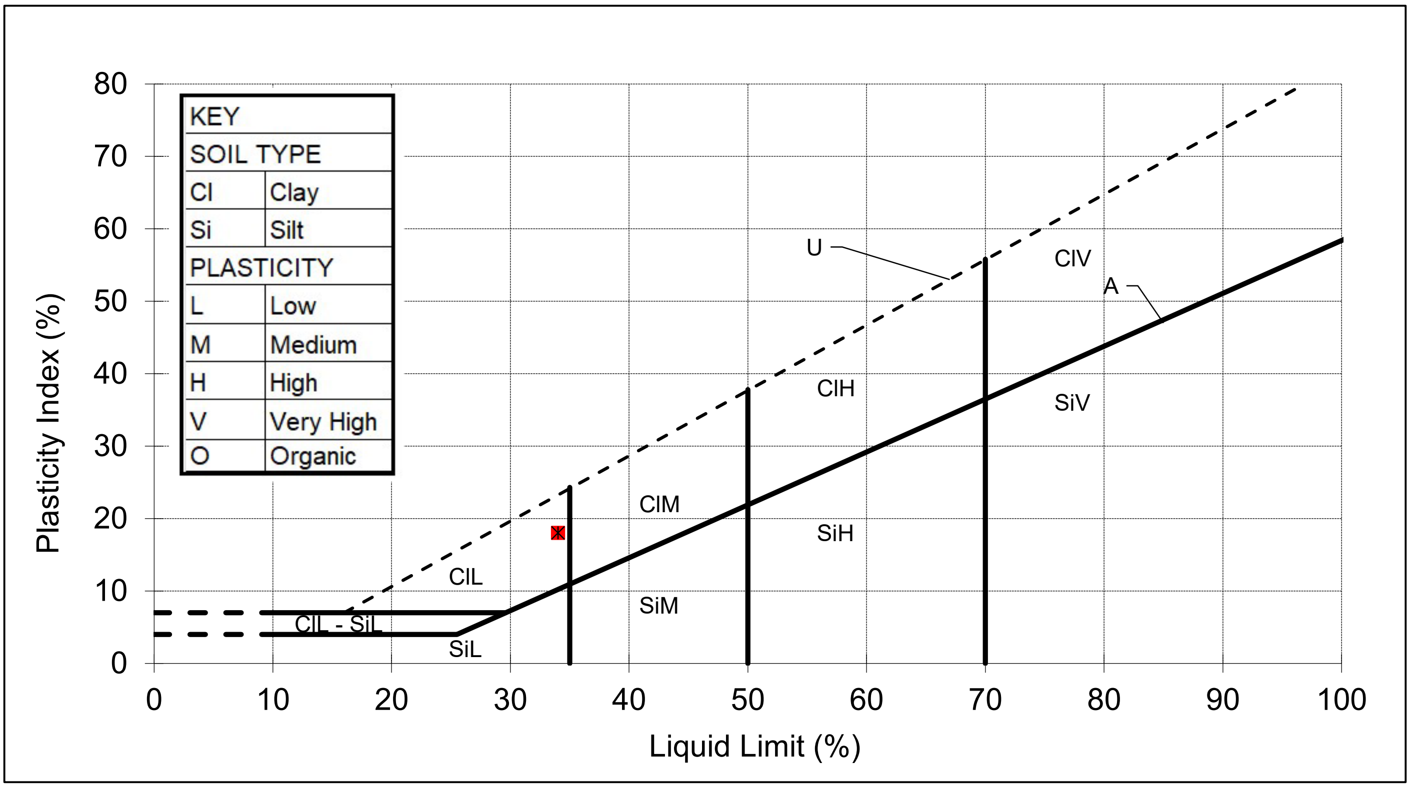
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP14 2 B	DATE SAMPLED	Not advised
SAMPLE No.	5017801	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.5	34.2	0.993	
Determination 2 (avg)	20.4	34.3		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
18.2	34	16	18	91



REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

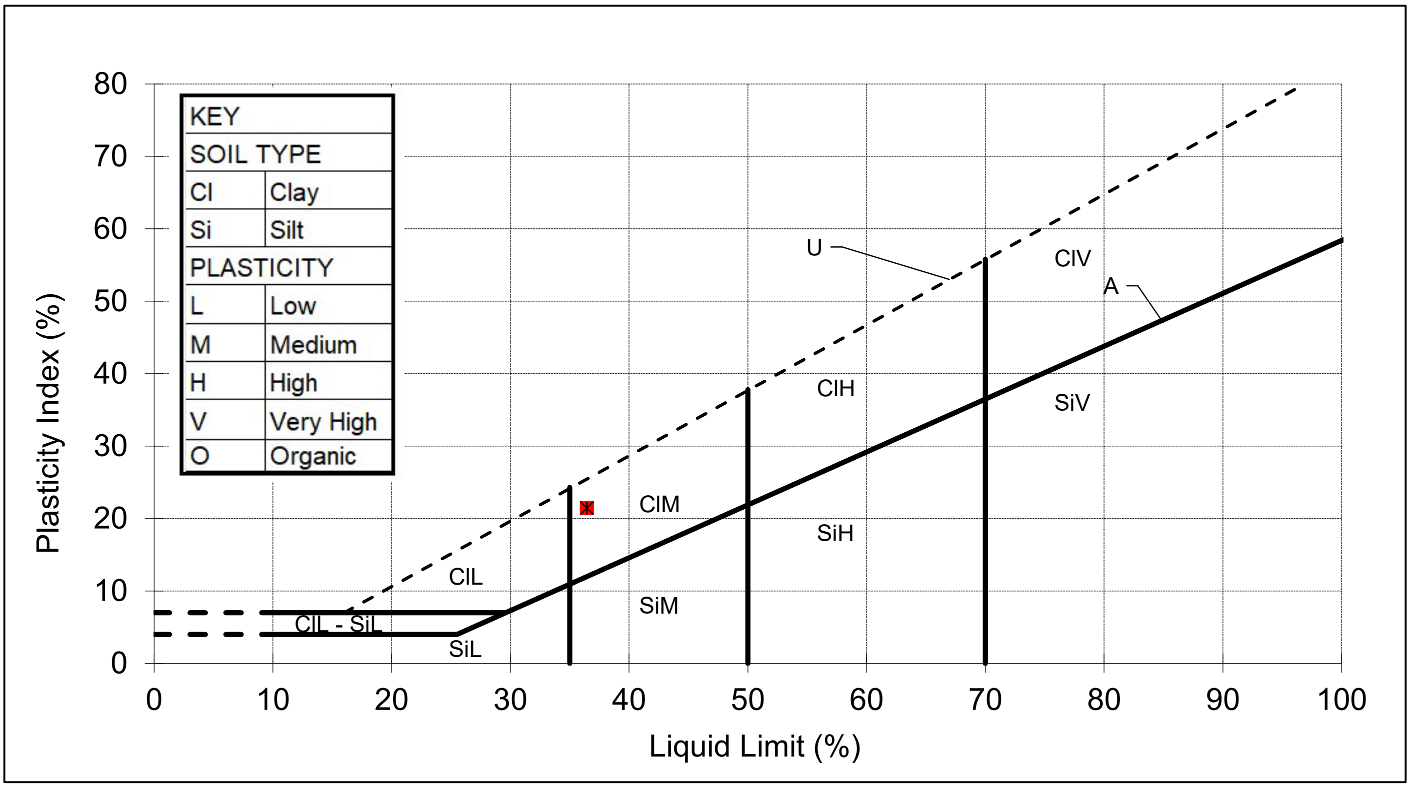
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP13 1.7 B	DATE SAMPLED	Not advised
SAMPLE No.	5017802	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.1	36.5	1.001	
Determination 2 (avg)	19.8	36.3		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17.1	36	15	21	88



REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

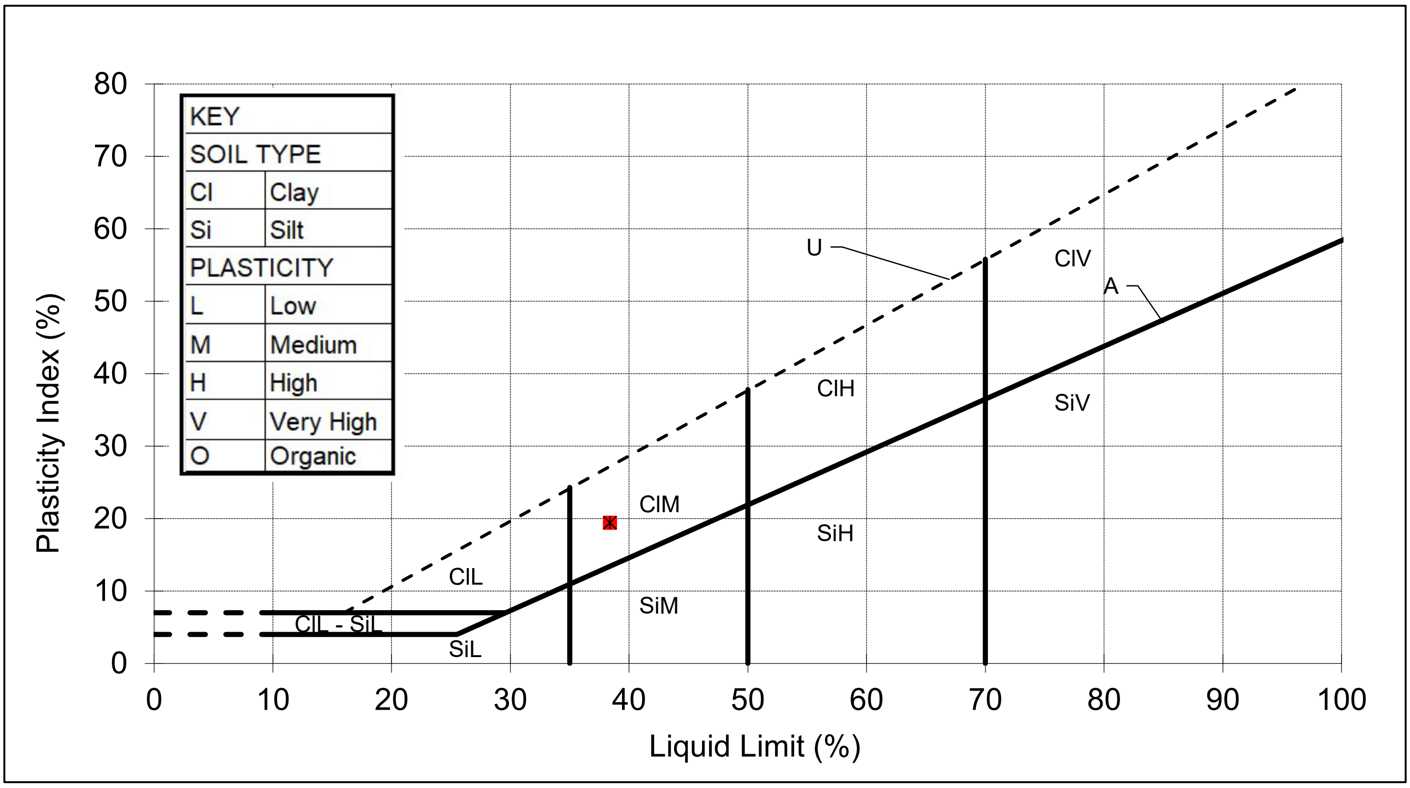
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	WS02 1.2 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5017815	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	16.1	35.7	1.071	
Determination 2 (avg)	16.2	36.0		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20.5	38	19	19	80



REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
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UKAS TESTING 1580

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

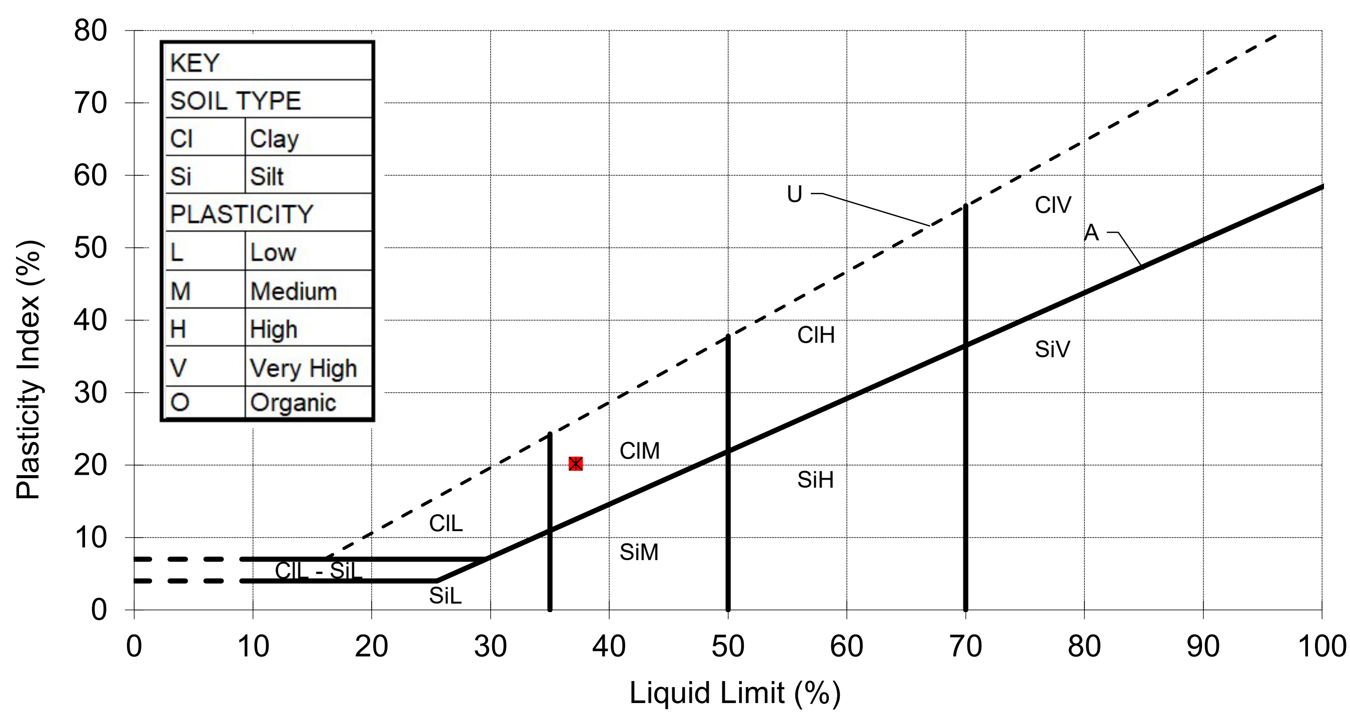
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	WS03 1.2 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5017821	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.1	36.6	1.020	
Determination 2 (avg)	18.9	36.3		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17.3	37	17	20	85



REMARKS

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DATE 03-Mar-25

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TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

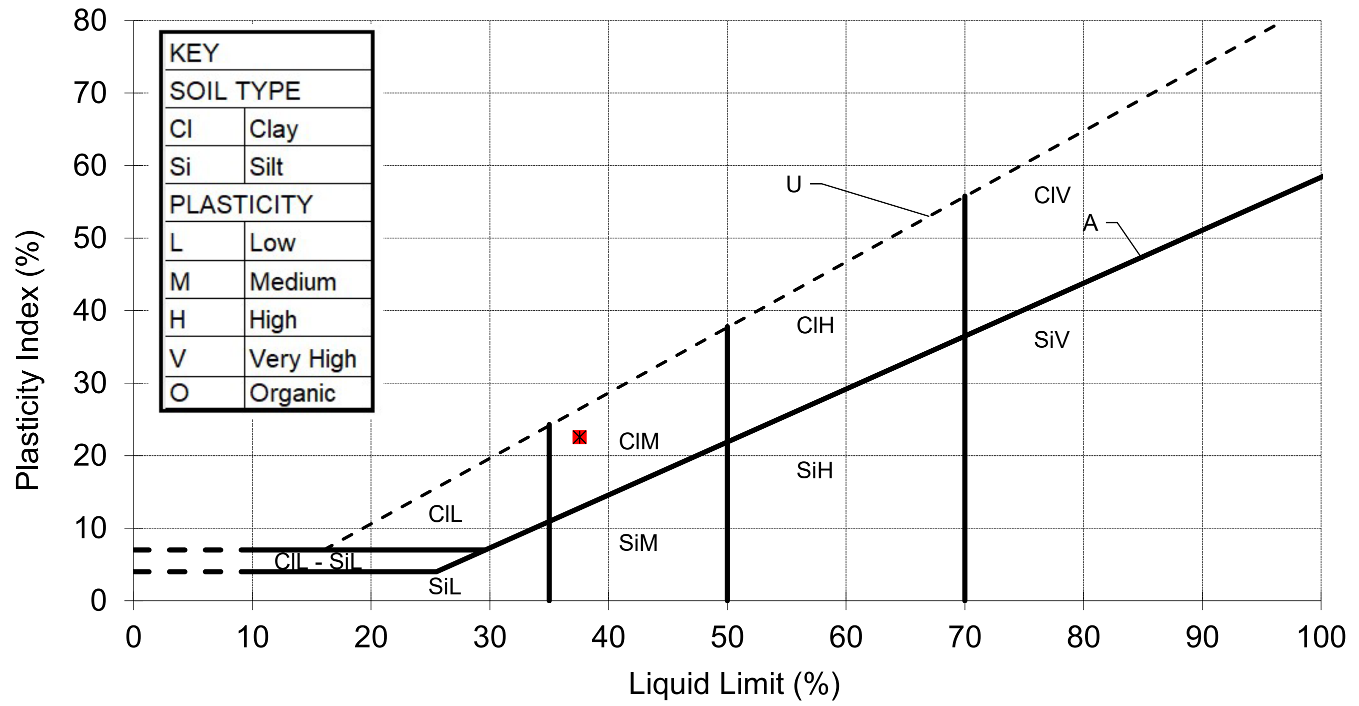
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	WS04 1.2 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5017824	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.5	37.2	1.012	
Determination 2 (avg)	19.3	37.0		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
15.5	38	15	23	76



REMARKS

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TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

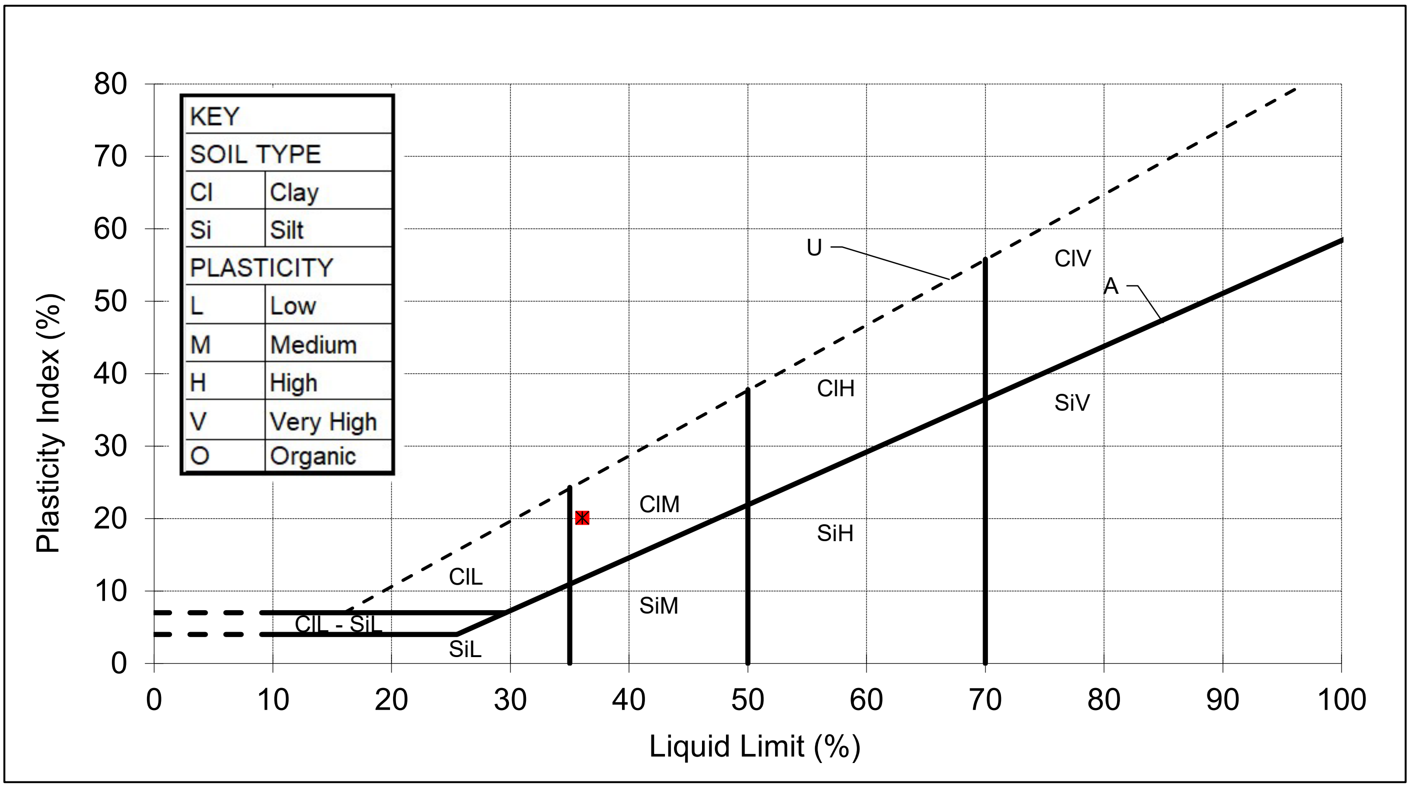
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	WS05 1.2 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5017827	DATE RECEIVED	07-Feb-25
DATE TESTED	11-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	23.2	37.8	0.954	
Determination 2 (avg)	23.1	37.8		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17.8	36	16	20	83



REMARKS

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NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

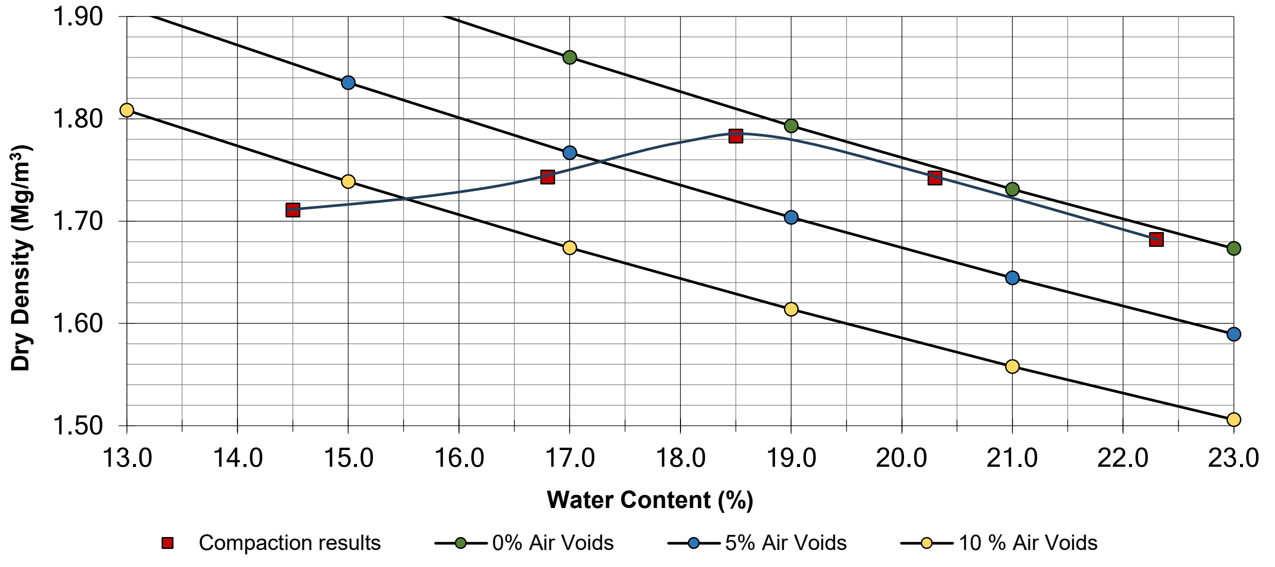
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP14 2 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017801	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.72 Mg/m3 (Measured)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	14.5	1.711
2	16.8	1.743
3	18.5	1.783
4	20.3	1.742
5	22.3	1.682



OPTIMUM WATER CONTENT	**19**	(%)
MAXIMUM DRY DENSITY	**1.79**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

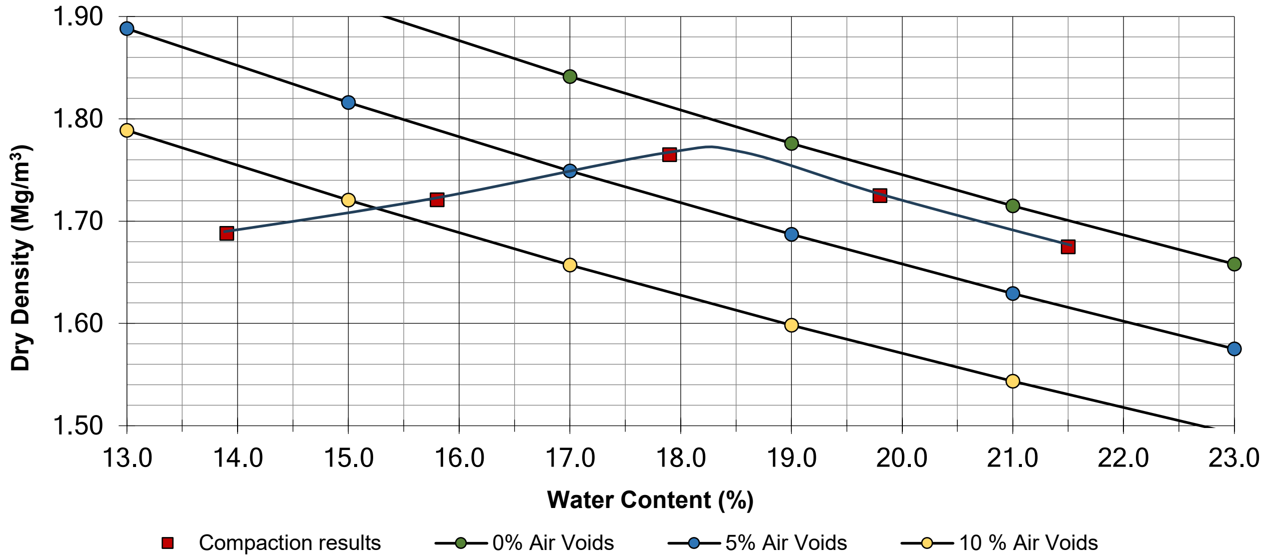
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP13 1.7 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017802	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.68 Mg/m3 (Measured)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	13.9	1.688
2	15.8	1.721
3	17.9	1.765
4	19.8	1.725
5	21.5	1.675



OPTIMUM WATER CONTENT	18	(%)
MAXIMUM DRY DENSITY	1.77	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons)
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UKAS TESTING 1580

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

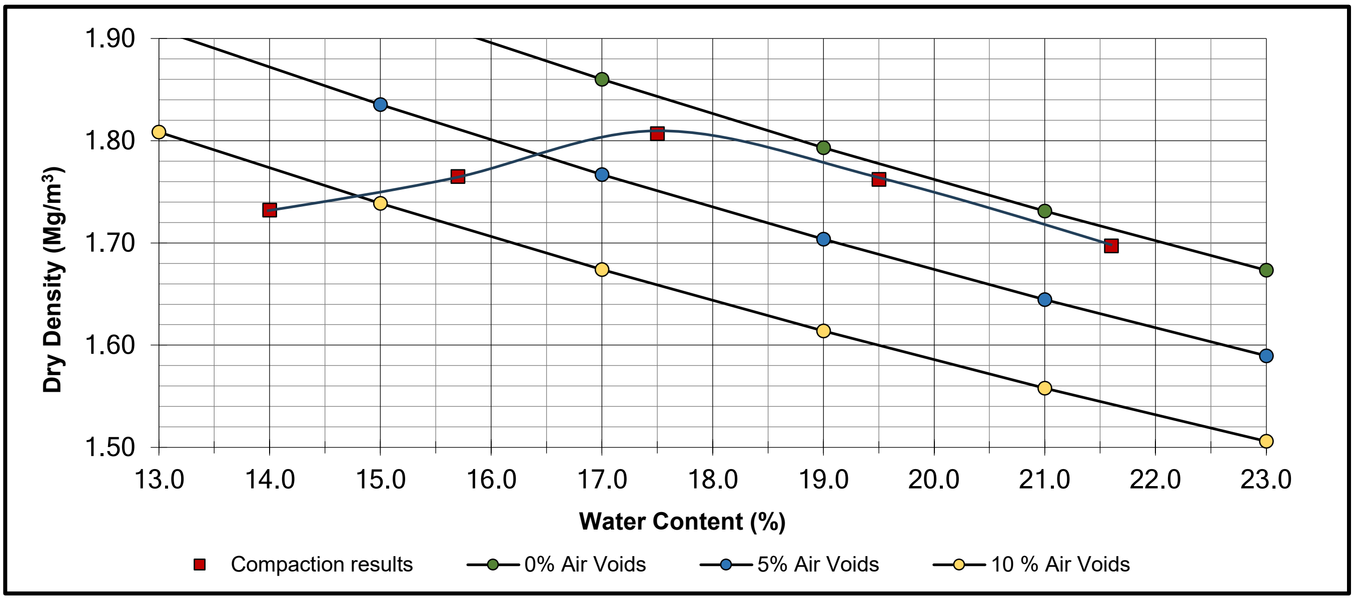
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP11 1.5 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017804	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	3 %	GRADING ZONE	Zone 4
RETAINED 20mm	4 %	PARTICLE DENSITY	2.72 Mg/m3 (Measured)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	14.0	1.732
2	15.7	1.765
3	17.5	1.807
4	19.5	1.762
5	21.6	1.697



OPTIMUM WATER CONTENT	**18**	(%)
MAXIMUM DRY DENSITY	**1.81**	(Mg/m^3)

REMARKS
As received water content = 17.5%

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

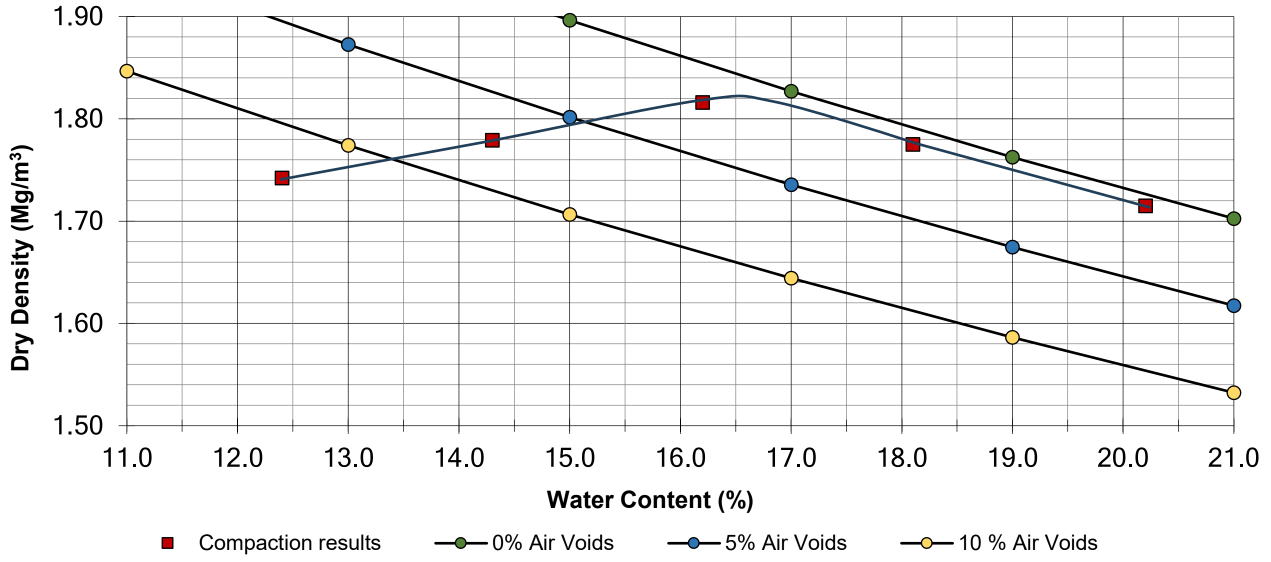
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP19 3 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017805	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.65 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	12.4	1.742
2	14.3	1.779
3	16.2	1.816
4	18.1	1.775
5	20.2	1.715



OPTIMUM WATER CONTENT	**17**	(%)
MAXIMUM DRY DENSITY	**1.82**	(Mg/m^3)

REMARKS
As received water content = 18.8%

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

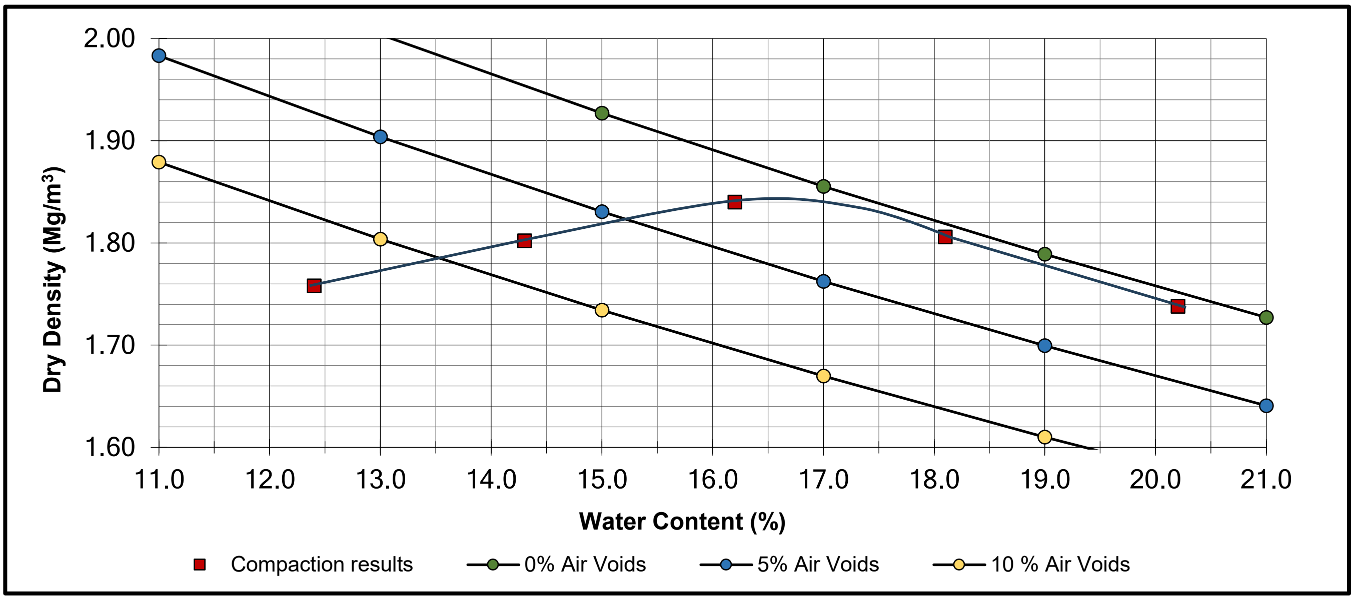
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP20 3.2 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017806	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 3
RETAINED 20mm	6 %	PARTICLE DENSITY	2.71 Mg/m3 (Measured)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	12.4	1.758
2	14.3	1.802
3	16.2	1.840
4	18.1	1.806
5	20.2	1.738



OPTIMUM WATER CONTENT	**17**	(%)
MAXIMUM DRY DENSITY	**1.84**	(Mg/m^3)

REMARKS
As received water content = 18.4%

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
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UKAS
TESTING
1580

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

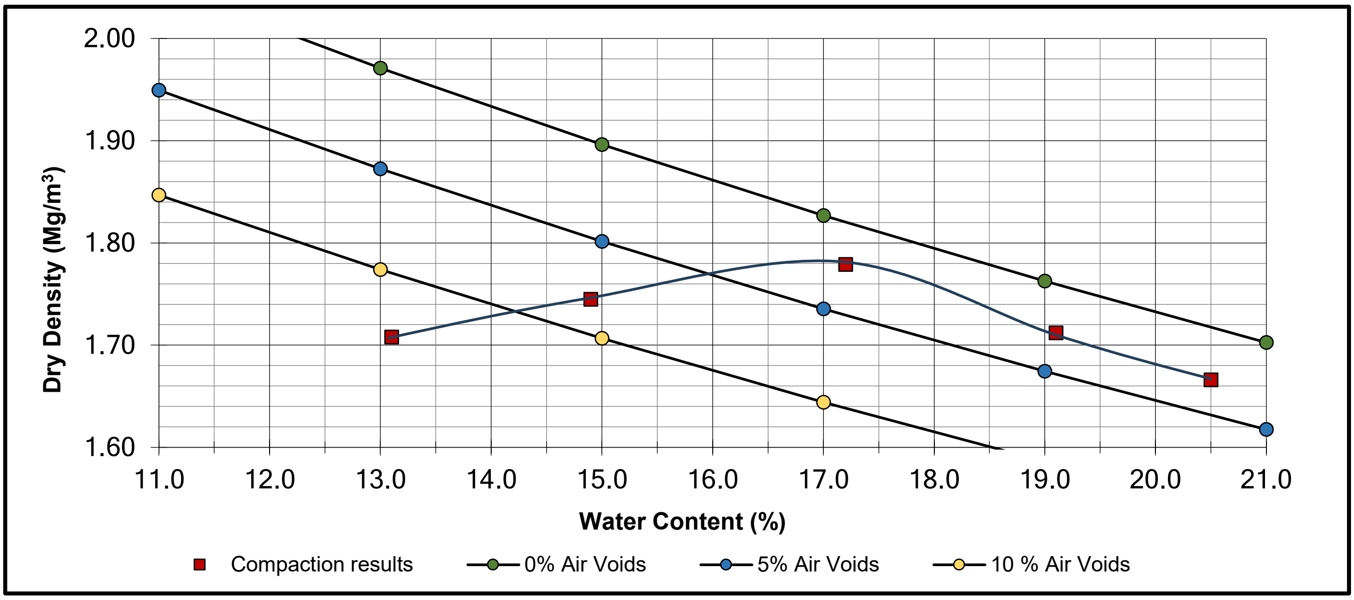
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP10 1.15 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017808	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 3
RETAINED 20mm	6 %	PARTICLE DENSITY	2.65 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	13.1	1.708
2	14.9	1.745
3	17.2	1.779
4	19.1	1.712
5	20.5	1.666



OPTIMUM WATER CONTENT	**17**	(%)
MAXIMUM DRY DENSITY	**1.78**	(Mg/m^3)

REMARKS
As received water content = 23.4%

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

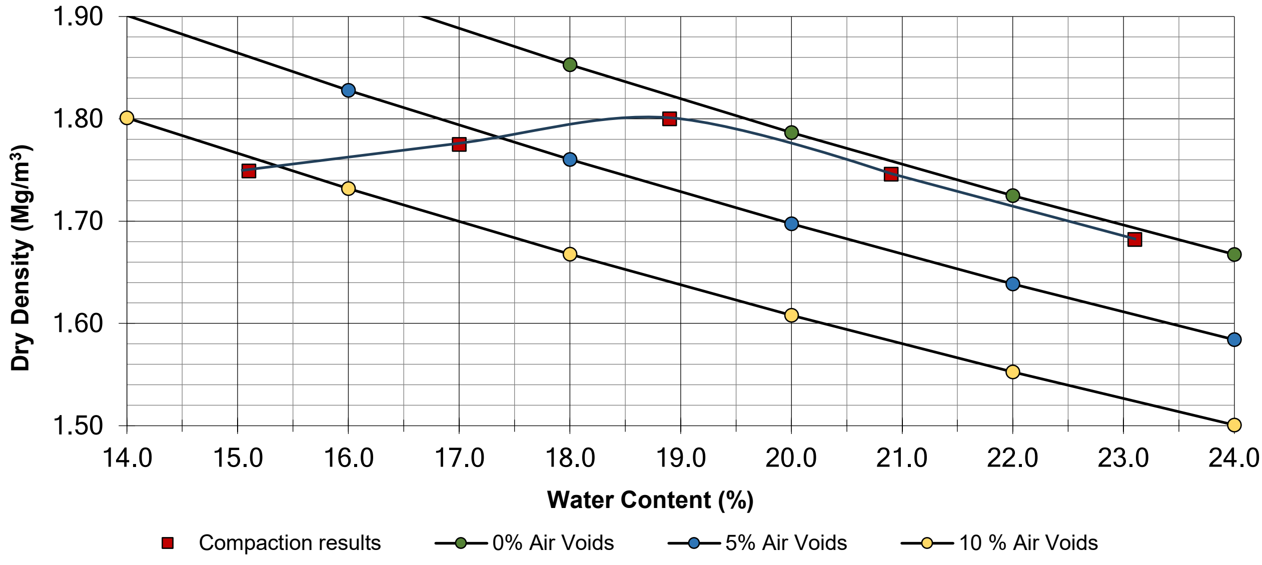
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP15 0.4 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017809	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.78 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	15.1	1.749
2	17.0	1.775
3	18.9	1.800
4	20.9	1.746
5	23.1	1.682



OPTIMUM WATER CONTENT	**19**	(%)
MAXIMUM DRY DENSITY	**1.80**	(Mg/m^3)

REMARKS
As received water content = 18.7%

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

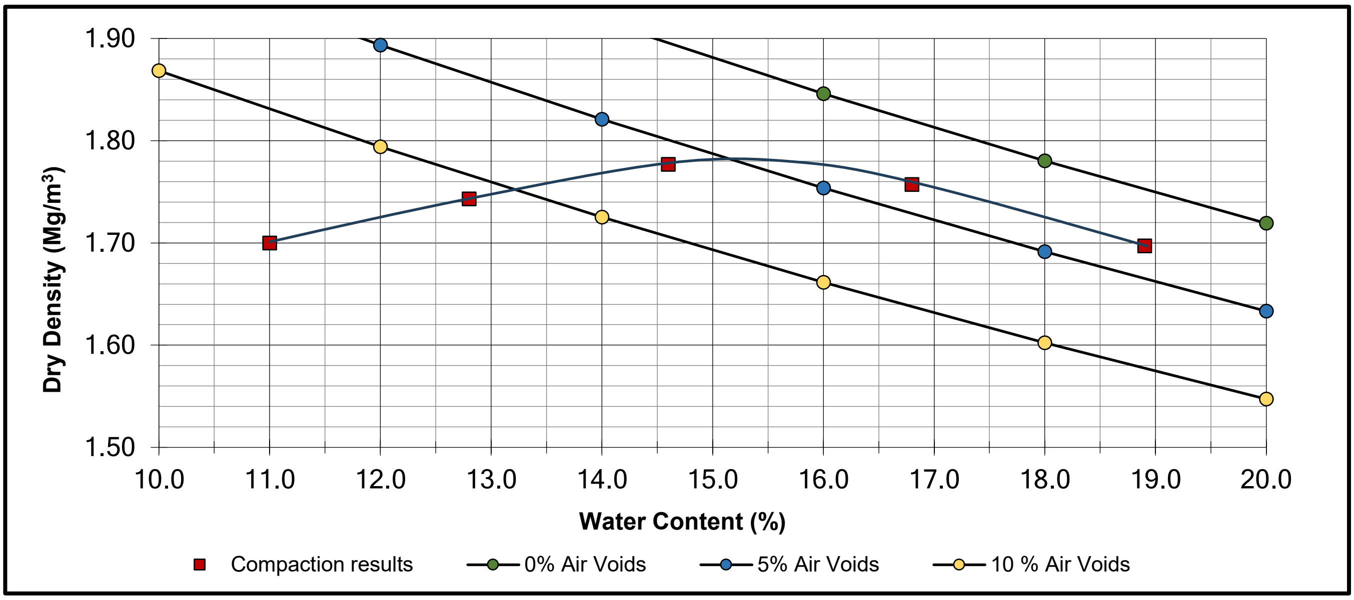
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP06 0.3 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017810	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.62 Mg/m3 (Measured)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	11.0	1.700
2	12.8	1.743
3	14.6	1.777
4	16.8	1.757
5	18.9	1.697



OPTIMUM WATER CONTENT	**15**	(%)
MAXIMUM DRY DENSITY	**1.78**	(Mg/m^3)

REMARKS
As received water content = 20.3%

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

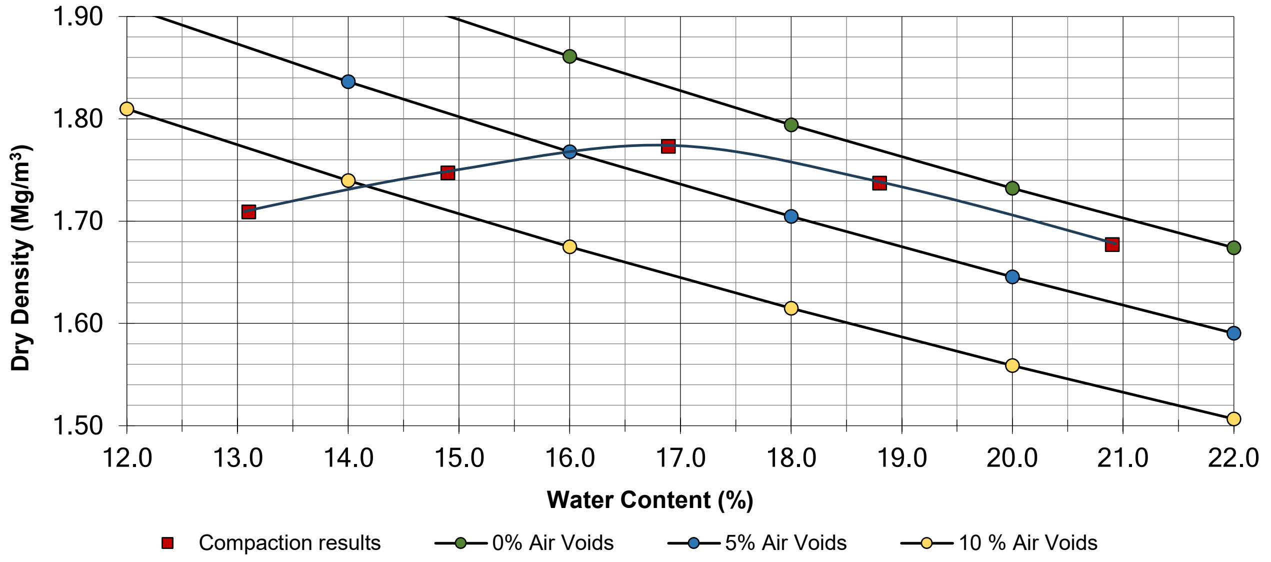
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP01 0.4 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017813	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.65 Mg/m3 (Measured)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	13.1	1.709
2	14.9	1.747
3	16.9	1.773
4	18.8	1.737
5	20.9	1.677



OPTIMUM WATER CONTENT	**17**	(%)
MAXIMUM DRY DENSITY	**1.77**	(Mg/m^3)

REMARKS
As received water content = 23.0%

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TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

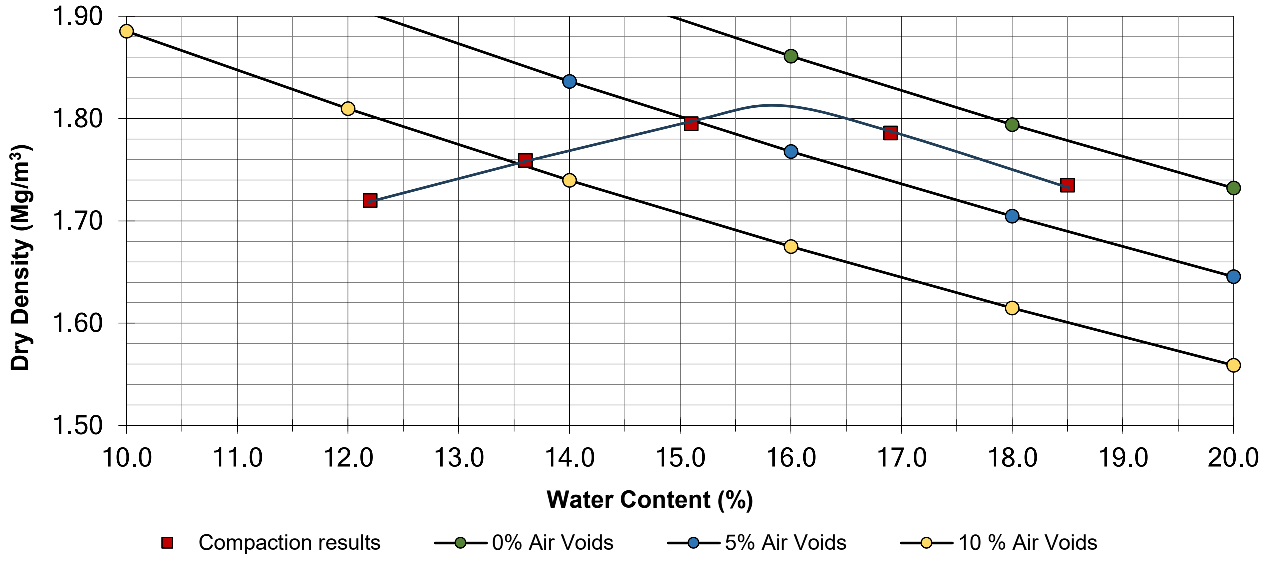
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/15

SAMPLE LABEL	TP02 0.4 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5017814	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Grey brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.65 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	12.2	1.720
2	13.6	1.759
3	15.1	1.795
4	16.9	1.786
5	18.5	1.735



OPTIMUM WATER CONTENT	**16**	(%)
MAXIMUM DRY DENSITY	**1.81**	(Mg/m^3)

REMARKS
As received water content = 14.0%

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
(Director / Head of Laboratory)

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Tier Environmental Ltd

Address
Suite 513
Chadwick House
Warrington Road
Birchwood
WA3 6AE

Contract TE1808 -
Pallex, Battram

Job Number MRN 25010/16
Date of Issue 03 March 2025
Pages 1 of 10

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

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

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

UKAS TESTING 1580

M U R R A Y R I X
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

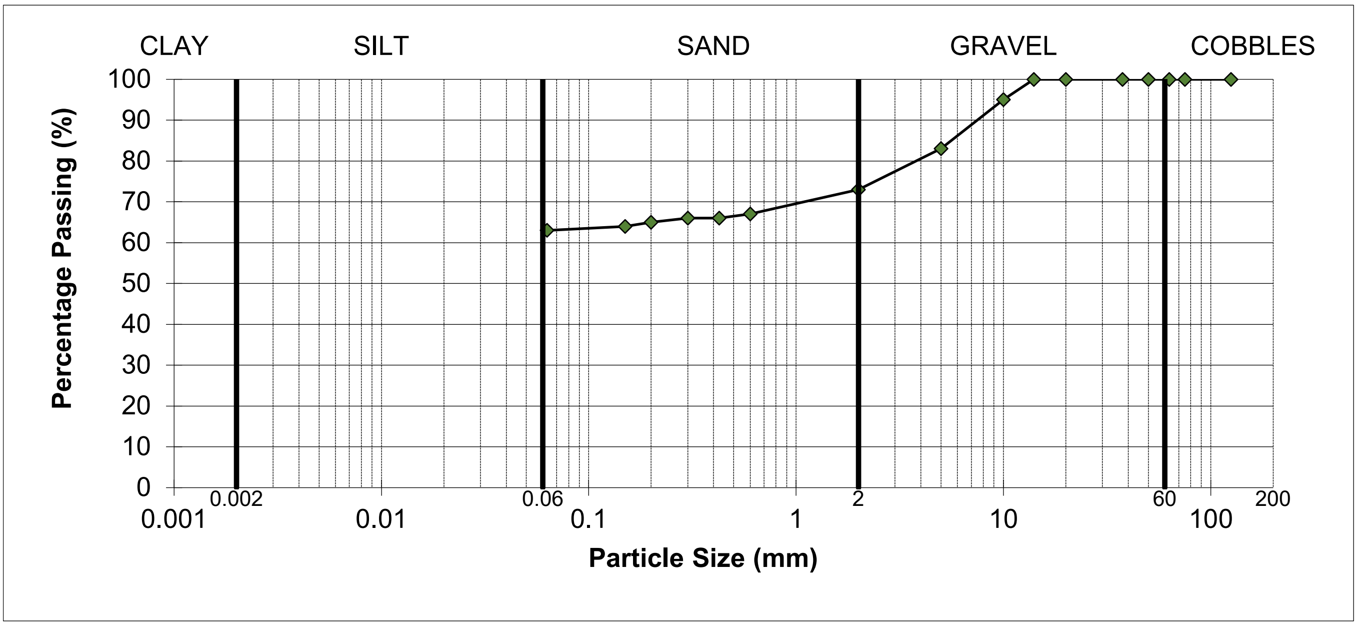
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS12 1.95-2.6 B	DATE SAMPLED	Not advised
LAB SAMPLE No	5021905	DATE RECEIVED	17-Feb-25
DATE TESTED	18-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	83	
75	100		2	73	
63	100		0.6	67	
50	100		0.425	66	
37.5	100		0.3	66	
20	100		0.2	65	
14	100		0.15	64	
10	95		0.063	63	



REMARKS
As received water content = 23.5%

SIGNED

NAME	O.P. Davies BA (Hons) (Director / Head of Laboratory)	DATE	03-Mar-25

MURRAY RIX
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TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

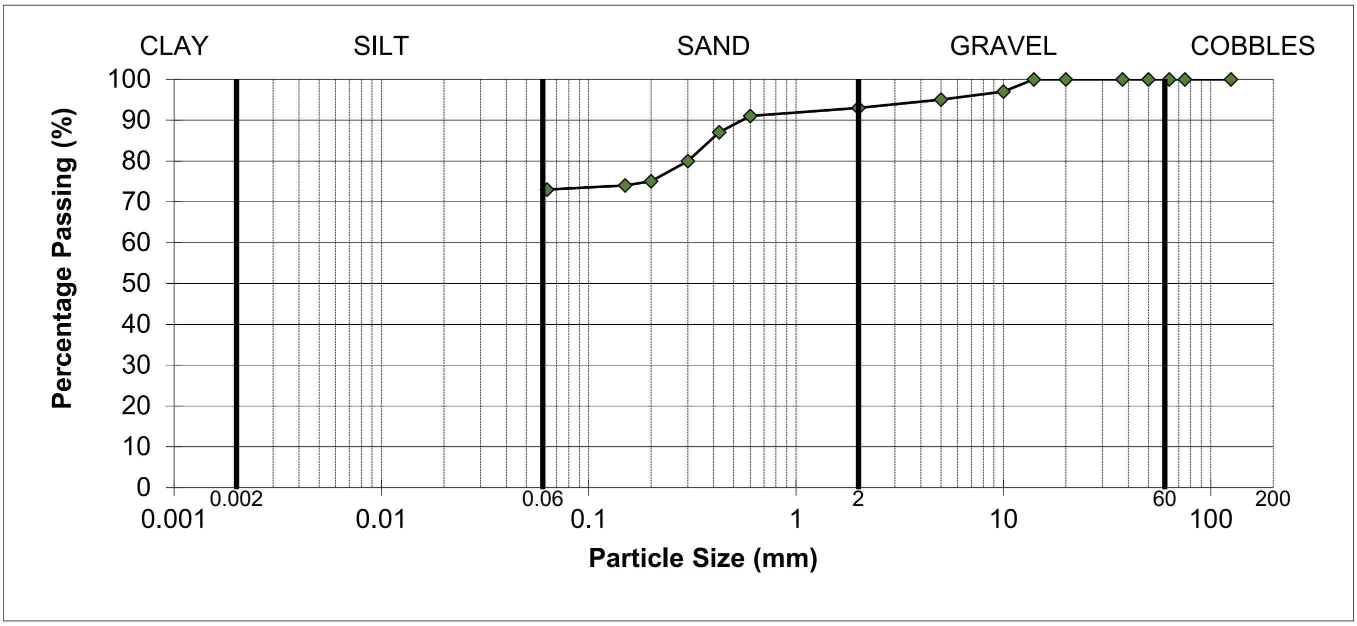
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS07 1.2-4.0 B	DATE SAMPLED	Not advised
LAB SAMPLE No	5021906	DATE RECEIVED	17-Feb-25
DATE TESTED	18-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	95	
75	100		2	93	
63	100		0.6	91	
50	100		0.425	87	
37.5	100		0.3	80	
20	100		0.2	75	
14	100		0.15	74	
10	97		0.063	73	



REMARKS
As received water content = 21.3%

SIGNED

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

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TEST CERTIFICATE

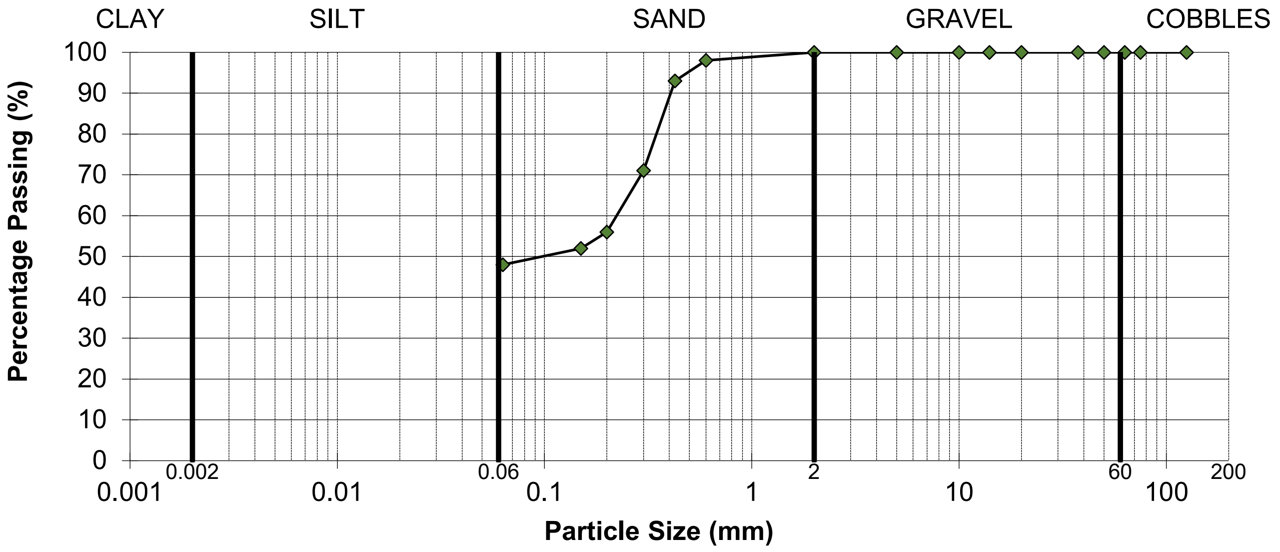
PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS06 1-4.5 B	DATE SAMPLED	Not advised
LAB SAMPLE No	5021907	DATE RECEIVED	17-Feb-25
DATE TESTED	18-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty very sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	100	
75	100		2	100	
63	100		0.6	98	
50	100		0.425	93	
37.5	100		0.3	71	
20	100		0.2	56	
14	100		0.15	52	
10	100		0.063	48	



REMARKS
As received water content = 16.5%

SIGNED

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

MURRAY RIX

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TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

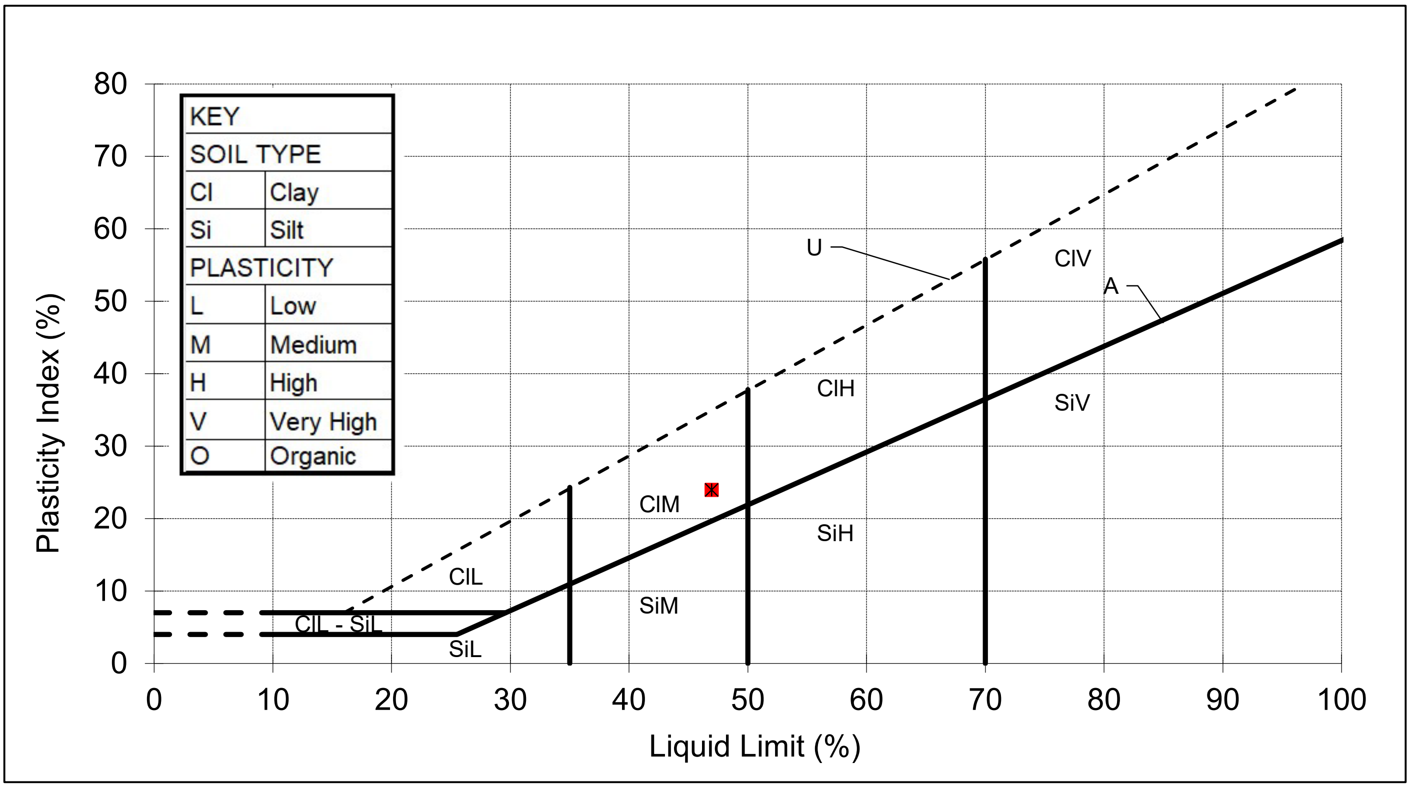
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS10 2 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5021901	DATE RECEIVED	17-Feb-25
DATE TESTED	24-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	21.1	47.8	0.978	
Determination 2 (avg)	21.8	48.2		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
29.2	47	23	24	95



REMARKS

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NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

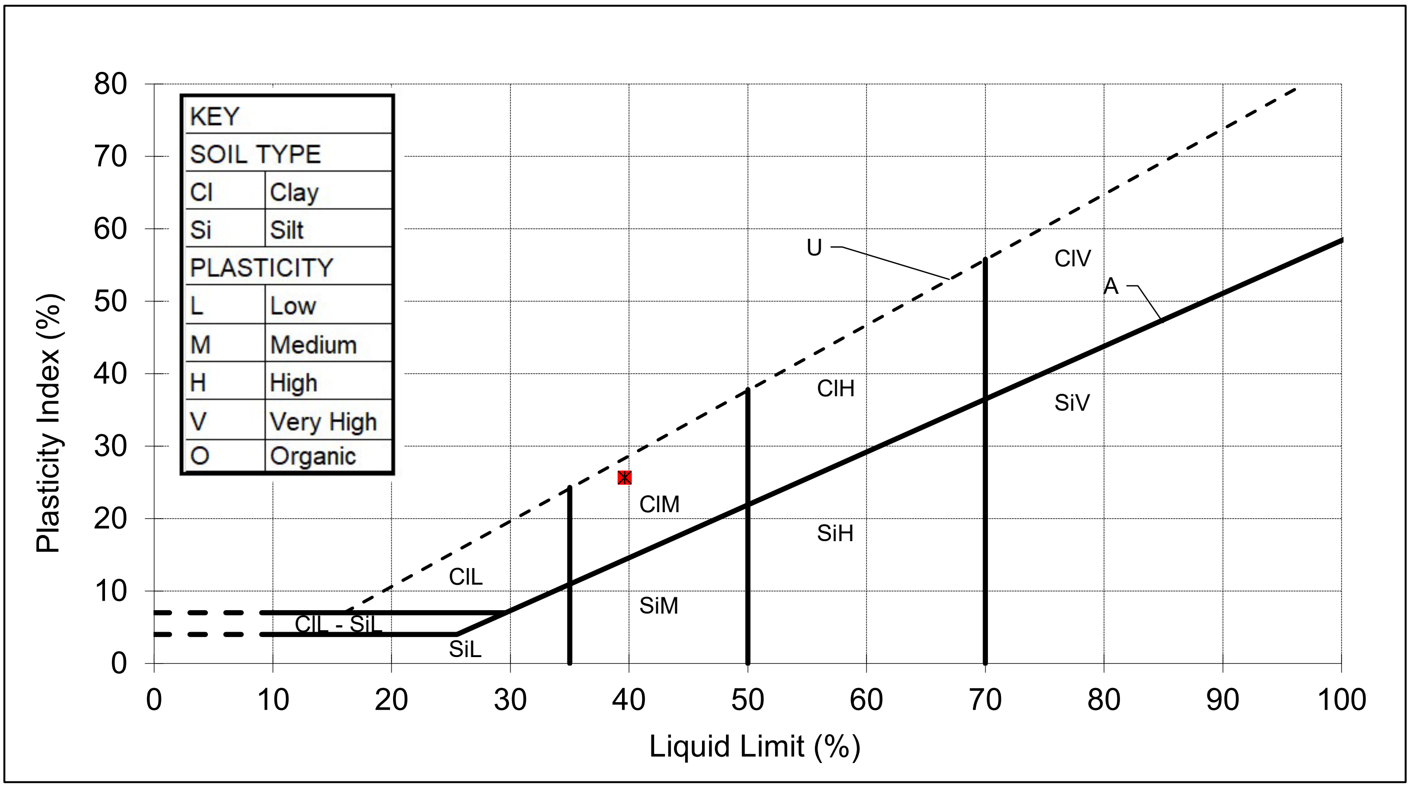
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS12 1.2 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5021902	DATE RECEIVED	17-Feb-25
DATE TESTED	24-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	21.9	40.6	0.968	
Determination 2 (avg)	22.2	41.3		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
15.3	40	14	26	92



REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

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TEST CERTIFICATE

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

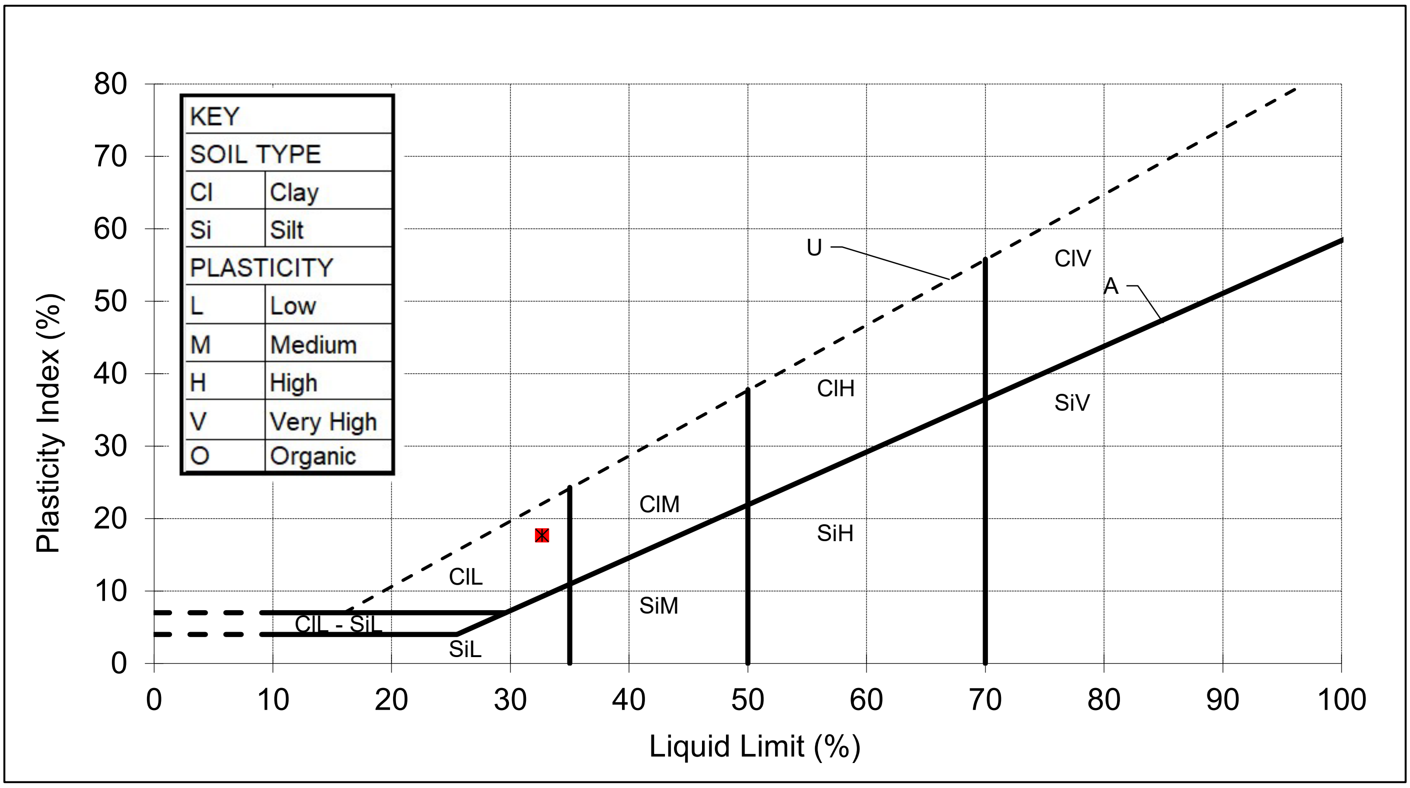
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS07 3 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5021903	DATE RECEIVED	17-Feb-25
DATE TESTED	24-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.6	32.2	1.026	
Determination 2 (avg)	18.0	31.5		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19.5	33	15	18	87



REMARKS

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NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

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TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

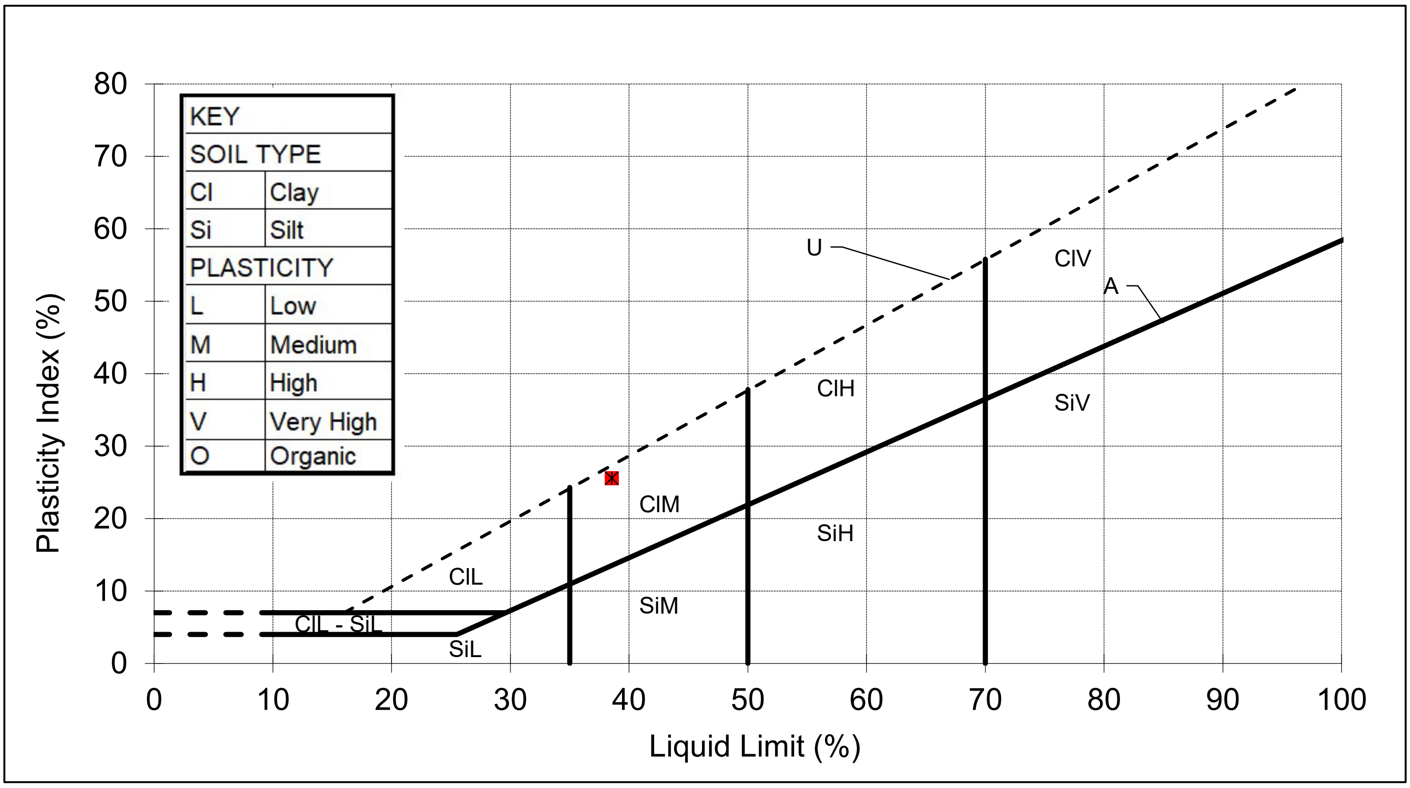
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS09 1.2 SPT	DATE SAMPLED	Not advised
SAMPLE No.	5021904	DATE RECEIVED	17-Feb-25
DATE TESTED	24-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.0	38.6	1.000	
Determination 2 (avg)	20.0	38.5		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
16.1	39	13	26	94



REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE 03-Mar-25

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UKAS
TESTING
1580

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

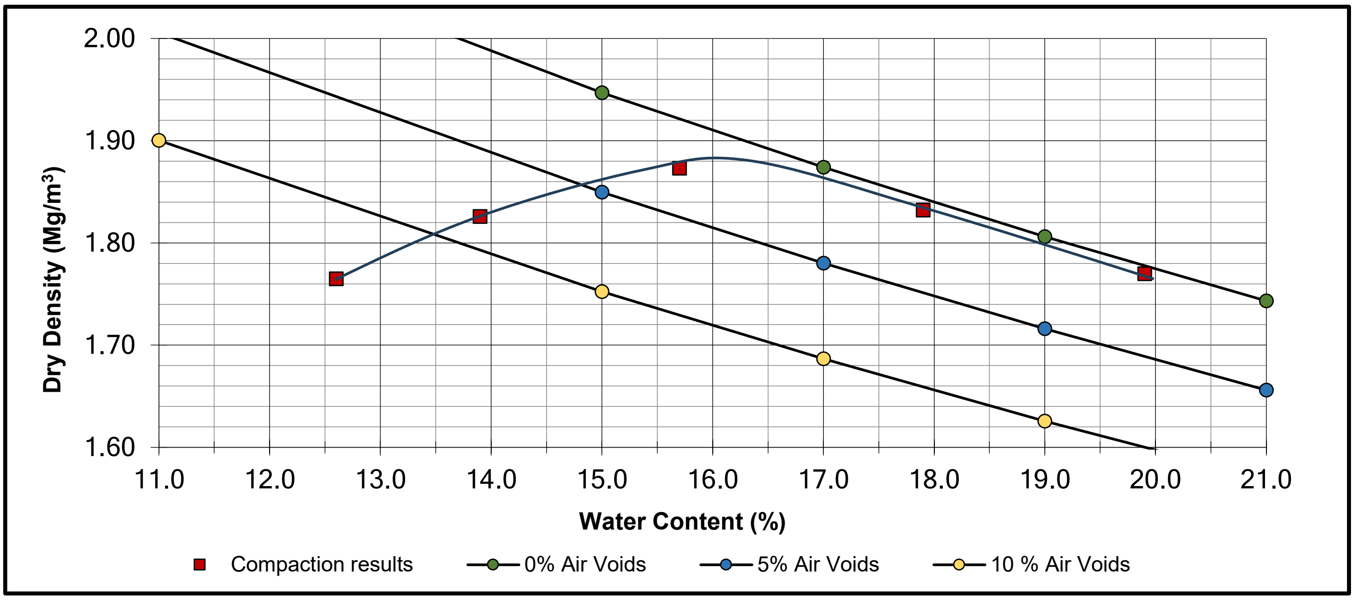
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS07 1.2-4.0 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5021906	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty slightly sandy slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.75 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	12.6	1.765
2	13.9	1.826
3	15.7	1.873
4	17.9	1.832
5	19.9	1.770



OPTIMUM WATER CONTENT	**16**	(%)
MAXIMUM DRY DENSITY	**1.88**	(Mg/m^3)

REMARKS

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
(Director / Head of Laboratory)

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UKAS
TESTING
1580

TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377-2:2022 Cl.11
PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

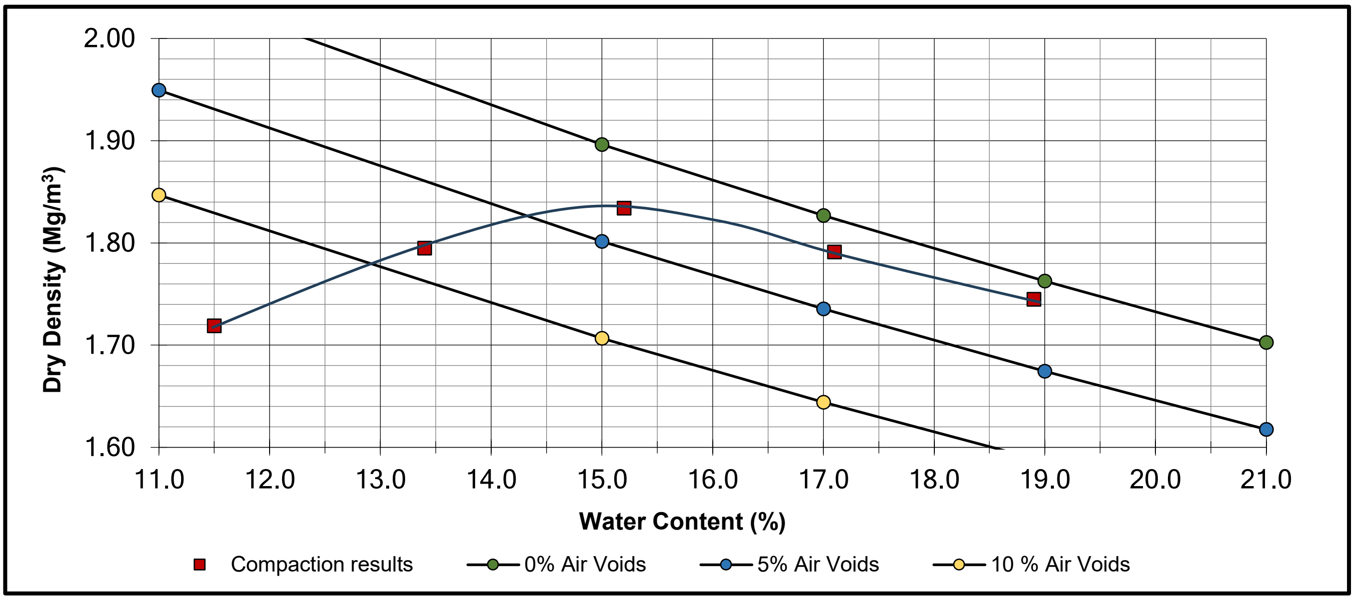
CLIENT	Tier Environmental Ltd
SITE	TE1808 - Pallex, Battram
JOB NUMBER	MRN 25010/16

SAMPLE LABEL	WS06 1-4.5 B	DATE SAMPLED	Not advised
SAMPLE NUMBER	5021907	DATE RECEIVED	07-Feb-25
DATE TESTED	12-Feb-25	SAMPLED BY	Client

MATERIAL	Brown silty very sandy CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Separate Batches

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.65 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m^3)
1	11.5	1.719
2	13.4	1.795
3	15.2	1.834
4	17.1	1.791
5	18.9	1.745



OPTIMUM WATER CONTENT	**16**	(%)
MAXIMUM DRY DENSITY	**1.88**	(Mg/m^3)

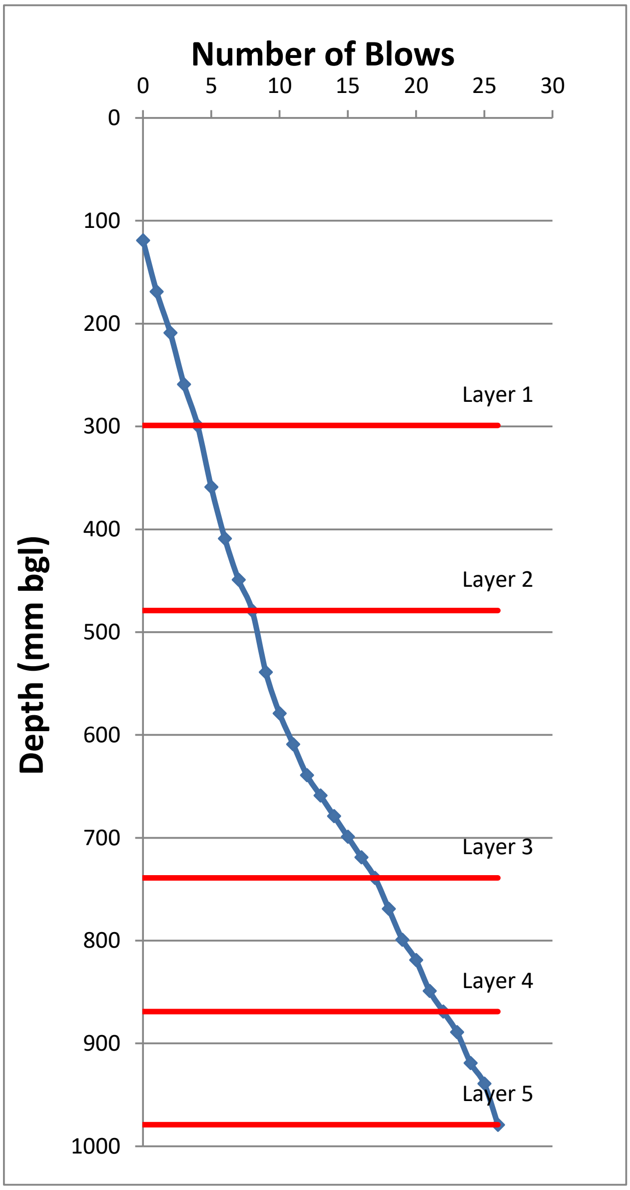
REMARKS

NAME O.P. Davies BA (Hons) SIGNED DATE 03-Mar-25
(Director / Head of Laboratory)

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS	
Job No:	TE1808
Site:	Wiggs Farm, Battram
Location	DCP01
Test Date	25.02.2025
Zero Error mm	1
Cone Angle	
Layers Removed	

No of Blows (Cumulative)	Height (mm)	Depth (mm bgl)
0	120	119
1	170	169
2	210	209
3	260	259
4	300	299
5	360	359
6	410	409
7	450	449
8	480	479
9	540	539
10	580	579
11	610	609
12	640	639
13	660	659
14	680	679
15	700	699
16	720	719
17	740	739
18	770	769
19	800	799
20	820	819
21	850	849
22	870	869
23	890	889
24	920	919
25	940	939
26	980	979

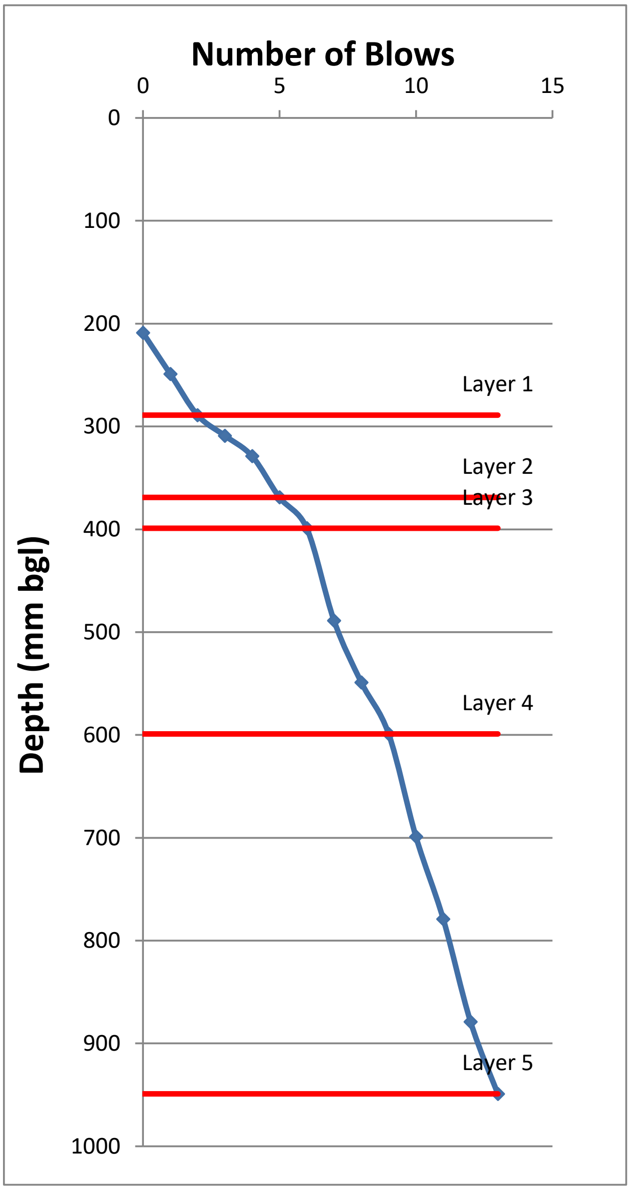


Based on the Kleyn and Van Heerden Model					
Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	119	299	4	45.00	3.34
2	299	479	8	45.00	3.34
3	479	739	17	28.89	5.87
4	739	869	22	26.00	6.71
5	869	979	26	27.50	6.25

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS	
Job No:	TE1808
Site:	Wiggs Farm, Battram
Location	DCP02
Test Date	25.02.2025
Zero Error mm	1
Cone Angle	
Layers Removed	

No of Blows (Cumulative)	Height (mm)	Depth (mm bgl)
0	210	209
1	250	249
2	290	289
3	310	309
4	330	329
5	370	369
6	400	399
7	490	489
8	550	549
9	600	599
10	700	699
11	780	779
12	880	879
13	950	949

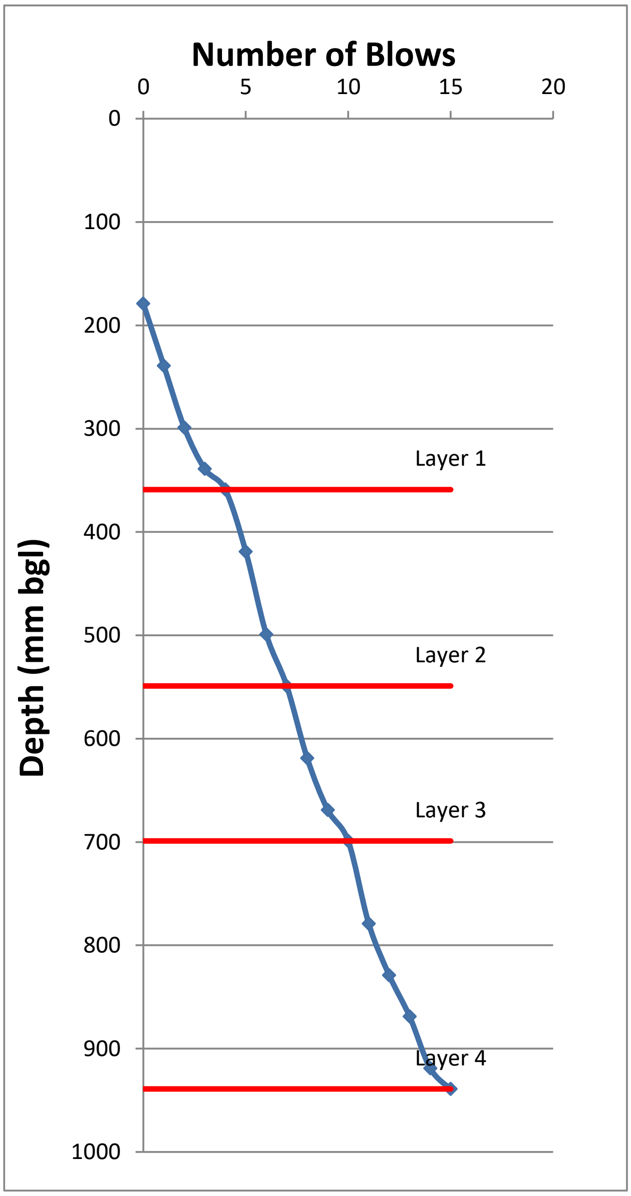


Based on the Kleyn and Van Heerden Model					
Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	209	289	2	40.00	3.88
2	289	369	5	26.67	6.50
3	369	399	6	30.00	5.59
4	399	599	9	66.67	2.02
5	599	949	13	87.50	1.43

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS	
Job No:	TE1808
Site:	Wiggs Farm, Battram
Location	DCP03
Test Date	25.02.2025
Zero Error mm	1
Cone Angle	
Layers Removed	

No of Blows (Cumulative)	Height (mm)	Depth (mm bgl)
0	180	179
1	240	239
2	300	299
3	340	339
4	360	359
5	420	419
6	500	499
7	550	549
8	620	619
9	670	669
10	700	699
11	780	779
12	830	829
13	870	869
14	920	919
15	940	939

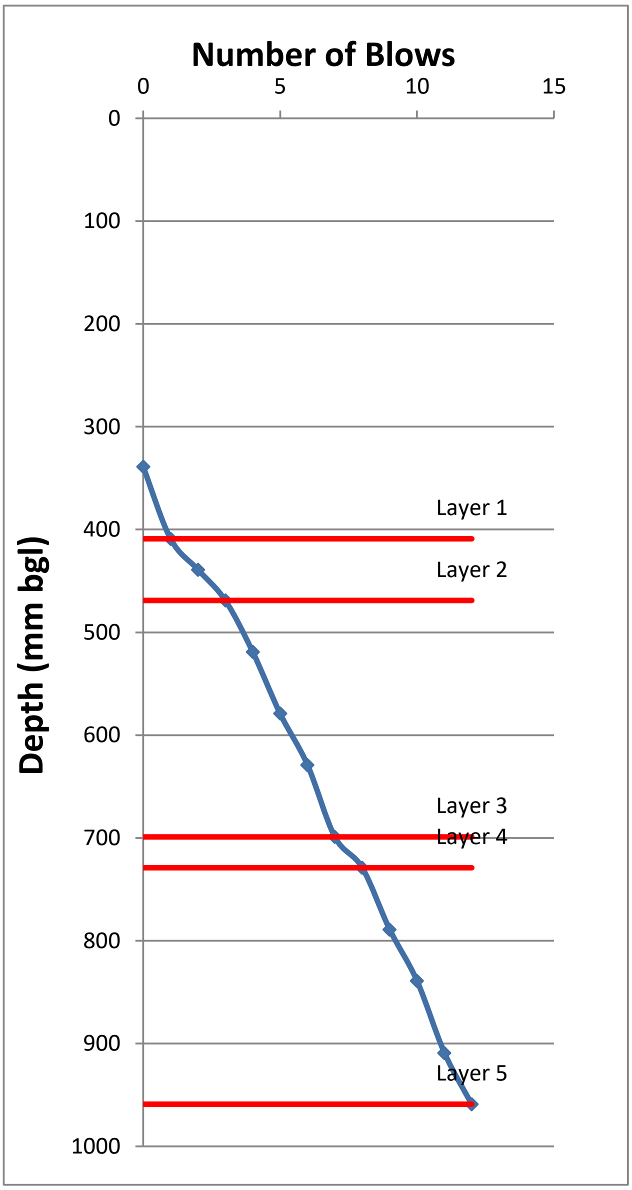


Based on the Kleyn and Van Heerden Model					
Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	179	359	4	45.00	3.34
2	359	549	7	63.33	2.16
3	549	699	10	50.00	2.92
4	699	939	15	48.00	3.07

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS	
Job No:	TE1808
Site:	Wiggs Farm, Battram
Location	DCP04
Test Date	25.02.2025
Zero Error mm	1
Cone Angle	
Layers Removed	

No of Blows (Cumulative)	**Height (mm)**	**Depth (mm bgl)**
0	340	339
1	410	409
2	440	439
3	470	469
4	520	519
5	580	579
6	630	629
7	700	699
8	730	729
9	790	789
10	840	839
11	910	909
12	960	959



Based on the Kleyn and Van Heerden Model

Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	339	409	1	70.00	1.90
2	409	469	3	30.00	5.59
3	469	699	7	57.50	2.44
4	699	729	8	30.00	5.59
5	729	959	12	57.50	2.44

APPENDIX F - GROUNDWATER AND GAS MONITORING RESULTS & GAS ANALYSER CALIBRATION CERTIFICATE

GAS AND GROUNDWATER MONITORING ACROSS BOREHOLE LOCATIONS FIELD PROFORMA

JOB DETAILS:	
Client:	Barberry Bardon Ltd
Site:	Wiggs Farm, Battram
Date:	25/02/2025

Job No:	TE1808		
Visit No:	1	of	4
Operator:	LH		
Project Manager:	SL		

Ground Gas Instrument **GA5000**

Ambient Gas Concentrations: CH_4 ND CO_2 0.2 O_2 20.7

METEOROLOGICAL AND SITE INFORMATION										
State of ground:		Dry		Moist	X	Wet		Snow		Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:		None		Slight	X	Cloudy		Overcast		
Preciptation:	X	None		Slight		Moderate		Heavy		
Barometric pressure (mbar):			989	Before			992	After		
Pressure Trend				Falling		Steady	X	Rising		

Key

CS	Hazard Potential	GSV (l/hr)	Additional Factors
CS1	Very Low	<0.07	Typically <1% CH4 and <5% CO2
CS2	Low	<0.70	Typical measured flow rate <70 l/h
CS3	Moderate	<3.5	N/A
CS4	Moderate to High	<15	N/A
CS5	High	<70	N/A
CS6	Very High	>70	N/A

Monitoring Point	FLOW DATA		GAS CONCENTRATIONS										WELL AND WATER DATA				RESPONSE ZONE	COMMENTS
	Flow rate (l/hr)		Methane (%v/v) CH4		Carbon dioxide (%v/v) CO2		Oxygen (%v/v) O2		Carbon monoxide (ppm) CO		Hydrogen sulphide (ppm) H2S		Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)		
	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady	Peak	Steady						
WS01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	2.95	154.35		WB	Area completely flooded therefore unable to measure gas.
WS05	-0.3	ND	ND	ND	1.7	1.7	19.2	19.7	2	ND	ND	ND	2.17	3.88	161.70	159.53	WB	Flow rate measured for 190 seconds (3 minutes and 10 seconds).
WS07	-0.3	ND	ND	ND	0.4	0.4	20.6	20.6	ND	ND	ND	ND	1.38	4.03	161.36	159.98	WB	Flow rate measured for 80 seconds (1 minute and 20 seconds).
WS12	-0.5	ND	ND	ND	1.4	1.4	9.8	9.8	2	ND	ND	ND	2.88	3.03	159.43	156.55	WB	Flow rate measured for 190 seconds (3 minutes and 10 seconds).

Min	-0.5	0.1	0.1	0.1	0.4	0.4	9.8	9.8	ND	ND	ND	ND	1.38	2.95	154.35	156.55
Max	-0.3	0.1	0.1	0.1	1.7	1.7	20.6	20.6	2	ND	ND	ND	2.88	4.03	161.70	159.98

Borehole Hazardous Gas Flow Rates (l/hr)							
Peak Flow Rates				Steady Flow Rates			
CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)	CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
-0.0003	-0.0051	-0.0003	-0.0051	0.0001	0.0017	0.0001	0.0017
-0.0003	-0.0012	-0.0003	-0.0012	0.0001	0.0004	0.0001	0.0004
-0.0005	-0.007	-0.0005	-0.007	0.0001	0.0014	0.0001	0.0014

GAS AND GROUNDWATER MONITORING ACROSS BOREHOLE LOCATIONS FIELD PROFORMA

JOB DETAILS:	
Client:	Barberry Bardon Ltd
Site:	Wiggs Farm, Battram
Date:	10/03/2025

Job No:	TE1808		
Visit No:	2	of	4
Operator:	LH		
Project Manager:	SL		

Key

CS	Hazard Potential	GSV (l/hr)	Additional Factors
CS1	Very Low	<0.07	Typically <1% CH4 and <5% CO2
CS2	Low	<0.70	Typical measured flow rate <70 l/h
CS3	Moderate	<3.5	N/A
CS4	Moderate to High	<15	N/A
CS5	High	<70	N/A
CS6	Very High	>70	N/A

Ground Gas Instrument	GA5000

Ambient Gas Concentrations:	CH_4	ND	CO_2	0.2	O_2	20.9

METEOROLOGICAL AND SITE INFORMATION					
State of ground:	☐ Dry	☒ Moist	☐ Wet	☐ Snow	☐ Frozen
Wind:	☐ Calm	☐ Light	☒ Moderate	☐ Strong	
Cloud cover:	☐ None	☐ Slight	☒ Cloudy	☐ Overcast	
Preciptation:	☒ None	☐ Slight	☐ Moderate	☐ Heavy	
Barometric pressure (mbar):		983 Before		983 After	
Pressure Trend		☐ Falling	☐ Steady	☒ Rising	

Monitoring Point	FLOW DATA		GAS CONCENTRATIONS										WELL AND WATER DATA				RESPONSE ZONE	COMMENTS
	Flow rate (l/hr)		Methane (%v/v) CH4		Carbon dioxide (%v/v) CO2		Oxygen (%v/v) O2		Carbon monoxide (ppm) CO		Hydrogen sulphide (ppm) H2S		Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)		
	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady	Peak	Steady						
WS01	ND	ND	ND	ND	1.2	1.2	8.8	8.8	ND	ND	ND	ND	ND	3.04	154.35		WB	Flow rate measured for 110 seconds (1 minute and 50 seconds).
WS05	ND	ND	ND	ND	2.0	2.0	19.3	19.3	1	ND	ND	ND	2.70	3.98	161.70	159.00	WB	Flow rate measured for 110 seconds (1 minute and 50 seconds).
WS07	ND	ND	ND	ND	2.4	2.4	19.7	19.7	ND	ND	ND	ND	2.51	4.10	161.36	158.85	WB	Flow rate measured for 60 seconds (1 minute).
WS12	ND	ND	ND	ND	2.1	2.1	7.8	7.8	ND	ND	ND	ND	3.00	3.08	159.43	156.43	WB	Flow rate measured for 80 seconds (1 minute and 20 seconds).

Min	0.1	0.1	0.1	0.1	1.2	1.2	7.8	7.8	ND	ND	ND	ND	2.51	3.04	154.35	156.43
Max	0.1	0.1	0.1	0.1	2.4	2.4	19.7	19.7	1	ND	ND	ND	3.00	4.10	161.70	159.00

Borehole Hazardous Gas Flow Rates (l/hr)							
Peak Flow Rates				Steady Flow Rates			
CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)	CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)
0.0001	0.0012	0.0001	0.0012	0.0001	0.0012	0.0001	0.0012
0.0001	0.002	0.0001	0.002	0.0001	0.002	0.0001	0.002
0.0001	0.0024	0.0001	0.0024	0.0001	0.0024	0.0001	0.0024
0.0001	0.0021	0.0001	0.0021	0.0001	0.0021	0.0001	0.0021

GAS AND GROUNDWATER MONITORING ACROSS BOREHOLE LOCATIONS FIELD PROFORMA

JOB DETAILS:	
Client:	Barberry Bardon Ltd
Site:	Wiggs Farm, Battram
Date:	27/03/2025

Job No:	TE1808		
Visit No:	3	of	4
Operator:	LH		
Project Manager:	SL		

Ground Gas Instrument GA5000

Ambient Gas Concentrations: CH_4 ND CO_2 0.2 O_2 20.8

METEOROLOGICAL AND SITE INFORMATION

State of ground: ☒ Dry ☐ Moist ☐ Wet ☐ Snow ☐ Frozen
Wind: ☐ Calm ☒ Light ☐ Moderate ☐ Strong
Cloud cover: ☐ None ☐ Slight ☒ Cloudy ☐ Overcast
Preciptation: ☒ None ☐ Slight ☐ Moderate ☐ Heavy
Barometric pressure (mbar): 975 Before 977 After
Pressure Trend ☒ Falling ☐ Steady ☐ Rising

Key

CS	Hazard Potential	GSV (l/hr)	Additional Factors
CS1	Very Low	<0.07	Typically <1% CH4 and <5% CO2
CS2	Low	<0.70	Typical measured flow rate <70 l/h
CS3	Moderate	<3.5	N/A
CS4	Moderate to High	<15	N/A
CS5	High	<70	N/A
CS6	Very High	>70	N/A

Monitoring Point	FLOW DATA Flow rate (l/hr)		GAS CONCENTRATIONS Methane (%v/v) CH4		Carbon dioxide (%v/v) CO2		Oxygen (%v/v) O2		Carbon monoxide (ppm) CO		Hydrogen sulphide (ppm) H2S		WELL AND WATER DATA Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)	RESPONSE ZONE	COMMENTS
	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady	Peak	Steady						
WS01	ND	ND	ND	ND	1.4	1.4	6.4	6.4	1	ND	ND	ND	ND	3.46	154.35		WB	Flow rate measured for 130 seconds (2 minutes and 10 seconds).
WS05	ND	ND	ND	ND	2.2	2.2	18.0	18.0	1	ND	ND	ND	1.92	4.06	161.70	159.78	WB	Flow rate measured for 130 seconds (2 minutes and 10 seconds).
WS07	ND	ND	ND	ND	2.6	2.6	16.7	18.8	1	ND	ND	ND	3.35	4.10	161.36	158.01	WB	Flow rate measured for 130 seconds (2 minutes and 10 seconds).
WS12	ND	ND	ND	ND	2.0	2.0	8.9	8.9	1	ND	ND	ND	2.98	3.08	159.43	156.45	WB	Flow rate measured for 130 seconds (2 minutes and 10 seconds).

Min	0.1	0.1	0.1	0.1	1.4	1.4	6.4	6.4	1	ND	ND	ND	1.92	3.08	154.35	156.45
Max	0.1	0.1	0.1	0.1	2.6	2.6	18.0	18.8	1	ND	ND	ND	3.35	4.10	161.70	159.78

Borehole Hazardous Gas Flow Rates (l/hr) Peak Flow Rates CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)	Steady Flow Rates CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)
0.0001	0.0014	0.0001	0.0014	0.0001	0.0014	0.0001	0.0014
0.0001	0.0022	0.0001	0.0022	0.0001	0.0022	0.0001	0.0022
0.0001	0.0026	0.0001	0.0026	0.0001	0.0026	0.0001	0.0026
0.0001	0.002	0.0001	0.002	0.0001	0.002	0.0001	0.002

GAS AND GROUNDWATER MONITORING ACROSS BOREHOLE LOCATIONS FIELD PROFORMA

TIER CONSULT GROUP

JOB DETAILS:	
Client:	Barberry Bardon Ltd
Site:	Wiggs Farm, Battram
Date:	15/04/2025

Job No:	TE1808		
Visit No:	4	of	4
Operator:	PN		
Project Manager:	SL		

Ground Gas Instrument: GA5000

Ambient Gas Concentrations: CH_4 ND; CO_2 0.2; O_2 20.9

METEOROLOGICAL AND SITE INFORMATION

State of ground:	☒ Dry	☐ Moist	☐ Wet	☐ Snow	☐ Frozen
Wind:	☐ Calm	☒ Light	☐ Moderate	☐ Strong	
Cloud cover:	☐ None	☐ Slight	☒ Cloudy	☐ Overcast	
Preciptation:	☒ None	☐ Slight	☐ Moderate	☐ Heavy	
Barometric pressure (mbar):		975 Before		997 After	
Pressure Trend		☒ Falling	☐ Steady	☐ Rising	

Key

CS	Hazard Potential	GSV (l/hr)	Additional Factors
CS1	Very Low	<0.07	Typically <1% CH4 and <5% CO2
CS2	Low	<0.70	Typical measured flow rate <70 l/h
CS3	Moderate	<3.5	N/A
CS4	Moderate to High	<15	N/A
CS5	High	<70	N/A
CS6	Very High	>70	N/A

Monitoring Point	FLOW DATA		GAS CONCENTRATIONS										WELL AND WATER DATA				RESPONSE ZONE	COMMENTS
	Flow rate (l/hr)		Methane (%v/v) CH4		Carbon dioxide (%v/v) CO2		Oxygen (%v/v) O2		Carbon monoxide (ppm) CO		Hydrogen sulphide (ppm) H2S		Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)		
	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady	Peak	Steady						
WS01	-0.1	ND	ND	ND	1.5	1.5	5.9	5.9	ND	ND	1	1	ND	3.01	154.35		WB	Flow rate measured for 130 seconds (2 minutes and 10 seconds).
WS05	ND	ND	ND	ND	2.3	2.3	17.6	18.0	1	ND	ND	ND	1.44	4.08	161.70	160.26	WB	Flow rate measured for 120 seconds (2 minutes).
WS07	-0.1	-0.1	ND	ND	4.2	4.2	13.3	13.3	ND	ND	1	1	3.71	4.09	161.36	157.65	WB	Flow rate measured for 120 seconds (2 minutes).
WS12	-0.1	-0.1	ND	ND	1.5	1.5	8.0	8.0	ND	ND	1	1	2.99	3.00	159.43	156.44	WB	Flow rate measured for 150 seconds (2 minutes and 30 seconds).
Min	0.1	0.1	0.1	0.1	1.5	1.5	5.9	5.9	ND	ND	ND	ND	1.44	3.00	154.35	156.44		
Max	-0.1	-0.1	0.1	0.1	4.2	4.2	17.6	18.0	1	ND	1	1	3.71	4.09	161.70	160.26		

Borehole Hazardous Gas Flow Rates (l/hr)							
Peak Flow Rates				Steady Flow Rates			
CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)	CH4 Qhg (Peak)	CO2 Qhg (Peak)	CH4 Qhg (Steady)	CO2 Qhg (Steady)
-0.0001	-0.0015	-0.0001	-0.0015	0.0001	0.0015	0.0001	0.0015
0.0001	0.0023	0.0001	0.0023	0.0001	0.0023	0.0001	0.0023
-0.0001	-0.0042	-0.0001	-0.0042	-0.0001	-0.0042	-0.0001	-0.0042
-0.0001	-0.0015	-0.0001	-0.0015	-0.0001	-0.0015	-0.0001	-0.0015

CERTIFICATION OF CALIBRATION

PJLA Calibration

Date Of Calibration: 09-Aug-2024

No. 66916

Certificate Number: G508641_9/36190

Issued by: QED Environmental Systems Inc.

Customer: **TIER ENVIRONMENTAL LTD**

UNIT 5 VILLAGE OFFICE CHESTER BUSINESS PARK CHESTER, CHESHIRE CH4 9QZ
GB

Description:

Model: GA5000

Serial Number: G508641

Accredited Results:

Methane (CH4)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.0	5.0	0.42
15.1	15.1	0.66
60.0	59.9	1.03

Carbon Dioxide (CO2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.0	5.0	0.43
15.0	15.0	0.71
39.9	40.0	1.19

Oxygen (O2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
20.9	21.0	0.25

Gas cylinders are traceable and details can be provided if requested.

CH4, CO2 readings recorded at:	34.6 °C/94.2 °F	Barometric Pressure:	0979 mbar/28.90 "Hg
O2 readings recorded at:	26.0 °C/78.8 °F		

Method of Test: The analyzer is calibrated in a temperature controlled chamber using reference gases. All analyzers are calibrated in accordance with our procedure ISP-17 using high purity grade gas.

Instrument has passed calibration as the measurement result is within the specification limit. The specification limit takes into account the measurement uncertainty.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with NIST requirements.

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Calibration Instance: 118 IGC Instance: 118

CERTIFICATION OF CALIBRATION

PJLA Calibration

Date Of Calibration: 09-Aug-2024

No. 66916

Certificate Number: G508641_9/36190

Issued by: QED Environmental Systems Inc.

Non Accredited results:

Pressure Transducers (inches of water column)					
Transducer	**Certified (Low)**	**Reading (Low)**	**Certified (High)**	**Reading (High)**	**Accuracy**
Relative	0"	0"	40"	40.7"	2.0"

Barometer (mbar)	
Reference	**Instrument Reading**
0979 mbar / 28.90 "Hg	0979 mbar / 28.90 "Hg

Additional Gas Cells		
Gas	**Certified Gas (ppm)**	**Instrument Reading (ppm)**
CO	500	500
H_2S	256	256

As received gas check readings:

Methane (CH4)	
Certified Gas (%)	**Instrument Reading (%)**
5.0	5.0
15.1	14.9
60.0	60.4

Carbon Dioxide (CO2)	
Certified Gas (%)	**Instrument Reading (%)**
5.0	5.6
15.0	16.9
39.9	44.4

Oxygen (O2)	
Certified Gas (%)	**Instrument Reading (%)**
20.9	20.5

As received Gas readings recorded at: 34.6 °C/94.2 °F

As received Barometric Pressure recorded at: 26.0 °C/78.8 °F

As received gas check readings are only recorded if the instrument is received in a working condition. Where the instrument is received damaged no reading can be taken.

Date of Issue : 12 Aug 2024

Approved By Signatory

Linda Ostrowski

Laboratory Inspection

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

APPENDIX G - PHOTOGRAPHS

Project Name Wiggs Farm, Battram

Project No. TE1808

Engineer George Foster

Client Barberry Bardon Ltd

Photographic Record

Location ID

TP01

Pit

Spoil

Photographed By

Date

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP02
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name Wiggs Farm, Battram

Project No. TE1808

Engineer George Foster

Client Barberry Bardon Ltd

Photographic Record

Location ID

TP03

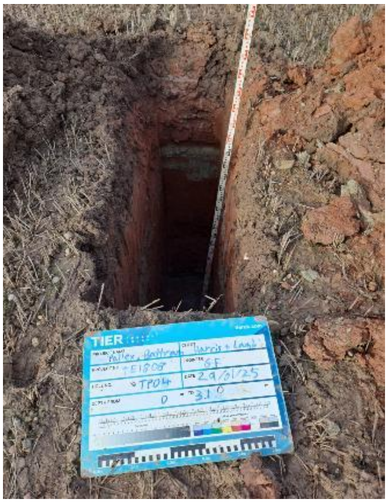
Pit

Spoil

Photographed By

Date

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP04
Engineer	George Foster		
Client	Barberry Bardon Ltd		



Pit

Spoil

Photographed By		**Date**	

Project Name	Wiggs Farm, Battram
Project No.	TE1808
Engineer	George Foster
Client	Barberry Bardon Ltd

Photographic Record

Location ID
TP05

Pit

Spoil

Photographed By

Date

Photographic Record

Project Name	Wiggs Farm, Battram
Project No.	TE1808
Engineer	George Foster
Client	Barberry Bardon Ltd

Location ID

TP06

Pit

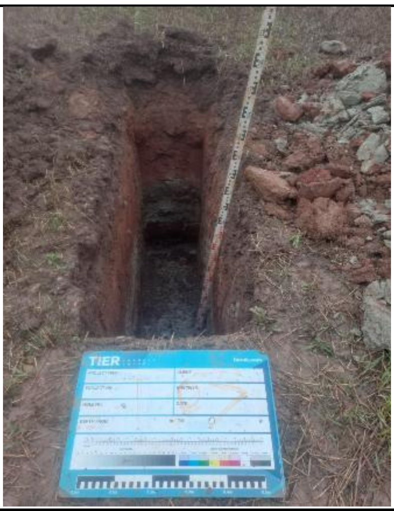
Spoil

Photographed By		**Date**	

Project Name Wiggs Farm, Battram
Project No. TE1808
Engineer George Foster
Client Barberry Bardon Ltd

Photographic Record

Location ID
TP07



Pit

Spoil

Photographed By

Date

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP08
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name Wiggs Farm, Battram

Project No. TE1808

Engineer George Foster

Client Barberry Bardon Ltd

Photographic Record

Location ID

TP09

Pit

Spoil

Photographed By

Date

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID** TP10
Project No.	TE1808		
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name Wiggs Farm, Battram

Project No. TE1808

Engineer George Foster

Client Barberry Bardon Ltd

Photographic Record

Location ID

TP11

Pit

Spoil

Photographed By

Date

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP12
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP13
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP14
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID** TP15
Project No.	TE1808		
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP16
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP17
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

		Photographic Record	**Location ID**
Project Name	Wiggs Farm, Battram		TP18
Project No.	TE1808		
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP19
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name Wiggs Farm, Battram

Project No. TE1808

Engineer George Foster

Client Barberry Bardon Ltd

Photographic Record

Location ID

TP20

Pit

Spoil

Photographed By

TIER CONSULT GROUP

Date

Project Name	Wiggs Farm, Battram	**Photographic Record**	**Location ID**
Project No.	TE1808		TP21
Engineer	George Foster		
Client	Barberry Bardon Ltd		

Pit

Spoil

Photographed By		**Date**	

Project Name Wiggs Farm, Battram

Project No. TE1808

Engineer George Foster

Client Barberry Bardon Ltd

Photographic Record

Location ID

TP22

Pit

Spoil

Photographed By

Date

APPENDIX H - PREVIOUS SITE INVESTIGATION REPORT (AVAILABLE AS A SEPARATE DOCUMENT)

APPENDIX I - DEFINITIONS OF TERMS USED IN QUALITATIVE AND QUANTITATIVE RISK ASSESSMENTS

CIRIA C552 Terminology

For the qualitative and quantitative assessment of risks posed by potential pollutant linkages have been undertaken using the risk matrix adapted from CIRIA C552 and outlined in the table below.

	Category	**Definition**
Potential severity	Severe	Acute (short term) risk to human health, Major pollution of sensitive controlled waters, ecosystems or habitat. Catastrophic damage to buildings or property or crops.
	Medium	Chronic (Medium / long term) risk to human health Pollution of sensitive controlled waters, ecosystems or species, Significant damage to crops, buildings or structures
	Mild	Easily preventable permanent health effects on humans. Pollution of non-sensitive controlled waters. Minor damage to buildings or structures.
	Minor	Easily preventable non-permanent health effects on humans, or no effects. Minor, low level and localised contamination of on-site soil. Easily repairable damage to buildings or structures.
Probability of risk	High Likelihood	Pollutant linkage may be present, and the risk is almost certain to occur , or there is evidence of harm already occurring.
	Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
	Low Likelihood	Pollutant linkages may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
	Unlikely	Pollutant linkage may be present but the circumstances under which harm would occur are improbable.

		Potential Severity			
		Severe	**Medium**	**Mild**	**Minor**
Probability of risk	**High Likelihood**	Very high risk	High risk	Moderate risk	Moderate / low risk
	Likely	High risk	Moderate risk	Moderate / low risk	Low risk
	Low Likelihood	Moderate risk	Moderate / low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	very low risk	Very low risk

APPENDIX J - HUMAN HEALTH ASSESSMENT CRITERIA

HUMAN HEALTH ASSESSMENT CRITERIA

Context

Contaminated Land is defined under law through Part IIA of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995 and associated guidance ("Part IIA"). These specify that a "suitable for use" approach is to be applied in the assessment of potentially contaminated land, implemented through a phased programme of site investigation and risk assessment appropriate to the site under consideration.

The assessment of potential risks posed by contaminated land is based upon the assessment of plausible contaminant source - pathway - receptor linkages ("pollutant linkages") for the current and/or proposed future use of the site. The process for the assessment of contaminated land adopted in this report is in line with guidance issued by the Environment Agency Land contamination risk management (LCRM) - GOV.UK (www.gov.uk)

Land contamination can harm:

- human health
- drinking water supplies, groundwater and surface water
- soils
- ecosystems including wildlife, animals and wetlands.
- property

It can also affect the current and future land use. Dealing with land contamination helps make the environment clean and safe. Through regeneration it can:

- enhance the health and wellbeing of all.
- add to the economic, ecological and amenity value of the area.

Use land contamination risk management (LCRM) to:

- identify and assess if there is an unacceptable risk.
- assess what remediation options are suitable to manage the risk.
- plan and carry out remediation.
- verify that remediation has worked.

You can use LCRM in a range of regulatory and management contexts. For example, voluntary remediation, planning, assessing liabilities or under the Part 2A contaminated land regime. The Environment Agency expects you to follow LCRM if you are managing the risks from land contamination.

We support the use of the National Quality Mark Scheme (NQMS). You can use it for any type of land contamination report.

Using the NQMS:

- will make sure all legislative requirements and necessary standards related to managing land contamination are met.
- can provide increased confidence by submitting reports of the quality we expect.
- can result in cost and time savings by 'getting it right first time'.

LCRM is made up of 4 guides.

1. LCRM: Before you start.
2. LCRM: Risk assessment.
3. LCRM: Options appraisal.
4. LCRM: Remediation and verification.

We use a staged risk based approach. There are 3 stages, and each stage is broken down into tiers or steps.

Stage 1: Risk assessment

You will use a tiered approach to risk assessment. The 3 tiers are:

1. Preliminary risk assessment.
2. Generic quantitative risk assessment.
3. Detailed quantitative risk assessment.

Stage 1 includes information for intrusive site investigations.

Stage 2: Options appraisal

There are 3 steps to follow.

1. Identify feasible remediation options.
2. Do a detailed evaluation of options.
3. Select the final remediation option.

Stage 3: Remediation and verification

There are 4 steps to follow.

1. Develop a remediation strategy.
2. Remediate.
3. Produce a verification report.
4. Do long term monitoring and maintenance, if required

You must always start with a preliminary risk assessment.

The risk assessment stage is an iterative process. You can do the 3 tiers in order or progress from a preliminary risk assessment to a detailed quantitative risk assessment. As part of a generic or detailed quantitative risk assessment you will need to collect detailed information about the site. This is usually through an intrusive site investigation.

Depending on the level of risk or regulatory requirements, you can proceed from a preliminary risk assessment to the options appraisal stage. If you proceed direct to the options appraisal stage, you still need to collect the detailed site investigation information required by the generic and detailed quantitative risk assessments. This is to confirm that your approach is viable and acceptable.

Following the risk assessment stage, if you conclude that the risks are acceptable, with agreement from the relevant regulator, you can end the process.

If there are unacceptable risks, then remediation or mitigation is required. Follow stages 2 and 3 in order.

In stage 2 options appraisal, you will:

- look at the most feasible options.
- produce a shortlist of options.
- use evaluation criteria to assess them.
- select which ones are the most suitable to take forward to stage 3.

In stage 3 remediation and verification, you will produce a remediation strategy, do the remediation and then produce a verification report.

You will decide at the options appraisal stage if long term monitoring and maintenance is the remediation option. You may need to do post-remediation monitoring for further verification.

The risk assessment and subsequent investigation, remediation and verification must address all potential sources of pollutants that may be present on the site (the “hazards”), all receptors that may be harmed by these (e.g., human health, controlled waters, ecological receptors) and the pathways by which the contamination may be transported from the contaminant source(s) to the receptor(s). This is defined within the conceptual model for the site, which represents the characteristics of the site in a form that shows the possible pollutant linkages. As further information becomes available (for example, through site investigation), so the conceptual model will be refined.

Remedial action can be specified at any phase within this assessment process to break the identified pollutant linkage in determining whether or not to undertake further assessment or to undertake remediation, the potential cost-savings arising from a more thorough assessment of the pollutant linkages and more tightly defined remedial strategy must be considered against the direct costs involved in the work and the time that this will take to execute and gain regulatory approval.

A different approach to the statistical appraisal of data is required depending on whether the assessment is being undertaken to assess land as Contaminated Land in accordance with the regulations or whether the assessment is to assess whether the site is suitable for new development in accordance with the Planning regime. The statistical approach to assessment is discussed further in CL:AIRE:2020 “Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration”.

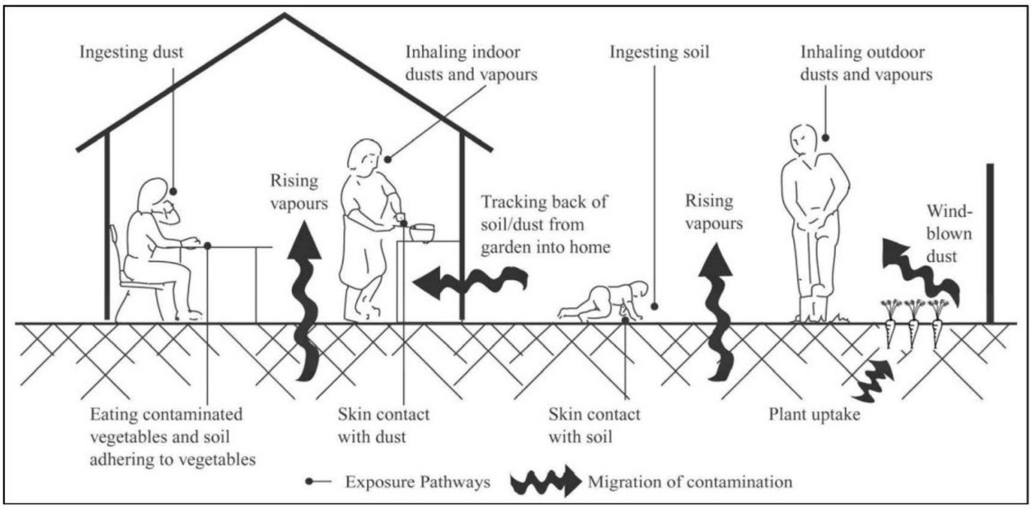
Some form of Detailed Quantitative Risk Assessment (DQRA) will be essential for those cases where appropriate GAC values cannot be established for the contaminant linkages under consideration.

Generic Assessment Criteria for Human Health Risk Assessment

In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports and guidance. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. The initial documents (CLR7 – 10) were withdrawn and replaced with revised guidance issued by the Environment Agency including:

- "Using Soil Guideline Values"; EA,2009; Land contamination: using soil guideline values (SGVs) - GOV.UK (www.gov.uk)
- "Human Health toxicology assessment of contaminants in soil" EA;, 2009; https://www.gov.uk/government/publications/human-health-toxicological-assessment-of-contaminants-in-soil
- "Update technical background to the CLEA model" 2009; https://www.gov.uk/government/publications/updated-technical-background-to-the-clea-model
- CLEA Software (Version1.05) Handbook 2015; https://www.gov.uk/government/publications/contaminated-land-exposure-assessment-clea-tool
- Compilation of Data for priority Organic Contaminants for Derivation of Soil Guideline Values; Science Report SC050021/SR7, 2008; and,
- "Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration". CL:AIRE:2020 https://www.claire.co.uk/component/phocadownload/category/9-other-cl-aire-documents?download=745:2020-stats-guidance

The CLEA model and associated guidance was developed to calculate an estimated tolerable daily intake (TDI) of contaminants for site users given a set of 'typical' human health exposure pathways which are detailed in "SR3: Updated technical background to the CLEA model" (Science Report SC050021/SR3, EA, 2009) and reproduced below.



Ingestion

- Outdoor soil;
- Indoor dust;
- Home grown produce;
- Soil attached to home grown produce.

Dermal Contact

- Outdoor soil;
- Indoor dust.

Inhalation

- Outdoor dust;
- Indoor dust;
- Outdoor vapour;
- Indoor vapour.

It should be noted that the CLEA model does not include an exhaustive list of potential exposure pathways, e.g. certain compounds can pass through plastic water pipes into drinking water supply.

The potential significance of each of the exposure pathways is dependent upon the type of land use and the nature of the contaminant being considered. The CLEA model considers principal 'default' land use scenarios and makes a series of assumptions with regards to building type (where applicable), identification of the critical human receptor group, exposure frequency and duration. The definitions of the principal land use types given in SR3 (EA, 2009) are:

Residential land use;

- A typical residential property consisting of a two-storey terraced house built on a ground-bearing slab of 0.15m thickness with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden. The critical receptor is a 0 – 6-year-old female.
- Active exposure pathways are ingestion of outdoor soil, ingestion of indoor dust, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and indoor dust and vapour.

Allotments

- A plot of open space commonly made available by the Local Authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than one hectare. The tenants are assumed to be the parents or grandparents and that young children make occasional accompanied visits to the plots. The critical receptor is a 0 – 6-year-old female and there is no building present on site.
- Active exposure pathways are ingestion of outdoor soil, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil; inhalation of outdoor vapour.

Commercial and industrial land use.

- A typical commercial or light industrial property consisting of a three-story office building (pre-1970) with a ground bearing floor slab at which employees spend most time indoors and are involved in office based or related light physical work. The critical receptor is a working female adult aged 16 – 65 years.
- Active exposure pathway is ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and inhalation of indoor dust and vapour.

Soil Guideline Values

Based on the assumption of each land use type, the EA and DEFRA developed and published Soil Guideline Value (SGV) using the CLEA model for a number of principal contaminants and 'default' end-use scenarios of residential, allotments and commercial/industrial use. The primary purpose of the SGVs is as trigger value for the tolerable daily intake (TDI), below which it can be assumed that the soil does not pose an unacceptable risk to the identified receptor. Where soils contamination is present above this level further assessment may be required. SGVs were developed for the following contaminants:

- Heavy metals and other inorganic compounds: arsenic, cadmium, chromium, cyanide, lead (now withdrawn), mercury, nickel and selenium.
- Benzene, ethylbenzene, toluene and xylenes.
- Phenol.
- Dioxins and dioxin-like polychlorinated biphenyls (PCBs)
- Polycyclic aromatic hydrocarbons (PAHs) – 11 substances

LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment

In addition, in 2009 CIEH through LQM and EIC published generic assessment criteria (GACs) for 82 substances including metals, petroleum hydrocarbons, PAHs and explosive substances for a variety of soil types and the three 'default' land uses – (residential, allotments and commercial end-uses) as described in SR3 (EA, 2009). These have been superseded as described below.

Category 4 Screening Values

In 2013 "SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination" (CL:AIRE 2013) was issued which detailed findings of a research project undertaken by CL:AIRE to set out the framework by which potential Category 4 Screening Levels (pC4SL) may be derived for 6 contaminants of concern, Arsenic, Benzene, Benzo(a)pyrene, Cadmium, Chromium VI and Lead.

This was supplemented in 2014 by "SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination – Policy Companion Document" (DEFRA, 2014). SP1010 proposed several updated toxicology information relating to contaminant behaviour updated assumptions relating to the modelling of human exposure to soil contaminants, derivation of separate C4SLs for residential with the consumption of home grown produce, residential without the consumption of home grown produce, and two new land uses: public open spaces near residential housing (POS resi) and public parks (POS park).

Public Open Space: Residential

- For public open space in close proximity to residential housing and the central green area around which houses are located, as on many housing estates from the 1930s to 1970s. It is also applicable for smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soil with planting. It is considered to be a generally grassed area up to 0.5ha with up to 50% bare soil. The land use is an important resource for children and the area is near the homes. The critical receptor is a female child age >3 - <9 years old (CLEA age class 4 – 9) as younger children are unlikely to play outdoors unsupervised.

- Active exposure pathways are ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor soil derived dust; inhalation of outdoor and indoor dust and inhalation of outdoor vapour.

Public Open Space: Park

- A public park is defined as an area of open space provided for recreational use and usually owned and maintained by the Local Authority. It is anticipated the park could be used for a wide range of activities, including the following:
    - Family visits and picnics;
    - Children's play area;
    - Sporting activities such as football on an informal basis (i.e. not a dedicated sports pitch); and
    - Dog walking.
- The park is modelled as an area >0.5 ha of predominantly grasses open space with no more than 25% of exposed soil.
- The critical receptor is a female child with CLEA age classes 1 – 6.
- Active exposure pathways are: ingestion of outdoor soil; direct dermal contact with outdoor soil; inhalation of outdoor dust and inhalation of outdoor vapour.

Furthermore, the C4SLs are based on a different toxicological benchmark, the 'low level of toxicological concern' (LLTC). This difference in approach was adopted because the C4SLs were primarily intended for use under Part2A of the EPA 1990 to quickly screen out Category 4 sites where there is "*no risk or that the level of risk posed is low*". SGVs and LQM GACs are based on the more conservative 'minimal or tolerable level of risk' as defined in SR2 (EA, 2009) and were derived for assessment of contamination for the Planning process.

LQM/CIEH Suitable 4 Use Levels (S4ULs)

The publication of the C4SLs resulted in considerable and inconclusive debate about the applicability of the lower level of protection of the C4SL, which are underlain by the LLTC, outside of the Part 2A context for which they were derived. In 2014 LQM/CIEH presented a Suitable 4 Use Levels (S4ULs), which incorporate the updated assumption exposure derived for the production of the C4SLs but within the context of deriving screening criteria above which further assessment of the risks or remedial action may be needed. The S4ULs replace the 82 substances, species and fractions and congeners contained in the previous LQM/CIEH GACs issued in 2009. Additionally, following changes and new land uses proposed in the C4SL research project, S4ULs have also been derived for the majority of substances for which the EA derived SGVs in 2009 with the exception of lead (see below).

Lead

The C4SL for lead provides a technically robust and conservative assessment tool using significantly updated toxicological modelling than the withdrawn SGV and derived in line with current science of lead toxicology.

EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (2010)

In some instances, EIC/AGC/CL:AIRE GACs for certain VOC / SVOC potential contaminants of concern have been used *in lieu* of available LQM / CIEH S4UL values.

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Metals/metalloids																			
Arsenic	37			40			43			640			79			170			LQM (2014)
Beryllium	1.7			1.7			35			12			2.2			63			LQM (2014)
Boron	290			11000			45			240000			21000			46000			LQM (2014)
Cadmium	11			85			1.9			190			120			532			LQM (2014)
Chromium III	910			910			18000			8600			1500			33000			LQM (2014)
Chromium VI	6			6			1.8			33			7.7			220			LQM (2014)
Copper	2400			7100			520			68000			12000			44000			LQM (2014)
Lead	200			310			80			2330			630			1300			C4SL
Mercury (elemental)	1.2			1.2			21			58 (25.8)			16			30 (25.8)			LQM (2014)
Mercury (Inorganic)	40			56			19			1100			120			240			LQM (2014)
Methylmercury	11			15			6			320			40			68			LQM (2014)
Nickel	130			180			53			980			230			800			LQM (2014)
Selenium	250			430			88			12000			1100			1800			LQM (2014)
Vanadium	410			1200			91			9000			2000			5000			LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Zinc	3700			40000			620			730000			81000			170000			LQM (2014)
Other																			
Total Sulphate	2,400			2,400			2,400			2,400			2,400			2,400			BRE (2005)
Water Soluble Sulphate (g/l)	0.5			0.5			0.5			0.5			0.5			0.5			BRE (2005)
PAHs																			
Acenaphthene	210	510	1100	3000 (57)	4700(141)	6000 (336)	34	85	200	84000 (57)	97000 (141)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Acenaphthylene	170	420	920	2900 (86.1)	4600 (212)	6000 (506)	28	69	160	8300 (86.1)	97000 (212)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Anthracene	2400	5400	11000	31000 (1.17)	35000	37000	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000	LQM (2014)
Benzo(a)anthracene	7.2	11	13	11	14	15	2.9	6.5	13	170	170	180	29	29	29	49	56	62	LQM (2014)
Benzo(a)pyrene	2.2	2.7	3	3.2	3.2	3.2	0.97	2	3.5	35	35	36	5.7	5.7	5.7	11	12	13	LQM (2014)
Benzo(b)fluoranthene	2.6	3.3	3.7	3.9	4	4	0.99	2.1	3.9	44	44	45	7.1	7.1	7.1	13	15	16	LQM (2014)
Benzo(g,h,i)perylene	320	340	350	360	360	360	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600	LQM (2014)
Benzo(k)fluoranthene	77	93	100	110	110	110	37	75	130	1200	1200	1200	190	190	190	370	410	440	LQM (2014)
Chrysene	15	22	27	30	31	32	4.1	9.4	19	350	350	350	57	57	57	93	110	120	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Dibenz(a,h)anthracene	0.24	0.28	0.3	0.31	0.32	0.32	0.14	0.27	0.61	3.5	3.6	3.6	0.57	0.57	0.58	1.1	1.3	1.4	LQM (2014)
Fluoranthene	280	560	890	1500	1600	1600	52	130	290	23000	23000	23000	3100	3100	3100	63	6300	6400	LQM (2014)
Fluorene	170	400	860	2800 (30.9)	3800 (76.5)	4500 (183)	27	67	160	63000 (30.9)	68000	71000	9900	9900	9900	20000	20000	20000	LQM (2014)
Indeno(1,2,3-cd)pyrene	27	36	41	45	46	46	9.5	21	39	500	510	510	82	82	82	150	170	180	LQM (2014)
Naphthalene	2.3	5.6	13	2.3	5.6	13	4.1	10	24	190 (76.4)	460 (183)	1100 (432)	4900	4900	4900	1200 (76.4)	1900 (183)	3000	LQM (2014)
Phenanthrene	95	220	440	1300 (36)	1500	1500	15	38	90	22000	22000	23000	3100	3100	3100	6200	6200	6300	LQM (2014)
Pyrene	620	1200	2000	3700	3800	3800	110	270	620	54000	54000	54000	7400	7400	7400	15000	15000	15000	LQM (2014)
Coal Tar (BaP as surrogate marker)	0.79	0.98	1.1	1.2	1.2	1.2	0.32	0.67	1.2	15	15	15	2.2	2.2	2.2	4.4	4.7	4.8	LQM (2014)
BTEX and TPH																			
Benzene	0.087	0.17	0.37	0.38	0.7	1.4	0.017	0.034	0.075	27	47	90	72	72	73	90	100	110	LQM (2014)
Toluene	130	290	660	880 vap (869)	1900	3900	22	51	120	56000 vap (869)	110000 vap (1920)	180000 vap (4360)	56000	56000	56000	87000 vap (869)	95000 vap (1920)	100000 vap (4360)	LQM (2014)
Ethylbenzene	47	110	260	83	190	440	16	39	91	5700 vap (518)	13000 vap (1220)	27000 vap (2840)	24000	24000	25000	17000 vap (518)	22000 vap (1220)	27000 vap (2840)	LQM (2014)
Xylene - o	60	140	330	88	210	480	28	67	160	6600 (478)	15000 (1120)	33000 (2620)	41000	42000	43000	17000 (478)	24000 (1120)	33000 (2620)	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Xylene - m	59	140	320	82	190	450	31	74	170	6200 (625)	14000 (1470)	31000 (3460)	41000	42000	43000	17000 (625)	24000 (1470)	32000 (3460)	LQM (2014)
Xylene - p	56	130	310	79	180	430	29	69	160	5900 (576)	14000 (1350)	30000 (3170)	41000	42000	43000	17000 (576)	23000 (1350)	31000 (3170)	LQM (2014)
Aliphatic EC 5-6	42	78	160	42	78	160	730	1700	3900	3200 (304)	5900 (558)	12000 (1150)	570000 (304)	590000	600000	95000 (304)	130000 (558)	180000 (1150)	LQM (2014)
Aliphatic EC >6-8	100	230	530	100	230	530	2300	5600	13000	7800 (144)	17000 (322)	40000 (736)	600000	610000	620000	150000 (144)	220000 (322)	320000 (736)	LQM (2014)
Aliphatic EC >8-10	27	65	150	27	65	150	320	770	1700	2000 (78)	4800 (190)	11000 (451)	13000	13000	13000	14000 (78)	18000 (190)	21000 (451)	LQM (2014)
Aliphatic EC >10-12	130 (48)	330 (118)	760 (283)	130 (48)	330 (118)	760 (283)	2200	4400	7300	9700 (48)	23000 (118)	47000 (283)	13000	13000	13000	21000 (48)	23000 (118)	24000(283)	LQM (2014)
Aliphatic EC >12-16	1100 (24)	2400 (59)	4300 (142)	1100 (24)	2400 (59)	4300 (142)	11000	13000	13000	59000 (24)	82000 (59)	90000 (142)	13000	13000	13000	25000 (24)	25000 (59)	26000 (142)	LQM (2014)
Aliphatic EC >16-35	65000 (8.48)	92000 (21)	110000	65000 (8.48)	92000 (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	LQM (2014)
Aliphatic EC >35-44	65000 (8.48)	92000 (21)	110000	65000 (8.48)	92000 (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	LQM (2014)
Aromatic EC 5-7	70	140	300	370	690	1400	13	27	57	26000 (1220)	46000 (2260)	86000 (4710)	56000	56000	56000	76000 (1220)	84000 (2260)	92000 (4710)	LQM (2014)
Aromatic EC >7-8	130	290	660	860	1800	3900	22	51	120	56000 (869)	110000 (1920)	180000 (4360)	56000	56000	56000	87000 (869)	95000 (1920)	100000 (4360)	LQM (2014)
Aromatic EC >8-10	34	83	190	47	110	270	8.6	21	51	3500 (613)	8100 (1500)	17000 (3580)	5000	5000	5000	7200 (613)	8500 (1500)	9300 (3580)	LQM (2014)
Aromatic EC >10-12	74	180	380	250	590	1200	13	31	74	16000 (364)	28000 (899)	34000 (2150)	5000	5000	5000	9200 (364)	9700 (899)	10000	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Aromatic EC >12-16	140	330	660	1800	2300 (419)	2500	23	27	130	36000 (169)	37000	38000	5100	5100	5000	10000	10000	10000	LQM (2014)
Aromatic EC >16-21	260	540	930	1900	1900	1900	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800	LQM (2014)
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
Aromatic EC >35-44	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
Aromatic EC >44-75	1600	1800	1900	1900	1900	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
VOCs																			
1,2-dichloroethane (1,2-DCA)	0.0071	0.011	0.019	0.0092	0.013	0.023	0.0046	0.0083	0.016	0.67	0.97	1.7	29	29	29	21	24	28	LQM (2014)
1,1,1-trichloroethane	8.8	18	39	9	18	40	48	110	240	660	1300	3000	140000	140000	140000	57000 (1425)	76000 (2915)	100000 (6392)	LQM (2014)
1,1,2,2,tetrachloroethane	1.6	3.4	7.5	3.9	8	17	0.41	0.89	2	270	550	1100	1400	1400	1400	1800	2100	2300	LQM (2014)
tetrachloroethene	0.18	0.39	0.9	0.18	0.4	0.92	0.65	1.5	3.6	19	45	95	1400	1400	1400	810 (424)	1100 (951)	1500	LQM (2014)
tetrachloromethane (Carbon tetrachloride)	0.026	0.056	0.13	0.026	0.056	0.13	0.45	1	2.4	2.9	6.3	14	890	920	950	190	270	400	LQM (2014)
Trichloroethene	0.016	0.034	0.075	0.017	0.036	0.08	0.041	0.091	0.21	1.2	2.6	5.7	120	120	120	70	91	120	LQM (2014)
Trichloromethane (chloroform)	0.91	1.7	3.4	1.2	2.1	4.2	0.42	0.83	1.7	99	170	350	2500	2500	2500	2600	2800	3100	LQM (2014)

Parameter	**Residential with homegrown produce**			**Residential without homegrown produce**			**Allotment**			**Commercial / Industrial**			**Public Open Space near Residential**			**Public Open Space - Park**			**Source**
	(mg/kg, unless otherwise stated)			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Chloroethene (Vinyl chloride)	0.00064	0.00087	0.0014	0.00077	0.001	0.0015	0.00055	0.001	0.0018	0.059	0.077	0.12	3.5	3.5	3.5	4.8	5	5.4	LQM (2014)
2,4,6 Trinitrotoluene (TNT)	1.6	3.7	8.1	65	66	66	0.24	0.58	1.4	1000	1000	1000	130	130	130	260	270	270	LQM (2014)
RDX	120	250	540	13000	13000	13000	17	38	85	210000	210000	210000	26000	26000	27000	49000 (18.7)	51000	53000	LQM (2014)
HMX	5.7	13	26	6700	6700	6700	0.86	1.9	3.9	110000	110000	110000	13000	13000	13000	23000 (0.35)	23000 (0.39)	24000 (0.48)	LQM (2014)
Aldrin	5.7	6.6	7.1	7.3	7.4	7.5	3.2	6.1	9.6	170	170	170	18	18	18	30	31	31	LQM (2014)
Dieldrin	0.97	2	3.5	7	7.3	7.4	0.17	0.41	0.96	170	170	170	18	18	18	30	30	31	LQM (2014)
Atrazine	3.3	7.6	17.4	610	620	620	0.5	1.2	2.7	9300	9400	9400	1200	1200	1200	2300	2400	2400	LQM (2014)
Dichlovos	0.032	0.066	0.014	6.4	6.5	6.6	0.0049	0.01	0.022	140	140	140	16	16	16	26	26	27	LQM (2014)
Alpha-Endosulfan	7.4	18	41	160 (0.003)	280 (0.007)	410 (0.016)	1.2	2.9	6.8	5600 (0.003)	7400 (0.007)	8400 (0.016)	1200	1200	1200	2400	2400	2500	LQM (2014)
alpha-Hexachlorocyclohexane	0.23	0.55	1.2	6.9	9.2	11	0.035	0.087	0.21	170	180	180	24	24	24	47	48	48	LQM (2014)
beta-hexachlorocyclohexanes	0.085	0.2	0.46	3.7	3.8	3.8	0.013	0.032	0.077	65	65	65	8.1	8.1	8.1	15	15	16	LQM (2014)
gamma-hexachlorocyclohexanes	0.06	0.14	0.33	2.9	3.3	3.5	0.0092	0.023	0.054	67	69	70	8.2	8.2	8.2	14	15	15	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Chlorobenzene	0.46	1	2.4	0.46	1	2.4	5.9	14	32	56	130	290	11000	13000	14000	1300 (675)	2000 (1520)	2900	LQM (2014)
1,2-Dichlorobenzene	23	55	130	24	57	130	94	230	540	2000 (571)	4800 (1370)	11000 (3240)	90000	95000	98000	24000 (571)	36000 (1370)	51000 (3240)	LQM (2014)
1,3-Dichlorobenzene	0.4	1	2.3	0.44	1.1	2.5	0.25	0.6	1.5	30	73	170	300	300	300	390	440	470	LQM (2014)
1,4-Dichlorobenzene	61	150	350	61	150	350	15	37	88	4400 (224)	10000 (540)	25000 (1280)	17000	17000	17000	36000 (224)	36000 (540)	36000 (1280)	LQM (2014)
VOCs Continued																			
1,2,3-Trichlorobenzene	1.5	3.6	8.6	1.5	3.7	8.8	4.7	12	28	102	250	590	1800	1800	1800	770 (134)	1100 (330)	1600 (789)	LQM (2014)
1,2,4-Trichlorobenzene	2.6	6.4	15	2.6	6.4	15	55	140	320	220	530	1300	15000	17000	19000	1700 (318)	2600 (786)	4000 (1880)	LQM (2014)
1,3,5-Trichlorobenzene	0.33	0.81	1.9	0.33	0.81	1.9	4.7	12	28	23	55	130	1700	1700	1800	380 (36.7)	580 (90.8)	860 (217)	LQM (2014)
1,2,3,4-Tetrachlorobenzene	15	36	78	24	56	120	4.4	11	26	1700 (122)	3080 (304)	4400 (728)	830	830	830	1500 (122)	1600	1600	LQM (2014)
1,2,3,5-Tetrachlorobenzene	0.66	1.6	3.7	0.75	1.9	4.3	0.38	0.9	2.2	49 (39.4)	120 (98.1)	240 (235)	78	79	79	110 (39)	120	130	LQM (2014)
1,2,4,5-Tetrachlorobenzene	0.33	0.77	1.6	0.73	1.7	3.5	0.06	0.16	0.37	42 (19.7)	72 (49.1)	96	13	13	13	25	26	26	LQM (2014)
Pentachlorobenzene	5.8	12	22	19	30	38	1.2	3.1	7	640 (43)	770 (107)	830	100	100	100	190	190	190	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Hexachlorobenzene	1.8 (0.2)	3.3 (0.5)	4.9	4.1 (0.2)	5.7 (0.5)	6.7 (1.2)	0.47	1.1	2.5	110 (0.2)	120	120	16	16	16	30	30	30	LQM (2014)
Phenol	280	550	1100	750	1300	2300	66	140	280	760 dir (31000)	1500 dir (35000)	3200 dir (37000)	760 dir (11000)	1500 dir (11000)	3200 dir (11000)	760 dir (8600)	1500 dir (9700)	3200 dir (11000)	LQM (2014)
Chlorophenols (excluding pentachlorophenol)	0.87 (g)	2	4.5	94	150	210	0.13 (g)	0.3	0.7	3500	4000	4300	620	620	620	1100	1100	1100	LQM (2014)
Pentachlorophenol	0.22	0.52	1.2	27 (16.4)	29	31	0.03	0.08	0.19	400	400	400	60	60	60	110	120	120	LQM (2014)
Carbon Disulphide	0.14	0.29	0.62	0.14	0.29	0.62	4.8	10	23	11	22	47	11000	11000	12000	1300	1900	2700	LQM (2014)
Hexachlorobutadiene	0.29	0.7	1.6	0.32	0.78	1.8	0.25	0.61	1.4	31	66	120	25	25	25	48	50	51	LQM (2014)

(g) derived based on 2,3,4,6-tetrachlorophenol; dir - based on a threshold protective of direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only); (vap) calculated for vapour phase only. SOM – Soil Organic Matter; (4.5) solubility.

APPENDIX K - CONTROLLED WATERS RISK ASSESSMENT

CURRENT GUIDANCE FOR CONTROLLED WATERS RISK ASSESSMENT

Regulatory Context

Government policy is based upon a “suitable for use approach,” which is relevant to both the current use of land and also to any proposed future use. When considering the current use of land, Part IIA of the Environment Protection Act 1990 (EPA 1990) provides the regulatory regime, which was introduced by Section 57 of the Environment Act 1995, which came into force in England on 1 April 2000. The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health, controlled waters or the wider environment given the current use and circumstances of the land. Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

> *“any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land, that:*
>
> *(a) Significant harm is being caused or there is a significant possibility of such harm being caused; or*
>
> *(b) Pollution of controlled waters is being, or is likely to be, caused.”*

Part IIA provides a statutory definition of the pollution of controlled waters under Section 78A(9) as:

> *“the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter”*

Controlled Waters are defined Section 104 of the Water Resources Act 1991. In summary, the comprise relevant territorial waters which extend seaward for three miles from the low-tide limit from which the territorial sea adjacent to England and Wales is measured.

The Environment Agency has powers under Part 7 of The Water Resources Act (1991) to take action to prevent or remedy the pollution of controlled waters, including circumstances where the pollution arises from contamination in the land. This is reinforced in The Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, 2012) which came into force in early April 2012.

Part IIA introduces the concept of a contaminant linkage; where for potential harm to exist there must be a connection between the source of the hazard and the receptor via a pathway. Risk assessment in contaminated land is therefore directed towards identifying the contaminants, pathways and receptors that can provide contaminant linkages. This is known as the contaminant-pathway-receptor link (CPR or contaminant linkage).

Part IIA places contaminated land responsibility as a part of the planning and redevelopment process, rather than Local Authority or Environment Agency directly, except in cases of very high pollution risk or where harm is occurring. In the planning process, guidance is provided by National Planning Policy Framework (NPPF) of March 2012. The NPPF requires that a site which has been developed shall not be capable of being determined “contaminated land” under Part IIA. Therefore, appropriate risk-based investigation is required to identify the contaminant linkages that can then be assessed, and then mitigated using methods that can be agreed with the planners.

Source Protection Zones

Source Protection Zones (SPZs) are defined by the Environment Agency (for England and Wales), SEPA (Scotland) and the Environment and Heritage Service (Northern Ireland) for groundwater sources such as wells, boreholes and springs that are used for public drinking water supply. The zones show the risk of contamination from activities that might cause groundwater pollution in the area. The size and shape of a zone depends upon subsurface conditions, how the groundwater is removed, and other environmental factors.

SPZs are classified into four categories:

- **Zone 1 (Inner protection zone).** Any pollution that can travel to the abstraction point within 50 days from any point within the zone is classified as being inside Zone 1. This applies at and below the groundwater table. This zone also has a minimum 50m protection radius around the abstraction point. These criteria are designed to protect against the transmission of toxic chemicals and water-borne disease.
- **Zone 2 (Outer protection zone).** The outer zone covers pollution that takes up to 400 days to travel to the abstraction point, or 25% of the total catchment area, whichever area is the largest. This travel time is the minimum period over which the Environment Agency considers that pollutants need to be diluted, reduced in strength or delayed by the time they reach the abstraction point.
- **Zone 3 (Total catchment).** This is the total area needed to support removal of water from the abstraction point, and to support any discharge from this.
- **Zone of special interest.** This may occasionally be defined as a special case. This is usually where local conditions mean that industrial sites and other potential sources of contamination could affect the groundwater source, even though they are outside the normal catchment area.

Groundwater Vulnerability Assessments

From 1 April 2010 The Environment Agency Groundwater Protection Policy began to use aquifer designations which are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

The aquifer designation data is based on geological mapping provided by the British Geological Survey. It is updated regularly to reflect their ongoing programme of improvements to these maps. The maps are split into two different type of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels.
- Bedrock -solid permeable formations e.g. sandstone, chalk and limestone.

The maps display the following aquifer designations:

Table 1. Aquifer Classification ("Geological Classification").

Classification	Definition
Principal Aquifers (Highly Permeable)	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Secondary A Aquifers	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
Secondary B Aquifers	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
Secondary Undifferentiated Aquifers	This has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Environment Agency Guidance

The Environment Agency's stance on groundwater resources is:

> *"to protect and manage groundwater resources for present and future generations in ways that are appropriate for the risks we identify"* (Groundwater Protection: Policy and Practice GP3, 2012).

At present, the legislation and guidance pertaining to the protection of controlled waters in the UK is complex; however, the core objectives seek to enforce the position given above.

In 1992, the National Rivers Authority published their Policy and Practice for the Protection of Groundwater (PPPG), this document introduced areas of focus for developments such as Source Protection Zones (SPZs) and Groundwater Vulnerability Maps. The Policy was revised in 1998, since which there have been substantial changes in legislation, driven by key European Directives relating to groundwater include the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). Aspects of these directives are controlled by primary UK legislation such as the Water Resources Act 1991 as amended by the Water Act 2003. Gaps in the 1998 PPPG that emerged as the result of further legislative changes were addressed in the Environment Agency Policy document Groundwater Protection: Policy and Practice (GP3), Version 1 of November 2012. The three main parts of GP3 were:

- Groundwater principals;
- Position statements and legislation; and
- Technical information.

The Environment Agency has a tiered risk based approach to drinking water protection as summarised below:

Increasing levels of protection ↑

Water Protection Zones

Safeguard Zones

Source Protection Zones

Principal Aquifers

Secondary Aquifers

Controlled Waters Risk Assessment

A number of tools are available (as detailed in GP3) in order for a developer of a potentially contaminated site to fulfil their obligations under the legislation. A site assessment would be required in order to identify any potential risks to controlled waters and to derive suitable clean up criteria, if required, to ensure the protection of controlled waters.

There are three main stages to any risk assessment of controlled waters:

1. Risk Screening (devise Conceptual Site Model, making reference to groundwater vulnerability maps, site setting, controlled waters context etc)
2. Generic Risk Assessment (EA Remedial Targets Methodology Tier 1 / Comparison of groundwater data with relevant standards)
3. Detailed Quantitative Risk Assessment (Consideration of aquifer properties and site specific parameters, EA Remedial Targets Methodology Tiers 2 & 3)

Risk Screening

Here, the Conceptual Site Model (CSM) is a critical tool to assessing any potentially contaminated site. The information from a robust CSM can be used to establish any pathways or receptors that do not require further assessment at an early stage. For example, it may be possible to confirm the absence of a particular sensitive controlled water receptor (such as a surface water feature) within the vicinity of the site thereby breaking the associated source-pathway-receptor pollutant linkage. Information from subsequent tiers of risk assessment, such as following intrusive investigations, are used to update the CSM accordingly.

Generic Risk Assessment - England and Wales

When undertaking the Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Tier 1), comparison of chemical analytical results is made with those screening criteria.

In accordance with Part 2A of the Environmental Protection Act 1990, Tier Environmental has made regard to all of the Water Quality Standards (WQS) that are relevant to the specific site and a judgment has been made against the most stringent of those relevant standards:

- EQS Directive 2008/105/EC
- Priority Substances Directive 2013/39/EU
- Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015
- UK Drinking Water Standards (UK DWS)
- World Health Organisation (WHO Guidelines) for Drinking Water Quality
- Council Directive 98/83/EC on the quality of water intended for human consumption (Drinking water directive)

In some instances, the laboratory method detection limit is greater than the appropriate EQS/UKDWS value. In these instances, only measured concentrations in excess of the laboratory method detection limit have been considered likely to potentially represent a possible significant risk to controlled waters.

Please note that there is no quantitative criterion for total petroleum hydrocarbons (TPH), or speciated TPH fractions. Historically, standards provided for petroleum hydrocarbons ranges from 10µg/l (Private Water Supply Regulations 1991, removed from the 2009 regulations) to 50µg/l-1000µg/l (Surface Waters (Abstraction for Drinking Water) Regulations 1989) which related to the degree of treatment of water prior to use as drinking water. Over time, the legislative standards have been rescinded and no alternative standard provided, although the Environment Agency planned to release speciated TPH criteria (Fretwell et al., 2009).

In order to assess whether there is a potentially unacceptable risk of pollution of controlled waters, the results of the groundwater chemical analysis for TPH and BTEX were evaluated against Water Quality Standards (WQS) appropriate to the conceptual model for the site:

Table 2. Summary of Selected TPH and BTEX Water Quality Standards Selected for Tier 1 Screening

Determinand	Units	WQS Selected	Source of WQS
Aliphatics >C5-C6	µg/l	15000	Table 5.4 of CL:AIRE 2017#
Aliphatics >C6-C8	µg/l	15000	Table 5.4 of CL:AIRE 2017#
Aliphatics >C8-C10	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C10-C12	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C12-C16	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C16-C21	µg/l	-	Table 5.4 of CL:AIRE 2017#
Aliphatics >C21-C35	µg/l	-	Table 5.4 of CL:AIRE 2017#
Aromatics >C5-EC7	µg/l	10	Table 5.4 of CL:AIRE 2017#
Aromatics >EC7-EC8	µg/l	700	Table 5.4 of CL:AIRE 2017#
Aromatics >EC8-EC10	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aromatics >EC10-EC12	µg/l	100	Table 5.4 of CL:AIRE 2017#

Aromatics >EC12-EC16	µg/l	100	Table 5.4 of CL:AIRE 2017#
Aromatics >EC16-EC21	µg/l	90	Table 5.4 of CL:AIRE 2017#
Aromatics >EC21-EC35	µg/l	90	Table 5.4 of CL:AIRE 2017#
Benzene	µg/l	10	Priority Substance Water Framework Directive 2015 and Table 5.3 of CL:AIRE 2017#
Toluene	µg/l	74	Table 1 Water Framework Directive 2015 and Table 5.3 of CL:AIRE 2017#
Ethylbenzene	µg/l	20	R&D Technical Report P2-115/TR4, 2002
Total xylenes	µg/l	30	DoE (1997c) Hedgecott S. and Lewis S, An update on proposed environmental quality standards for xylenes in water, final report to the Department of the Environment. Report No. DoE 4273/1. Medmenham: WRc; and; Table 5.3 of CL:AIRE 2017#

Notes - # = CL:AIRE document 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' (ISBN 978-1-905046-31-7, dated 2017),

Table 5.3 was referenced in the first instance from the CL:AIRE document 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' (ISBN 978-1-905046-31-7, dated 2017), the to select appropriate Freshwater EQS values for benzene, toluene and total xylenes. The selected value for Ethylbenzene was derived from the proposed EQS value of 20µg/l from the Environment Agency R&D Technical Report P2-115/TR4, 2002. This represents a more conservative value than the 300µg/l value in Table 5.3.

With respect to speciated TPH CWG fractions, Table 5.3 states and refers the reader to 'See Table 5.4'. On this basis, Tier Environmental selected the World Health Organization (WHO) guide values for TPHCWG fractions in drinking water that are presented in Table 5.4 which may be considered appropriately protective of the controlled waters environment based on the conceptual site model.

Generic Risk Assessment is generally undertaken via comparison of reported leachate and/or groundwater concentrations against selected assessment criteria for the potential contaminants of concern identified for the site from a preliminary desk based assessment.

The selected Generic Assessment Criteria (GAC) derived from a Water Quality Standard (WQS) for any specific substance may not necessarily be a simple number and can often be found to be expressed as:

- Annual mean concentration;
- Maximum allowable concentration;
- 95th percentile concentration for *n* samples;
- Total concentration;
- Dissolved concentration (applicable to filtered samples)

The values may sometimes be expressed for individual substances (e.g. arsenic or for groups of substances e.g. total xylenes or sums of certain PAHs).

Environmental Quality Standards (EQS) have been used where available for Priority Substances and Priority Hazardous Substances set at a European level:

- Priority Substances Directive 2013/39/EU;
- Amending 2008/105 and 2000/118/EC

In addition, EQS values derived for Specific Pollutants have been used as presented in The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

For assessing risks to potable water abstraction supplies, UK Drinking Water Standards presented in the Water Supply (Water Quality) Regulations 2000 (SI/2000/3184) (as amended) have been applied.

In selecting a GAC for a particular site, Tier Environmental considers the following factors:

- Current use/function of the groundwater (e.g. drinking water, irrigation water, industrial use, base-flow to rivers and streams);
- Plausible, proposed or planned future uses of the water and nearby waters;
- Sensitivity of the critical receptor (e.g. human health, aquatic life); and,
- Requirements to trigger action under the legal context.

In accordance with Part 2A:

> *"in deciding whether pollution of controlled waters is occurring, the assessor will have regard to all of the water quality standards that are relevant to the specific site and make a judgment against the most stringent of those relevant standards."*

Should the Level 1 or 2 assessments indicate threshold levels to be exceeded, then there are three alternative ways in which to proceed:

- To devise suitable remedial solutions;
- To carry out more investigation, sampling and analysis;
- To conduct a site-specific Detailed Quantitative Risk Assessment (DQRA) to whether or not the soil materials are suitable for their site-specific intended use or to devise a site-specific clean-up level.

Detailed Quantitative Risk Assessment (DQRA)

The decision to carry out a DQRA will be informed by the initial qualitative and generic assessment. The scope of any such assessment will be accurately defined by the outcomes of the former two stages. The robust CSM will be sufficiently refined by this stage that only certain contaminants of concern, certain pathways and certain receptors will require further assessment.

Additional site specific data is normally required for this stage of assessment, as explained above, more processes that are capable of affecting contaminant concentrations are considered (such as dilution and attenuation).

Remediation criteria derived will therefore be specific to each site and will be based on a detailed assessment of the potential impact at the identified receptor or compliance point. A greater level of confidence can be placed on the predicted impact on the compliance point following a DQRA.

Hazardous and Non Hazardous Substances

The Groundwater (England and Wales) Regulations 2009 control the disposal to the hydrogeological environment of potentially polluting substances which are divided into Hazardous Substances and Non-hazardous Contaminants (this roughly approximates to the former List 1 and List 2 substances).

Hazardous Substances are the most damaging and toxic and must be prevented from directly or indirectly entering the groundwater environment. Hazardous Substances include mineral oils and hydrocarbons, pesticides, biocides, herbicides, solvents and some metals. Discharge of Hazardous Substances to Controlled Waters must be prevented.

Non-hazardous Pollutants are any contaminants other than Hazardous Substances. Non-hazardous Pollutants are potentially toxic but are less harmful than Hazardous Substances, but their direct discharge to groundwater is generally not permitted and any indirect discharge to groundwater must be limited and be controlled by technical precautions in order to prevent pollution. Non-hazardous Pollutants include ammonia and nitrites, many metals and fluorides.

APPENDIX L - ASSESSMENT CRITERIA APPLIED FOR GROUND GAS

Ground Gas Monitoring Methodology

Monitoring for the following is generally performed as part of ground gas assessment:

- Methane (CH_4): an odourless, flammable gas. Mixtures of methane with air containing between 5 and 15% v/v methane are explosive.
- Carbon dioxide (CO_2): an asphyxiant at elevated concentrations. Denser than air, it can accumulate in excavations, and within low points inside buildings.
- Oxygen (O_2): important in the assessment of the potential formation of explosive mixtures with methane. Monitoring normally measures both methane and oxygen concentrations in ground gas to derive an indication of the risk of explosive mixture formation, expressed as a percentage of the Lower Explosive Limit (LEL). Low concentrations of oxygen in ground gas can also exacerbate the risk of CO_2 asphyxiation.
- Hydrogen sulphide (H_2S): odorous and toxic, capable of forming flammable mixtures with air.

In addition, depending on the Conceptual Site Model, monitoring may also include for measurements of Volatile Organic Compounds (VOCs); present as chemical contaminants of soil and sometimes also biologically produced in low concentrations.

Assessment of methane (CH_4) and carbon dioxide (CO_2)

Methane and carbon dioxide can arise from natural geological sources, mine workings, rotting organic matter (peat, landfilled materials, etc.) and/or contaminant biodegradation. Assessment of ground gas composition and flows is therefore an essential part of site assessment. The need to adequately address potential risks from ground gas on development sites is therefore required under the planning regime.

In order to appropriately assess the site risks, the Construction Industry Research and Information Association (CIRIA) and others have issued several guidance documents on landfill and ground gas that are intended to provide advice on how to investigate and deal with gas contaminated ground with respect to development. These are:

- Report 149: ‘Protecting Development from Methane’ (CIRIA, 1995a)
- Report 150: ‘Methane Investigation Strategies’ (CIRIA, 1995b)
- Report 151: ‘Interpreting Measurement of Gas in the Ground’ (CIRIA, 1995c)
- Report 152: ‘Risk Assessment for Methane and Other Gases from the Ground’ (CIRIA, 1995d)

More recent guidance has been published to update the documents detailed above to collaborate and promote industry ‘good practice’. These are:

- CIRIA Report 665: ‘Assessing risks posed by hazardous ground gases to buildings (CIRIA, 2008)
- NHBC: ‘Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present’ (NHBC, 2007)
- BS8485:201+A1:2019: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (BSI Group, 2019)
- BS8576:2013: Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs) (BSI Group, 2013)
- SoBRA Report Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater (Feb 2017)
- CL:AIRE Technical Bulletin TB17 Ground Gas Monitoring and ‘Worst Case’ Conditions (CL:AIRE Aug 2018)

The earlier CIRIA 149 approach is now considered to be too conservative. A more realistic measure of the risk posed by methane and CO2 in ground gas can be established by determining an appropriate Gas Screening Value (GSV), using the methods described in the NHBC and CIRIA 659 documents. These values are based upon earlier work undertaken by Wilson and Card (1999).

GSVs are calculated by multiplying the borehole flow rate (l/hr) by the percentage (% v/v) concentration in the gas stream of the specific component, i.e.:

GSV = (Concentration / 100) x Flow rate.

A risk-based methodology for deriving GSVs is defined for two situations (designated A and B), which are adequate for the great majority of site cases (as per CIRIA 665 Section 8.3):

- **Situation A**: Any development other than Situation B, e.g. factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements, etc
- **Situation B**: Low rise building with minimum ventilated under floor void (min 150mm)

Under Situation A, classification of the scope of protection required is determined from the site GSV, summarised in Table 1. For Situation B, GSVs derived are used in a ‘Traffic Light’ classification (summarised in Table 2) which determines the required level and scope of protection measures. Tables 1 and 2 are summaries only: the details provided in the body text, footnotes and appendices of the above-referenced documents should be read in conjunction with the results to determine the appropriate level of protection.

For conservatism, Tier Environmental **initially** uses the maximum concentration and gas flow rate of methane detected in any borehole during all of the monitoring visits in deriving recommendations on appropriate protection measures. This represents the worst-case risk of forming an explosive mixtures. For carbon dioxide, steady state concentrations and flow data are applied, as these determine the development of an asphyxiating mixture. All values are selected whether or not they occurred in the same borehole or during the same monitoring event.

Exceedances of the maximum concentrations used in a Tier 1 Gas Risk Assessment can be tolerated, when the conceptual site model indicates that it is safe to do so. However, appropriately derived GSV values must never be exceeded - where site-specific circumstances permit the derivation of alternative GSVs according to the defined conceptual model, then the appropriate GSV values should be applied.

Table 1. GSV Categories Defined for Situation A (Summarised from CIRIA Report 665).

Risk classification	GSV (CH4 or CO2; l/hr)	Additional factors	Characteristic Situation
Very low	<0.07	Typically methane <=1% and/or CO_2 <=5%, otherwise consider increase to Low Risk.	1
Low	<0.7	Typically borehole ground gas flow rate <=70 l/hr; otherwise consider increase to Moderate Risk.	2
Moderate	<3.5	---	3
Moderate to high	<15	QRA required to evaluate scope of remediation measures.	4
High	<70	---	5
Very high	>70	---	6

Table 2. GSV Categories Defined for Situation B (Summarised from NHBC, 2007).

Methane		CO_2		"Traffic light" classification
Typical max. conc. (% v/v)	GSV (l/hr)	Typical max. conc. (% v/v)	GSV (l/hr)	
				Green
1	0.13	5	0.78	
				Amber 1
5	0.63	10	1.60	
				Amber 2
20	1.60	30	3.10	
				Red

Assessment of hydrogen sulphide (H2S)

H2S is toxic and highly odorous ("rotten eggs") gas. It is often a minor component within mine gases, in ground gas within or overlying strata rich in pyrites or other sulphide-rich ores, and in most natural gas fields.

H2S can be generated biologically in significant concentrations by the decomposition by sulphate-reducing bacteria of natural or anthropogenic organic matter under oxygen-free conditions. Its potential generation will be greater in environments containing elevated sulphate concentrations (including sea water). H2S is therefore common within the gas arising from estuarine and marine sediments, pond sediment, stagnant water bodies, bogs and marshlands and landfilled waste, for example.

It must be noted that H2S normally occurs together with other potentially hazardous ground gases. The measures adopted for protection against these will prove equally protective against H2S.

There are no standards by which H2S concentrations in ground gas can be assessed directly. Therefore, the significance of measured H2S concentrations in ground gas must be evaluated on a case-by-case basis, taking into account the measured concentrations of other components and the specific conceptual site and exposure models. To assist in this process, the following standards and guidance may be applied.

General protection of land users

There are no UK air quality standards for general exposure to H2S. The World Health Organisation has derived ambient air quality standards (WHO, 2000) for this gas, which may be used to inform risk assessment and decision-making:

The 24 hour average exposure guideline value for ambient air: 0.15mg/m3 (0.1 ppmv, approx.; this was derived by the application of a 100x safety factor to the LOAEL for long-term exposure).

This is significantly above the odour threshold, which is typically around 0.01 mg/m3. To avoid substantial nuisance odour complaints, WHO (2000) recommends that the 30 minute average H2S concentration in ambient air should not exceed: 0.007 mg/m3 (0.005 ppmv, approx.).

Occupational exposures

For occupational exposure, the HSE (2005) limits for H2S are applicable:

- 8 hour time weighted average occupational exposure limit: 5 ppmv (7 mg/m3).
- Short-term exposure limit (15 minute reference period): 10 ppmv (14 mg/m3).

VOC Data Collection, Sampling and Assessment

BS8576 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs).

Volatile organic compounds (VOCs) include, for example, halogenated hydrocarbons such as trichloroethene, non-halogenated hydrocarbons such as benzene, and organosulfur compounds such as thiols (mercapatans). They can occur as a component of ground gas originating from historically contaminated ground, spills and leaks from industry, commercial or residential properties (e.g. from pipelines, storage facilities, and at the point of use or dispensing), land-filled wastes and from naturally occurring sources.

The migration of VOCs in ground gas can be via three primary mechanisms:

- diffusive flow (movement of constituent along a concentration gradient);
- advective flow (movement of constituent due to motion of a transporting fluid);
- dispersion (transport resulting from local variations in fluid flow, e.g. due to friction effects in the matrix).

The choice of sampling and monitoring techniques should be based upon the conceptual model and be designed to achieve the objectives of the investigation, bearing in mind the requirements of any subsequent analytical procedures and the need to provide relevant data of sufficient quantity and quality. Consideration should also be given to the nature of ground under investigation, as well as the nature and distribution of contamination, the geology and the hydrogeology. Every effort should be made to avoid cross-contamination and at no point should underlying aquifers be put at risk.

Where the response zone extends below the water table, gas present in the groundwater will tend to produce an equilibrium concentration in the well headspace. This applies to both permanent gases and VOCs but can be particularly misleading in the latter case. Testing for dissolved gases in groundwater is useful to help interpret monitoring results in such a situation. Similarly, any VOCs in a floating non-aqueous hydrocarbon layer will produce an equilibrium concentration in the well headspace.

The monitoring period and frequency of monitoring for VOCs in ground gases should be developed on a site-specific basis from the conceptual site model and investigation data quality objectives.

Ground gas samples can be collected from the unsaturated zone adjacent to, or above, the known or suspected source of VOCs in ground gas through installation of a ground gas monitoring point in the unsaturated zone (see 10.2), and from a near-surface location beneath hardstanding or a floor or foundation slab through installation of a near- or sub-slab monitoring point (see 10.3). For monitoring of VOCs in ground gas the monitoring well should be installed into unsaturated ground to allow sampling for VOCs to take place. The borehole should not be progressed below the groundwater table or the surface of any floating non-aqueous layer. The borehole should be progressed to the target sampling depth within the unsaturated zone. Full details can be found in BS8576 Section 10.2 onwards.

Assessment of VOC concentrations have been made for limited number of VOCs by SoBRA with the Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater in Feb 2017.

The assessment of VOC concentrations is not covered by above-referenced reports. These data can be used to inform the human health risk assessment for site occupants but should not be relied upon to assess human health risk due to uncertainties in the ground gas flow regime, variability in the (generally low) contaminant concentrations measured and inaccuracies in the concentrations measured by PID instruments.

Data on the VOC concentration in ground gas can also help inform potential occupational exposure risks to construction and similar workers. For this purpose, the measured values can be compared to the relevant occupational exposure limit (OEL) for the contaminant(s) of concern, as given in HSE (2005). In cases of doubt as to the identity of the organic contaminants within the ground gas or when these are present as a complex mixture, then the 8 hour time-weighted average (TWA) exposure limit for benzene (1 ppmv) will be applied for screening purposes. This is a reasonably conservative approach since the OEL for benzene is lower than that for the great majority of organic contaminants commonly encountered in soil and groundwater at contaminated sites.

APPENDIX M - CHEMICAL AND GEOTECHNICAL TEST SAMPLING

Samples were selected by a representative of Tier Environmental during the site investigation works in accordance with the sampling approach described elsewhere in this report.

Samples for geotechnical and related testing

Bulk samples were placed within robust heavy duty plastic bags and sealed, together with small-disturbed samples, within airtight 1 litre plastic containers.

100mm diameter ‘undisturbed’ samples (“U100 samples”) were obtained where possible from cable percussive and large diameter window sample boreholes within cohesive materials.

Samples for chemical analysis

All samples for chemical analysis were placed into clean new containers as summarised in Table 1. Unless explicitly stated elsewhere in this report, no preservatives were used to eliminate the risk that preservatives cause contaminant dissolution or analytical interference. Containers for VOC analysis were fully filled to exclude headspace.

Soil samples were dispensed as soon as possible after collection using reusable stainless steel spatulas, trowels or similar implements.

Ground water samples were collected from boreholes using single-use Teflon bailers or dedicated Waterra tubing with foot valves, except as otherwise noted within this report. Caution was taken to avoid excessive agitation during collection.

New disposable gloves were used by the engineer for the collection of each sample.

Reusable equipment was washed down with distilled or deionised water between samples, except where tarry or similarly sticky materials were present. In such cases specific cleaning procedures were adopted as specifically described elsewhere in this report.

All sub-samples taken for chemical analysis were placed into refrigerators or cool boxes containing frozen ice packs immediately after aliquoting. All samples were transferred in cool boxes containing frozen ice packs to the relevant UKAS/MCERTS accredited laboratory as soon as possible. Recommended maximum holding times before analysis are summarised in Table 1.

Table 1. Sample containers and holding times.

Analysis	Container/special requirements	Max. holding time at 4°C before analysis
Soil and sediment samples		
VOCs	30-60 g brown or green glass jar with VOC-resistant cap and inert cap liner. Must be fully filled.	14 days
TPHCWG	30-60 g brown or green glass jar with VOC-resistant cap and inert cap liner **PLUS** 250-500 g brown or green glass jar with unwaxed cap liner.[1] The former must be fully filled.	14 days
All other organics	250-500 g brown or green glass jar with unwaxed cap liner.	7 days
Inorganics	Air-tight 0.5-2.0 kg plastic container (250-500 g brown or green glass jar may also be used).	14 days[2]
Water samples		
VOCs	40-50ml glass vial with VOC resistant screw cap and inert liner. Must be fully filled.	14 days
TPHCWG	40-50ml glass vial with VOC resistant screw cap and inert liner **PLUS** 500-1000ml brown or green glass bottle with screw cap and unwaxed liner.[1] The former must be fully filled, the latter should be filled if possible.	14 days
All other organics	500-1000ml brown or green glass bottle with screw cap. Fill if possible.	7 days
Inorganics	500-1000ml translucent or opaque screw cap plastic *or* brown or green glass bottles. Fill if possible.	14 days[3]

1 The smaller vessel is used for analysis of the volatile components within the TPH mixture and the larger one is for the non-volatile components.

2 14 days is set as a reasonable limit for all routine analyses of soil for those inorganic components vulnerable to chemical and/or biological breakdown. Samples for sulphate analysis are vulnerable to biological sulphate-reduction but can be held for up to 28 days. For total metals, a holding period of up to 6 months is acceptable.

3 14 days applies for all routine analyses of most inorganic components that may be vulnerable to chemical and/or biological reactions. In the specific cases of sulphide, nitrite, nitrate and phosphate analyses, storage time must not exceed 48 hours. For total metals, a holding time of up to 6 months is acceptable.

Tier Environmental standard analytical suites

The analyses included with Tier Environmental's standard analytical suites for soil, soil leachate and water samples are presented in Table 2. Other individual analyses were specified as described within this report.

Table 2. Tier Environmental Standard Analytical Suites.

Parameter	**Sample type**					
	Soil		**Leachate**[1]		**Water**	
		LoD[2] **(mg/kg or as stated)**		**LoD (µg/l or as stated)**		**LoD (µg/l or as stated)**
Metals and metalloids						
Arsenic	✓	1	✓	10	✓	10
Cadmium	✓	1	✓	5	✓	5
Chromium	✓	1	✓	5	✓	5
Mercury	✓	1	✓	1	✓	1
Lead	✓	1	✓	4	✓	4
Selenium	✓	2	✓	10	✓	10
Copper	✓	1	✓	1	✓	1
Nickel	✓	1	✓	50	✓	50
Zinc	✓	1	✓	8	✓	8
Other inorganics						
Ammonia (as NH_4-N)					✓	15
Total sulphate	✓	100			✓	50 mg/l
Water-soluble sulphate	✓	0.1 g/l				
Hardness (as $CaCO_3$)					✓	1 mg/l
Organics						
Monohydric phenol	✓	1	✓	0.5	✓	0.5
Speciated PAHs (USEPA 16)	✓	0.1	✓	0.01	✓	0.01
Total Organic Carbon	✓	0.1 wt%				
Others						
Electrical conductivity					✓	NA
pH	✓	NA	✓	NA	✓	NA

NA - Not applicable

1 Leachate preparation according to NRA (1994), 10:1 liquid to solid ratio.

2 The table presents the desired limit of detection for the analysis. Higher LoDs may be reported on analytical data sheets due to interference between analytes within specific samples or if the laboratory needed to dilute samples to achieve results within the calibrated range for that instrument.

Analytical QA procedures

Introduction

Quality Assurance (QA) is a system of review and audit that assesses the effectiveness of that product and assures the producer and user that defined standards of quality have been met. If we consider site investigation and chemical analysis, QA is the management system that ensures these measures are in place and working as intended.

QA within the laboratory form part of relevant certification programmes (such as UKAS and MCERTS) and, indeed, will be undertaken in some form by any reputable analyst, whether for a certified technique or not. Laboratory QA/QC is beyond the control of Tier Environmental and will not be considered further in this document, although the relevant laboratory documentation can be obtained upon request. QA must also form part of the design and execution of a site investigation.

Two parameters often used to assess measurement quality objectives are bias and precision. Bias is a systematic deviation in the data. For example, a positive bias (concentrations higher than in reality) would be introduced if sampling bottles were a source of the analyte and this fact was unknown. Precision is the variation in the measurements around a central 'expected' value. This could be due both to real variability in the environmental medium being measured and random errors in the analytical process. Both precision and bias can be assessed by the use of appropriate blanks and replicates within the site investigation programme.

The objectives of the QA activities undertaken in this present site investigation were to recognise and quantify systematic bias within the analytical dataset and to obtain an indication of precision. In environmental samples, much of the observed variability is likely to result from heterogeneity in the sampled medium, particularly for soil and sediment samples.

Such QA practice within the sampling programme is required by current guidance (e.g., Environment Agency report P5-065/TR (2000); Environment Agency LFTGN02 (2002); BS 10175:2001).

Alternative QA procedures to the generic approach presented in this appendix may be specified for a project, provided case-specific justification is given.

QA checking procedure (data validation)

The responsible Engineer and Project Reviewer are required to undertake data validation and provide comment on data quality within the main body of the report(s) issued, when noteworthy matters arise. This QA checking should involve:

Confirming that data reported by the laboratory have achieved the standards specified by the certification scheme (MCERTS or UKAS). This will be indicated on the analytical certificates issued by the laboratory.

Checking that the limit of detection (LoD) and limit of quantification (LoQ) achieved by the laboratory for an individual analyte is appropriate for the purposes of the report. LoD and LoQ will vary dependent upon analyte concentrations, sample matrix properties and interference from co-contaminants.

A check that the reported range of concentrations are reasonable for the analyte. For example, the dissolved concentration of an analyte in a water sample should not exceed saturation. If it does, then this merits further consideration (e.g., was colloidal organic matter or other solid-phase material present or could there have been unobserved free-phase organic liquid?) and explicit comment. At its simplest, there may be a unit error.

Where analysis involves reporting of Tentatively Identified Compounds (TICs; normally by mass spectrometry), the reviewers should check that these might reasonably be expected at the site under consideration. The uncertainties in identification by MS mean that it is not uncommon that TICs are incorrectly assigned. In cases of doubt, the analytical laboratory can re-check the raw data and confirm.

A review of the analytical precision by comparing data obtained for duplicate samples. There is no absolute threshold - variability is entirely dependent upon the sample matrix and manner in which the contaminant has entered the sample. Variability that cannot reasonably be assigned to such factors (for example a very high apparent variability in data for sediment-free water samples) should be reviewed with the laboratory. Variability that is attributable to the sample matrix can nevertheless provide important pointers to improve understanding of contaminant transport pathways and the risks posed by pollutant linkages (e.g., soil heterogeneity, the association of contamination with particular soil fractions, the presence of residual NAPL within soil pores or the role of suspended sediments in contaminant transport).

Confirmation that no errors have been introduced by data transcription, unit conversion or corrections between preliminary and certificates issued by the laboratory. The reviewer should audit a proportion (typically 5-10%) of all data from the original (final) certificates of analysis through to the equivalent values in the report for those specific samples.

In is important to consult the analytical laboratory if apparent QA issues arise. Many apparent concerns can be adequately resolved on the basis of revisiting the raw analytical data or by obtaining a better understanding of the inherent limitations of the analysis for a particular matrix or sample type.

APPENDIX N - COAL TAR CONTAINING ASPHALT CONSIDERATIONS

Tier Environmental Approach to Coal Tar in Asphalt

This appendix outlines a summary of available guidance and describes the Tier Environmental interpretation of available information to inform, in a robust manner, the approach adopted to consider on, or both of the following objectives:

- If asphalt is present on site, what the waste classification and waste disposal route should be if there is an intention to grub up and dispose of either some, or all, of the asphalt;
- If asphalt is present and there is an intention (subject to suitability for re-use assessment) for re-use, then to determine how that may be achieved.

In order to info the decision making with respect to the above, the following guidance documents and articles have been referenced:

- Waste Classification - Guidance on the classification and assessment of waste (1st Edition v1.2.GB) Technical Guidance WM3. Environment Agency, Scottish Environmental Protection Agency and Natural Resources Wales;
- Managing Reclaimed Asphalt Highways And Pavements - An ADEPT & Construction Demolition Waste Forum Guidance Note (Version 2019 Revision 1, August 2019);
- Environment Agency Regulatory Position Statement 075: 'The movement and use of treated asphalt waste containing coal tar';
- Environment Agency Regulatory Position Statement 157: 'Storing and treating asphalt waste: RPS 157' (Updated 4th February 2020);
- Environment Agency WRAP Quality Protocol - Aggregates from inert waste. End of waste criteria for the production of aggregates from inert waste;
- CIRIA Sustainable management of surplus soil and aggregates from construction, CIRIA, C809, dated 2023;
- Contaminated Land: Applications in Real Environments (CL:AIRE) (2011) Definition of Waste Code of Practice (version 2);
- SEPA Guidance on the Production of fully Recovered Asphalt Road Planings (Scotland);
- AGS magazine – article entitled 'Coal Tar: Analysis and Detection' (March 2023 edition)

COAL TAR CONTAINING ASPHALT

WM3 includes the following text with regards to ascertaining the correct EWC code for waste asphalt:

> ***Waste containing coal tar***
>
> *This example provides guidance on the classification of road asphalt waste containing coal tar (AWCCT) and other construction and demolition wastes containing coal tar and related materials. This does not apply to wastes where coal tar is known not to be present.*
>
> *Coal tar and many coal tar distillates are potentially carcinogenic hazardous substances. If the concentration of such materials is at or above 0.1% the waste would possess the hazardous property HP 7 carcinogenic. Coal tar is complex mix of hydrocarbon compounds which have to be added to together to determine the concentration of coal tar. Therefore the 0.1% concentration must be applied to all fractions of the coal tar. Assessments based on PAH's alone are not consistent with the legislation and cannot be used to classify a waste as non-hazardous. However, if the concentration of coal tar is known, the MCL under the GB CLP uses benzo[a]pyrene (BaP) as a marker compound for carcinogenicity for certain coal tar entries. Where the concentration of BaP is less than 0.005% of the concentration of the coal tar (rather than in the waste as a whole), the coal tar is not carcinogenic and does not need to be considered for HP7.*
>
> *'Black top' (road surface) waste*
>
> *The following applies only to Asphalt material classified in the List of Wastes as*
>
> - *17 03 01* bituminous mixtures containing coal tar*
> - *17 03 02 bituminous mixtures other than those mentioned in 17 03 01*
>
> *Where the concentration of benzo[a]pyrene is at or above 50 ppm (mg/kg) in the black top alone (excluding other material) then the amount of coal tar should be considered to be sufficient (0.1% or more) for the material to be hazardous and thus coded 17 03 01*. Any sampling of black top would need to ensure that layers with different concentrations of benzo[a]pyrene are identified and sampled.*

Tier Environmental have observed third party assessments that have determined 'black top' (road surface) waste as non-hazardous when benzo(a)pyrene is at or below 50mg/kg; however, it is considered that this represents a misunderstanding of WM3 guidance for the following reasons:

1) The first paragraph in the 'Waste containing coal tar' section of WM3 is clear to state that *'This example provides guidance on the classification of road asphalt waste containing coal tar (AWCCT) and other construction and demolition wastes containing coal tar and related materials.';*
2) It also states, explicitly that *"Assessments based on PAH's alone are not consistent with the legislation and cannot be used to classify a waste as non-hazardous"*. Tier Environmental consider this statement is tacit to include road asphalt waste containing coal tar (AWCCT) as it is mentioned in the previous paragraph;
3) The 'Black top' (road surface) waste sub-section states *"Where the concentration of benzo[a]pyrene is at or above 50 ppm (mg/kg) in the black top alone (excluding other material) then the amount of coal tar should be considered to be sufficient (0.1% or more) for the material*

> *to be hazardous and thus coded 17 03 01*"*. However, this does not mean that benzo(a)pyrene concentrations less than 50mg/kg can be classed as non-hazardous when you take into consideration the text in Item 2), above. This either suggests a contradiction in the guidance, or that benzo(a)pyrene alone can only be used to prove the whether the AWCCT is hazardous but that the opposite does not classify the material as non-hazardous such that to prove non-hazardous you would still require the concentration of the coal tar to be determined.

The AGS article (March 2023) states that for determining whether asphalt waste is hazardous waste that "we *also* have to consider [B(a)P being greater than or equal to 50mg/kg]" suggesting that is consistent with the Tier Environmental interpretation. However, a bit further down the article states that the ADEPT Guidance reiterates and references WM3 and *"the use of the 50mg/kg level for measuring B(a)P should the total coal tar concentration values not be available for measurement"*. Tier Environmental's interpretation of WM3 is that it does not make reference to the 50mg/kg B(a)P level being used as a threshold *in lieu* of a coal tar concentration value being available.

So if, in order to determine whether asphalt is non-hazardous waste, there is a requirement for the concentration of coal tar to be analysed then a decision needs to be made as to what type of coal tar test is adequate. The AGS article (March 2023) highlights that *"One of the challenges facing laboratories is the lack of standardization in the specification from clients and, also, the analysis itself"*. The article explains that a review by the AGS Laboratory Working Group revealed a range of techniques and *"a potentially confusing landscape for the industry to navigate"*.

The ADEPT Guidance states there is data corroborating this assertion that 50mg/kg correlates to around 1000mg/kg road tar, this data is presented in Appendix D4.0. of the ADEPT Guidance document; however, Tier Environmental notes that the ADEPT Guidance states *"This guidance is not intended as a complete guide to managing waste materials and should be read in conjunction with Regulations and guidance issued by the relevant Regulator, these will take precedence over this guidance in all cases"*. As such, with respect to waste classification WM3 takes precedence over the ADEPT Guidance and WM3 does not provide details of any corroboration between B(a)P and road tar.

RE-USE OF ASPHALT

The AGS article (March 2023) summarises the ADEPT Guidance as follows:

> The ADEPT guidance provides more specific focus on the managing of reclaimed asphalt and provides information in to the classification of waste. It reiterates and references WM3 and the 0.1% threshold for coal tar and also the use of the 50mg/kg level for measuring B(a)P should the total coal tar concentration values not be available for measurement [see Tier Environmental comment above regarding this statement].
>
> What the ADEPT guidance then gives, is a clear and defined protocol for sampling, sample preparation, sample volumes and data review with also indication of analytical requirements and basic principles. The document gives details and refences to specific British Standards for the sampling and preparation of road plannings and road cores (BS 932 and BS 12697), and then recommends the following testing:
>
> - PAH analysis in the laboratory by gas chromatography mass spectrometry (GCMS) for the USEPA16 suite of PAHs, though only B(a)P may be necessary. It is worth noting here that labs will test for the full suite in a single process so requesting B(a)P only will usually give no cost or speed benefit. Should further characterisation for landfill disposal be required then the USEPA17 suite inclusive of coronene should be used,
> - Screening methods such as PAK marker sprays or Acrylic White sprays can be used but validated by the use of frequent 'full' analysis,
> - Specifies the use of Monohydric Phenol (Phenol Index) testing, with a potential requirement to speciate the individual compounds (Phenol, Cresols and Xylenols) should the levels be sufficiently high.
>
> In terms of data review the 3 potential outcomes are:
>
> 1) Classed as Inert for the purposes of the Quality Protocol for Aggregates from Inert Waste if:
>   a. The guidance of sample numbers has been observed,
>   b. All the B(Aa)P results are below 25mg/ kg,
>   c. There are ≥3 results.
> 2) Classed as Hazardous and treated accordingly is:
>   a. All the B(a)P results are above 50mg/kg Note: If there are limited results and close to the threshold then further investigation is required.
> 3) Full statistical analysis required to make assessment if:
>   a. Some or all results are above 25mg/kg and below 50mg/kg.

Tier Environmental once again notes that the ADEPT Guidance states *'This guidance is not intended as a complete guide to managing waste materials and should be read in conjunction with Regulations and guidance issued by the relevant Regulator, these will take precedence over this guidance in all cases'*. As such, with respect to *waste classification* WM3 takes precedence over the ADEPT Guidance.

ENVIRONMENT AGENCY REGULATORY POSITION STATEMENTS 075 AND 157

The ADEPT Guidance describes that these documents allow the treatment, movement and use of asphalt waste containing coal tar in construction operations for hard paving structures in England only. They do not enable the producer to demonstrate that end of waste criteria has been met, but they do state that if followed correctly, the EA will not pursue an application for an environmental permit.

CIRIA C809 states the following:

RPS 75 (EA, 2014d) allows the use of treated asphalt waste containing coal tar (AWCCT) (i.e. classified as hazardous) in specific construction operations for hard paving structures such as roads, pavements, footways, car parks and airfields.

While AWCCT is commonly treated by crushing, grinding, and screening, the treatment of AWCCT is not covered by this RPS. The AWCCT needs to meet the requirements of the Specification for Highways Works and can only be used in bound sub-surface layers, e.g. sub- base, base and binder layers.

SEPA GUIDANCE ON THE PRODUCTION OF FULLY RECOVERED ASPHALT ROAD PLANINGS (SCOTLAND)

The ADEPT Guidance describes that this document provides approved methodology that allows producers to demonstrate when aggregate produced from asphalt has been fully recovered and has ceased to be a waste. This guidance is only applicable in Scotland. However, it is not applicable to tar bound aggregates, asphalt contaminated with other substances or asphalt removed/processed by any other method than a road planer.

WRAP QUALITY PROTOCOL - AGGREGATES FROM INERT WASTE. END OF WASTE CRITERIA FOR THE PRODUCTION OF AGGREGATES FROM INERT WASTE

The ADEPT Guidance summarises that this document is applicable to England, Northern Ireland and Wales. It identifies that certain specified inert wastes (including uncontaminated asphalt) may achieve end of waste status through treatment and use in compliance with the Quality Protocol for recycled aggregates from inert waste.

RE-USE UNDER DOWCOP

Tier Environmental consider that *in situ* asphalt may be reasonably considered for re-use under DoWCoP, (subject to following DoWCoP fully including conducting site-specific risk assessments to demonstrate suitability for use) as it would constitute "*Source segregated aggregate material arising from demolition activities…."*.

If the asphalt materials are coal tar containing then it would be necessary to consider the potential risks to human health and controlled waters carefully and agreement with the Local Authority (via Contaminated Land Officer or equivalent), Environment Agency / Natural Resources Wales local waste team / groundwater team would be necessary.

Due consideration may also need to be given to Series 600 if the materials is to be combined with other materials to form an engineering material.

APPENDIX O - COMPLYING WITH CONTROL OF ASBESTOS REGULATIONS 2012

Complying with Control of Asbestos Regulations (CAR): Risk Assessments, Licensing and Training

This appendix outlines CAR risk assessments and where they should be applied in relation to assessing and remediating brownfield sites. The information below details the different classifications of work with asbestos under CAR, summarises the legal requirements for asbestos awareness training for all involved in the investigation and management of asbestos containing soil (ACS), and details the potential requirements for suitable proficiency training relating specifically to ACS.

CAR RISK ASSESSMENTS

A CAR Risk Assessment is required for any work which may expose employees to asbestos. It is recommended that a precautionary approach is adopted if there is any doubt about risks associated with asbestos.

There are three main activities for potential asbestos exposure during work on brownfield sites:

- Site reconnaissance visits;
- Site investigation works; and
- Site remediation.

CAR risk assessments are needed at each stage but may be incorporated during the site investigation stage into the overarching health and safety risk assessments.

The CAR risk assessment must:

- Identify the type of asbestos to which employees are liable to be exposed, where possible, or assume it is present in different forms;
- Determine the type and extent of exposures to asbestos that may occur during the work.
- Identify the steps to be taken to prevent exposure or reduce it to the lowest level reasonably practicable; and,
- Consider the effects of control measures that have been or will be taken.

The CAR risk assessment should include any information used to inform the risk assessment such as asbestos reports or desk study information. In the event that this information is not available, the assessor should be assumed that all forms of asbestos may be present on site.

For all investigation and remediation of ACSs, a detailed written work plan should he produced and followed as detailed on the HSE website and in the CAR.

The CAR risk assessments for specific investigations or remediation projects, will determine whether or not work is 'licensable work' (LW)**,** notifiable non-licensable work' (NNLW) or 'non-licensed work' (NLW). In addition, training requirements are also defined by the CAR risk assessment.

Some examples of control measures that apply during site reconnaissance, site investigation works, and site remediation are given below and should be applied depending on the asbestos risks identified for the site at each stage of investigation:

- Avoiding stirring up dust;
- Cleaning footwear after site works;
- Removing and bagging any overalls for disposal/laundering;
- Respirators and hygiene facilities for high risk sites;
- Segregated welfare units;
- Wetting ground
- Minimising soil disturbances;
- Implementation or retention of capping/break layers;
- Implementation of awareness training;
- Air monitoring;
- Managing stockpiles;
- Area segregation;
- Wheel washing
- Road washing/cleaning

It is important to note that during site reconnaissance visits, site investigation works and site remediation that asbestos should not be considered in isolation and control measures are likely to form part of a wider health and safety precautions.

Respiratory protective equipment (RPE)

RPE is the last line of defence and its requirement would be defined by the CAR risk assessment. HSE (2013b) advises that RPE should have an assigned protection factor of 20 or more for all work with asbestos. In certain instances, full face-piece, positive pressure respirators with a protection factor of 40 are necessary (to EN 12942:1998, TM3).

Suitable types of RPE for most ***short*** duration non-licensed asbestos work:

- Disposable respirator to standards EN149 (type FFP3) or EN1827 (type FMP3)
- Half mask respirator (to standard EN140) with P3 filter
- Semi-disposable respirator (to EN405) with P3 filter

These filters are not suitable for people with beards/stubble or for long or continuous use.

LICENSING

CAR defined certain types of activities involving asbestos as 'licensable work' (LW) or as 'notifiable non-licensable work' (NNLW). All other work would be 'non-licensable work' (NLW).

LW is defined as:

- work where exposure is not 'sporadic and low intensity'.
- work where the risk assessment cannot demonstrate that the control limits (four hour and 10 minute limits) will not be exceeded.
- work on asbestos coating
- work on AIB or insulation where risk assessment is either of first two points above or not of short duration (where short duration is defined for any work liable to disturb asbestos as taking less than two hours per week (including ancillary work) and no one person carries out that work for more than one hour').

NNLW includes work with:

- AIB or asbestos insulation of short duration that is not licensable.
- fire-damaged asbestos cement or asbestos cement damaged so as to create significant dust and debris.
- asbestos ropes, yarns, woven cloths in poor condition or handling cutting or breaking up the materials.
- asbestos papers, felts and cardboard in poor condition, unencapsulated or not bound into another material.

Work with weathered asbestos cement, air monitoring and collecting samples of ACM in buildings would not normally be notifiable.

It is impossible to specify definitively what activities will and will not be licensable. This decision should be made as part of the CAR risk assessment. CAR is not primarily aimed at work with ACSs and there is little published information on airborne asbestos concentrations during work with ACSs. Nevertheless, CAR will require some remediation projects, and occasionally site investigations, to be LW. Investigations on other sites may involve NNLW. The decision as to whether work is LW or NNLW should be made during the CAR risk assessment by those in charge of the brownfield site investigations and remediation projects.

TRAINING REQUIREMENTS

Asbestos health and safety courses are offered by a number of providers in the UK. Training courses that include the problem of identifying ACMs in soil should be undertaken at regular intervals by those involved in the investigation, assessment and management of sites where ACs are known or suspected. It is the role of the employer to identify the level of training required for an employee based on their role, experience and duties. Reference to Regulation 10 of CAR should be referred to for more information on training requirements.

Recognising asbestos within soils is challenging due to the heterogeneity of such soils and the discolouration of asbestos by smeared soil. Specific training for ground workers should include understanding fibre release potential, potential control measures in the field, how to take representative ACSs safely, sample labelling and what analytical tests are available and when the y should be implemented.

Health and safety training required under CAR includes asbestos awareness, non-licensable work (including notifiable non-licensable work) and licensable work with asbestos.

In addition to health and safety training, some staff involved in the technical identification on site of ACMs, sampling and analysis may require technical proficiency training (competency training).

Training vs. Competence

HSE (2005) identifies that 'training alone does not make people competent. Training must be consolidated by practical experience so that the person becomes confident, skilful and knowledgeable in practice on the job'. It is critical that ACS surveyors demonstrate competency with details of relevant field experience alongside training and examples of previous works/references.