



Phase 2 Site Investigation Report Paradise Wharf, Ducie Street, Manchester

Prepared for Victor (M1) Limited

January 2023

10/1836/002 Rev. 01

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Document Origin

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Executive Summary

Client	Victor (M1) Limited
Location	Adjacent to the Ashton Canal at Paradise Wharf, Manchester.
Description	The site currently comprises a car parking area associated with offices and residential apartment buildings to the north and west and is surfaced with tarmac and block paving. A two-storey masonry office building is present to the north and a seven-storey apartment building to the west. A retaining wall forms the eastern boundary of the site, beyond which is Paradise Walk and a diecasting factory.
Development	It is proposed to develop the site with a four-storey residential scheme, marketed as Paradise Mews. The scheme is to include a ground floor given over to garage space, utilities / storage facilities, entrance halls and an office, with the apartments above.
Site History	<p>Current site use as a car park is not considered to represent a potentially significant source of contaminants of concern. However, the site was formerly used as a loading shed.</p> <p>The area surrounding the site has had a significant industrial history, which may also represent potentially significant sources of contamination. Neighboring land use has included various works and factories, timber yards, wharves, mills and a goods rail station. An infilled canal basin is also present adjacent to the western boundary of the site.</p>
Geology	<p>A previous investigation of the site by Geo Research in January 2000 recorded Made Ground to depths of up to 4.70m below ground level (bgl), overlying Till.</p> <p>British Geological Survey (BGS) mapping indicates that the site is underlain by Devensian Till, overlying the Chester Formation. Historical borehole records in the vicinity of the site did not prove the base of the Till and indicate it is likely to be at least 20m in thickness.</p>
Radon	The radon guidance on protective measures for new dwellings indicates that the site is in a 'low' probability radon area where less than 1% of homes are estimated to be at or above the Action Level. Radon gas protection measures are therefore not required in the construction of new dwellings or extensions.
Mining & Ground Stability	<p>Following a review of the CON29M Coal Mining Report obtained for the site, significant risks associated with coal mining were not considered to be present and no further assessment considered to be required.</p> <p>The environmental database report indicates that the site represents a low risk with regard ground stability issues relating to running sands, collapsible ground, landslides, compressible ground, ground dissolution features and shrinking/swelling clays.</p>
Flood Risk	According to the Flood Map for Planning, available on the gov.uk website, the site is located within Flood Zone 1, whereby there is between a 1 in 1000 chance of flooding from rivers or the sea occurring each year.
Environmental Setting	The site is underlain by Devensian Till, classified as an Undifferentiated Secondary Aquifer. However, the site is not located within a groundwater Source Protection Zone (SPZ) and the nearest licensed groundwater abstraction is located

approximately 650m to the southeast, used for process cooling. Therefore, this aquifer is not considered to represent a sensitive controlled water receptor.

The cohesive nature of the Devensian Till beneath the site is likely to restrict the vertical migration of potential contaminants of concern beneath the site towards the deeper Chester Formation Principal Aquifer. Therefore, this has not been considered further as a receptor.

The nearest surface water feature is the Ashton Canal, located immediately beyond the southern boundary of the site. The Rochdale Canal is located approximately 135m to the northwest. The River Medlock is located approximately 600m to the southeast. Given its distance, the River Medlock is not considered to be at significant risk from contamination sourced from the subject site.

There is considered to be potential for any contaminants present beneath the site to migrate off-site towards neighbouring residential properties. However, these comprise multistorey apartment buildings with little or no soft landscaping at ground level. The potential risk of neighbouring site users to come into contact with contaminants sourced from the site is therefore not considered to be significant

UXO

A UXO Desk Study was obtained for the site. This indicated that the site represented a low UXO hazard level and that intrusive investigations could be undertaken with no additional risk mitigation measures required.

Site Investigation

The site investigation comprised two cable percussion boreholes (BH2 and BH3) to depths of approximately 19.00m below ground level (bgl) and one window sample borehole to a depth of approximately 5.45m bgl (BH1B). BH1 and BH1A were terminated at shallow depth upon obstructions. A falling head permeability test was undertaken in borehole BH2. Groundwater and ground gas monitoring wells were installed in each borehole.

Ground Conditions

Made Ground was recorded beneath asphalt hardstanding and ranged in thickness from approximately 3.20m to 5.30m. Made Ground was underlain by Devensian Till to a depth of approximately 18.00m bgl, beneath which weathered deposits of the Chester Formation were encountered.

Contamination

Lead, PAH and TPH compounds were recorded in samples of Made Ground collected from boreholes BH1A, BH2, and BH3 at concentrations in excess of adopted assessment criteria (AC). Chrysotile and amosite asbestos fibres were also recorded within samples of Made Ground collected from boreholes BH1 and BH1A. Following redevelopment, the pathways of direct contact, ingestion and inhalation of contaminated dust will be not be active in areas covered by building footprint or hard surfacing. It is understood that no new areas of soft landscaping are proposed at ground surface level.

Given the presence of chrysotile and amosite asbestos fibres recorded in two samples of Made Ground, it is recommended that an asbestos management plan be put in place during the proposed development. If significant quantities of asbestos are encountered during the works, a specialist should be contacted regarding its treatment and removal.

Reduced oxygen concentrations were recorded in monitoring well BH3. Construction works in enclosed spaces below ground level as part of the proposed development should take this into account and risk mitigate measures put in place.

The site is underlain by an Undifferentiated Secondary Aquifer, relating to the Devensian Till and a Principal Aquifer, relating to the Chester Formation. However, the site is not located within a groundwater SPZ and the nearest groundwater

abstraction is indicated to be approximately 650m from the site. Furthermore, the presence of a significant thickness of cohesive material beneath the site is likely to restrict the vertical migration of the contaminants. Therefore, these aquifers are not considered to represent sensitive groundwater resource receptors.

The Aston Canal is located immediately adjacent to the site. Significant concentrations of mobile contaminants of concern were not recorded in boreholes closest to the canal. Elevated TPH concentrations recorded in Made Ground analysed from borehole BH3 at 3.40m bgl were at a depth below the level of the base of canal and therefore unlikely to pose a significant risk to this receptor.

Ground Gas

Based on six rounds of monitoring undertaken, the ground gas regime at this site corresponds to CIRIA Characteristic Situation 1 (CS1), whereby no ground gas protection measures are required.

Geotechnical

Given the thickness of Made Ground beneath the site, it is considered that piled foundations would be required to support the proposed development. Continuous flight auger (CFA) or bored piles, terminating in the deeper layers of the Devensian Till or Chester Formation are likely to be most suitable on the subject site from a geotechnical viewpoint.

Groundwater was recorded from depths of approximately 1.23m bgl within wells during monitoring visits to site. Excavations beneath this depth are therefore likely to require groundwater control and exclusion measures.

Testing indicates that that a Design Sulphate Class of DS1 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC1 would be required for buried concrete structures in contact with the Made Ground and natural soils.

Infiltration Testing

A falling head test was undertaken in borehole BH2 at depths of between 3.00m and 4.00m bgl within the Made Ground in order to obtain preliminary permeability data for drainage design.

An infiltration rate of 3.5×10^{-7} m/s was obtained, which is considered very low and unlikely to be suitable for the adoption of infiltration drainage to discharge surface water runoff from the proposed development. However, this should be confirmed by a drainage engineer.

Waste Characterisation

Based on available information, it is considered likely that the majority of the Made Ground and natural strata beneath the site would be suitable for disposal to a Non-Hazardous Waste landfill (if it needed to be removed from site). Hydrocarbon impacted Made Ground in the locations of borehole BH1A at 0.20m bgl and borehole BH3 at 3.40m bgl would require disposal to a Stable Non-Reactive Hazardous Waste landfill.

Any material sent to landfill should be accompanied by the appropriate duty of care documentation and the chemical data should be forwarded to the accepting landfill for approval prior to removal of the soil from site.

It should be noted that ground conditions are often variable, particularly Made Ground. To manage disposal costs, we recommend that Made Ground soils generated during construction works (including pile arisings) be stockpiled separately, sorted by location, composition and any obviously visually / olfactory contaminated material.

**Recommended
Further Works /
Considerations**

The following further works are recommended:

- An asbestos management plan be put in place during the proposed development.
- Made Ground generated during construction works should be stockpiled separately, sorted by location, composition and any obviously visually / olfactory contaminated material.

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Proposed Development Plan
Borehole Location Plan

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Appendix III	Exploratory Hole Logs
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Appendix V	Geotechnical Laboratory Test Results
Appendix VI	Ground Gas Monitoring Records
Appendix VII	Waste Soil Classification

1.0 Introduction

1.1 Background

Clancy Consulting Limited has been instructed by Victor (M1) Limited to carry out a Phase 2 Site Investigation at a site located adjacent to the Ashton Canal at Paradise Wharf, Manchester. The site currently comprises a car park associated with an existing commercial and residential development.

It is proposed to develop the site with a four-storey residential scheme, marketed as Paradise Mews.

A site location plan and proposed development layout are included in Appendix I.

1.2 Objectives

The objectives of this investigation are summarised below:

- Undertake intrusive site investigation works to establish the ground conditions across the proposed development area.
- Carry out a geotechnical assessment of the ground conditions and provide preliminary recommendations for foundation design.
- Perform a falling head test in one borehole to provide preliminary permeability data to assess whether infiltration drainage may be suitable to discharge surface water runoff from the proposed development.
- Carry out chemical testing of soil samples to determine the contamination status of the site and potential risk posed to human health and environmental receptors.
- Carry out chemical testing of soil samples to characterise arisings from excavations for disposal off-site to landfill.
- Refine the preliminary risk assessment and conceptual site model undertaken as part of the Phase 1 assessment.
- Provide recommendations regarding the requirement for further investigations or remedial works, if required, to satisfy the Local Planning Authority and to inform detailed civil and structural design.

1.3 Limitations of the Study

Clancy Consulting Limited cannot be held responsible for any omissions, misrepresentation, errors or inaccuracies with the supplied third-party report information. The report is written in the context of an agreed scope of work and budget and should not be used in a different context. New information or improved practices and changes in legislation may require a reinterpretation of the report in whole or in part.

Clancy Consulting Limited reserves the right to amend either conclusions or recommendations in light of any further information that may become available. The report is provided for the sole use of Victor (M1) Limited for the objectives discussed previously only and is confidential to them.

The report may not be relied upon by any other party without prior written consent of Clancy Consulting Limited. Those using this information in subsequent assessments or evaluations do so at their own risk.

It must be noted that whilst this investigation aims to characterise the general ground conditions beneath the proposed development site, Clancy Consulting Ltd cannot be held accountable for variations in ground and groundwater conditions, unidentified contamination or the presence of below ground structures present.

2.0 Summary of Previous Phase 1 Preliminary Risk Assessment

Clancy Consulting Ltd has previously undertaken a Phase 1 Preliminary Risk Assessment for the site, the findings of which were reported in the following document:

Phase 1 Preliminary Risk Assessment, Paradise Wharf, Ducie Street, Manchester, report ref 10/1836/001 Rev 01, dated September 2021.

A summary of the report's findings are presented below;

The site currently comprises a car parking area associated with offices and residential apartment buildings to the north and west and is surfaced with tarmac and block paving. A two-storey masonry office building is present to the north and a seven-storey apartment building to the west. A retaining wall forms the eastern boundary of the site, beyond which is Paradise Walk and a diecasting factory.

It is proposed to develop the site with a four-storey residential scheme, marketed as Paradise Mews. The scheme is to include a ground floor given over to garage space, utilities / storage facilities, entrance halls and an office, with the apartments above.

Current site use as a car park is not considered to represent a potentially significant source of contaminants of concern. However, the site was formerly used as a loading shed.

The area surrounding the site has had a significant industrial history, which may also represent potentially significant sources of contamination. Neighboring land use has included various works and factories, timber yards, wharves, mills and a goods rail station. An infilled canal basin is also present adjacent to the western boundary of the site.

A previous investigation of the site by Geo Research in January 2000 recorded Made Ground to depths of up to 4.70m below ground level (bgl), overlying Till.

British Geological Survey (BGS) mapping indicates that the site is underlain by Devensian Till, overlying the Chester Formation. Historical borehole records in the vicinity of the site did not prove the base of the Till and indicate it is likely to be at least 20m in thickness.

The radon guidance on protective measures for new dwellings indicates that the site is in a 'low' probability radon area where less than 1% of homes are estimated to be at or above the Action Level. Radon gas protection measures are therefore not required in the construction of new dwellings or extensions.

Following a review of the CON29M Coal Mining Report obtained for the site, significant risks associated with coal mining were not considered to be present and no further assessment considered to be required.

The environmental database report indicates that the site represents a low risk with regard ground stability issues relating to running sands, collapsible ground, landslides, compressible ground, ground dissolution features and shrinking/swelling clays.

According to the Flood Map for Planning, available on the gov.uk website, the site is located within Flood Zone 1, whereby there is between a 1 in 1000 chance of flooding from rivers or the sea occurring each year.

The site is underlain by Devensian Till, classified as an Undifferentiated Secondary Aquifer. However, the site is not located within a groundwater Source Protection Zone (SPZ) and the nearest licensed groundwater abstraction is located approximately 650m to the southeast, used for process cooling. Therefore, this aquifer is not considered to represent a sensitive controlled water receptor.

The cohesive nature of the Devensian Till beneath the site is likely to restrict the vertical migration of potential contaminants of concern beneath the site towards the deeper Chester Formation Principal Aquifer. Therefore, this has not been considered further as a receptor.

The nearest surface water feature is the Ashton Canal, located immediately beyond the southern boundary of the site. The Rochdale Canal is located approximately 135m to the northwest. The River Medlock is located approximately 600m to the southeast. Given its distance, the River Medlock is not considered to be at significant risk from contamination sourced from the subject site.

There is considered to be potential for any contaminants present beneath the site to migrate off-site towards neighbouring residential properties. However, these comprise multistorey apartment buildings with little or no soft landscaping at ground level. The potential risk of neighbouring site users to come into contact with contaminants sourced from the site is therefore not considered to be significant.

A review of publicly available bomb risk mapping from Zetica indicates the site to be in an area of moderate bombing density during the Second World War. A Detailed UXO Desk Study is therefore recommended to assess the potential risk posed by UXO, prior to intrusive works.

Potential pollutant linkages associated with the site have been identified which may be active following the proposed redevelopment of the site. A Phase 2 Environmental Site Investigation is therefore recommended to determine the contamination status of soil beneath the site and to assess the potential risk poses by ground gas. Geotechnical testing is also recommended in order to provide parameters to enable foundation, floor slab and road pavement design.

On the basis of the above, the following further works were recommended:

- Procurement of a Detailed UXO Threat Assessment report.
- Carry out an intrusive site investigation to confirm ground conditions beneath the site. Any new structures will likely require a piled foundation solution and selected boreholes should be taken to sufficient depth to allow detailed pile design.
- Installation of wells in boreholes to allow the assessment of the potential risk to future site users posed by ground gases.
- Soil samples should be recovered from selected exploratory holes and tested for potential contaminants of concern.
- In-situ testing and geotechnical soil sampling should be carried out during intrusive investigation to allow recommendations to be made for foundation and pavement design.
- The stability of the retaining wall forming the eastern boundary of the site should also be considered when designing foundations for the proposed development.

A UXO Desk Study was subsequently obtained for the site. This indicated that the site represented a low UXO hazard level and that intrusive investigations could be undertaken with no additional risk mitigation measures required. A copy of the report is provided as Appendix II.

3.0 Site Investigation

3.1 Investigation Design & Objectives

Pollutant linkages identified within the Preliminary Conceptual Site Model are currently active or will be made active upon redevelopment of the site. The investigation design approach was based on guidance provided in BS 10175 Code of Practice for Investigation of Potentially Contaminated Land (2011). The investigation also provided information on ground conditions and data for the assessment geotechnical properties of the strata underlying the site.

It must be noted that whilst this investigation aims to characterise the general ground conditions beneath the proposed development site, Clancy Consulting Ltd cannot be held accountable for variations in ground and groundwater conditions, unidentified contamination or the presence of below ground structures in areas of the site which fall outside our borehole locations.

3.2 Fieldwork

Site investigation works were carried out from 20th to 26th September 2022 and on 20th October 2022 and comprised:

- Two cable percussion boreholes (BH02 and BH03) to depths of approximately 19.00m below ground level (bgl).
- One window sample borehole (BH1B) to a depth of approximately 5.45m bgl.
- In situ geotechnical testing throughout the depth of each borehole.
- Installation of groundwater and ground gas monitoring wells in boreholes BH1B, BH2 and BH3,
- Soil samples were collected at regular intervals from each exploratory hole for chemical and geotechnical laboratory analysis.

A plan indicating the positions of the exploratory hole boreholes is provided in Appendix I. Exploratory hole logs are provided as Appendix III.

Boreholes BH1 and BH1A and BH1C were terminated at shallow depth upon obstructions.

3.3 Laboratory Testing

3.3.1 Environmental Laboratory Testing – Soil

Nine samples of the Made Ground and one sample of the Devensian Till were submitted to a UKAS/MCERTS accredited laboratory and analysed for a number of determinands including:

Inorganic Determinands:

pH, arsenic, beryllium, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, sulphate, selenium, vanadium, zinc and asbestos.

Organic Determinands:

Polycyclic aromatic hydrocarbons (PAH) and total petroleum hydrocarbons (TPH).

Three samples collected from the Made Ground were also submitted for Waste Acceptance Criteria (WAC) analysis.

Chemical Laboratory Certificates are presented as Appendix IV.

3.3.2 Geotechnical Laboratory Testing

Samples collected from the Made Ground and Devensian Till were analysed by a UKAS accredited laboratory for Atterberg Limits, total stress parameters, pH and water-soluble sulphate content.

Geotechnical Laboratory Certificates are presented as Appendix V.

4.0 Site Investigation Findings

4.1 Ground Conditions & Geotechnical Testing Parameters

The strata encountered during the intrusive investigation are summarised in the table below and described in the following section.

Table 1 – Encountered Strata

Strata	Depth to Top of Strata m bgl	Thickness (m)
Asphalt hardstanding	Ground level	0.07 to 0.15
Made Ground	0.07 to 0.15	3.05 to 5.15 (where proven)
Devensian Till	3.20 to 5.30	12.50 to 12.70
Chester Formation	16.80 to 18.00	Not proven at a maximum depth of approximately 19.10m bgl

General descriptions of the strata encountered during the intrusive investigation are summarised below. Reference should be made to the borehole logs within Appendix III of this report for full descriptions of ground conditions underlying the site.

4.1.1 Made Ground

Made Ground was recorded beneath asphalt hardstanding and ranged in thickness from approximately 3.05m to 5.15m bgl. The stratum was encountered at greatest thickness in boreholes BH2 and BH3, located in the east of the site. The Made Ground was variable in nature, but typically comprised grey gravel immediately underlying asphalt, underlain by sandy, gravelly clay. Gravel comprised medium to coarse sandstone, limestone and quartz. Sand was encountered towards the base of the Made Ground in boreholes BH2 and BH3.

A suspected sandstone slab was encountered in boreholes BH1, BH1A, BH1B and BH1C at depths ranging from approximately 0.60m to 0.80m bgl. In borehole BH1B the slab was cored through and shown to be approximately 0.30m in thickness.

A strong hydrocarbon odour and staining was encountered within the Made Ground in borehole BH3 at depths ranging from 3.20m and 4.30m bgl.

11 SPTs undertaken within the Made Ground at depths ranging from approximately 1.20m to 4.00m bgl gave results ranging from N = 2 to N = 22.

Approximate undrained shear strengths were calculated from the SPT results using the correlation by Stroud:

$$C = f_1 \times N$$

Where, a conservative value for $f_1 = 4.5$.

The SPT results correspond approximately to undrained shear strength values ranging from 9kN/m² to 99kN/m², which is indicative of a very soft, ranging to a stiff cohesive material.

4.1.2 Devensian Till

The Devensian Till was encountered beneath the Made Ground at depths ranging from approximately 3.20m to 5.30m bgl and ranged in thickness from approximately 12.50m to 12.70m. The stratum was variable in nature, but generally comprised grey and brown, sandy, gravelly clay. Interbedded bands of sand, gravel and clay were encountered from 11.50m bgl in borehole BH2 and 13.80m bgl in borehole BH3. No visual or olfactory evidence of contamination was noted within this stratum.

Atterberg Limit testing was undertaken on four soil sample collected from the Devensian Till at depths ranging from approximately 3.00m to 7.00m bgl. This testing was undertaken to determine values for Liquid Limit (LL),

Plastic Limit (PL) and Plasticity Index (PI). The results for LL ranged from 32% to 40%. The results for PL ranged from 16% to 20%. The results for PI ranged from 16% to 20%. This is indicative of a low to intermediate plasticity clay. Modified plasticity index values indicate that the samples have a low volume change potential. The natural moisture content of the samples ranged from 17% to 23%.

SPTs undertaken within predominantly cohesive layers of the Devensian Till at depths ranging from approximately 4.00m to 13.50m bgl gave results ranging from $N = 8$ to in excess of $N = 50$. The SPT results correspond approximately to undrained shear strength values ranging from 36kN/m^2 to in excess of 225kN/m^2 , which is indicative of a soft, ranging to a very stiff cohesive material.

Two SPTs undertaken within predominantly granular layers of the granular Devensian Till at depths of approximately 14.50m bgl gave results of $N = 46$ and $N = 48$, which is representative of a dense granular material.

Two samples collected from granular layers of the Devensian Till at depths of approximately 4.00m and 15.00m bgl were analysed for PSD. The results are summarised in the table below:

Table 2: PSD Results

	BH2 4.0m bgl	BH3 15.0m bgl
Gravel	18%	68
Sand	48%	31
Silt / Clay	34%	1

Four quick undrained triaxial compression tests undertaken on samples collected from the Devensian Till at depths of 5.50m, 7.00m, 10.00m and 11.50m bgl, gave results of 131kPa, 144kPa, 150kPa and 152kPa respectively. These are indicative of high strength clays. The natural moisture content of these samples ranged from 11 to 17%. The bulk densities ranged from 2.09Mg/m^3 to 2.16Mg/m^3 . The dry densities ranged from 1.81Mg/m^3 to 1.95Mg/m^3 .

4.1.3 Chester Formation

The Chester Formation was encountered at a depth of 18.00m bgl in borehole BH2 and 16.80m bgl in borehole BH3. The stratum comprised very dense red sand.

Ten SPTs undertaken within the Chester Formation all gave results in excess of $N=50$, which is indicative of a very dense granular material.

4.2 Groundwater

A Groundwater strike was recorded in granular deposits of the Devensian Till in borehole BH2 during intrusive works at a depth of approximately 15.00m bgl, rising to 14.50m bgl after 20 minutes.

Groundwater levels recorded within wells during subsequent groundwater monitoring visits are summarised in the table below:

Table 3– Groundwater Level Data

Monitoring Well ID	Well Screen Depth (m bgl)	Strata	Depth to Water (m bgl)					
			20/10/22	31/10/22	09/11/22	01/12/22	08/12/22	06/01/23
BH1B	1.50 to 3.30	Made Ground	-	1.89	1.82	1.90	2.10	1.90
BH2	1.00 to 5.00	Made Ground	3.97	2.93	2.82	2.98	2.80	2.85
BH3	1.00 to 4.20	Made Ground	3.21	3.32	3.10	2.90	3.06	3.05

The results of monitoring appear to be representative of perched groundwater within the Made Ground. Groundwater is likely to be restricted to granular layers, which would account for the variation in depth.

5.0 Hazardous Ground Gas Assessment

5.1 Introduction

Made Ground was encountered across the site to depths up to 5.30m bgl, which may represent a significant source of ground gas.

Visual and olfactory evidence of hydrocarbon contamination was recorded within the Made Ground in borehole BH3 at depths of between 3.20m and 4.20m bgl. Hydrocarbon contamination can generate concentrations of hazardous ground gas and volatile vapours and is therefore considered a potentially significant source of ground gas.

Potential off-site sources of ground gas include Made Ground associated with historic land uses / demolition of historic buildings and infilled railway sidings.

5.2 Scope of Works

Ground monitoring wells were installed in three boreholes with the response zones positioned within the Made Ground. An initial monitoring programme comprising six monitoring visits over a period of three months is to be carried out in accordance with the guidance within CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings.

5.3 Monitoring Results

Six gas monitoring visits have been carried out between 20th October and 6th January 2023. Atmospheric pressure ranged from 992mb to 1007mb during the visits. Falling pressure trends were recorded on three occasions. Copies of the results are presented in Appendix VI and summarised in the table below.

Table 4 – Gas Monitoring Results

Hole ID	Max Methane (%v/v)	Max Carbon Dioxide (%v/v)	Flow Rate (l/hr)	Gas Screening Value (l/hr)	Characteristic Situation
BH1B	0.0	0.5	0.0	0.005	CS1
BH2	0.0	2.9	0.0	0.029	CS1
BH3	0.2	4.1	0.0	0.041	CS1

Installations were monitored for concentrations of methane, carbon dioxide and oxygen. In addition, the flow rate and barometric pressure were recorded.

Methane was recorded at a maximum concentration of 0.2% by volume (v/v) within monitoring well BH3 on 20th October 2022.

Carbon dioxide was recorded at a maximum concentration of 4.10% v/v within monitoring well BH3 on 1st December 2022.

Ground gas flow rates were not recorded in excess of the instrument limit of detection (less than 0.1 litres per hour).

The lowest recorded oxygen concentration was 12.10% v/v within monitoring well BH3 on 9th November 2022.

5.4 Discussion

The CIRIA Report C665 outlines indicative guideline concentrations for carbon dioxide and methane in association with gas flow rates for which gas protection measures may be required in new residential or commercial developments. The methodology is based on the Modified Wilson and Card approach that characterises the gas regime into a series of Characteristic Situations (1 to 5), with corresponding indicative gas protection measures.

Using this methodology, the ground gas regime at this site corresponds to CIRIA Characteristic Situation 1 (CS1), whereby no ground gas protection measures are required.

The reduced oxygen concentrations encountered in BH3 should be taken into account during construction activities. Construction works undertaken in trenches in this area should be undertaken taking into account the possibility of low oxygen concentrations in this area of the site.

6.0 Tier 1 Contamination Analysis

The field investigation findings indicate that pathways are present by which contaminants of concern can impact identified receptors. Chemical analysis has been carried out on soils sampled from beneath the site. The concentrations of contaminants of concern within soil can be compared to assessment criteria (AC) to determine whether these represent an unacceptable risk to identified receptors. The derivation of AC to be used and the comparison of these criteria to the results of the chemical analyses are presented below.

6.1 Human Health Assessment Criteria

In order to assess risks to future site users, concentrations of contaminants of concern have been compared to Suitable 4 Use Levels (S4UL) generic Assessment Criteria (AC) published by Land Quality Management: Chartered Institute of Environmental Health (LQM:CIEH) in 2015.

The assessment has been based upon the use of the site for residential purposes without plant uptake, given its proposed redevelopment with a four storey apartment block.

The average Soil Organic Matter concentration within samples analysed is 3.1%. Concentrations of contaminants of concern have therefore been compared to the S4UL (2.50% Soil Organic Matter) values.

A notable exclusion from the S4ULs is lead. In the absence of a S4UL for lead, the Category 4 Screening Level (C4SL) has been selected, published by DEFRA in 2014. It is noted that the C4SL are based on the acceptance of a low level of toxicological concern, rather than the more conservative standard adopted in the derivation of S4ULs, which are based on a tolerable or minimal level of risk.

The potential risk posed to controlled waters from contaminants of concern within soils beneath the site is not addressed by these screening criteria.

6.2 Comparison of Soil Analyses to Human Health Assessment Criteria

Chemical analysis was undertaken on nine samples of the Made Ground and one sample of Devensian Till. A comparison of soil analyses to their relevant AC is presented below.

6.2.1 Inorganic Determinands

Beryllium was recorded in a sample of Made Ground collected from borehole BH2 at 1.00m bgl (1.90mg/kg) at a concentration in excess of its adopted AC (1.70mg/kg).

Lead was recorded in samples of Made Ground collected from borehole BH1A at 0.20m bgl (353mg/kg) and borehole BH3 at 3.40m bgl (562mg/kg) at concentrations in excess of its adopted AC (310mg/kg).

6.2.2 Organic Determinands

Benzo(a)pyrene was recorded in samples of Made Ground collected from borehole BH1A at 0.20m bgl (5.08mg/kg) and borehole BH3 at 0.30m bgl (8.03mg/kg) at concentrations in excess of its adopted AC (3.20mg/kg).

Benzo(b)fluoranthene was recorded in samples of Made Ground collected from borehole BH1A at 0.20m bgl (5.35mg/kg) and borehole BH3 at 0.30m bgl (8.84mg/kg) at concentrations in excess of its adopted AC (4.00mg/kg).

Dibenz(a,h)anthracene was recorded in samples of Made Ground collected from borehole BH1A at 0.20m bgl (0.94mg/kg) and borehole BH3 at 0.30m bgl (1.12mg/kg) at concentrations in excess of its adopted AC (0.32mg/kg).

PAH contaminants of concern were not recorded within other soil samples analysed from beneath the site at concentrations in excess of adopted AC.

Aliphatic TPH in the C8 to C10 range was recorded in a sample of Made Ground collected from borehole BH3 at 3.40m bgl (209mg/kg) at a concentration in excess of its adopted AC (65mg/kg). A sample analysed from natural soils in borehole BH3 beneath this at a depth of approximately 4.40m bgl did not record TPH concentrations in excess of adopted AC.

TPH contaminants of concern were not recorded within other soil samples analysed from beneath the site at concentrations in excess of adopted AC.

6.2.3 Asbestos

Chrysotile asbestos fibres were recorded in a sample of Made Ground collected from borehole BH1A at a depth of approximately 0.20m bgl. Subsequent quantification analysis reported concentrations of asbestos of less 0.001%.

Amosite fibres were encountered in a sample of Made Ground collected from borehole BH1 at a depth of 0.20m bgl. Subsequent quantification analysis reported concentrations of asbestos of 0.003%.

Asbestos containing materials (ACMs) were not identified in any of the other soil samples submitted for screening.

7.0 Contamination Assessment

7.1 Introduction

Based on the information obtained during the ground investigation and laboratory testing, the 'Preliminary Conceptual Site Model' has been amended accordingly. The Conceptual Site Model is used as a basis to identify contamination sources, pathways and receptors and is subject to constant refinement as more information becomes available.

7.2 On Site Human Health Receptors

Lead, PAH and TPH compounds were recorded in samples of Made Ground collected from boreholes BH1A, BH2, and BH3 at concentrations in excess of adopted AC. Chrysotile and amosite asbestos fibres were also recorded within samples of Made Ground collected from boreholes BH1 and BH1A. Following redevelopment, the pathways of direct contact, ingestion and inhalation of contaminated dust will not be active in areas covered by building footprint or hard surfacing. It is understood that no new areas of soft landscaping are proposed at ground surface level.

Significant concentrations of volatile contaminants of concern were not recorded within soil sampled from beneath the site. Therefore, future site users are not considered to be at significant risk from contaminants in soil via the vapour inhalation pathway in indoor areas.

Based on the available information, concentrations of contaminants of concern detected within soil sampled from beneath the site are not considered to represent a potentially significant risk to future site users.

7.3 Off-site Human Health Receptors

Following redevelopment, the site will be covered by building footprint, or hardstanding and there is limited potential for the air-borne migration of soil or dust to impact neighbouring receptors.

Given the absence of significant areas of soft landscaping on neighbouring properties, concentrations of contaminants of concern detected within soil sampled from beneath the site are not considered to represent a potentially significant risk to off-site human health receptors.

7.4 Construction / Maintenance Workers

S4UL screening criteria cannot be used to assess the acute (short term exposure) risk that personnel in close contact with exposed soils may experience during construction/site maintenance duties.

Potential risks to construction/maintenance workers can be controlled by the use of appropriate personal protection equipment (e.g. disposable coveralls, gloves and particulate/vapour masks) and by adopting high levels of personal hygiene.

Given the presence of chrysotile and amosite asbestos fibres recorded in two samples of Made Ground, it is recommended that an asbestos management plan be put in place during the proposed development. If significant quantities of asbestos are encountered during the works, a specialist should be contacted regarding its treatment and removal.

Reduced oxygen concentrations were recorded in monitoring well BH3. Construction works in enclosed spaces below ground level as part of the proposed development should take this into account and risk mitigate measures put in place.

7.5 Groundwater

The site is underlain by an Undifferentiated Secondary Aquifer, relating to the Devensian Till and a Principal Aquifer, relating to the Chester Formation. However, the site is not located within a groundwater SPZ and the nearest groundwater abstraction is indicated to be approximately 650m from the site. Furthermore, the

presence of a significant thickness of cohesive material beneath the site is likely to restrict the vertical migration of the contaminants. Therefore, these aquifers are not considered to represent sensitive groundwater resource receptors.

7.6 Surface Water

The Aston Canal is located immediately adjacent to the site. Significant concentrations of mobile contaminants of concern were not recorded in boreholes closest to the canal. Elevated TPH concentrations recorded in Made Ground analysed from borehole BH3 at 3.40m bgl were at a depth below the level of the base of canal and therefore unlikely to pose a significant risk to this receptor.

7.7 Polymeric Utility Pipes

Hydrocarbon contaminants were recorded in samples of Made Ground analysed from beneath the site at concentrations that may pose a risk to potable water supply pipes. Standard polymeric utility pipes may therefore not be suitable for the proposed development. Barrier pipe may be required, or utility pipes laid in dedicated trenches and backfilled with clean, inert material.

Requirements for buried utility pipes should be discussed with service providers before the development stage.

7.8 Revised Conceptual Site Model

The potential source-pathway-receptor linkages and associated risks upon completion of the proposed development at the site, as identified following completion of the assessment, are summarised in the table below.

Table 5 – Revised Conceptual Site Model

Potential Source	Via	Potential Pathways	Linkage Potentially Active? (Yes/No)	Receptors
On site: Made Ground and recorded lead, PAH and TPH contamination.	Soil	Direct contact/ingestion	No	Site users
		Inhalation of volatiles	No	
		Airborne migration of soil or dust	No	Off-site users
		Leaching of mobile contaminants	No	Devensian Till Undifferentiated Secondary Aquifer Chester Formation Principal Aquifer
	Groundwater	Direct contact/ingestion	No	Site users
			No	Off-site users
		Inhalation of volatiles	No	Site users
			No	Off-site users
		Vertical and lateral migration in permeable strata	No	Devensian Till Undifferentiated Secondary Aquifer Chester Formation Principal Aquifer
			No	Aston Canal
Off site: Runoff from car parks and road network	Groundwater	Direct contact/ingestion	No	Site users
		Inhalation of volatiles	No	Site users
	Service conduits	Direct contact/ingestion	No	Site users
		Inhalation of volatiles	No	Site users
On and off-site: Potential hazardous ground gas and vapours from Made Ground	Ground Gas	Inhalation of ground gas	No	Site users
			No	Off-site users
		Explosive risks	No	Site users
			No	Off-site users

The risk assessment is based upon the available information relating to the site and all recommended mitigation measures being implemented. Should ground conditions inconsistent with those outlined in this report be encountered CCL should be contacted to enable further assessment. The findings of the CSM should be confirmed upon finalisation of the proposed redevelopment plans.

8.0 Geotechnical Assessment

8.1 Introduction

It is proposed to develop the site with a single storey four storey apartment block with car parking on the ground floor.

No preliminary structural loads have been received for the proposed development. Therefore, the preliminary recommendations below will need to be reviewed at the detailed design stage once these are known.

8.2 Preliminary Geotechnical Risk Register

The table below summarises the potential geotechnical hazards associated with the development. The table provides an assessment of whether the site is likely to be affected by the hazard and the possible consequences and engineering considerations.

Table 6 – Geotechnical Risk Register

Hazard Description	Is hazard likely to be present / affect the site?	Comments/possible engineering requirements where hazard present
Sudden lateral/vertical changes in ground conditions	M/H	A variable thickness of Made Ground was recorded beneath the site, overlying Devensian Till. The main variation in ground conditions is likely to be associated with the thickness and composition of the Made Ground.
Highly compressible/low bearing capacity soils, (including peat and soft clay)	M/H	Low SPT results were obtained in the Made Ground. These strata are not considered suitable to support traditional foundations.
Ground dissolution features/natural cavities	L	Ground conditions beneath the site are not consistent with these features.
Shrinking and swelling clays	L/M	Samples tested from the Devensian Till Formation ranged had a low volume change potential. Where traditional foundations are adopted, these should still be designed in accordance with Appendix 4.2H of the NHBC guidance (Building Near Trees). It is considered that the adoption of piled foundations would effectively mitigate against risks associated with volume change hazards.
Slope stability/Retaining wall issues	L	No slopes or retaining walls are understood to be proposed as part of the development. However, any temporary or permanent slopes or retaining walls created as part of the development should be subject to appropriate geotechnical design based on site-specific site investigation information.
High groundwater table (including waterlogged ground)	L/M	Groundwater was recorded from depths of approximately 0.50m bgl within wells during monitoring visits to site. The results of monitoring appear to be representative of perched groundwater within the Made Ground. On this basis, it is considered likely that groundwater may be controlled via pumping from a localised sump.
Filled and Made Ground (including embankments)	M/H	Made Ground was recorded beneath the site, up to 4.30m in thickness.
Obstructions (including foundations, services, basements, tunnels and adjacent sub-structures)	L/M	Historical development of the site has been limited. However, buried slabs were encountered in a number of locations. It is considered that any relic foundations and/or buried services encountered could be removed using standard construction plant.
Underground mining	L	The site is not located in an area affected by mining.
Concrete classification	L	Testing indicates that that a Design Sulphate Class of DS1 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC1 would be suitable for all buried concrete structures.

Hazard Description	Is hazard likely to be present / affect the site?	Comments/possible engineering requirements where hazard present
Seismic Activity	L	The Eurocode 8 seismic hazard zoning maps for the UK (Musson and Sargeant, 2007) indicate that horizontal Peak Ground Acceleration (PGA) values with 10% probability of being exceeded in 50 years (475 year return period) are between 0.00g and 0.02g, which is considered very low.
NOTES: H – High Risk M – Medium Risk L – Low risk		

8.3 Foundation Solutions

8.3.1 Piled Foundations

Given the thickness of Made Ground beneath the site and likely high loads from the development, it is considered that piled foundations would be required to support the proposed development. Continuous flight auger (CFA) or bored piles, terminating in the deeper layers of the Devensian Till or Chester Formation are likely to be most suitable on the subject site from a geotechnical viewpoint.

Preliminary anticipated CFA or bored pile bearing capacities are detailed in the table, below:

Table 7 – Anticipated Preliminary Pile Capacities

Pile Length (m bgl)	Pile Diameter		
	450mm	600mm	750mm
10.00	320kN	460kN	625kN
12.00	480kN	685kN	915kN
14.00	1240kN	1995kN	2915kN
16.00	1335kN	2120kN	3075kN
18.00	1455kN	2280kN	3275kN

A piling contractor should be consulted with regard to detailed pile design, since the type of pile and method of installation adopted will affect capacity.

Partial safety factors have been applied to the calculated pile capacities above in accordance with Design Approach 1: Combination 2, as detailed within Tables A.6, A.7 and A.8 of Annex A in BS EN 1997-1. This was found to be the most conservative design approach.

It should be noted that no design loads have been received at this stage. It is recommended that when the final structural loads have known further detailed assessment of pile capacity will need to be undertaken in accordance with the recommendations provided in Eurocode 7.

Loads are based on single piles only and do not take into account the action of groups of piles. This should be considered at the detailed design stage.

The pile capacity estimates presented above are preliminary and based on a conservative soil profile derived from exploratory holes undertaken on site. The adopted pile profile is summarised as follows:

Table 8 – Adopted Soil Profile

Stratum	Depth (m bgl)	Bulk Density (kN/m ³)	Shear Strength (kN/m ²)	Nc	Soil/Pile Friction Angle (°)	Nq
Made Ground	GL to 5.00	18	Not taken into account			
Cohesive Devensian Till	5.00 to 14.00	20	90 at 5.00, increasing linearly to 150 at 14.00	9	N/A	N/A
Granular Devensian Till	14.00 to 18.00	20	N/A	N/A	30	40
Chester Formation	18.00 to 19.10	20	N/A	N/A	30	40

An appropriate piling platform should be designed and constructed in accordance with BRE Digest 470 (Working platforms for Tracked Plant).

8.4 Floor Slabs

Made Ground is anticipated to be present at floor slab formation level beneath the proposed development at an assumed depth of approximately 0.60m bgl. Suspended floor slabs will therefore be required to prevent excessive total and differential settlement, whereby settlement beneath the slab would be controlled by the foundations of the building. Additional loads from suspended floor slabs should be taken into account when designing foundations for the proposed development.

8.5 Temporary Works and Excavations

Historical development of the site has been limited. However, buried slabs were encountered in a number of locations. It is considered that any relic foundations and/or buried services encountered could be removed using standard construction plant.

Groundwater was recorded from depths of approximately 1.80m bgl within wells during monitoring visits to site. The results of monitoring appear to be representative of perched groundwater within the Made Ground. On this basis, it is considered likely that groundwater may be controlled via pumping from a localised sump.

If groundwater is encountered during excavation, degradation of the formation may occur. The formation should therefore be adequately protected from seepages and protected from adverse weather conditions. If the formation layer becomes wet resulting in loosening or softening of the surface materials, then excavation may have to be taken deeper in order to find a suitable bearing layer. Instability of excavations in granular material should be expected, especially during periods of adverse weather. Suitable shoring measures or battering back of slopes may be required for any excavations greater than 1.20m bgl. All temporary excavations should be undertaken in accordance with CIRIA Report 97 'Trenching Practice'.

8.6 Chemical Attack on Buried Concrete

Samples of the Made Ground, and Devensian Till were tested for pH and for sulphate content. The results are presented below:

Table 9 – Results of pH and sulphate testing

Stratum	No. Samples	Range of pH	Characteristic pH	Range of Sulphate (mg/kg)	Characteristic Sulphate (mg/kg)	Design Sulphate Class	ACEC Class
Made Ground	3	8.1 to 8.4	8.12	10 to 170	170	DS1	AC1
Devensian Till	7	7.9 to 8.5	7.90	15 to 25	24	DS1	AC1

The data was used to assess appropriate concrete classification for buried concrete in accordance with BRE Special Digest 1, based on the following assumptions:

- Brownfield ground conditions.
- Mobile groundwater conditions.
- For a dataset of less than five samples, the characteristic value for soluble sulphate has been taken as the highest result, while the characteristic value for pH is taken as the lowest pH result; and
- For a dataset of between five and nine samples, the characteristic value for soluble sulphate has been taken as the average of the two highest results, while the characteristic value for pH is taken as the average of the two lowest pH results.

Based on the above, it is considered that a Design Sulphate Class of DS1 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC1 would be suitable for all buried concrete structures.

8.7 Infiltration Testing

A falling head test was undertaken in borehole BH2 at depths of between 3.00m and 4.00m bgl within the Made Ground in order to obtain preliminary permeability data for drainage design.

An infiltration rate of $3.5 \times 10^{-7} \text{m/s}$ was obtained, which is considered very low and unlikely to be suitable for the adoption of infiltration drainage to discharge surface water runoff from the proposed development. However, this should be confirmed by a drainage engineer.

9.0 Waste Characterisation

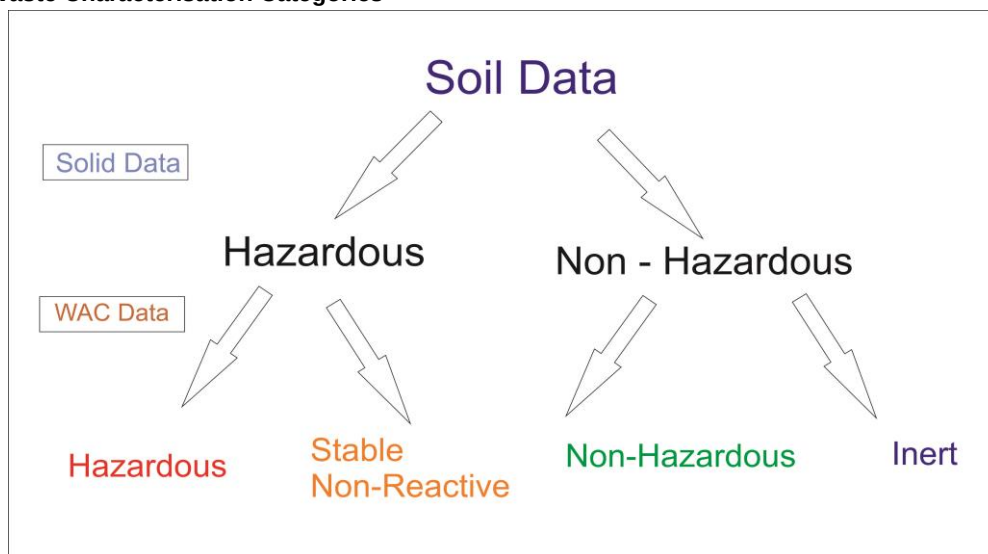
9.1 Assessment Criteria

It is likely that soil arisings generated through piling or any other excavation associated with the development will require removal from site, since there is limited potential for on-site re-use of this material. Should no suitable off site re-use options be available, disposal to landfill may need to be considered. However, if contaminated material is to be disposed of, use of soil treatment facilities should also be considered.

If disposal to landfill is required, the excavated material would be considered as waste and should be classified in line with the Hazardous Waste Directive - HWD, Council Directive 91/689/EC. This legislation divides waste into two categories, hazardous and non-hazardous. These two categories can then be subdivided into a number of classes relating to the type of landfill/cell to which the material can be sent; these are illustrated below.

In order to provide an indication of the likely waste characterisation of soils excavated from the site, should disposal be required, a waste characterisation exercise has been carried out. This is summarised in Sections 9.2 to 9.5 below. Any material sent to landfill should be accompanied by the appropriate duty of care documentation and the chemical data should be forwarded to the accepting landfill for approval prior to removal of the soil from site.

Figure 1 – Waste Characterisation Categories



9.2 Soil Sampling and Testing

9.2.1 Solid Suite of Analysis

Chemical analysis was undertaken on nine samples of Made Ground and one sample of the Devensian Till. Soil samples were analysed for the following solid suite of analysis:

pH, arsenic, asbestos, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, sulphide, sulphate, cyanide and PAH.

9.2.2 WAC Testing

Samples of Made Ground collected from borehole BH1A at a depth of approximately 0.20m bgl, borehole BH2 at a depth of approximately 1.40m bgl and borehole BH3 at a depth of approximately 3.40m bgl were also submitted for the solid WAC suite of analysis.

The solid WAC suite of analysis included testing for the following determinands:

Total organic carbon (TOC), loss on ignition (LOI), BTEX, sum of PCBs, mineral oil and total PAH, acid neutralisation capacity and pH.

WAC single stage leachate analysis was also carried out on the above samples. The analysis included testing for the following determinands:

Arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium, zinc, chloride, fluoride, sulphate, total dissolved solids (TDS), phenol index and dissolved organic carbon.

Chemical laboratory and WAC analysis results are provided in Appendix IV.

9.3 Solid Soil Data

Results of the solid suite were analysed using HazWasteOnline Software which allows users to classify waste as defined in the EWC (European Waste Catalogue 2002) based on the regulatory framework for the Classification Labelling and Packaging of Substances and mixtures Regulation, (EC) No 172/2008 and the latest Environment Agency guidance (Technical Guidance WM3).

The results of the analysis indicate that the majority of the samples of Made Ground and Devensian Till analysed would be suitable for disposal as Non-Hazardous Waste (if they needed to be removed from site). Samples of Made Ground collected from borehole BH1A at 0.20m bgl and borehole BH3 at 3.40m bgl would require disposal as Hazardous Waste, due to elevated concentrations of TPH.

9.4 WAC Data

9.4.1 Solid Data

Samples of Made Ground collected from borehole BH1A at a depth of approximately 0.20m bgl, borehole BH2 at a depth of approximately 1.40m bgl and borehole BH3 at a depth of approximately 3.40m bgl were also submitted for the solid WAC suite of analysis.

The samples of Made Ground collected from borehole BH1A at a depth of approximately 0.20m bgl and borehole BH3 at a depth of approximately 3.40m bgl did not exceed contaminant threshold levels for Hazardous Waste.

The sample of Made Ground collected from borehole BH2 at a depth of approximately 1.40m bgl did not exceed contaminant threshold levels for Inert Waste.

9.4.2 Leachate Data

The samples of Made Ground were also subject to the WAC leachate suite of analysis.

The samples of Made Ground collected from borehole BH1A at a depth of approximately 0.20m bgl and borehole BH3 at a depth of approximately 3.40m bgl did not exceed contaminant threshold levels for Hazardous Waste.

The sample of Made Ground collected from borehole BH2 at a depth of approximately 1.40m bgl did not exceed contaminant threshold levels for Inert Waste.

9.5 Summary of Results

The results of the waste characterisation exercise are provided in Appendix VII and summarised in the table below.

Table 10– Summary of Waste Characterisation Exercise

Position	Depth (m bgl)	Strata	Solid Suite of Analysis	Exceedance of Corresponding Inert, SNRHW and Hazardous waste WAC Limit Value?	WAC Analysis Results
BH1	0.2	Made Ground	Non-Hazardous	N/A	N/A
BH1A	0.2	Made Ground	Hazardous	None	SNRHW
BH1B	0.4	Made Ground	Non-Hazardous	N/A	N/A
BH1B	2.0	Made Ground	Non-Hazardous	N/A	N/A
BH2	1.0	Made Ground	Non-Hazardous	N/A	N/A
BH2	1.4	Made Ground	Non-Hazardous	None	Inert
BH3	0.3	Made Ground	Non-Hazardous	N/A	N/A
BH3	1.6	Made Ground	Non-Hazardous	N/A	N/A
BH3	3.4	Made Ground	Hazardous	None	SNRHW
BH3	4.4	Devensian Till	Non-Hazardous	N/A	N/A

N/A – Additional WAC analysis not carried out on sample

Based on available information, it is considered likely that the majority of the Made Ground and natural strata beneath the site would be suitable for disposal to a Non-Hazardous Waste landfill (if it needed to be removed from site). Hydrocarbon impacted Made Ground in the locations of borehole BH1A at 0.20m bgl and borehole BH3 at 3.40m bgl would require disposal to a Stable Non-Reactive Hazardous Waste landfill.

Any material sent to landfill should be accompanied by the appropriate duty of care documentation and the chemical data should be forwarded to the accepting landfill for approval prior to removal of the soil from site.

It should be noted that ground conditions are often variable, particularly Made Ground. To manage disposal costs, we recommend that Made Ground soils generated during construction works (including pile arisings) be stockpiled separately, sorted by location, composition and any obviously visually / olfactory contaminated material.

As such, the advice provided in this report should be considered preliminary at this stage and is subject to change depending on the actual waste materials generated during the construction works.

9.6 Waste Management

Arisings generated from excavations for foundations and service trenches etc. may be classified as waste and it is the responsibility of the holder of such material to form a view as to whether or not it constitutes waste.

Guidance on how this can be achieved is set out in the Development Industry Code of Practice (CoP) (CL:AIRE, March 2011).

The handling, re-use or disposal of waste materials is regulated by the Environment Agency, who take into account the CoP in determining whether materials are classified as waste. If materials are handled in accordance with the CoP it is considered unlikely that they will be considered waste at the point when they are used during development. This might be because the materials were never formally discarded or because they have been processed as part of a 'recovery' operation and therefore ceased to be waste.

Should site won material be intended for re-use on site a Materials Management Plan will be required from a suitably qualified environmental consultant in order to comply with the CoP.

10.0 Conclusions and Recommendations

Clancy Consulting Limited was instructed by Victor (M1) Limited to carry out a Phase 2 Site Investigation at a site located adjacent to the Ashton Canal at Paradise Wharf, Manchester. The site currently comprises a car park associated with an existing commercial and residential development. It is proposed to develop the site with a four-storey residential scheme, marketed as Paradise Mews.

The site investigation comprised two cable percussion boreholes (BH2 and BH3) to depths of approximately 19.00m bgl and one window sample borehole to a depth of approximately 5.45m bgl (BH1B). BH1 and BH1A were terminated at shallow depth upon obstructions. A falling head permeability test was undertaken in borehole BH2. Groundwater and ground gas monitoring wells were installed in each borehole.

Made Ground was recorded beneath asphalt hardstanding and ranged in thickness from approximately 3.20m to 5.30m. Made Ground was underlain by Devensian Till to a depth of approximately 18.00m bgl, beneath which weathered deposits of the Chester Formation were encountered.

Lead, PAH and TPH compounds were recorded in samples of Made Ground collected from boreholes BH1A, BH2, and BH3 at concentrations in excess of adopted AC. Chrysotile and amosite asbestos fibres were also recorded within samples of Made Ground collected from boreholes BH1 and BH1A. Following redevelopment, the pathways of direct contact, ingestion and inhalation of contaminated dust will not be active in areas covered by building footprint or hard surfacing. It is understood that no new areas of soft landscaping are proposed at ground surface level.

Given the presence of chrysotile and amosite asbestos fibres recorded in two samples of Made Ground, it is recommended that an asbestos management plan be put in place during the proposed development. If significant quantities of asbestos are encountered during the works, a specialist should be contacted regarding its treatment and removal.

Reduced oxygen concentrations were recorded in monitoring well BH3. Construction works in enclosed spaces below ground level as part of the proposed development should take this into account and risk mitigate measures put in place.

The site is underlain by an Undifferentiated Secondary Aquifer, relating to the Devensian Till and a Principal Aquifer, relating to the Chester Formation. However, the site is not located within a groundwater SPZ and the nearest groundwater abstraction is indicated to be approximately 650m from the site. Furthermore, the presence of a significant thickness of cohesive material beneath the site is likely to restrict the vertical migration of the contaminants. Therefore, these aquifers are not considered to represent sensitive groundwater resource receptors.

The Aston Canal is located immediately adjacent to the site. Significant concentrations of mobile contaminants of concern were not recorded in boreholes closest to the canal. Elevated TPH concentrations recorded in Made Ground analysed from borehole BH3 at 3.40m bgl were at a depth below the level of the base of canal and therefore unlikely to pose a significant risk to this receptor.

Six rounds of gas monitoring have been undertaken, the ground gas regime at this site corresponds to CIRIA CS1, whereby no ground gas protection measures are required.

Given the thickness of Made Ground beneath the site, it is considered that piled foundations would be required to support the proposed development. CFA or bored piles, terminating in the deeper layers of the Devensian Till or Chester Formation are likely to be most suitable on the subject site from a geotechnical viewpoint.

Groundwater was recorded from depths of approximately 1.23m bgl within wells during monitoring visits to site. Excavations beneath this depth are therefore likely to require groundwater control and exclusion measures.

Testing indicates that a Design Sulphate Class of DS1 and an ACEC Classification of AC1 would be required for buried concrete structures in contact with the Made Ground and natural soils.

A falling head test was undertaken in borehole BH2 at depths of between 3.00m and 4.00m bgl within the Made Ground in order to obtain preliminary permeability data for drainage design.

An infiltration rate of 3.5×10^{-7} m/s was obtained, which is considered very low and unlikely to be suitable for the adoption of infiltration drainage to discharge surface water runoff from the proposed development. However, this should be confirmed by a drainage engineer.

Based on available information, it is considered likely that the majority of the Made Ground and natural strata beneath the site would be suitable for disposal to a Non-Hazardous Waste landfill (if it needed to be removed from site). Hydrocarbon impacted Made Ground in the locations of borehole BH1A at 0.20m bgl and borehole BH3 at 3.40m bgl would require disposal to a Stable Non-Reactive Hazardous Waste landfill.

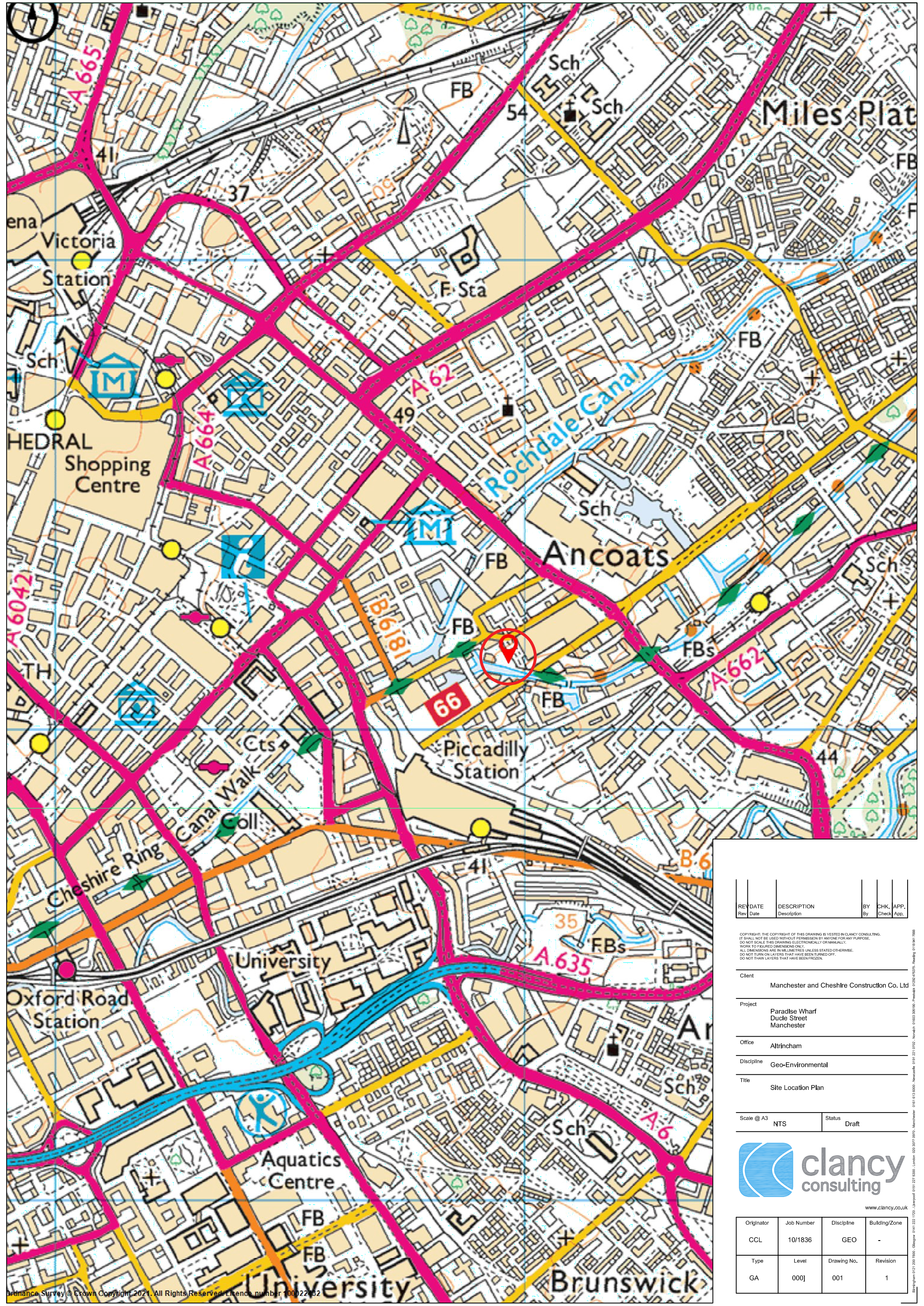
Any material sent to landfill should be accompanied by the appropriate duty of care documentation and the chemical data should be forwarded to the accepting landfill for approval prior to removal of the soil from site.

It should be noted that ground conditions are often variable, particularly Made Ground. To manage disposal costs, we recommend that Made Ground soils generated during construction works (including pile arisings) be stockpiled separately, sorted by location, composition and any obviously visually / olfactory contaminated material.

The following further works are recommended:

- An asbestos management plan be put in place during the proposed development.
- Made Ground generated during construction works should be stockpiled separately, sorted by location, composition and any obviously visually / olfactory contaminated material.

APPENDIX I
DRAWINGS



REV	DATE	DESCRIPTION	BY	CHK.	APP.
Rev	Date	Description	By	Check	App.

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Client
Manchester and Cheshire Construction Co. Ltd

Project
Paradise Wharf
Dude Street
Manchester

Office
Altrincham

Discipline
Geo-Environmental

Title
Site Location Plan

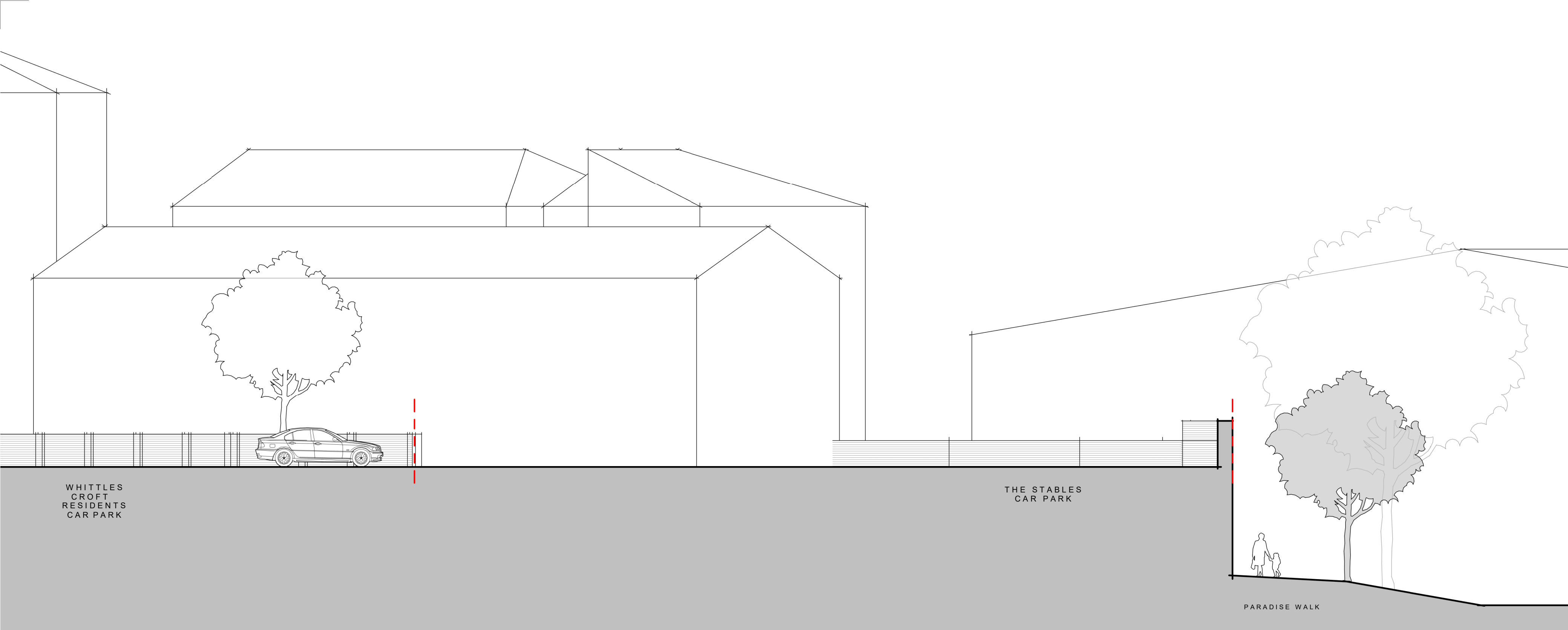
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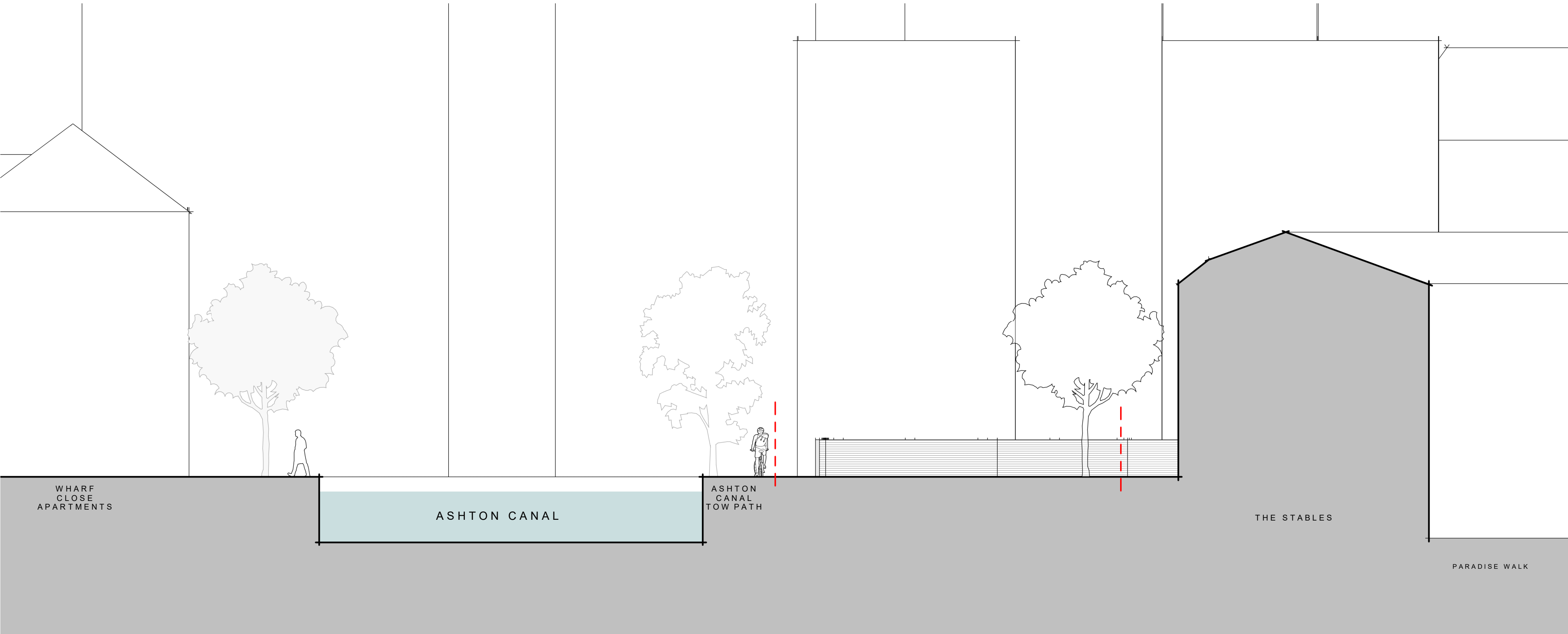
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Type	Level	Drawing No.	Revision
GA	000J	001	1



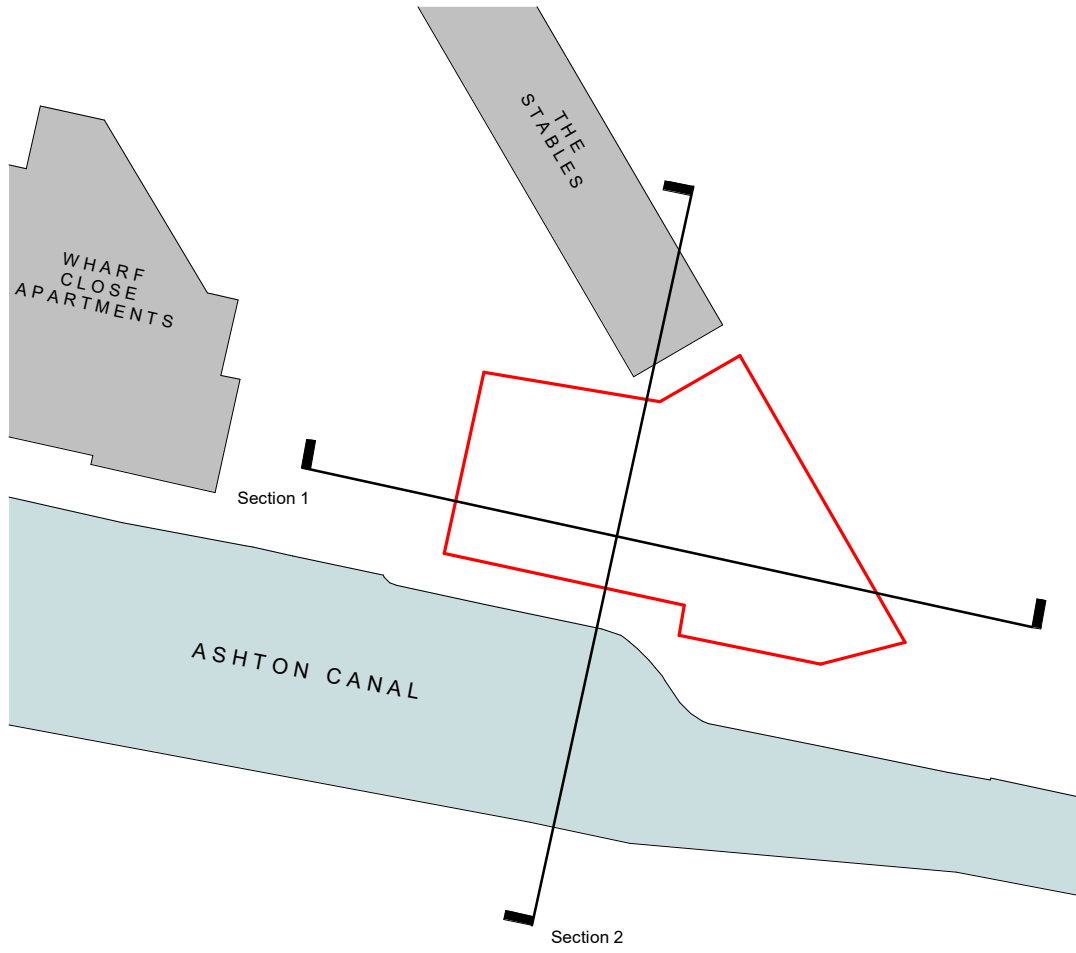
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Project
PARADISE MEWS, MANCHESTER

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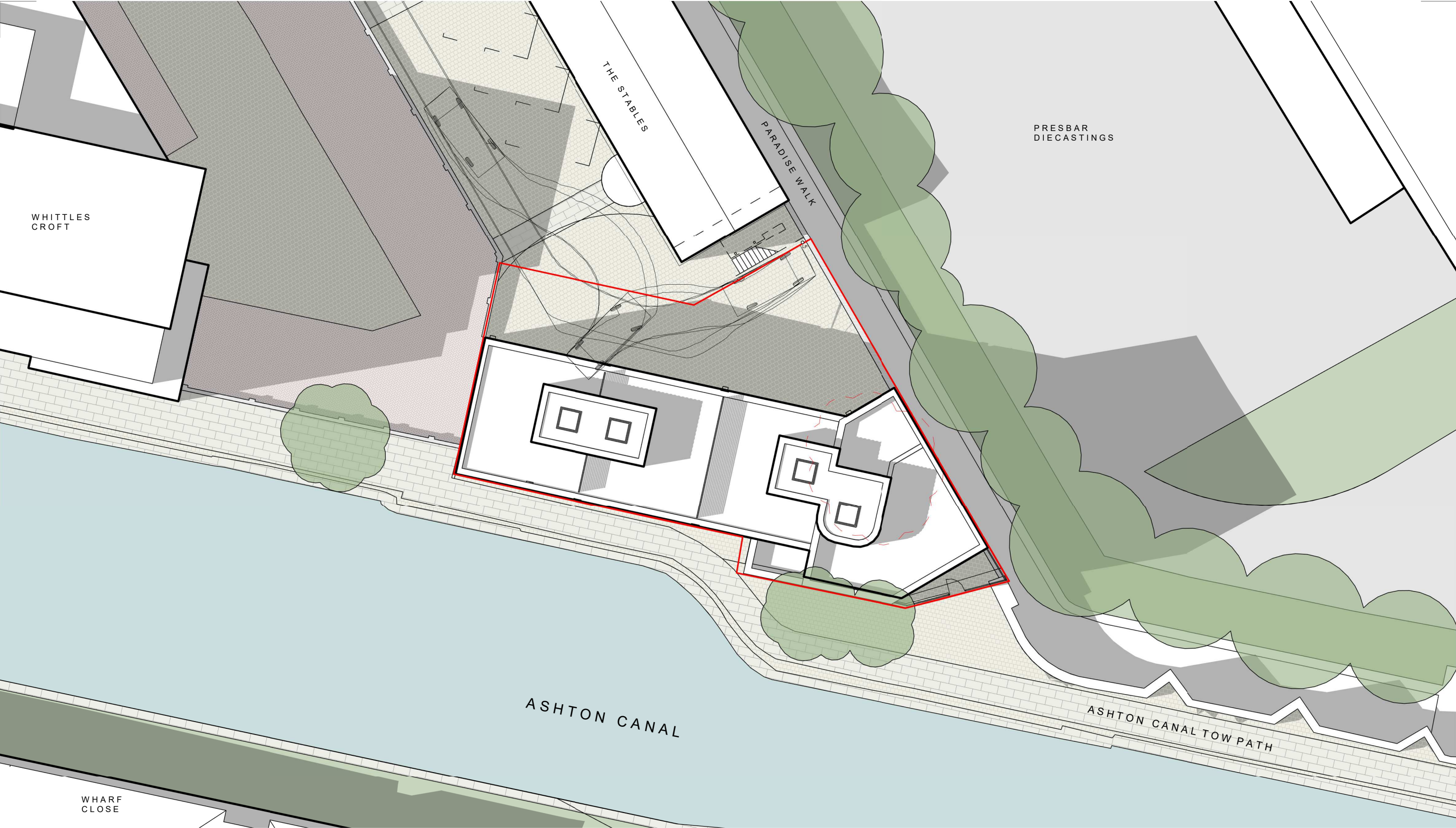
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MANCHESTER

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PROPOSED SITE PLAN - LEVEL
01

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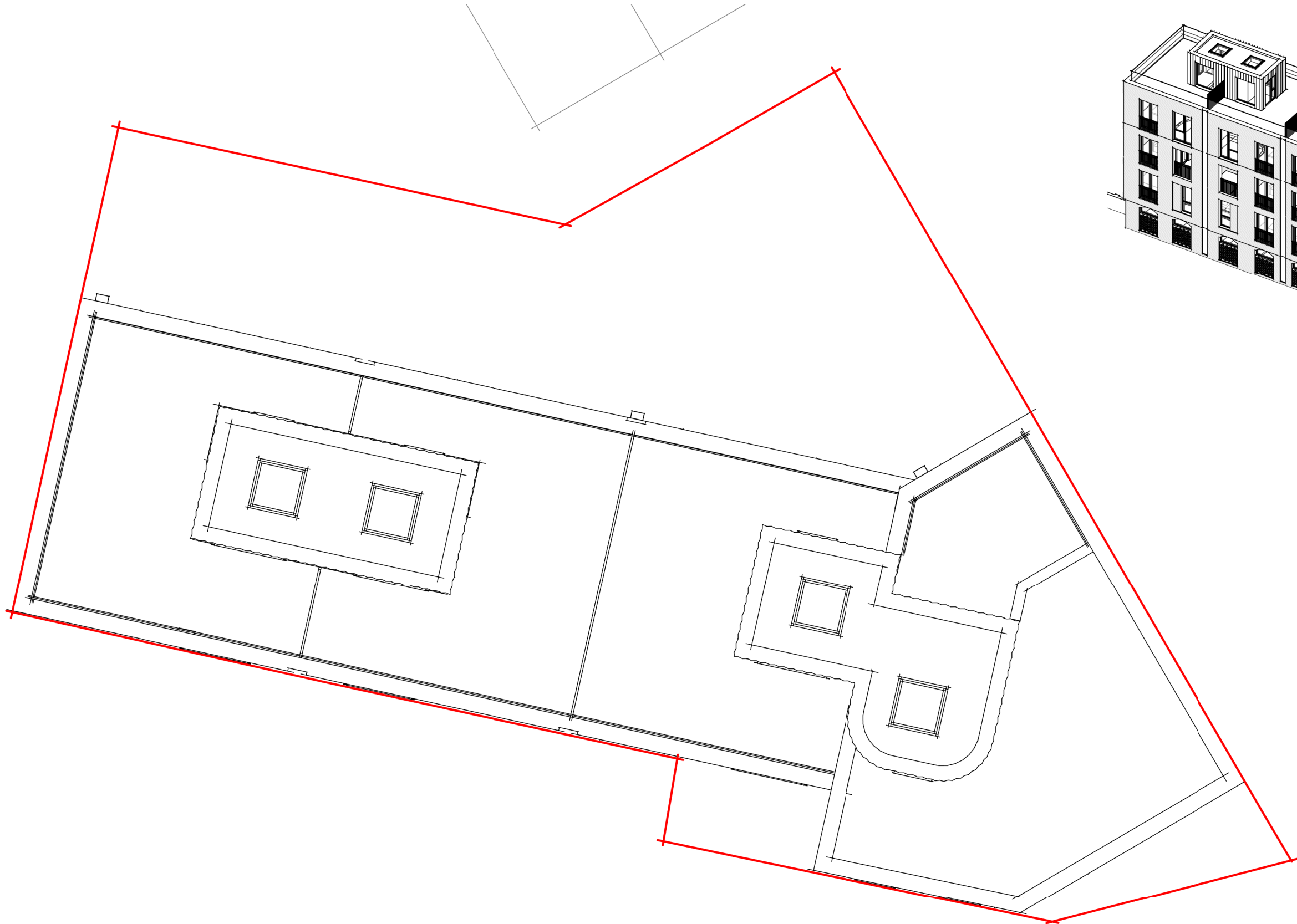
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Rev.	Description	Date	Drawn	Chk.

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PARADISE MEWS,
MANCHESTER

Drawing Title
PROPOSED SITE PLAN - LEVEL
RF

Drawing Status
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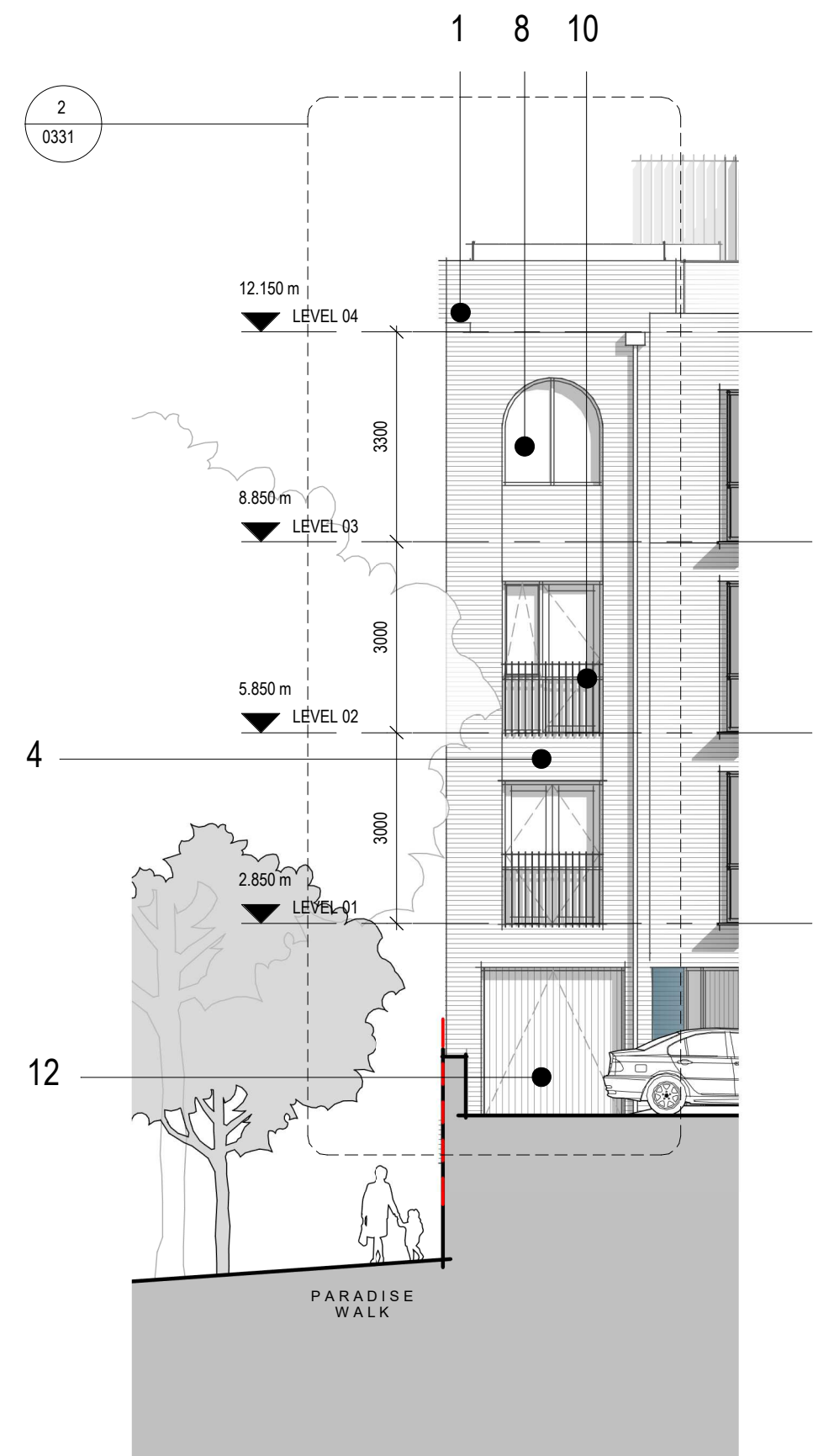
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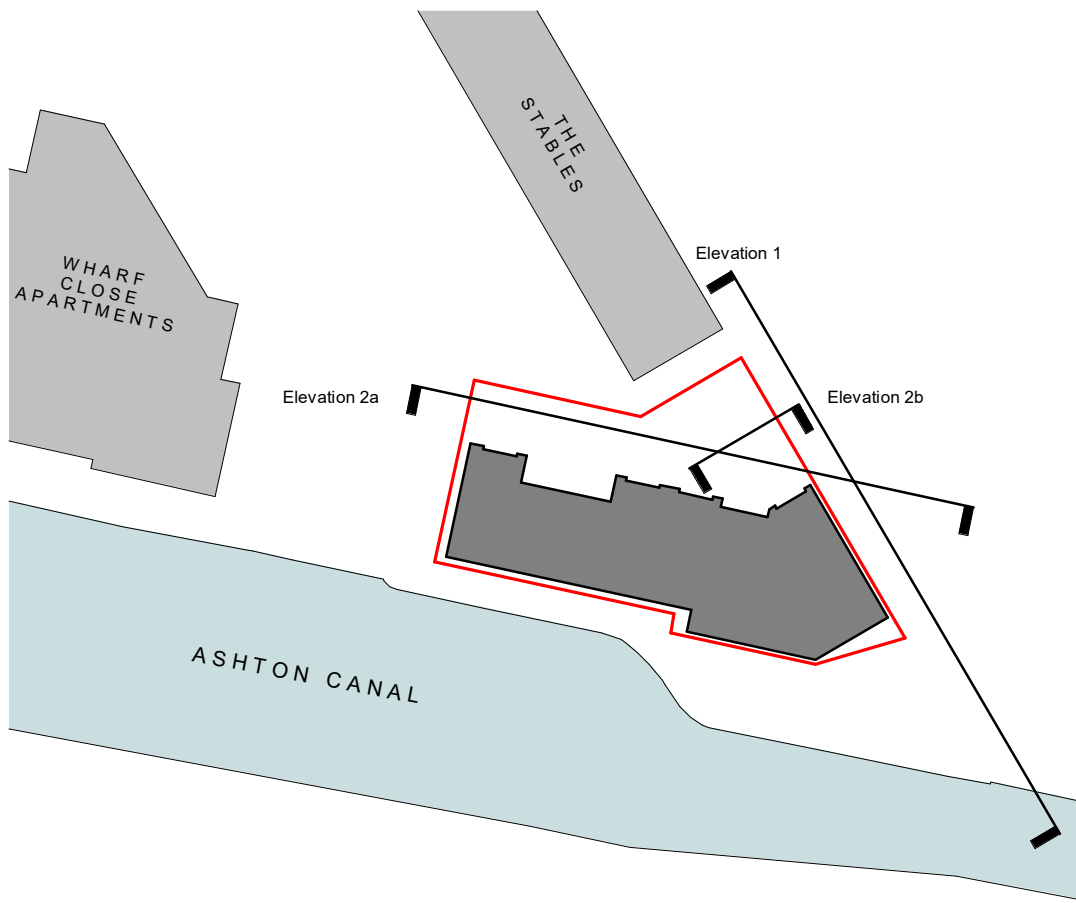
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Elevation 2a
1 : 100



Elevation 2b
1 : 100



MATERIAL SPECIFICATION

1. Red brickwork – colour and mortar to match the adjacent stables building
2. Black brickwork – specification TBC
3. Glazed brickwork to entrances – colour and specification TBC
4. Recessed brickwork panels – colour and specification to match adjacent brickwork
5. Recessed brickwork arch
6. Glazed ceramic cladding to top floor pop-ups
7. Entrance doors – specification TBC
8. PPC Aluminium framed, double glazed windows – colour : TBC
9. PPC Aluminium framed, double glazed terrace doors – colour : TBC
10. Powder coated, flat bar steel balustrade
11. Frameless, glazed balustrade
12. Timber garage door – colour and specification TBC
13. 25mm Projecting brickwork - colour and specification to match adjacent brickwork



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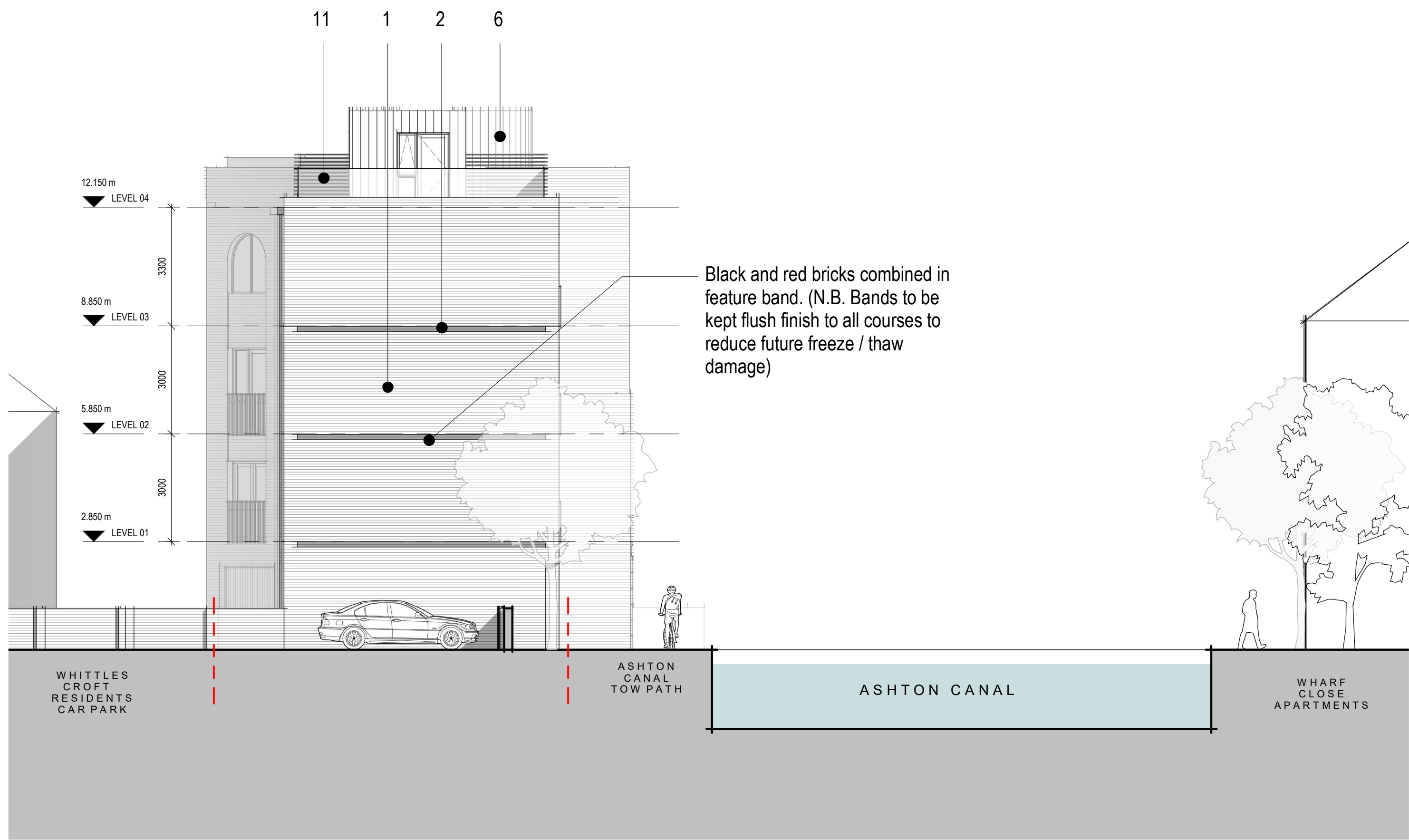
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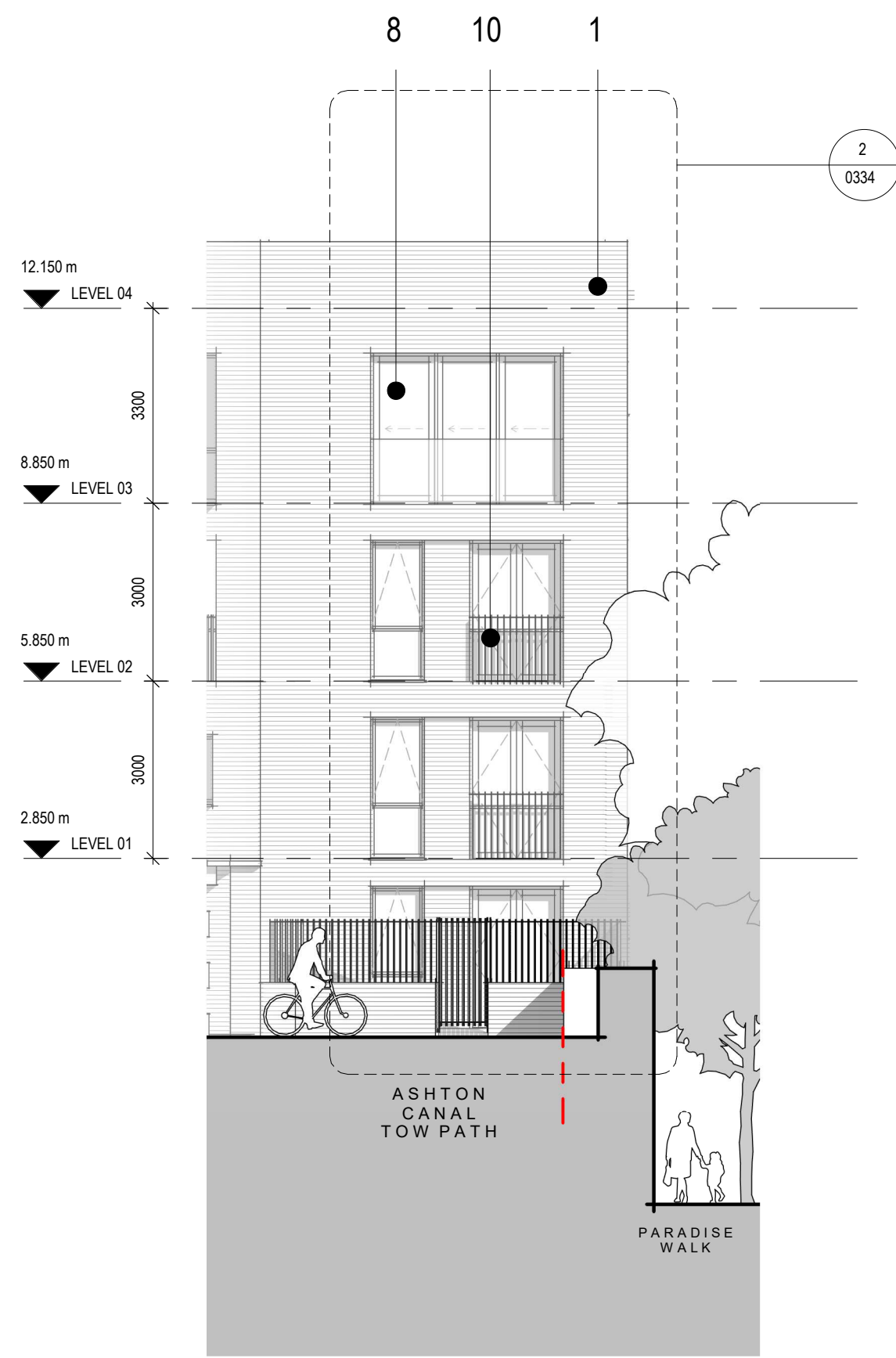
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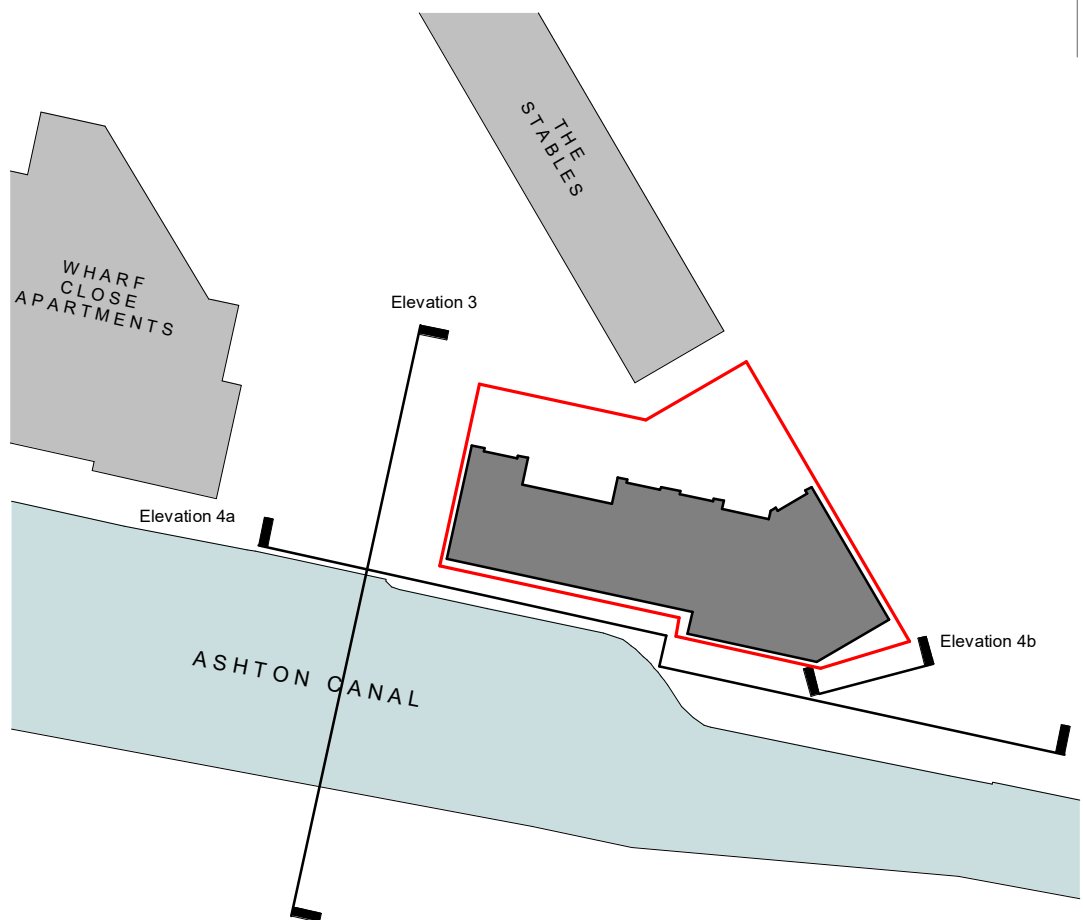
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MATERIAL SPECIFICATION

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2. Black brickwork – specification TBC
3. Glazed brickwork to entrances – colour and specification TBC
4. Recessed brickwork panels – colour and specification to match adjacent brickwork
5. Recessed brickwork arch
6. Glazed ceramic cladding to top floor pop-ups
7. Entrance doors – specification TBC
8. PPC Aluminium framed, double glazed windows – colour : TBC
9. PPC Aluminium framed, double glazed terrace doors – colour : TBC
10. Powder coated, flat bar steel balustrade
11. Frameless, glazed balustrade
12. Timber garage door – colour and specification TBC
13. 25mm Projecting brickwork - colour and specification to match adjacent brickwork



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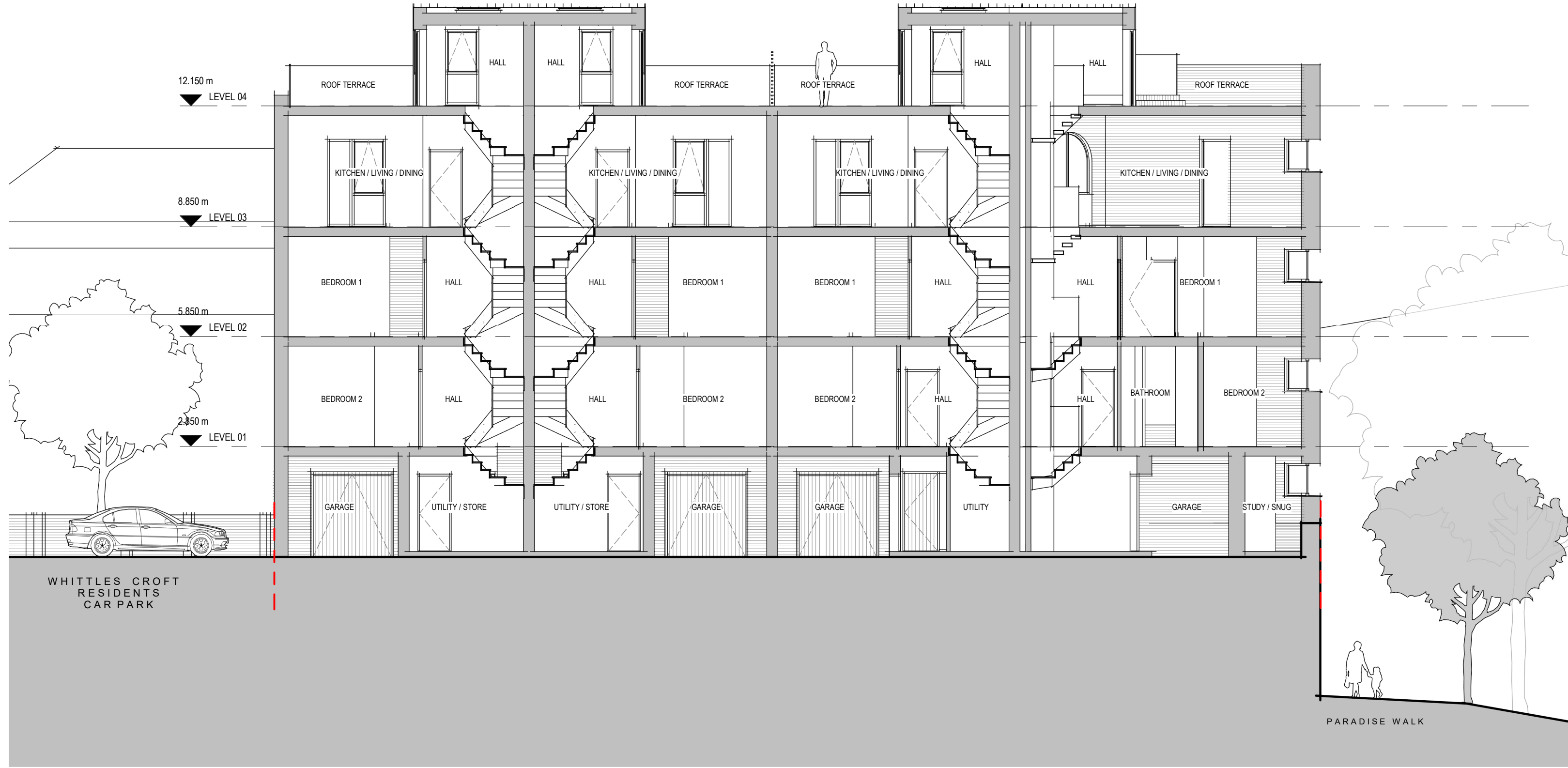
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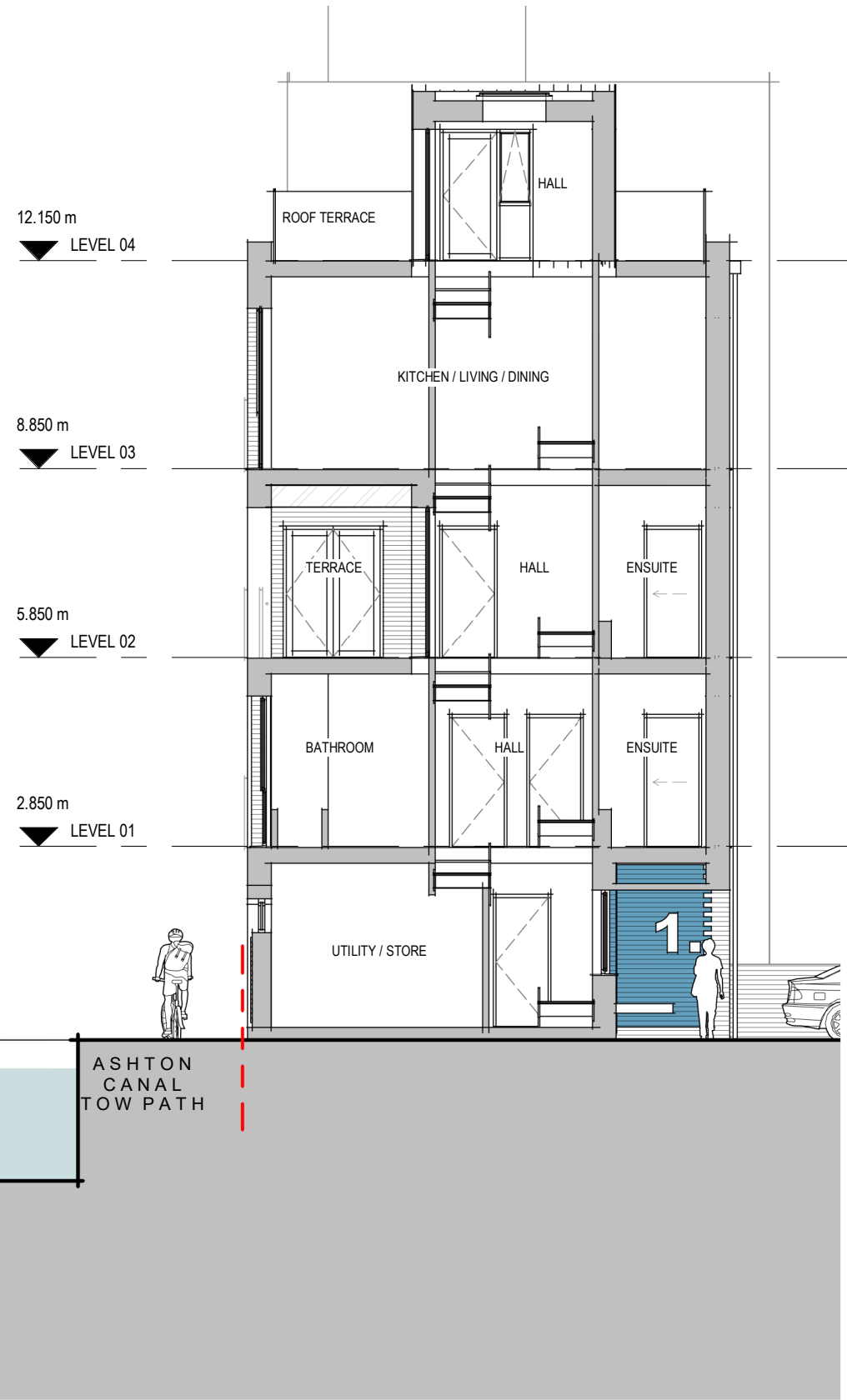
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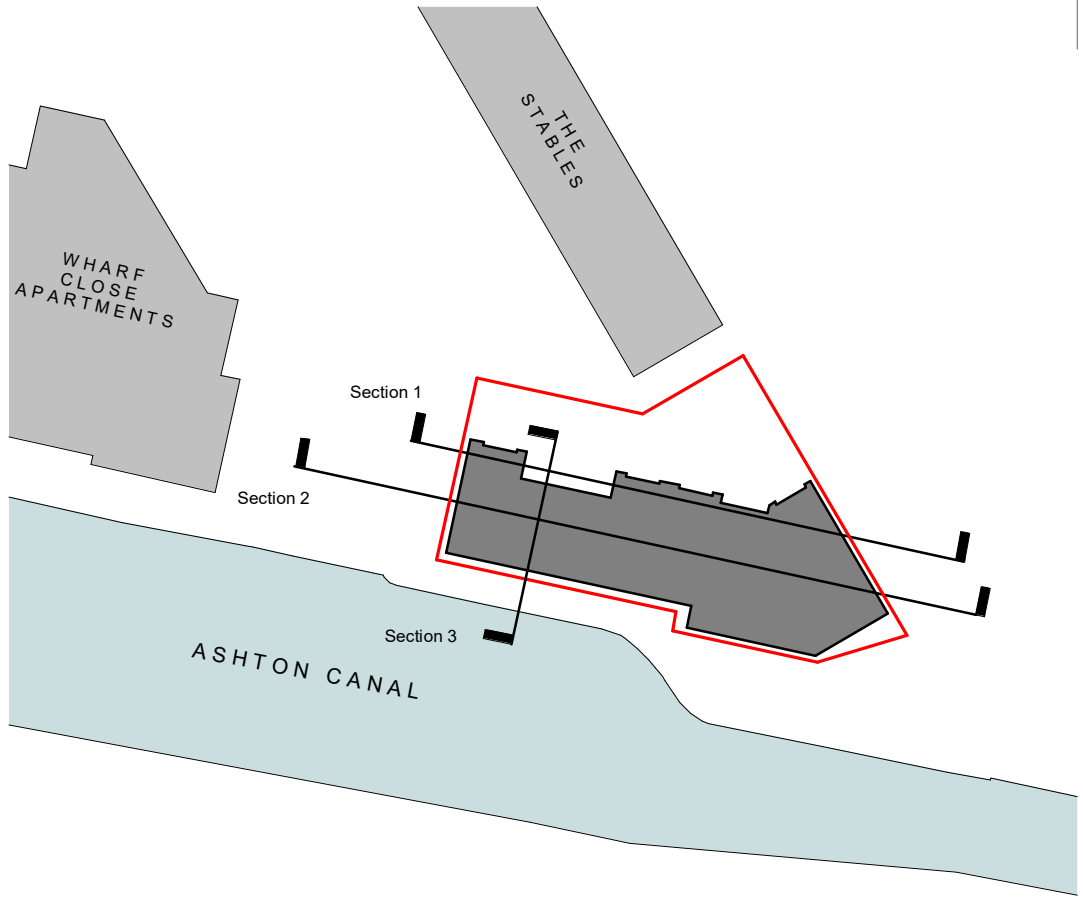
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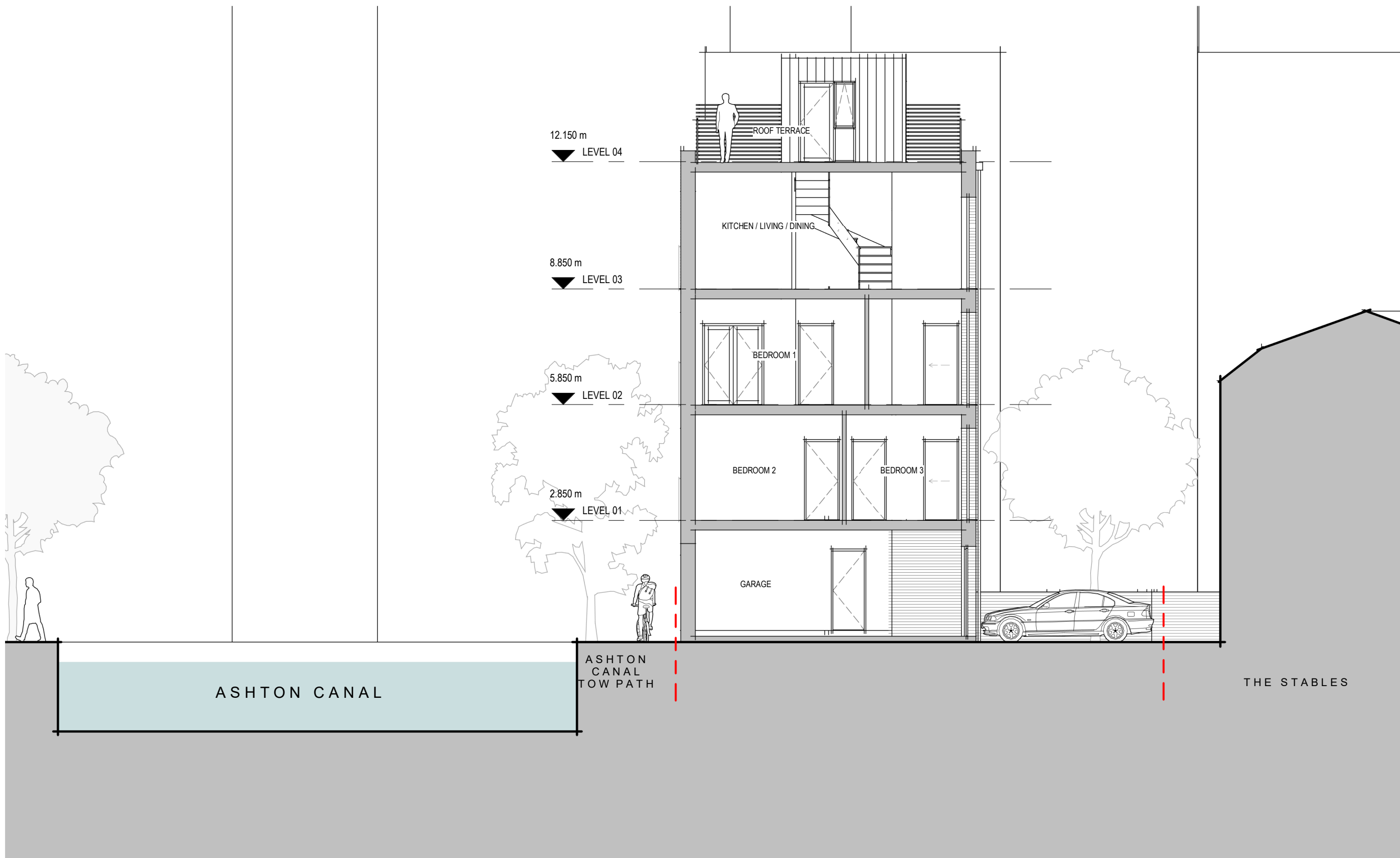
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Rev.	Description	Date	Drawn	Chk.

Client
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Project
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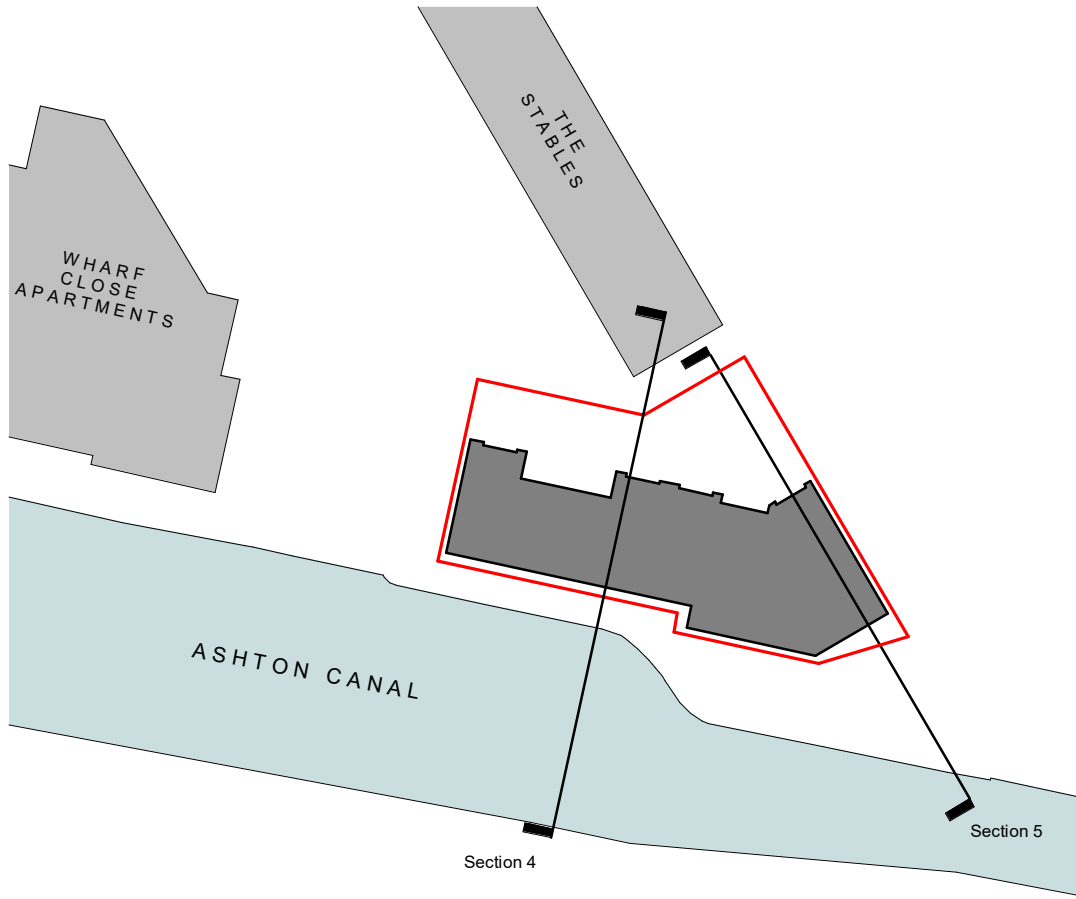
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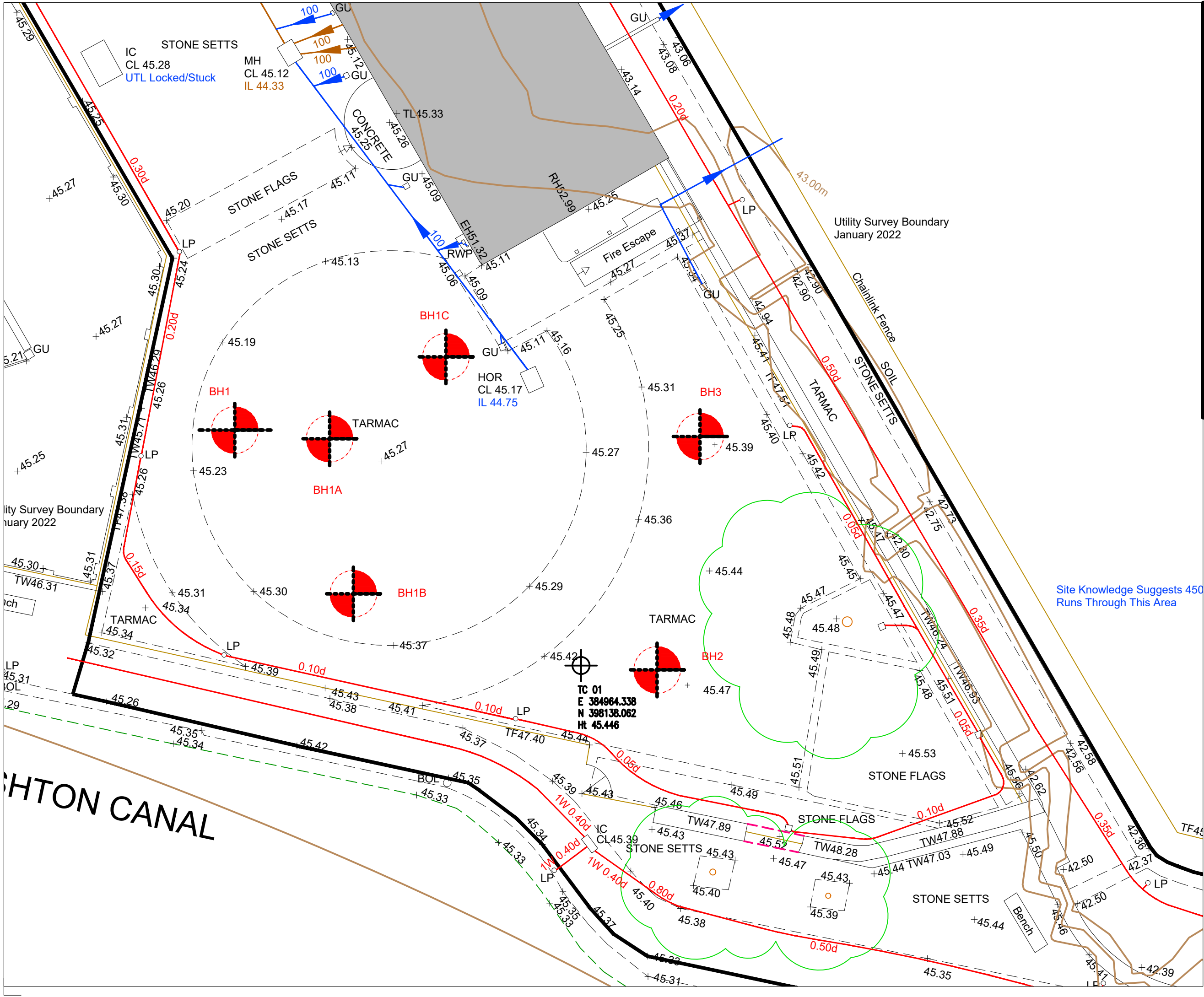
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Manchester

Office
Altrincham

Discipline
Geo

Title
Borehole Location Plan

Scale @ A3
NTS

Status
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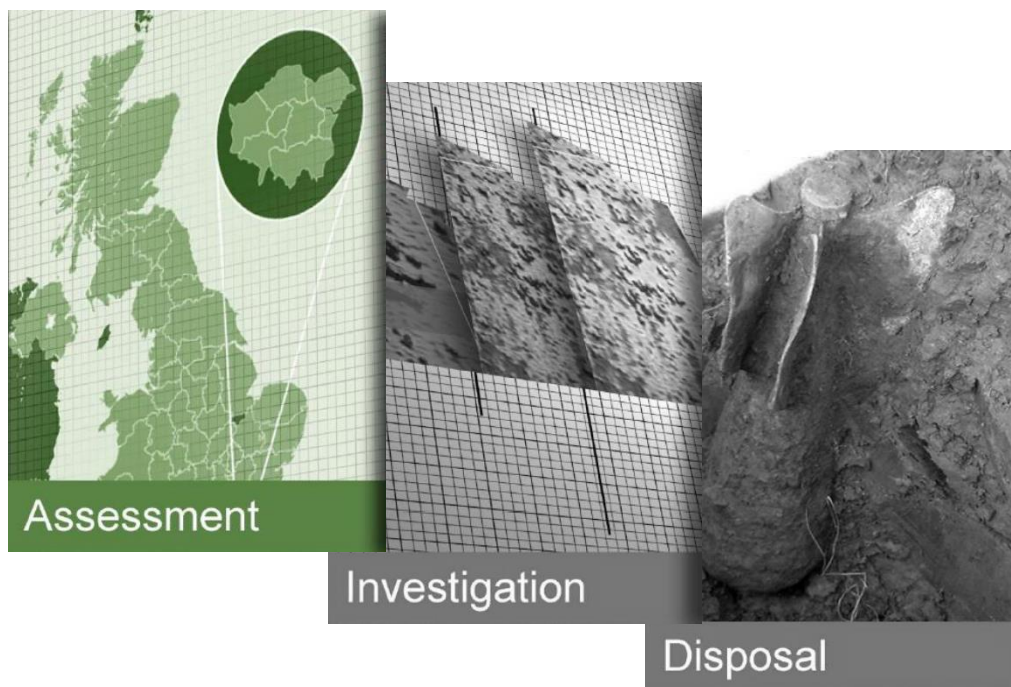


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Type	Level	Drawing No.	Revision
BH Plan	-	002	-

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APPENDIX II
ZETICA DESK TOP UXO STUDY



Paradise Wharf - UXO Desk Study & Risk Assessment

Drafted by Matthew Eatough
Checked by Ellie Chaston
Authorised by Stefan Lang

Document Title UXO Desk Study & Risk Assessment
Document Ref. P11207-21-R1
Revision A
Project Location Paradise Wharf
Client Clancy Consulting
Date 26th October 2021

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UXO DESK STUDY & RISK ASSESSMENT

EXECUTIVE SUMMARY

Key findings: No significant sources of Unexploded Ordnance (UXO) hazard have been identified.

Key actions: Proceed with works.

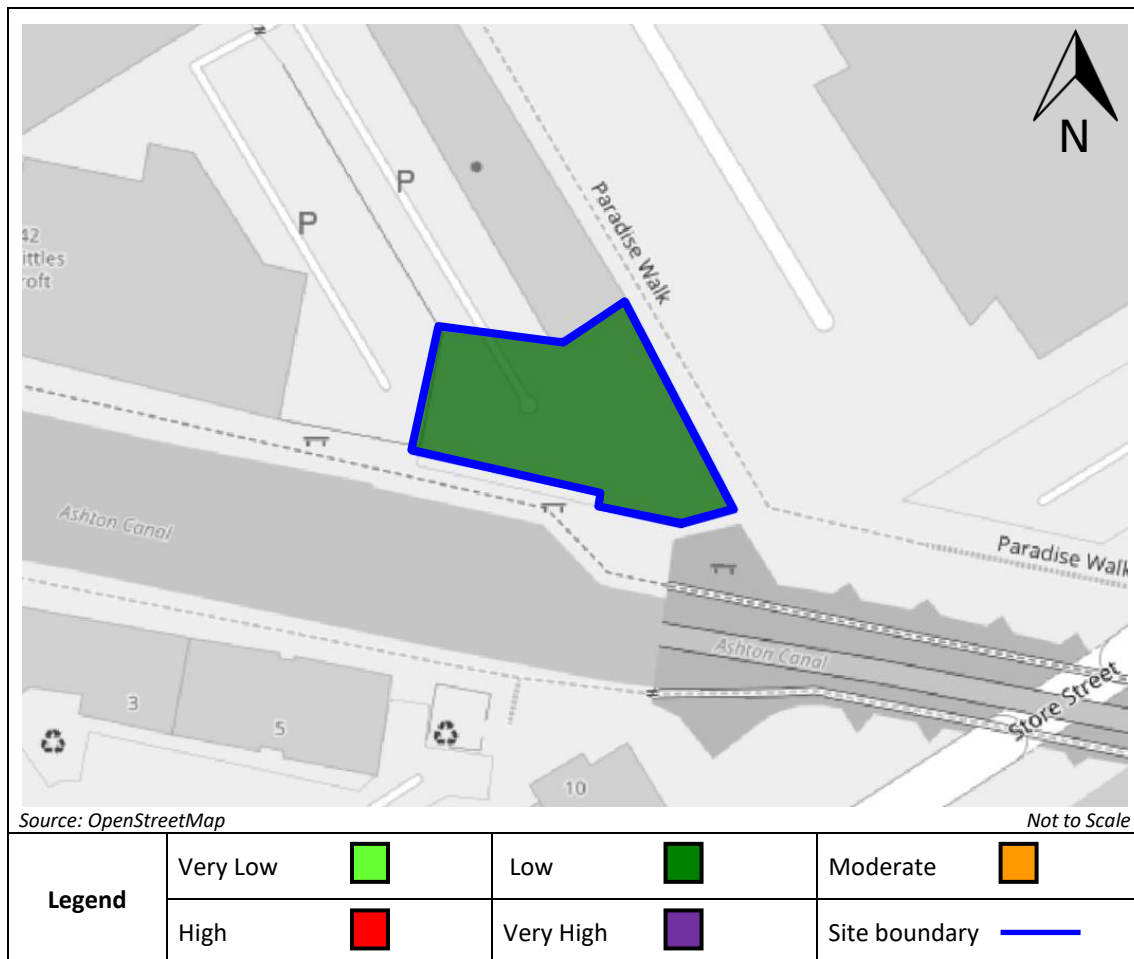
UXO Hazard Assessment

No records have been found indicating that the Site was bombed and no other significant sources of UXO hazard have been identified on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in the following Figure, reproduced as Figure 4 in the main report.

The UXO hazard zone plan of the Site is also given in the accompanying P11207-21-R1-MAP01-A.

UXO hazard zone plan of the Site



The main findings of the report are summarised below.

- No records of bombing or military activity on the Site during World War One (WWI) have been found.
- During World War Two (WWII) the main strategic targets in the vicinity of the Site included Salford Docks, the Manchester Ship Canal, major transport infrastructure, chemical and metal works.

- No records have been found indicating that the Site was bombed during WWII. Records indicate that the nearest High Explosive (HE) bomb fell approximately 50m south of the Site on the 22nd December 1940.
- No records of military activity on the Site post-WWII have been found.

Data Confidence Level

The findings of this report were based on good corroborative evidence of the military activity and bombing on the Site.

Proposed Works

It is understood that the Site will be developed into a four-storey residential property.

Works on the Site will comprise intrusive ground investigations, including 3No. boreholes to approximately 20m below ground level (bgl), excavations, and piling.

Risk Assessment

The Table below, reproduced as Table 4 in the main report, provides a UXO risk assessment for the proposed works on the Site.

Further details on the methodology for the risk assessment are provided in Section 7.2 of the main report.

UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Boreholes/Piling	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Boreholes/Piling	1	1	1	1	3	3	Low
PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)								
Shallow Excavations defined as <1.0m below ground level (bgl.)								

Risk Mitigation Plan

The Table below, reproduced as Table 5 in the main report, summarises the UXO risk for proposed works on the Site and recommended actions.

Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations	 A black silhouette of an excavator on a green background.	Proceed with works – if additional comfort is required to address the residual UXO hazard, a formal UXO awareness briefing can be provided.
Boreholes/Piling	 A black silhouette of a piling rig on a green background.	Proceed with works

In summary, no additional measures are considered essential to reduce the UXO risk on the Site to As Low As is Reasonably Practicable (ALARP).

What Do I Do Next?

If you have any comments or require further assistance, contact us via phone (01993 886682) or email (uxo@zetica.com) and we can help.

If you have requirements to identify other buried hazards (such as mapping utilities or obstructions) we can provide these surveys.

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

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Accompanying GIS Data

P11207-21-R1-MAP01-A (UXO Desk Study)

ABBREVIATIONS

AA	Anti-Aircraft
AAP	Aircraft Acceptance Park
ALARP	As Low As Reasonably Practicable
ARP	Air Raid Precaution
AXO	Abandoned Explosive Ordnance
BD	Bomb Disposal
BDO	Bomb Disposal Officer
BDU	Bomb Disposal Unit
CMD	Conventional Munitions Disposal
DCLG	Department of Communities and Local Government
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOR	Explosive Ordnance Reconnaissance
ERW	Explosive Remnants of War
ESA	Explosive Substances and Articles
FAA	Fleet Air Arm
FFE	Free From Explosives
HAA	Heavy Anti-Aircraft
HE	High Explosive
HSE	Health and Safety Executive
IB	Incendiary Bomb
IED	Improvised Explosive Device
IEDD	Improvised Explosive Device Disposal
JSEODOC	Joint Services EOD Operations Centre
LAA	Light Anti-Aircraft
MoD	Ministry of Defence
NSF	National Shell Factory
OB	Oil Bomb
PM	Parachute Mine
PUCA	Pick Up and Carry Away
RAF	Royal Air Force
TEP	Time Expired Pyrotechnics
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
WWI	World War One
WWII	World War Two

UXO DESK STUDY & RISK ASSESSMENT

Please read: Zetica has colour coded each paragraph. Paragraphs with black text on a white background are paragraphs that provide site-specific information or information specifically researched as part of this project.

Boxed paragraphs in a dark green text with a green background are paragraphs providing general information and, where appropriate, links to online resources giving further detail. These are all available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

1 INTRODUCTION

1.1 Project Outline

Zetica Ltd was commissioned by Clancy Consulting to carry out a detailed Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of less than 0.1 hectares (ha) off Paradise Walk in Manchester (the 'Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'.

Where appropriate, this hazard assessment includes:

- Likelihood of ordnance being present.
- Type of ordnance (size, filling, fuze mechanisms).
- Quantity of ordnance.
- Potential for live ordnance.
- Probable location.
- Ordnance condition.

It should be noted that some military activity providing a source of UXO hazard may not be recorded and therefore there cannot be any guarantee that all UXO hazards affecting the Site have been identified in this report.

1.2 Sources of Information

Zetica Ltd researched the military history of the Site and its surrounding area using a range of information sources. The main sources of information are detailed in the following sections and referenced at the end of this report.

1.2.1 Zetica Ltd Defence Related Site Records

Zetica Ltd's in-house records were consulted, including reference books and archived materials from past work in the region. Relevant documents have been cited within the bibliography of this report.

1.2.2 Zetica Ltd Bombing Density Records and Maps

Reference has been made to the Zetica Ltd bomb risk maps located on Zetica's website (<http://zeticauxo.com/downloads-and-resources/risk-maps/>)

1.2.3 Ministry of Defence and Government Records

Government departments and units within the Ministry of Defence (MoD) were approached for information of past and present military activity in the area. These included the Department of Communities and Local Government (DCLG) records of abandoned bombs.

1.2.4 Other Historical Records, Maps and Drawings

Numerous reference documents including historical maps, aerial photographs and drawings have been consulted from sources such as the National Archives, the US National Archives & Records Administration (NARA), the Imperial War Museum (IWM), Historic England and the Defence of Britain Project.

The British Geological Survey (BGS) was consulted for borehole information.

1.2.5 Local Authority Records

Information was obtained from Manchester City Council.

1.2.6 Local Record Offices and Libraries

The Lancashire Record Office, Manchester Central Library and Greater Manchester County Record Office were consulted for records.

1.2.7 Local Historical and Other Groups

Local history groups and archaeological bodies were consulted, including the Greater Manchester Historic Environment Record (HER).

1.3 Data Confidence Level

In general, there is a high level of confidence in the researched information sources used for this report.

Due to Covid-19 restrictions, access to Historic England has been limited during the writing of this report. As such, Zetica has relied on aerial photography gathered for previous projects in the area, in addition to readily available historical aerial photography where necessary.

2 THE SITE

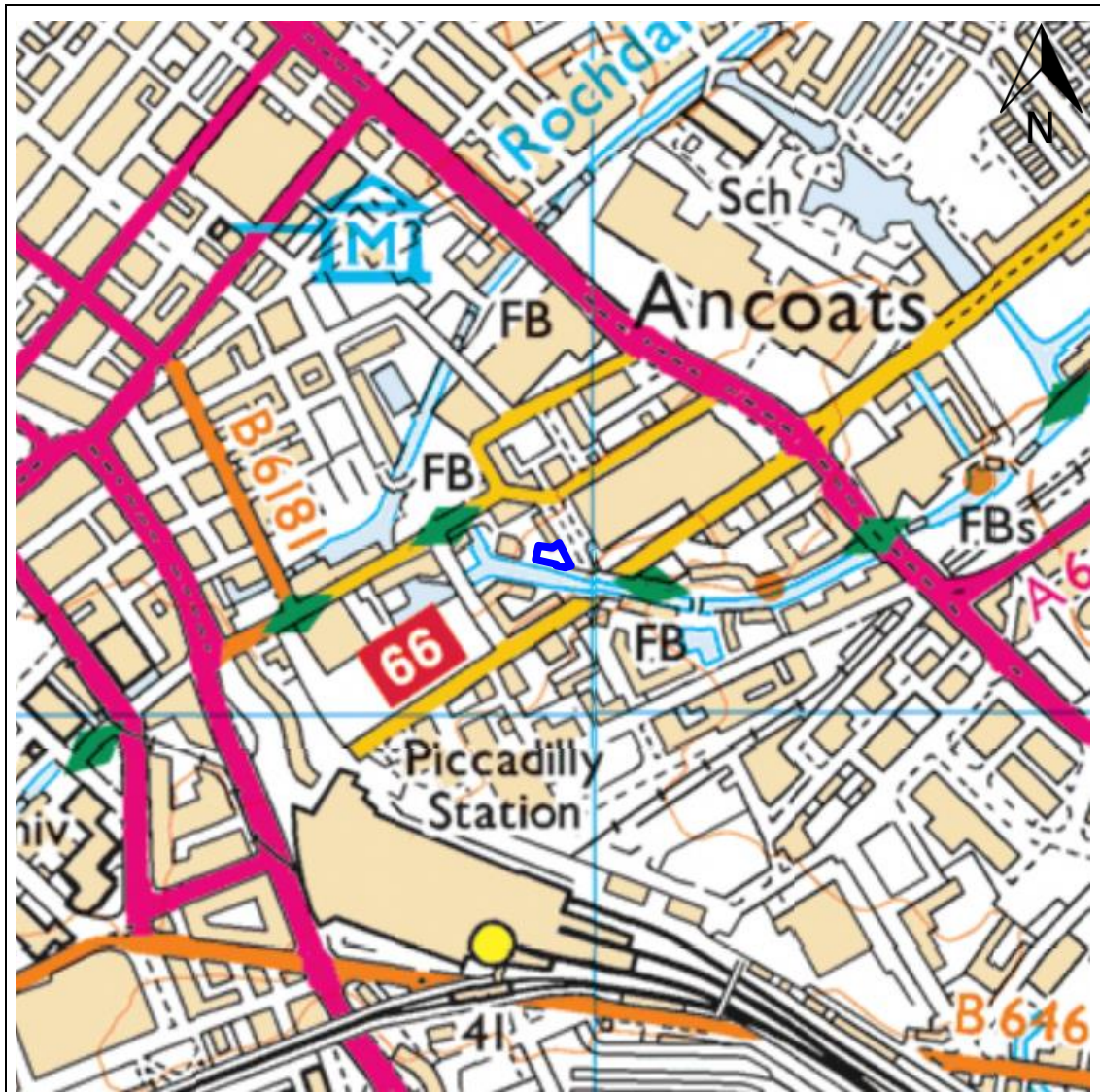
2.1 Site Location

The Site is centred on Ordnance Survey National Grid Reference (OSNGR) SJ 849981. It is located approximately 1km east of Manchester city centre.

The Site comprises a car park. It is bounded to the north and west by commercial and industrial premises, to the east by Paradise Walk, and to the south by Ashton Canal.

Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Figure 1 Site location map



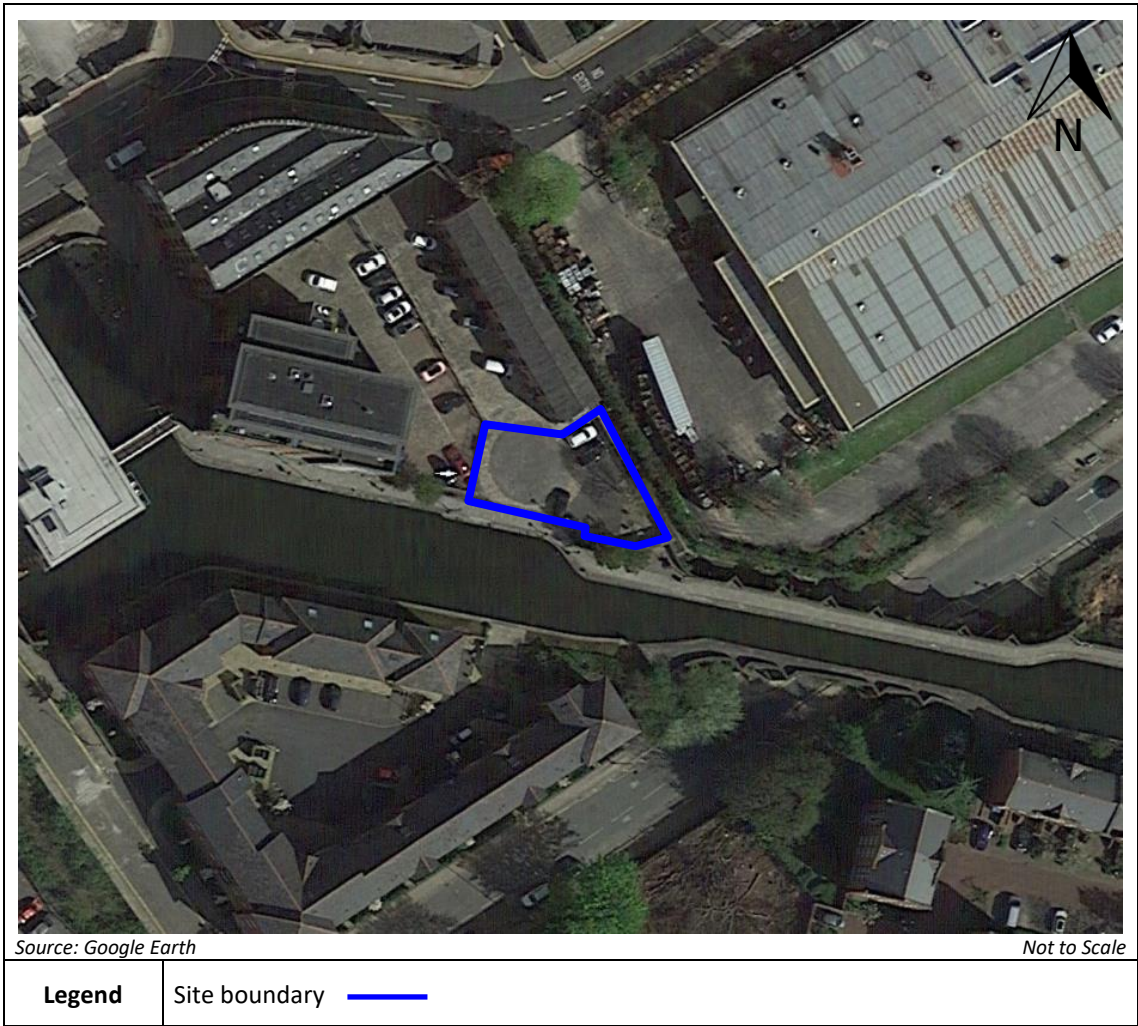
Source: © Crown Copyright 2021. Reproduced by permission of Ordnance Survey

Not to Scale

Legend	
Site boundary	—



Plate 1 Recent aerial photograph of the Site



3 MILITARY ACTIVITY

The following sections outline the recorded military activity in the vicinity of the Site. The potential UXO hazard from World War One (WWI) and World War Two (WWII) bombing is detailed in Section 4.

Each sub-section provides hyperlinks to further information on potential sources of UXO hazard. These are also available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

3.1 Defences

For further information on military defences, and the potential UXO hazards associated with them, follow the links below:

- [Anti-Aircraft Guns](#)
- [Anti-Invasion Defences](#)
- [Barrage Balloons](#)
- [Bombing Decoys](#)
- [Home Guard](#)
- [Mined Locations](#)
- [Mortar & Gun Emplacements](#)
- [Pillboxes](#)

No military defences have been identified on the Site. The nearest are described below.

3.1.1 Anti-Aircraft Guns

Records indicate that during WWI there were 10No. Anti-Aircraft (AA) batteries within 10km of the Site. The nearest was located at Newton Heath (SJ 877996), approximately 3km northeast of the Site. It was armed with 1No. 18-pounder (-pdr) gun.

Records indicate that during WWII there were 33No. Heavy AA (HAA) and ZAA batteries within 10km of the Site. The nearest was located at Queen's Street Brick Works (SD 849004), approximately 1.9km north of the Site. Its armament is unknown.

The nearest recorded WWII AA shell incident to the Site is described below.

27th October 1940

1No. AA shell fell on the junction of Ducie Street and London Road, approximately 0.3km west-southwest of the Site.

Potential UXO Hazard

Given the number of HAA gun batteries in the surrounding area during WWII, the potential for a UXAA shell to have fallen on the Site unnoticed, whilst unlikely, cannot be totally discounted.

3.1.2 Bombing Decoys

The nearest recorded bombing decoy was located at Reddish (SJ 912939), approximately 7.5km southeast of the Site.

Bombing decoys are not considered to provide a source of UXO hazard to the Site.

3.2 Military Airfields

For further information on military airfields, and the potential UXO hazards associated with them, follow the link below:

- [Military Airfields](#)

No records of any military airfields on or in close proximity to the Site have been found.

During WWI, the nearest recorded military airfield was Royal Air Force (RAF) Alexandra Park (SJ 833933), approximately 4.8km southwest of the Site. Constructed in 1918, it was an Aircraft Acceptance Park (AAP) used for the assembly, test flying, and delivery of aircraft from nearby aircraft factories. In May 1919, the airfield was handed over for civilian use before it closed in August 1924.

During WWII, the nearest military airfield was RAF Barton (SJ 742972), approximately 10.6km west-southwest of the Site. Its primary function was to accept and repair damaged aircraft for the RAF and the Fleet Air Arm (FAA). These aircraft included Fairey Battles, Fairey Fulmars, Fairey Barracudas, Fairey Swordfish, F4U Corsairs, and Hawker Hurricanes.

Post-WWII, No. 2 Reserve Flying School operated at Barton Airfield from October 1948 to March 1953. The airfield remains in use for civilian light aircraft and helicopters.

Military airfields are not considered to provide a source of UXO hazard to the Site.

3.3 Aircraft Crashes

For further information on military aircraft crashes, and the potential UXO hazards associated with them, follow the link below:

- [Aircraft Crashes](#)

No records of any aircraft crashes on or in close proximity to the Site have been found.

3.4 Explosives Factories, Munitions Depots and Disposal Areas

For further information on explosives factories, munitions depots and disposal areas, and the potential UXO hazards associated with them, follow the links below:

- [Explosives Factories](#)
- [Munitions Depots](#)
- [Munitions Disposal Areas](#)

No records of any explosives factories, munitions depots or munitions disposal areas on or in close proximity to the Site have been found. The nearest is described below.

3.4.1 Manchester National Shell Factory

During WWI, the Manchester Corporation's tram depot, approximately 1.3km southeast of the Site, was converted into a National Shell Factory (NSF). Between 1916 and 1918, it was engaged in the production of 4.5-inch (") shells.

Manchester NSF is not considered to provide a source of UXO hazard to the Site.

3.5 Firing Ranges and Military Training Areas

For further information on firing ranges and military training areas, and the potential UXO hazards associated with them, follow the links below:

- [Artillery Ranges](#)
- [Bombing Ranges](#)
- [Military Training Areas](#)
- [Small Arms Ranges](#)

No records of any firing ranges or military training areas on or in close proximity to the Site have been found.

3.6 Other Military Establishments

No other military establishments have been identified on or in close proximity to the Site.

4 BOMBING

4.1 WWI Bombing

For further information on WWI bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.1. Alternatively, use the following link.

- [WWI Bombing](#)

No records have been found indicating that the Site was bombed during WWI.

4.2 WWII Bombing

For further information on WWII bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.2. Alternatively, use the following link.

- [WWII Bombing](#)

No records have been found indicating that the Site was bombed during WWII. Details of WWII bombing in the vicinity of the Site are provided in the following sections.

4.2.1 Bombing in Manchester

Manchester's industrial conurbations and port made it a principal target for enemy bombers. The Luftwaffe possessed detailed target photographs of many industrial complexes from as early as 1937.

Air raids on Manchester began in August 1940 and continued until 1945. The heaviest raid on the city occurred between the 22nd and 24th December 1940, the 'Manchester Blitz', during which more than 400No. High Explosive (HE) bombs and 30,000No. Incendiary Bombs (IB) fell on the city.

More than 1,710No. HE bombs and 115No. Parachute Mines (PM) fell across the Manchester region during WWII. Bombing was concentrated on the city centre, approximately 0.7km west of the Site, and in West Manchester where the Salford Docks and major industrial works at Trafford Park attracted heavy raids.

Bombing densities generally decreased away from the city centre and far less damage was sustained by properties in these areas.

4.2.2 Strategic Targets

The Site was located in an area which contained numerous potential strategic targets, including Salford Docks, the Manchester Ship Canal, major transport infrastructure, chemical and metal works.

Plate 2 is a Luftwaffe target photograph of central Manchester, dated the 4th October 1939.

Several targets are identified, as summarised in Table 1.

Table 1 Luftwaffe targets in the vicinity of the Site

Target No.	Target
A	Victoria Station
B	Central Station
GB 717	Copper Works
GB 829	Foundry
GB 52 86	Gas Works

Plate 2 Luftwaffe target photograph of central Manchester, 4th October 1939

4.2.3 Bombing Densities and Incidents

Table 2 gives details of the overall bombing statistics recorded for the Local Authority Districts of the Site (highlighted by bold text) and surrounding districts. These were categorised as Rural Districts (RD), Urban Districts (UD), Municipal or Metropolitan Boroughs (MB) and County Boroughs (CB). WWII bomb density levels are defined below:

<5 bombs per 405ha is a Very Low regional bombing density.

5-15 bombs per 405ha is Low.

15-50 bombs per 405ha is Moderate.

50-250 bombs per 405ha is High.

>250 bombs per 405ha is Very High.

Table 2 Bombing statistics

Area	Bombs Recorded				Bombs per 405ha (1000 acres)
	High Explosive	Parachute Mines	Other	Total	
Manchester CB	712	18	7	737	27.0
Stretford MB	456	64	0	520	147.3
Salford CB	406	29	16	451	86.7

Note that Table 2 excludes the figures for V1s (Pilotless Aircraft or Flying Bombs) and Incendiary Bombs (IBs). Discrepancies between this list and other records, such as bomb clearance records, demonstrate that this data is likely to under-represent actual bombing.

Details of the nearest recorded bombing incidents to the Site are given in the following section.

22nd December 1940

1No. HE bomb fell on Store Street, approximately 50m south of the Site.

1No. PM fell on the junction of Store Street and Meadow Street, approximately 0.1km east of the Site. This was recorded as an Unexploded Parachute Mine (UXPM).

3No. HE bombs fell on Dale Street, approximately 0.2km west-northwest of the Site.

Several IBs fell across Little Newton Street towards Mill Street, within approximately 0.2km northeast of the Site.

1No. HE bomb fell on Sheffield Street, approximately 0.3km south-southeast of the Site.

1st June 1941

1No. IB fell on Roby Street, approximately 0.3km west of the Site.

1No. IB fell on Dale Street, approximately 0.3km west of the Site.

1No. IB fell on Tarriff Street, approximately 0.3km west-northwest of the Site.

1No. IB fell on the junction of Newton Street and Back Piccadilly, approximately 0.3km west-northwest of the Site.

It should be noted that during WWII, many Unexploded Bombs (UXB) were mapped and subsequently removed as and when conditions and demands on Bomb Disposal teams allowed. Their removal was not always accurately recorded and sometimes records were later destroyed. In practice, most UXB were probably removed and only a much smaller number were actually registered as officially abandoned bombs.

Figure 2 is a map showing the approximate location of recorded bomb impacts in the immediate vicinity of the Site. IBs shown are indicative of larger numbers of similar devices that fell within the given area.

The map has been compiled from a number of different sources, including air raid incident reports, historical aerial photographs and bomb census maps.

The bomb map is also given in the accompanying P11207-21-R1-MAP01-A.

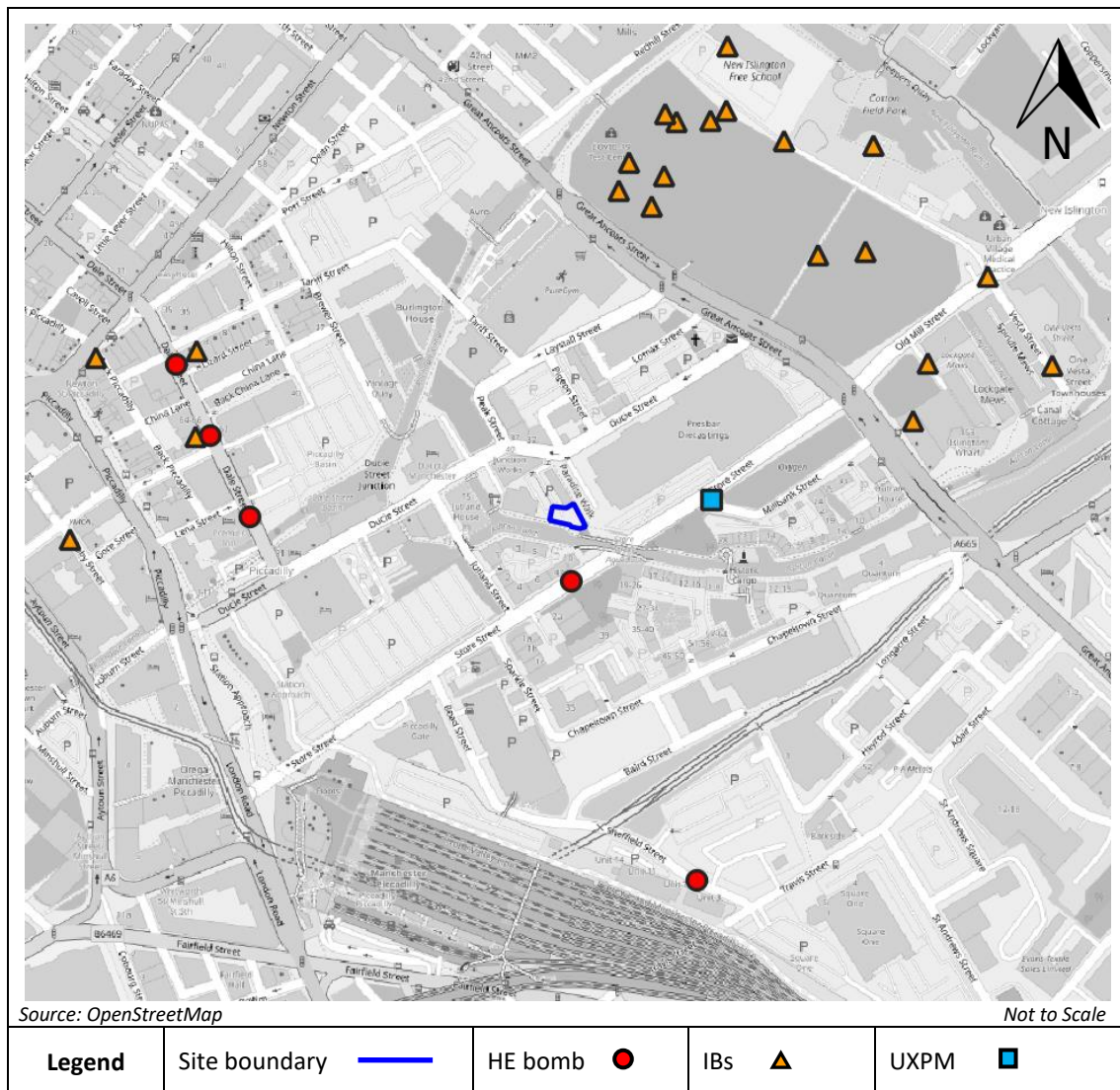
Figure 2 Compiled bomb impact map for the vicinity of the Site

Figure 3 is an extract of the Manchester bomb damage map compiled at the end of WWII, on which the colouring denotes the severity of damage to buildings.

Dark red shading indicates severe damage or demolition and light red shading indicates minor damage. No bomb damage is identified on or in close proximity to the Site.

Figure 3 Extract from the Manchester Bomb Damage Map

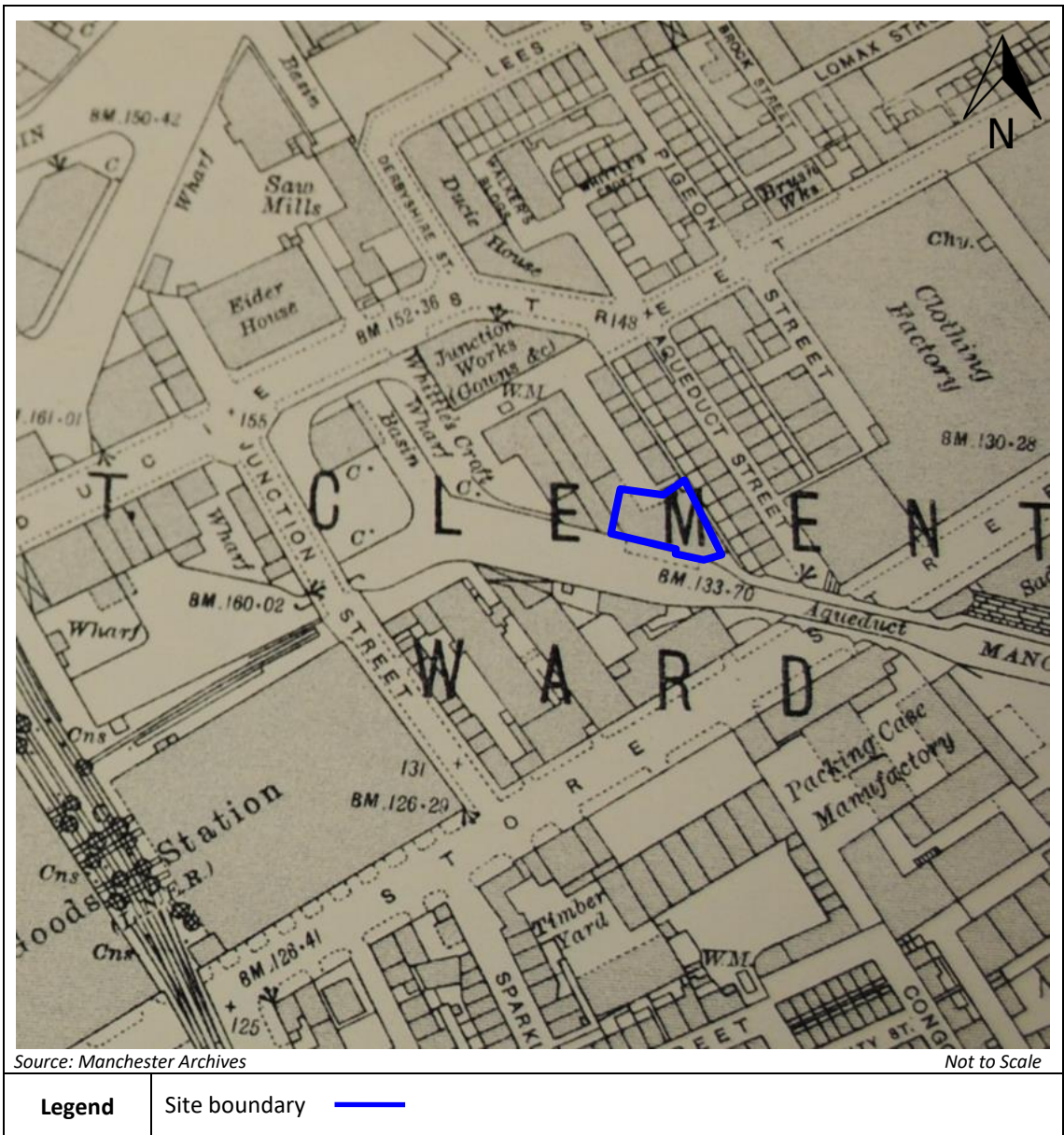
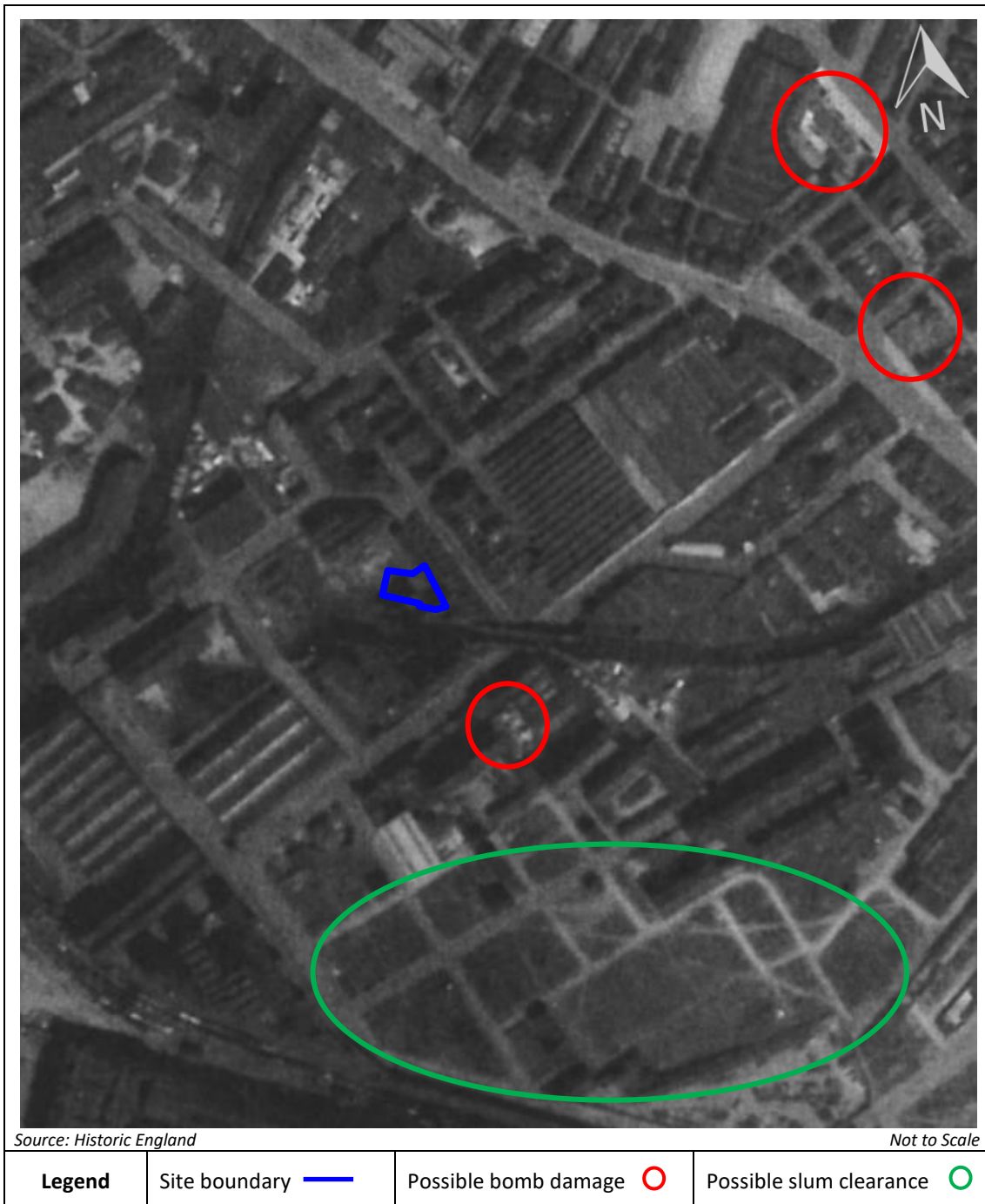


Plate 3 is an aerial photograph dated the 16th May 1948. No bomb damage has been identified on the Site.

Some areas of demolished and ruined buildings have been identified in the vicinity of the Site. Some of these relate to damage sustained during WWII air raids and others are likely to be the result of pre-WWII slum clearance.

An evaluation of historical maps from before and after WWII has enabled an estimation of which demolished areas are more likely to be due to planned slum clearance.

Plate 3 Aerial photograph, 16th May 1948

Potential UXO Hazard

No records have been found indicating that the Site was bombed and no bomb damage has been identified on the Site on historical aerial photography.

WWII bombing is not considered to provide a source of UXO hazard to the Site.

4.2.4 Geology and Bomb Penetration Depths

It is important to consider the geological materials present at the time that a bomb was dropped in order to establish its maximum penetration depth.

At the time of writing, no Site-specific ground investigation data was available.

British Geological Survey (BGS) 1:50,000 Sheet 85 Manchester (Bedrock & Superficial) and BGS borehole records from nearby investigations have been consulted to get an indicative overview of the Site geology.

The geology of the Site is understood to consist of Made Ground, over Devensian Till deposits, overlying the Chester Formation.

Table 3 provides an estimate of average maximum bomb penetration depths for the Site assuming WWII ground conditions of 4.5m of Made Ground (modelled as gravel), over 10m of stiff clay, overlying more than 20m of weak rock.

Table 3 Estimated average maximum bomb penetration depths

Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	2.5m
	250kg	3.5m
	500kg	8.0m

These calculations can be refined on receipt of Site-specific information.

The estimated bomb penetration depths given in Table 3 are from the WWII ground level and are based on the following assumptions:

- a) High level release of the bomb resulting in an impact velocity of 260m/s (>5,000m altitude).
- b) A strike angle of 10 to 15 degrees to the vertical.
- c) That the bomb is stable, both in flight and on penetration.
- d) That no retarding units are fitted to the bomb.
- e) That the soil type is homogenous.

A high altitude release of a bomb will result in ground entry at between 10° and 15° to the vertical with the bomb travelling on this trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The distance between the centre of the entry hole and the centre of the bomb at rest is known as the 'offset'. A marked lateral movement from the original line of entry is common.

Low-level attacks may have an impact angle of 45° or more, which will frequently lead to a much greater amount of offset movement during soil penetration.

The average offset is one third of the penetration depth, i.e. an offset of 2m may be expected for a 50kg bomb in dry silts and clays. If hard standings or Made Ground were present during WWII, bomb penetration depths would have been significantly reduced but offset distances may have been up to four times greater.

5 EXPLOSIVE ORDNANCE CLEARANCE ACTIVITIES

Official UK bombing statistics have been compiled from both British and German sources. There were differences in the way the figures were originally reported and collated which has led to discrepancies in the summary data.

Based on data from 1939 to 1945, War Office statistics indicate that 200,195No. HE bombs exploded within Great Britain. Additionally, 25,195No. HE bombs (representing 11%) were recorded as UXBs. However, records from the Royal Engineers who were responsible for bomb disposal at the time indicate that as of 27th February 1946 upwards of 45,000No. UXBs were disposed of.

On average 8.5% of UXBs later self-exploded. In some cases the bombs had delayed action fuzes or were never intended to explode, their purpose being to cause inconvenience and fear. Given the discrepancy in records and the fact that UXBs are still being found unexpectedly, it is clear that the original figures are understated and provide only an approximation of the number of potential UXBs in the UK.

War Office statistics also show that between October 1940 and May 1941 most of the UXBs (93%) were either 50kg or 250kg. It should be noted that details of the recovery and the size of the UXB were not always accurately reported.

The larger WWII UXBs are often difficult to recover due to both penetration depths and the presence of two or more fuzes, combined with more sensitive fillings of explosive mixtures including Amatol and Trialen.

5.1 Abandoned Bombs

For further information on abandoned bombs, and the potential UXO hazard associated with them, follow the link below:

- [Abandoned Bombs](#)

No records have been found indicating that any officially abandoned bombs are located on the Site.

5.2 EOC Tasks

Records held by Zetica Ltd show that the following post-WWII EOC tasks have taken place in the vicinity of the Site.

1960

1No. 1kg IB was found on the roof of St Ann's Church, approximately 1.1km west-northwest of the Site. It was made safe and removed.

3rd April 2007

1No. empty WWII mortar shell was discovered on a building site on Cambridge Street, approximately 1.2km southeast of the Site. It was removed.

6 UXO HAZARD ASSESSMENT

6.1 UXO Hazard Level

The definitions for the levels of UXO hazard are provided below.

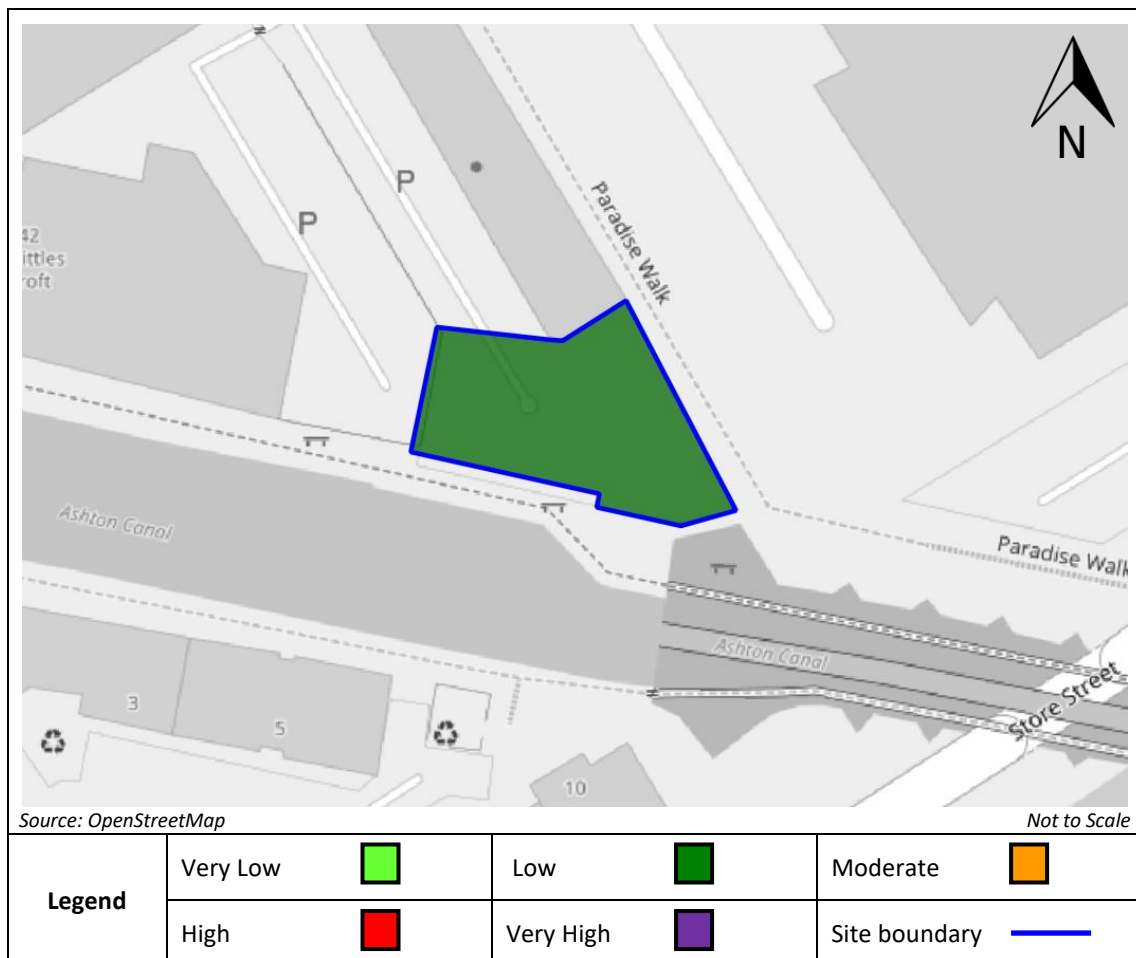
Definitions of UXO Hazard Level for a Site	
Hazard Level	Definition
Very Low	There is positive evidence that UXO is not present, e.g. through physical constraints or removal.
Low	There is no positive evidence that UXO is present, but its occurrence cannot be totally discounted.
Moderate	There is positive evidence that ordnance was present or that other uncharted ordnance may be present as UXO.
High	There is positive evidence that UXO is present.
Very High	As high, but requires immediate or special attention due to the potential hazard.

No records have been found indicating that the Site was bombed and no other significant sources of UXO hazard have been identified on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in Figure 4.

The UXO hazard zone plan of the Site is also given in the accompanying P11207-21-R7-MAP01-A.

Figure 4 UXO hazard zone plan of the Site



7 UXO RISK ASSESSMENT

7.1 Proposed Works

It is understood that the Site will be developed into a four-storey residential property.

Works on the Site will comprise intrusive ground investigations, including 3No. boreholes to approximately 20m below ground level (bgl), excavations, and piling.

7.2 Risk Assessment Methodology

A UXO risk assessment has been undertaken for the proposed works, taking into consideration the identified UXO hazard.

Firstly, the probability of encountering UXO (PE) has been considered and rated for the different construction techniques, as detailed below.

Probability of Encounter (PE)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Secondly, the probability of detonating a UXO (PD) has been considered and rated for the different construction techniques, as detailed below.

Probability of Detonation (PD)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Next, the probability of encountering and detonating the UXO (PE x PD) have been used to generate an overall likelihood rating (P).

P = PE x PD	LIKELIHOOD of Encounter and Detonation	Rating
21 to 25	Frequent, highly likely, almost certain.	5
16 to 20	Probable, more likely to happen than not.	4
6 to 15	Occasional, increased chance or probability.	3
2 to 5	Remote, unlikely to happen but could.	2
1	Improbable, highly unlikely.	1
0	Impossible	0
P ranges from 25, a certainty of UXO being encountered and detonated on the Site by engineering activity, to 0, a certainty that UXO does not occur on the Site and will not be detonated by engineering activity.		

The likelihood of encountering and detonating UXO during site works is multiplied by the severity of such an event occurring (P x S), in order to provide a risk level using the following matrix.

Severity (S)	Rating
Multiple fatalities	5
Major injury, long term health issues, single fatality.	4
Minor injury, short term health issues, no fatalities.	3
First aid case but no lost time or ill health.	2
Minor injuries, no first aid.	1
No injuries.	0

UXO Risk Matrix							
LIKELIHOOD (P)	SEVERITY (S)						
		5	4	3	2	1	0
	5	25	20	15	10	5	0
	4	20	16	12	8	4	0
	3	15	12	9	6	3	0
	2	10	8	6	4	2	0
	1	5	4	3	2	1	0
	0	0	0	0	0	0	0

7.3 UXO Risk Level

The UXO risk assessment for proposed works on the Site is given in Table 4.

Table 4 UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Boreholes/Piling	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Boreholes/Piling	1	1	1	1	3	3	Low
PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)								
Shallow Excavations defined as <1.0m below ground level (bgl.)								

8 RISK MITIGATION PLAN

Key findings: No significant sources of UXO hazard have been identified.

Key actions: Proceed with works.

8.1 UXO Risk Summary

Table 5 summarises the UXO risk for proposed works on the Site and recommended actions.

Table 5 Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		Proceed with works – if additional comfort is required to address the residual UXO hazard, a formal UXO awareness briefing can be provided.
Boreholes/Piling		Proceed with works

In summary, no additional measures are considered essential to reduce the UXO risk on the Site to As Low As is Reasonably Practicable (ALARP).

8.2 Risk Mitigation Techniques

Should you wish to provide staff involved in excavations with increased awareness regarding the potential (albeit low) for UXO encounter, this can be done through a formal briefing.

8.2.1 UXO Awareness Briefing

Typically ~1hour in duration, these briefings will be expected to provide site workers with:-

- Background to the potential UXO hazards that could be encountered.
- Awareness of how the UXO hazard could present a risk.
- Knowledge of what to do in the event that a suspect item is encountered.

The briefing is to be provided along with back-up materials such as UXO awareness posters, emergency contact numbers and other background information to assist site workers in becoming familiar with what potential UXO can look like.

The materials can also be used by key staff to pass on the relevant points of the induction to others who visit or work on the Site.

By providing the UXO awareness briefing, it ensures that in the unlikely event that UXO is encountered:-

- All site staff take appropriate action.
- A support mechanism and points of contact are established.
- The likelihood of harm to people or property is reduced.
- Significant delays to site work are prevented.

8.3 What Do I Do Next?

If you have any comments or require further assistance, contact us via phone (01993 886682) or email (uxo@zetica.com) and we can help.

If you have requirements to identify other buried hazards (such as mapping utilities or obstructions) we can provide these surveys.

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

APPENDICES

Appendix 1 Anticipated Ordnance Types

The probability of encountering UXO on the Site is considered to be low. As with any similar site in the UK, there is always a background risk of finding ordnance and potential types to be encountered are detailed below. For a more comprehensive set of ordnance data sheets, see <http://zeticauxo.com/downloads-and-resources/ordnance-data-sheets/>.

Information Data Sheet

Category Bomb (Luftwaffe)

Type Sprengbombe-Cylindrisch (SC) 50kg

Variants 8

Body Dimensions 762 x 200mm (30" x 7.9")

Weight 55kg (122lbs)

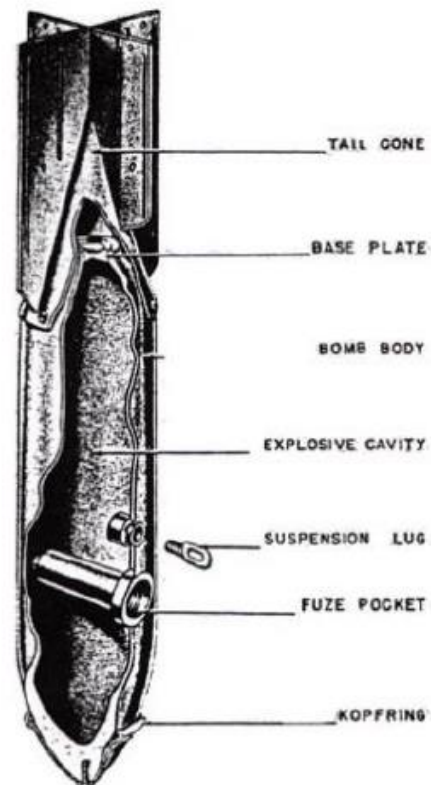
Charge Weight 25kg (54lbs)

Fuze Single electric impact fuze. Some have short time delay

Composition Sheet steel

Description Thick nose welded to a steel body. Nose may be attached to Kopfring (a triangular section steel ring) or spike. Suspension bolt in eye/body and sheet metal tail attached to body with rivets/screws. Originally painted green-grey with a yellow stripe on the tail. Cast TNT, Amatol or Trialen filling.

Function Designed to maximise shock waves through air, water and earth and for general demolition. Used against easily damageable targets, including roads, aircraft hangars, rolling stock and small buildings. Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) were used against rail lines and country roads, with Kopfring used against naval targets.



Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 250kg

Variants 8

Body Dimensions 1194mm x 368mm (47" x 14.5")

Weight 249-264 kg (548-582lbs)

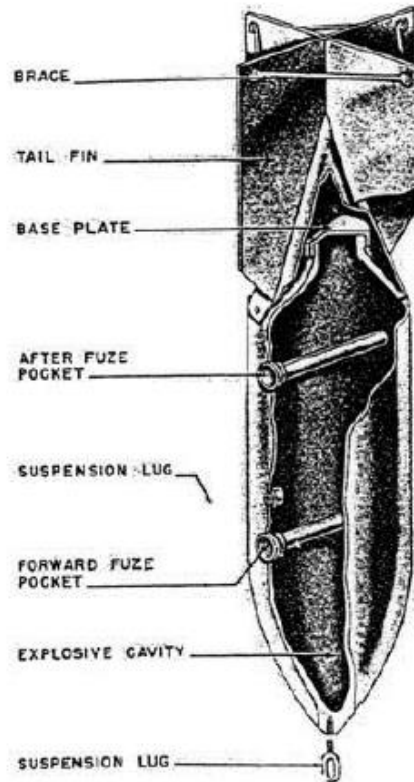
Charge Weight 130-145 kg (287-320lbs)

Fuze Electric impact fuze/electric clockwork time fuse & electric anti-disturbance fuze

Composition Sheet steel with stays

Description Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring) or spike. Sheet metal tail attached to body with rivets/ screws. Suspension eye bolt in the nose/body. Originally painted green-grey with a yellow stripe on the tail. TNT; amatol; TNT and aluminium powder, naphthalene, ammonium nitrate and wax/ wood meal filling.

Function Designed to maximise shock waves through air, water and earth and general demolition. Used against railway installations, large buildings, ammunition depots and below-ground installations (to 8m). Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) used against rail lines and country roads.



Information Data Sheet

Category Bomb

Type Sprengbombe-Cylindrisch (SC) 500kg

Variants -

Body Dimensions 1414–1486mm x 470mm (55.7-58.5" x 18.5")

Weight 500kg (1,100lbs)

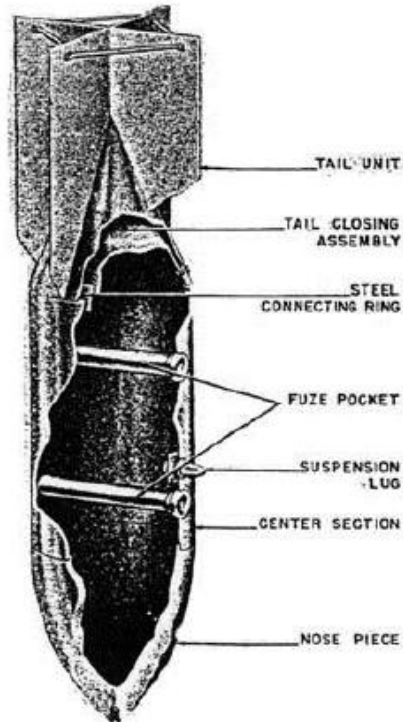
Charge Weight 220kg (484lbs)

Fuze Electric impact fuze/electric clockwork time fuze & electric anti-disturbance fuze.

Composition Sheet steel with stays or drum

Description Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring). Tail either steel sheet or drum-shaped. Suspension band. Originally painted green-grey/ buff (some later versions sky blue) with yellow stripe on tail. Filled with amatol, TNT or trialen.

Function Designed to maximise shock waves through air, water and earth and for general demolition. Used against railway property, large buildings, shipping and below-ground installations.



Information Data Sheet

Category Bomb

Type Sprengbombe-Cylindrisch (SC) 1,000kg (HERMANN)

Variants 3

Body Dimensions 1742-1905mm x 648-660mm (68.6-75" x 25.5-26")

Weight 1,000-1,088kg (2,204-2,398lbs)

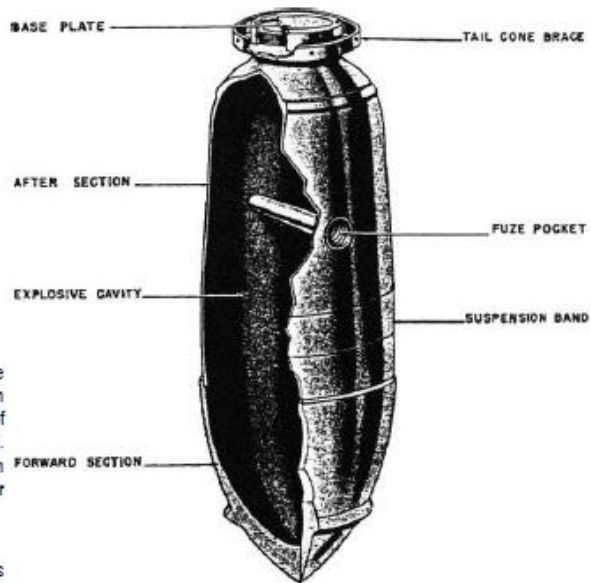
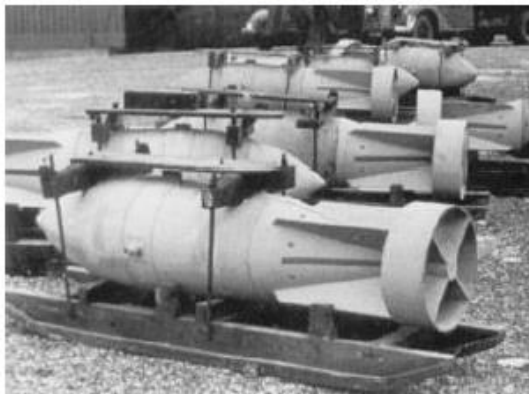
Charge Weight 529-619kg (1,166-1,364lbs)

Fuze Electric impact fuze/ electric clockwork time fuze & electric anti-disturbance fuze

Composition Magnesium alloy with drum

Description Thick nose welded to steel body. Nose attached to Kopfring (triangular section steel ring). Drum-shaped tail made of magnesium alloy. Suspension band. Originally painted sky-blue. Filled with amatol, TNT/aluminium/wood meal or trialen.

Function Designed to maximise shock waves through air, water and earth and for general demolition.



Information Data Sheet

Category Projectile
Type 3.7" Anti-Aircraft Shell

Variants 6

Body Dimensions 94mm x 360mm (3.7 x 14.7")

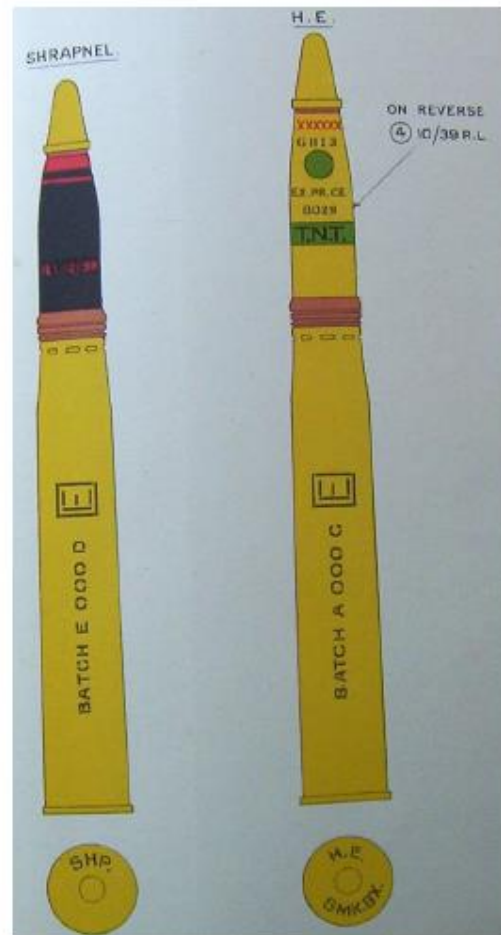
Weight 12.7kg (28lb)

Fuze Mechanical time fuze

Composition Cast steel

Description Brass cartridge case. Square-based shell with tapered nose, filled with Amatol, TNT or RDX/TNT. MK6 had forward centring bands and a wider driving band.

Function Used as a defence against enemy aircraft, fired from fixed batteries and mobile mountings. Could fire approximately 20 rounds per minute with a maximum ceiling of 41,000ft and horizontal range of 20,600 yards.



Information Data Sheet

Category Projectile
Type 4.5" Shell (Mark II – Anti-Aircraft)

Variants -

Body Dimensions 114mm x 566mm (4.5" x 21.9")

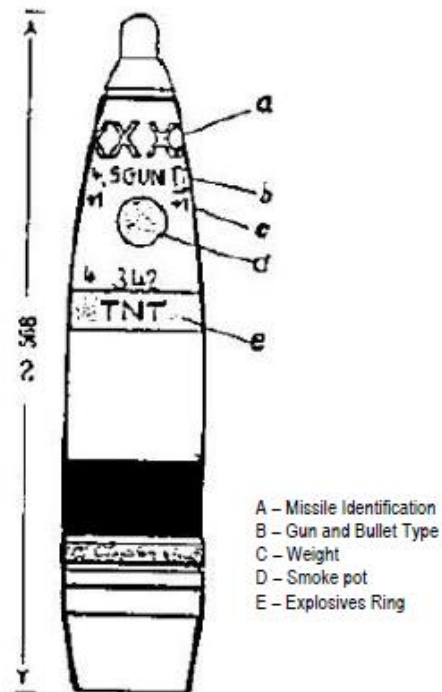
Weight 24.9kg (55lb)

Fuze Mechanical time fuze

Composition Cast steel

Description Square-based, tapered-nosed shell filled with TNT or Amatol. Steel casing, rotating band of either copper or gilding metal located 3.5" in front of the base end with single groove.

Function Used as field artillery and adapted for use in anti-aircraft defence from fixed batteries. Rate of fire of 8 rounds per minute, maximum ceiling of 44,000ft and horizontal range of 22,800 yards.



Appendix 2 Sources of UXO Hazard

The sections below provide background information on the potential sources of UXO hazard (albeit low) affecting the Site. For a more comprehensive set of UXO information sheets, see <http://zeticauxo.com/downloads-and-resources/uxo-information-sheets/>.

Appendix 2.1 WWI Bombing

It is not generally realised that during World War One (WWI) significant bombing took place across some areas of the UK. An estimated 9,000No. German bombs were dropped on Britain during the course of 51No. airship and 52No. aircraft raids. It was the first time that strategic aerial bombardment had been used. More than 1,400No. people were killed during these raids.

Most air raids were carried out on London and Southeast England. Areas along the East Coast were also targeted regularly due to their proximity to the European continent. Bombing raids further inland were rare and West England and Wales were out of reach for German aircraft of the time.

Aerial bombing during WWI initially relied on visual aiming, with bombsights not developed until later in the war. The inaccuracy inherent in this method meant that bombs often fell some way from their intended targets.

The first recorded raid against England occurred on the 21st December 1914 when 2No. high explosive bombs fell near the Admiralty Pier at Dover. Zeppelin raids intensified during 1915 and 1916, with aircraft raids becoming more frequent after 1917. The last raid of WWI took place on the 19th May 1918, when 38 Gotha and 3 Giant aircraft bombed London and surrounding districts, dropping a total of more than 2,500lbs of bombs.



The potential of coming across an Unexploded Bomb (UXB) from WWI is far less likely than a WWII UXB given the lower bombing densities during raids in the Great War.

Some areas which were subjected to sustained bombing raids, such as parts of London and coastal towns, recorded a higher number of UXB. In these areas, where there has been no significant development for the last century, the potential of a UXB remaining from WWI cannot be totally discounted.

Appendix 2.2 WWII Bombing

Bombing raids began in the summer of 1940 and continued until the end of WWII. Bombing densities generally increased towards major cities or strategic targets such as docks, harbours, industrial premises, power stations and airfields. In addition to London, industrial cities and ports, including Birmingham, Coventry, Southampton, Liverpool, Hull and Glasgow, were heavily targeted, as well as seaside towns such as Eastbourne and cathedral cities such as Canterbury.

The German bombing campaign saw the extensive use of both High Explosive (HE) bombs and Incendiary Bombs (IBs). The most common HE bombs were the 50kg and 250kg bombs, although 500kg were also used to a lesser extent. More rarely 1,000kg, 1,400kg and 1,800kg bombs were dropped.

The HE bombs tended to contain about half of their weight in explosives and were fitted with one or sometimes two fuzes. Not all HE bombs were intended to explode on impact. Some contained timing mechanisms where detonation could occur more than 70 hours after impact.

Incendiary devices ranged from small 1kg thermite filled, magnesium bodied Incendiary Bombs (IBs) to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. In some cases the IBs were fitted with a bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area. The C300 bombs were similar in appearance to 500kg HE bombs, although their design was sufficiently different to warrant a specially trained unit of the Royal Engineers to deal with their disposal.



Anti-Personnel (AP) bombs and Parachute Mines (PMs) were also deployed. 2No. types of anti-personnel bombs were in common use, the 2kg and the 12kg bomb. The 2kg bomb could inflict injury across an area up to 150m away from the impact. PMs (which were up to 4m in length) could be detonated either magnetically or by noise/vibration.

Anti-shipping parachute mines were commonly dropped over navigable rivers, dockland areas and coastlines. The Royal Navy was responsible for ensuring that the bombs were made safe. Removal and disposal was still the responsibility of the Bomb Disposal Unit of the Royal Engineers.

In 1944, the Germans introduced new weapons; the V1, a 'flying bomb' and guided missile, and the V2, a ballistic missile rocket that travelled at such speed that no one could see or hear its approach. London was the main target for these attacks.

WWII bomb targeting was inaccurate, especially in the first year of the war. A typical bomb load of 50kg HE bombs mixed with IBs which was aimed at a specific location might not just miss the intended target but fall some considerable distance away.



It is understood that the local Civil Defence authorities in urban areas had a comprehensive system for reporting bomb incidents and dealing with any Unexploded Bombs (UXB) or other UXO. In more rural areas, fewer bombing raids occurred. It is known that Air Raid Precaution (ARP) records under-represent the number and frequency of bombs falling in rural and coastal areas. Bombs were either released over targets or as part of 'tip and run' raids where bomber crews would drop their bombs to avoid anti-aircraft fire or Allied fighter aircraft on the route to and from other strategic targets. Bombs dropped as a result of poor targeting or 'tip and run' raids on rural and coastal areas often went unrecorded or entered as 'fell in open country' or 'fell in the sea'. The Luftwaffe are thought to have dropped approximately 75,000 tons of bombs on Britain throughout the Second World War and an estimated 11% of all bombs dropped during the war failed to detonate.

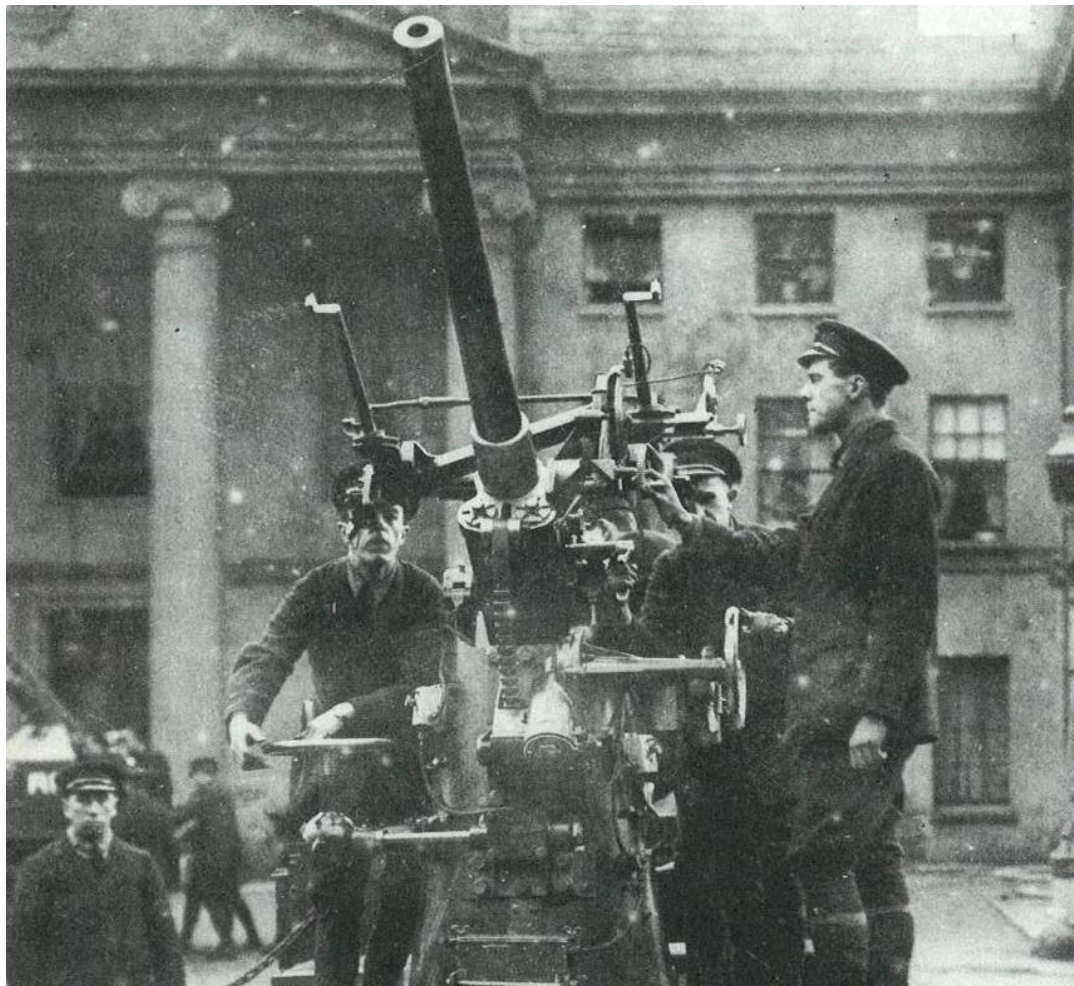
The potential for a UXB hazard to exist on a site depends on a variety of factors. Were there strategic targets in the surrounding area? Was the site bombed? Could a UXB impact have been missed? Even in rural areas, the potential for UXB cannot be totally discounted and therefore it is essential that detailed local bombing records are obtained when assessing the UXB hazard on any site.

Appendix 2.3 Anti-Aircraft Guns

As aerial bombardment first began during WWI, Anti-Aircraft (AA) gun batteries were established and gradually established throughout much of England to counter German bombing raids. By June 1916, there were approximately 271 No. AA guns and 258 No. searchlight installations defending London alone.

Common AA defences during WWI included 3-inch, 75 millimetre, 6-pounder and 1-pounder guns. Many of these guns were mobile, being mounted on lorry chassis. They were driven about following the course of an airship and fired from any area of open land.

During WWI, Unexploded AA (UXAA) shells, could land up to 13km from the firing point, although more typically fell within 10km.



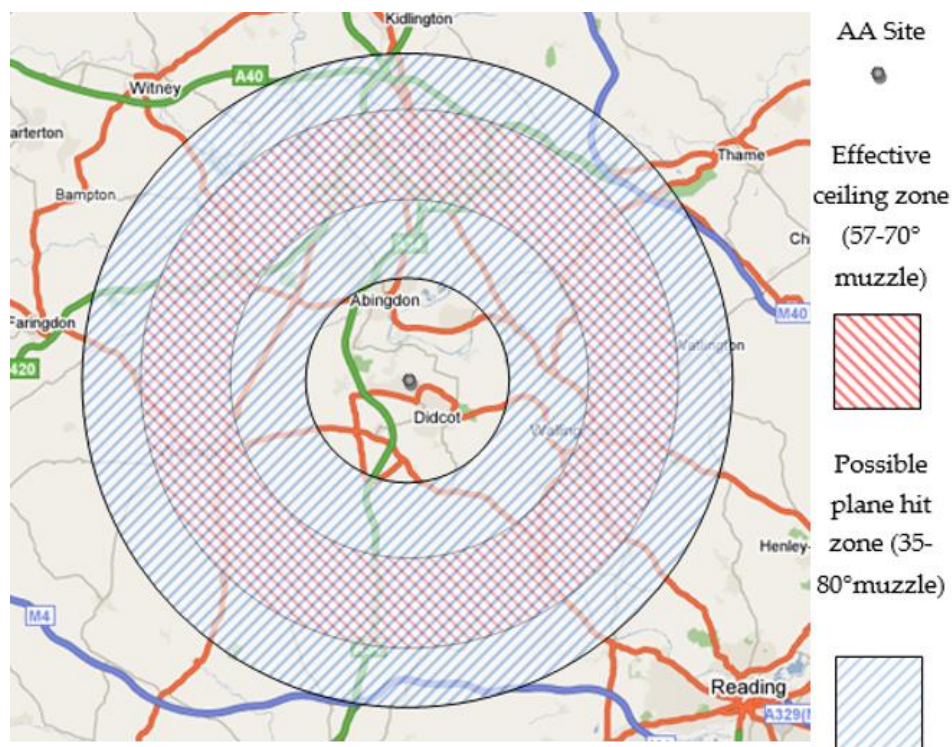
AA gun batteries were used extensively during WWII to counter the threat posed by enemy aircraft. In many instances, AA shells caused damage to Allied territory and in some areas caused significant numbers of civilian fatalities.

During WWII, AA shells could land up to 27km from the firing point, although more typically fell within 15km. These could be distributed over a wide area.

3No. types of AA batteries existed:

- **Heavy Anti-Aircraft (HAA)** batteries of large guns (typically 3.7", 4.5" and 5.25" calibre) designed to engage high flying bomber aircraft. These tended to be relatively permanent gun emplacements.
- **Light Anti-Aircraft (LAA)** weaponry, designed to counter low flying aircraft. These were often mobile and were moved periodically to new locations around strategic targets such as airfields. They typically fired 40mm shells and machine gun ammunition.
- **Rocket batteries (ZAA)** firing 3" or 3.7" AA rockets with a maximum altitude of 5,800m and a ground range of 9km were typically permanent emplacements.

Unexploded AA (UXAA) shells were a common occurrence during WWII. As the figure below demonstrates, shells were unlikely to fall in the immediate vicinity of a gun battery but in the surrounding area. This would be dependent upon the angle of fire and the flight height of the attacking aircraft.



AA batteries were deliberately targeted by the Luftwaffe and therefore areas surrounding a gun battery may have a greater risk of UXB being present.

Munitions stores were also established around AA batteries. These stored the shells for the batteries and small arms ammunition for troops manning the position. Such stores were typically removed at the end of WWII, although some disposal may have occurred in the immediate vicinity of the gun battery.

Appendix 3 Recent UXO Finds

UXO finds in the UK are a regular occurrence, although they almost never result in an accidental detonation.

It is still important to note that explosives rarely lose effectiveness with age. In some instances, mechanisms such as fuzes and gaines can become more sensitive and more prone to detonation, regardless of whether the device has been submersed in water or embedded in silt, clay or similar materials.

The effects of an accidental UXO detonation are usually extremely fast, often catastrophic and invariably traumatic to any personnel involved. Such occurrences are largely restricted to current theatres of war and overseas minefields, with occasional events in mainland Europe.

The sections below provide a brief summary of recent significant UXO finds in the UK. To keep up to date with the latest UXO finds, visit <http://zeticauxo.com/news/>.

On the 11th February 2018, 1No. 500kg UXB was found in King George V Dock in London, resulting in the temporary closure of the adjacent London City Airport. The UXB was freed from a silt bed and towed along the River Thames to Shoeburyness where it was destroyed in a controlled explosion.

On the 20th May 2018, a 1,000kg German sea mine washed ashore at Elmer beach near Bognor Regis, West Sussex. A 1 mile exclusion zone was enforced before an EOD team towed the device out to sea for a controlled explosion.

On the 10th July 2018, a suspected 1,000kg German UXB was found by scuba divers near Teignmouth Pier in Devon. The UXB was towed out into open sea by a RN EOD team for a controlled explosion.

On the 30th August 2018, a 2,000lb German PM was trawled up by a fishing vessel off Mersea in Essex. The PM was moved to an area of open sea where it was destroyed in a controlled explosion by a RN EOD team.

On the 21st January 2019 a suspected 1,000lb torpedo was brought into Brixham Harbour by a fishing trawler. It was towed back out to sea and destroyed by a Naval EOD team.

On the 14th March 2019 an unexploded pipe mine was found at the former RAF Manston airfield near Ramsgate, Kent. It was destroyed in a controlled explosion.

On the 23rd May 2019 a 250kg German UXB was found by workers on a building site at Kingston University in London. The UXB could not be safely removed and was consequently destroyed in situ by an EOD team.

On the 7th June 2019 a 50kg German fragmentation UXB was found at a building site in Kings Hill at the former RAF West Malling airfield. It was destroyed in a controlled explosion by an EOD team the following day. On the 26th September 2019 another 50kg German UXB was found at Kings Hill and was destroyed in a controlled explosion the next day.

On the 20th September 2019 a suspected 250kg German UXB was found on a construction site in Bordon, Hampshire. It was destroyed in a controlled explosion by an EOD team.

On the 3rd February 2020, a 500kg German UXB was found on a building site in Soho, London. It was removed by an EOD team.

On the 22nd and 23rd February 2020, storms uncovered 16No. items of UXO on beaches near Southend-on-Sea in Essex, prompting a race to locate, identify and dispose of each item before they were lost to incoming tides. They were destroyed in-situ by a Royal Navy EOD team.

On the 5th March 2020, several items of historic unexploded ordnance was uncovered at Sandwich Bay in Kent and investigated by a Royal Logistics Corps EOD team. A similar event occurred in the same area in 2016.

On the 18th April 2020, a 500lb British UXB was discovered by a farmer near Drayton in Oxfordshire. The area had been used as an RAF practice bombing range during WWII and after an in-situ disposal was completed the item was found to have contained no explosives.

On the 4th May 2020, a UXB was discovered by builders at Kings Hill on the former RAF West Malling airfield, the fourth found since 2017. It was destroyed in a controlled explosion.

On the 21st July 2020, more than 100No. items of UXO were washed ashore at Eskmeals beach in Cumbria. An army EOD team attended the site and confirmed they had come from the nearby MoD Eskmeals Range. Whilst many items were found to be inert, those which contained explosives were destroyed in-situ.

On the 19th September 2020, 2No. anti-submarine torpedoes were uncovered on Sand Bay near Weston-super-Mare, Somerset. Both items were confirmed to be 'test' devices and destroyed in-situ by a Royal Navy EOD team.

On the 1st December 2020, a research vessel discovered an unexploded marine mine containing 350kg of explosives in Wemyss Bay in the Firth of Clyde. RN divers investigated the item and destroyed it.

On the 25th December 2020, a UXB was found on Eastney Beach, Hampshire. An army EOD team closed the beach and carried out a controlled explosion of the item.

On the 26th February 2021, a 1,000kg German "Hermann" UXB was discovered by builders at Exeter University campus (see plate below). It was investigated and detonated in-situ following the evacuation of nearby properties and University halls of residence.



Appendix 4 Glossary and Definitions

Abandoned Explosive Ordnance (AXO)	Abandoned Explosive Ordnance is explosive ordnance that has not been used during an armed conflict, that has been left behind or disposed of by a party to an armed conflict, and which is no longer under control of that party. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use.
Close Combat Munitions	Items of ordnance thrown, propelled or placed during land warfare, to include grenades, mortars, projectiles, rockets and land mines.
Demil	Derived from the term 'Demilitarisation', it refers to the break down and the recycling or disposal of ordnance components.
Detonation	The high-speed chemical breakdown of an energetic material producing heat, pressure, flame and a shock wave.
Device	This term is used for any component, sub-assembly or completed ordnance, which may or may not have an explosive risk. It can apply to detonators, primers, gaines, fuzes, shells or bombs.
Explosive	The term explosive refers to compounds forming energetic materials that under certain conditions chemically react, rapidly producing gas, heat and pressure. Obviously, these are extremely dangerous and should only be handled by qualified professionals.
Explosive Ordnance (EO)	Explosive Ordnance is all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads, guided and ballistic missiles, artillery, mortar, rocket, small arms ammunition, mines, torpedoes, depth charges, pyrotechnics, cluster bombs & dispensers, cartridge & propellant actuated devices, electro-explosive devices, clandestine & improvised explosive devices, and all similar or related items or components explosive in nature.
Explosive Ordnance Clearance (EOC)	Explosive Ordnance Clearance is a term used to describe the operation of ordnance detection, investigation, identification and removal, with EOD being a separate operation.
Explosive Ordnance Disposal (EOD)	Explosive Ordnance Disposal is the detection, identification, on-site evaluation, rendering safe, recovery and final disposal of unexploded explosive ordnance.
Explosive Ordnance Reconnaissance (EOR)	Explosive Ordnance Reconnaissance is the detection, identification and on-site evaluation of unexploded explosive ordnance before Explosive Ordnance Disposal.
Explosive Remnants of War (ERW)	Explosive Remnants of War are Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.

Explosive Substances and Articles (ESA)	<p>Explosive substances are solid or liquid substances (or a mixture of substances), which are either:</p> <ul style="list-style-type: none"> • capable by chemical reaction in itself of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. • designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these as a result of a non-detonative, self-sustaining, exothermic reaction. <p>Explosive article is an article containing one or more explosive substances.</p>
Fuze	<p>A fuze is the part of an explosive device that initiates the main explosive charge to function. In common usage, the word fuze is used indiscriminately, but when being specific (and in particular in a military context), fuze is used to mean a more complicated device, such as a device within military ordnance.</p>
Gain	<p>Small explosive charge that is sometimes placed between the detonator and the main charge to ensure ignition.</p>
Geophysical survey	<p>A geophysical survey is essentially a range of methods that can be used to detect objects or identify ground conditions without the need for intrusive methods (such as excavation or drilling). This is particularly suited to ordnance as disturbance of ordnance items is to be avoided where ever possible.</p>
Gold line	<p>This is the estimated limit of blast damage from an explosive storage magazine. It usually means that development within this zone is restricted.</p>
High Explosive	<p>Secondary explosives (commonly known as High Explosives (HE)) make up the main charge or filling of an ordnance device. They are usually less sensitive than primary explosives. Examples of secondary explosives are: Nitro glycerine (NG), Trinitrotoluene (TNT), AMATOL (Ammonia nitrate + TNT), Gunpowder (GP), and Cyclotrimethylenetrinitramine (RDX).</p>
Munition	<p>Munition is the complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions. This includes those munitions that have been suitably modified for use in training, ceremonial or non-operational purposes. These fall into three distinct categories:-</p> <ul style="list-style-type: none"> • inert - contain no explosives whatsoever. • live - contain explosives and have not been fired. • blind - have fired but failed to function as intended.

Primary Explosive	Primary explosives are usually extremely sensitive to friction, heat, and pressure. These are used to initiate less sensitive explosives. Examples of primary explosives are: Lead Azide, Lead Styphnate, and Mercury Fulminate. Primary explosive are commonly found in detonators.
Propellants	Propellants provide ordnance with the ability to travel in a controlled manner and deliver the ordnance to a predetermined target. Propellants burn rapidly producing gas, pressure and flame. Although usually in solid form they can be produced in liquid form. Examples of propellants are: Ballistite often found in a flake form and Cordite used in small arms ammunition.
Pyrotechnic	A pyrotechnic is an explosive article or substance designed to produce an effect by heat, light, sound, gas or smoke, or a combination of any of these, as a result of non-detonative, self-sustaining, exothermic chemical reactions.
Small Arms Ammunition (SAA)	SAA includes projectiles around 12mm or less in calibre and no longer than approximately 100mm. They are fired from a variety of weapons, including rifles, pistols, shotguns and machine guns.
Unexploded Anti-Aircraft (UXAA) Shell	<p>UXAA shells are army ordnance commonly containing HE, though they can also contain pyrotechnic compounds that produce smoke.</p> <p>Most commonly, these were 3.7" and 4.5" HE shells, although they ranged from 2" to 5.25" calibre.</p>
Unexploded Bomb (UXB)	UXB is a common term for unexploded air-dropped munitions.
Unexploded Ordnance (UXO)	UXO is explosive ordnance that has been either primed, fuzed, armed or prepared for use and has been subsequently fired, dropped, launched, projected or placed in such a manner as to present a hazard to operations, persons or objects and remains unexploded either by malfunction or design.
V1	The Vergeltungswaffe-1, V-1, also designated Fieseler Fi 103/FZG-76, known colloquially in English as the Flying Bomb, Buzz Bomb or Doodlebug, was the first guided missile used in WWII and the forerunner of today's cruise missile.

Appendix 5 Bibliography

Bulloch G, Steeds J E, Green K, Sainsbury M G, Brockwell J S & Slade N J, Land Contamination: Technical Guidance on Special Sites: MoD Land

Bulloch G, Steeds J E, Green K, Sainsbury M G, Brockwell J S, & Slade N J, R&D Technical Report P5-042/TR/03, Land Contamination: Technical Guidance on Special Sites: Explosives Manufacturing & Processing Sites

CIRIA, Unexploded Ordnance (UXO), a Guide for the Construction Industry, 2009

Clarke N J, Luftwaffe Target Reconnaissance, German aerial Photography 1939-1942, 1996

Clarke N J, Adolf's British Holiday Snaps: Luftwaffe Aerial Reconnaissance Photographs of England, Scotland and Wales, 2012

Cocroft W D, Dangerous Energy, 2000

Cocroft W D, Thomas R J, Cold War, 2003

Department of the Environment, Sampling Strategies for Contaminated Land, Department of the Environment: Contaminated Land Research Report, CLR Report No. 4, 1994.

Dobinson C S, Twentieth Century Fortifications in England, Volume I 1, Anti-aircraft artillery, England's air defence gun sites. 1914 – 46. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Volume I 2, Anti-aircraft artillery, Site gazetteer, WWI. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Volume I. 3. Anti-aircraft artillery, 1914-46, Site gazetteer, WWII HAA & ZAA. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Volume I 4, Anti-aircraft artillery, Site gazetteer, WWII LAA. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Volume I 5, Anti-aircraft artillery, Sources. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Volume II, Anti-invasion defences of WWII. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Volume III, Bombing decoys of WWII, England's passive air defence 1939-45. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Volume VIII, Civil defence in WWII, Protecting England's Civil Population. Council for British Archaeology, 1996

Dobinson C S, Twentieth Century Fortifications in England, Supporting paper AA/1 Searchlight sites in WWII. Council for British Archaeology, 1996

Dobinson C S, Fields of Deception, Britain's Bombing Decoys of World War II, 2000

Dobinson C S, AA Command, 2001

Hardy C, Manchester at War, 1986

Fegan T, The Baby Killers, 2002

Morris J, German Air Raids on Britain 1914-1918, 1993

Phythian G, Blitz Britain, Manchester and Salford, 2015

Price A, Blitz on Britain 1939-45, 2000

Ramsey W, The Blitz Then and Now, Vol 1, 1987

Ramsey W, The Blitz Then and Now, Vol 2, 1988

Ramsey W, The Blitz Then and Now, Vol 3, 1990

Zetica, ZeticaUXO Handbook: a guide to dealing with UXO during construction, 2018

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APPENDIX III
EXPLRATORY HOLE LOGS

		Project Title: Paradise Wharf, Ducie Street				<h1>BH1</h1>	
		Project Number: 10/1836		Client: Victor (M1) Ltd			
		GL (mAOD):		N Coord: 0		E Coord: 0	
Date: 20/09/2022		Method: Cable Percussion		Driller: PB DRILLING		Logged By: PH	

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.20 - 0.30	ES				0.07 0.20	Tarmacadam. (MADE GROUND)		
					0.60 0.60	Dark grey / black very sandy gravel. Gravel is fine to coarse, angular of limestone and occasional sandstone cobble (stone sett). (MADE GROUND)		
					1.00	Yellow / brown sand and gravel with cobbles of brick. Gravel is medium to coarse, angular to rounded of limestone, sandstone and quartz. (MADE GROUND)		
					2.00	Sandstone (Probable remnant Slab). (MADE GROUND)		
					3.00			
					4.00			
					5.00			
					6.00			
					7.00			
					8.00			

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
 - Groundwater Strike
 - Groundwater Level



REMARKS

No Groundwater Encountered

Scale: 1:50

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths **Chiselling**

Date	Casing	Water	From	To	Hours

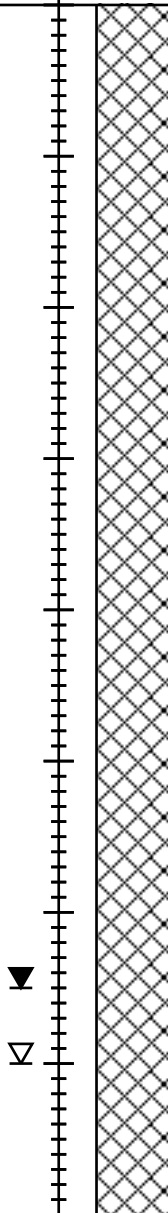
		Project Title: Paradise Wharf, Ducie Street				BH1B	
		Project Number: 10/1836		Client: Victor (M1) Ltd			
		GL (mAOD):		N Coord: 0		E Coord: 0	
Date: 26/09/2022		Method: Window Sampler		Driller: PB DRILLING		Logged By: PH	

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.40 - 0.50	ES				0.15	Tarmacaddam (2 layers). (MADE GROUND)		
		N=2			0.42			
					0.55			
					0.70			
					1.00	Black brick ash and clay with much gravel and cobbles. Cobbles are of brick, gravel is of brick, limestone, sandstone. (MADE GROUND)		
						Yellow Sandstone (probable large cobble or remnant slab). (MADE GROUND)		
2.00 - 2.30	D	N=4			2.00	Black, gravel, clay and sand with fragments of brick and sandstone. (MADE GROUND)		
						Yellow Sandstone (Probable remnant slab) (MADE GROUND)		
		N=4			3.00			
					3.20	Very soft dark grey gravelly clay. Gravel is fine to coarse, angular of brick, sandstone. (MADE GROUND)		
		N=8			4.00	Firm becoming stiff dark brown slightly sandy CLAY with occasional gravel. Gravel is fine to coarse rounded to subrounded of sandstone, mudstone and quartz. (DEVENSIAN TILL)		
		N=25			5.00			
					5.25	End Of Borehole At 5.25 m		
					6.00			
					7.00			
					8.00			

KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa  - Groundwater Strike  - Groundwater Level		REMARKS No Groundwater Encountered  Scale: 1:50	Water Strikes <table border="1"> <tr> <th>Date</th> <th>Strike</th> <th>Level</th> <th>Minutes</th> <th>Casing</th> <th>Sealed</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> Daily Log Of Depths <table border="1"> <tr> <th>Date</th> <th>Casing</th> <th>Water</th> <th>From</th> <th>To</th> <th>Hours</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	Date	Strike	Level	Minutes	Casing	Sealed																			Date	Casing	Water	From	To	Hours												
Date	Strike	Level	Minutes	Casing	Sealed																																								
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<div></div>			Project Title: Paradise Wharf, Ducie Street			BH2					
			Project Number: 10/1836		Client: Victor (M1) Ltd				Sheet 1 Of 3		
			GL (mAOD):		N Coord: 0		E Coord: 0				
Date: 20/09/2022-21/09/2022			Method: Cable Percussion		Driller: PB DRILLING		Logged By: PH				
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe			
0.40	ES	N=3			0.15 0.25	Tarmacaddam. (MADE GROUND)					
1.00	ES				0.60	Dark grey / black gravel with sand. Gravel is fine to coarse of limestone. (MADE GROUND)					
1.25 - 1.65 1.40	B ES				1.00 1.20	Yellow / brown sand and gravel with occasional cobbles of brick. Gravel is fine to coarse of limestone and sandstone. (MADE GROUND)					
2.00 - 2.25	B	N=4			2.00	Soft brown very sandy gravelly clay with cobbles. Gravel is fine to coarse, angular to sub-rounded of sandstone, limestone and brick. Cobbles are of brick. (MADE GROUND)					
3.00 - 3.45	B	N=7			2.30	Soft dark grey slightly clayey sand and gravel. Gravel is fine to coarse, rounded of sandstone, mudstone and quartz. (MADE GROUND)					
4.00 - 4.45	B	N=13			3.00 3.20	Soft to firm brown / black slightly sandy gravelly clay. Gravel is fine to coarse, rounded of sandstone, mudstone quartz and occasional brick. (MADE GROUND)					
5.50 - 5.95	U				4.30	Firm brown clay with occasional gravel. Gravel is fine, rounded of sandstone and mudstone. Occasional pockets of dark grey sandy clay. Probable Made Ground. (MADE GROUND)					
					5.00 5.30	Dark grey very clayey sand with occasional gravel. Gravel is fine to medium, rounded of sandstone and mudstone. (DEVENSIAN TILL)					
7.00 - 7.45	B	N=18			6.00	Firm to stiff dark brown CLAY with occasional gravel. gravel is fine to medium, rounded of sandstone, mudstone and occasional coal. (DEVENSIAN TILL)					
					7.00						
					8.00						
						Borehole Continues					
<div>KEY</div> <div>D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa ▽ - Groundwater Strike ▼ - Groundwater Level</div> <div></div>			<div>REMARKS</div> <div>Scale: 1:50</div>			Water Strikes					
						Date	Strike	Level	Minutes	Casing	Sealed
						27/09/2022	15	14.5	20		
Daily Log Of Depths						Chiselling					
Date	Casing	Water	From	To	Hours						

		Project Title: Paradise Wharf, Ducie Street				<h1>BH2</h1>	
		Project Number: 10/1836		Client: Victor (M1) Ltd			
		GL (mAOD):		N Coord: 0		E Coord: 0	
Date: 20/09/2022-21/09/2022		Method: Cable Percussion		Driller: PB DRILLING		Logged By: PH	

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
8.50 - 8.95	B	N=25			8.50	Firm to stiff dark brown CLAY with occasional gravel. gravel is fine to medium, rounded of sandstone, mudstone and occasional coal. (DEVENSIAN TILL)		
10.00 - 10.45	U				9.00	Stiff brown silty CLAY with occasional gravel. Gravel is fine to medium, rounded of sandstone and mudstone. (DEVENSIAN TILL)		
					10.00			
					11.00			
					11.50			
12.00 - 12.25	D	N=38			12.00	Dense red / brown very clayey SAND / sandy Clay. (DEVENSIAN TILL)		
13.50 - 14.00	D	pp 50/295mm			12.80			
					13.00	Very stiff dark brown CLAY with occasional gravel. Gravel is fine, rounded of sandstone and mudstone. (DEVENSIAN TILL)		
15.50 - 16.00	D	N=48			13.50	Dense light brown SAND and GRAVEL. Gravel is fine to coarse rounded of sandstone, mudstone and quartz. (DEVENSIAN TILL)		
					14.00			
					15.00			
					15.80			
		pp 50/290mm			16.00	Very dense red SAND with occasional gravel. Gravel is fine to coarse, sub-rounded to subangular of sandstone and rare mudstone. Possible Weathered Sandstone (DEVENSIAN TILL)		
Borehole Continues								

KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa  - Groundwater Strike  - Groundwater Level 	REMARKS Scale: 1:50	Water Strikes					
		Date	Strike	Level	Minutes	Casing	Sealed
		27/09/2022	15	14.5	20		
		Daily Log Of Depths			Chiselling		
		Date	Casing	Water	From	To	Hours

		Project Title: Paradise Wharf, Ducie Street				<h1>BH2</h1>	
		Project Number: 10/1836		Client: Victor (M1) Ltd			
		GL (mAOD):		N Coord: 0		E Coord: 0	
Date: 20/09/2022-21/09/2022		Method: Cable Percussion		Driller: PB DRILLING		Logged By: PH	

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
16.50	D				17.00	Very dense red SAND with occasional gravel. Gravel is fine to coarse, sub-rounded to subangular of sandstone and rare mudstone. Possible Weathered Sandstone (DEVENSIAN TILL)		
		pp 50/295mm			18.00			
					19.00	Very dense red SAND with gravel. Gravel is fine to coarse, sub-rounded to subangular of sandstone and rare mudstone. Probable Weathered Sandstone (CHESTER FORMATION)		
		pp 0/300mm			19.10			
						End Of Borehole At 19.10 m		
					20.00			
					21.00			
					22.00			
					23.00			
					24.00			

KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa  - Groundwater Strike  - Groundwater Level 		REMARKS Scale: 1:50		Water Strikes																									
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Date	Casing	Water	From	To	Hours																								

		Project Title: Paradise Wharf, Ducie Street				<h1>BH3</h1>	
		Project Number: 10/1836		Client: Victor (M1) Ltd			
		GL (mAOD):		N Coord: 0		E Coord: 0	
Date: 22/09/2022-23/09/2022		Method: Cable Percussion		Driller: PB DRILLING		Logged By: PH	

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.30	ES				0.12 0.25	Tarmacaddam (MADE GROUND)		
						Light grey gravel. Gravel is subrounded to rounded of limestone. (MADE GROUND)		
1.20	ES	N=2			1.00			
1.60	ES				1.40	Black sand and gravel with pockets of clay and many brick cobbles. Gravel is fine to coarse, angular to rounded of sandstone, mudstone. Cobbles are of brick. (MADE GROUND)		
		N=3			2.00			
						Dark brown sandy clay with much gravel. Gravel is fine to coarse, angular to rounded of sandstone, mudstone and brick. (MADE GROUND)		
		N=4			3.00			
3.40 - 3.60	ES				3.20			
		N=22				Black sandy clay. Strong hydrocarbon odour and taint. (MADE GROUND)		
					4.00			
4.40	ES				4.10			
4.50 - 5.00	B				4.30	Dense dark grey / mottled very clayey sand with occasional gravel, Gravel is fine to medium, rounded of sandstone and mudstone. Hydrocarbon odour. (MADE GROUND)		
					5.00			
5.50 - 5.95	D	N=21				Stiff dark brown CLAY with occasional gravel. Gravel is fine to medium, rounded or sandstone, mudstone and rare coal. (DEVENSIAN TILL)		
					6.00			
7.00 - 7.45	U				7.00			
7.50 - 7.80	D							
					8.00			
						Borehole Continues		

KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa  - Groundwater Strike  - Groundwater Level 		REMARKS No Groundwater Encountered Scale: 1:50		Water Strikes																															
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		Project Title: Paradise Wharf, Ducie Street				<h1>BH3</h1>				
		Project Number: 10/1836		Client: Victor (M1) Ltd						
		GL (mAOD):		N Coord: 0		E Coord: 0				
Date: 22/09/2022-23/09/2022		Method: Cable Percussion		Driller: PB DRILLING		Logged By: PH				
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe		
11.50 - 11.95 12.00 - 12.30 13.80 14.00 - 14.50 15.00 - 15.50 15.60 - 16.00	U D D B B B	N=22			8.80	Stiff dark brown CLAY with occasional gravel. Gravel is fine to medium, rounded or sandstone, mudstone and rare coal. (DEVENSIAN TILL)				
		N=23			9.00	Stiff brown slightly sandy CLAY with occasional gravel. Gravel is fine to medium, rounded or sandstone, mudstone and rare coal. (DEVENSIAN TILL)				
					10.00					
					11.00					
									11.50	Stiff brown sandy CLAY with occasional gravel. Gravel is fine to medium, rounded or sandstone, mudstone and rare coal. (DEVENSIAN TILL)
						12.00				
						13.00				
				N=39					13.80	Dense yellow SAND with occasional gravel. Gravel is fine to coarse, rounded of mudstone, sandstone and quartz. (DEVENSIAN TILL)
						14.00				
						15.00				
		N=46			15.35	Stiff brown slightly sandy CLAY. Gravel is fine to medium, rounded or sandstone, mudstone and quartz. (DEVENSIAN TILL)				
					15.60					
					16.00	Dense red SAND with much gravel. Gravel is fine to coarse of sandstone, mudstone. Possible weathered sandstone. (CHESTER FORMATION)				

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level



REMARKS

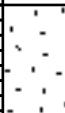
No Groundwater Encountered

Scale: 1:50

Borehole Continues

Water Strikes					
Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths			Chiselling		
Date	Casing	Water	From	To	Hours

		Project Title: Paradise Wharf, Ducie Street				<h1>BH3</h1>																																						
		Project Number: 10/1836		Client: Victor (M1) Ltd																																								
		GL (mAOD):		N Coord: 0		E Coord: 0																																						
Date: 22/09/2022-23/09/2022		Method: Cable Percussion		Driller: PB DRILLING		Logged By: PH																																						
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe																																				
		pp 0/300mm			16.80	Dense red SAND with much gravel. Gravel is fine to coarse of sandstone, mudstone. Possible weathered sandstone. (CHESTER FORMATION)																																						
		pp 0/300mm			17.00	Very dense red SAND. Probable Weathered Sandstone. (CHESTER FORMATION)																																						
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APPENDIX IV
CHEMICAL LABORATORY RESULTS

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 22/09751/1

Amendments: Request for Additional Analysis

Envirolab Job Number: 22/09751
Issue Number: 2

Date: 11 November, 2022

Client: Clancy Consulting
Dunham Court
2 Dunham Road
Altrincham
Cheshire
UK
WA14 4NX

Project Manager: Phil Hill/Sean Pilling
Project Name: Paradise Wharf, Manchester
Project Ref: 10/1836
Order No: 13561 / PJH / ZMW
Date Samples Received: 05/10/22
Date Instructions Received: 05/10/22
Date Analysis Completed: 11/11/22

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/1	22/09751/2	22/09751/3	22/09751/4	22/09751/5	22/09751/6	22/09751/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	BH1A	BH1B	BH2	BH2	BH3	BH3			
Depth to Top	0.20	0.20	0.40	1.00	1.40	0.30	1.60			
Depth To Bottom										
Date Sampled	20-Sep-22	22-Sep-22	26-Sep-22	20-Sep-22	20-Sep-22	22-Sep-22	22-Sep-22			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4A	5AB	4A	4AB	5AB			
% Stones >10mm _A	<0.1	<0.1	18.8	2.1	9.0	19.9	1.8	% w/w	0.1	A-T-044
pH _D ^{M#}	8.36	8.45	8.33	7.97	8.12	8.32	8.30	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	<0.01	-	-	0.05	-	-	g/l	0.01	A-T-026s
Total Organic Carbon _D ^{M#}	3.34	3.72	-	-	2.77	-	4.64	% w/w	0.03	A-T-032s
Arsenic _D ^{M#}	28	23	25	31	28	29	21	mg/kg	1	A-T-024s
Beryllium _D	0.8	1.0	1.4	1.9	1.5	1.7	1.5	mg/kg	0.5	A-T-024s
Boron (water soluble) _D	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	1.1	1.5	1.1	1.0	0.9	1.3	0.9	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	58	115	99	81	146	110	102	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Lead _D ^{M#}	171	353	249	162	182	310	243	mg/kg	1	A-T-024s
Mercury _D	2.27	3.19	1.63	0.29	0.22	2.14	0.68	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	19	27	31	40	30	27	36	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Vanadium _D ^{M#}	36	31	31	49	33	36	36	mg/kg	1	A-T-024s
Zinc _D ^{M#}	108	180	76	76	103	111	70	mg/kg	5	A-T-024s

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/1	22/09751/2	22/09751/3	22/09751/4	22/09751/5	22/09751/6	22/09751/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	BH1A	BH1B	BH2	BH2	BH3	BH3			
Depth to Top	0.20	0.20	0.40	1.00	1.40	0.30	1.60			
Depth To Bottom										
Date Sampled	20-Sep-22	22-Sep-22	26-Sep-22	20-Sep-22	20-Sep-22	22-Sep-22	22-Sep-22			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4A	5AB	4A	4AB	5AB			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	Amosite	Chrysotile	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos Matrix (visual) ₀	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope) ₀	Loose Fibres	Loose Fibres	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ₀	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) ₀	<0.001	0.003	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/1	22/09751/2	22/09751/3	22/09751/4	22/09751/5	22/09751/6	22/09751/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	BH1A	BH1B	BH2	BH2	BH3	BH3			
Depth to Top	0.20	0.20	0.40	1.00	1.40	0.30	1.60			
Depth To Bottom										
Date Sampled	20-Sep-22	22-Sep-22	26-Sep-22	20-Sep-22	20-Sep-22	22-Sep-22	22-Sep-22			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4A	5AB	4A	4AB	5AB			
PAH-16MS										
Acenaphthene _A ^{M#}	0.04	0.26	<0.01	0.03	0.03	0.36	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.01	0.09	<0.01	<0.01	<0.01	0.07	<0.01	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.07	0.55	<0.02	0.05	0.04	1.50	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.48	4.30	0.14	0.15	0.13	9.23	<0.04	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.56	5.08	0.14	0.10	0.08	8.03	<0.04	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.62	5.35	0.15	0.13	0.11	8.84	<0.05	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.42	4.50	0.10	<0.05	<0.05	4.32	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.21	1.81	<0.07	<0.07	<0.07	3.10	<0.07	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.57	4.32	0.15	0.15	0.13	8.62	<0.06	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.11	0.94	<0.04	<0.04	<0.04	1.13	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.78	6.22	0.25	0.33	0.29	17.7	<0.08	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.02	0.18	<0.01	0.01	0.02	0.28	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.42	4.29	0.10	0.06	0.04	5.01	<0.03	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	0.08	<0.03	<0.03	<0.03	0.08	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.24	1.84	0.10	0.17	0.19	5.13	<0.03	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.72	5.63	0.24	0.27	0.23	15.9	<0.07	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	5.27	45.4	1.37	1.45	1.29	89.3	<0.08	mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/1	22/09751/2	22/09751/3	22/09751/4	22/09751/5	22/09751/6	22/09751/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	BH1A	BH1B	BH2	BH2	BH3	BH3			
Depth to Top	0.20	0.20	0.40	1.00	1.40	0.30	1.60			
Depth To Bottom										
Date Sampled	20-Sep-22	22-Sep-22	26-Sep-22	20-Sep-22	20-Sep-22	22-Sep-22	22-Sep-22			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4A	4A	4A	5AB	4A	4AB	5AB			
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	6	<1	-	-	2	-	<1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	4	<1	-	-	2	-	<1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	3	11	-	-	3	-	1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	6	20	-	-	3	-	1	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	233	464	-	-	11	-	5	mg/kg	1	A-T-055s
Total Aliphatics _A	252	495	-	-	21	-	7	mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	7	<1	-	-	3	-	2	mg/kg	1	A-T-055s
Aro >C10-C12 _A	4	<1	-	-	1	-	<1	mg/kg	1	A-T-055s
Aro >C12-C16 _A	7	22	-	-	4	-	2	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	23	112	-	-	8	-	5	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	129	468	-	-	21	-	16	mg/kg	1	A-T-055s
Total Aromatics _A	170	602	-	-	38	-	26	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	422	1100	-	-	59	-	33	mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/8	22/09751/9	22/09751/10	22/09751/11				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH3	BH3	BH2	BH3						
Depth to Top	3.40	4.40	0.40	1.20						
Depth To Bottom										
Date Sampled	22-Sep-22	22-Sep-22	20-Sep-22	22-Sep-22						
Sample Type	Solid	Soil	Soil	Soil						
Sample Matrix Code	7	6A	4AB	4AB						
% Stones >10mm _A	<0.1	0.9	11.1	9.4				% w/w	0.1	A-T-044
pH _D ^{M#}	8.13	8.38	-	-				pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.17	0.03	0.67	0.04				g/l	0.01	A-T-026s
Total Organic Carbon _D ^{M#}	2.46	1.68	-	-				% w/w	0.03	A-T-032s
Arsenic _D ^{M#}	15	<1	-	-				mg/kg	1	A-T-024s
Beryllium _D	1.6	1.2	-	-				mg/kg	0.5	A-T-024s
Boron (water soluble) _D	<1.0	<1.0	-	-				mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.9	0.9	-	-				mg/kg	0.5	A-T-024s
Copper _D ^{M#}	76	29	-	-				mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	-	-				mg/kg	1	A-T-040s
Lead _D ^{M#}	562	23	-	-				mg/kg	1	A-T-024s
Mercury _D	0.45	<0.17	-	-				mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	31	42	-	-				mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	-	-				mg/kg	1	A-T-024s
Vanadium _D ^{M#}	41	36	-	-				mg/kg	1	A-T-024s
Zinc _D ^{M#}	45	60	-	-				mg/kg	5	A-T-024s

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/8	22/09751/9	22/09751/10	22/09751/11				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH3	BH3	BH2	BH3						
Depth to Top	3.40	4.40	0.40	1.20						
Depth To Bottom										
Date Sampled	22-Sep-22	22-Sep-22	20-Sep-22	22-Sep-22						
Sample Type	Solid	Soil	Soil	Soil						
Sample Matrix Code	7	6A	4AB	4AB						
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	-	-						A-T-045
Asbestos Matrix (visual) _D	-	-	-	-						A-T-045
Asbestos Matrix (microscope) _D	-	-	-	-						A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	-	-						A-T-045

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/8	22/09751/9	22/09751/10	22/09751/11				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH3	BH3	BH2	BH3						
Depth to Top	3.40	4.40	0.40	1.20						
Depth To Bottom										
Date Sampled	22-Sep-22	22-Sep-22	20-Sep-22	22-Sep-22						
Sample Type	Solid	Soil	Soil	Soil						
Sample Matrix Code	7	6A	4AB	4AB						
PAH-16MS										
Acenaphthene _A ^{M#}	0.12	<0.01	-	-				mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.08	<0.01	-	-				mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.21	<0.02	-	-				mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.32	<0.04	-	-				mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.21	<0.04	-	-				mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.17	<0.05	-	-				mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.11	<0.05	-	-				mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	-	-				mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.30	<0.06	-	-				mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	-	-				mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.62	<0.08	-	-				mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.38	<0.01	-	-				mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.07	<0.03	-	-				mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	-	-				mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.09	<0.03	-	-				mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.82	<0.07	-	-				mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	3.50	<0.08	-	-				mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/09751

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10/1836

Lab Sample ID	22/09751/8	22/09751/9	22/09751/10	22/09751/11				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH3	BH3	BH2	BH3						
Depth to Top	3.40	4.40	0.40	1.20						
Depth To Bottom										
Date Sampled	22-Sep-22	22-Sep-22	20-Sep-22	22-Sep-22						
Sample Type	Solid	Soil	Soil	Soil						
Sample Matrix Code	7	6A	4AB	4AB						
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	0.43	<0.01	-	-				mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	7.91	<0.01	-	-				mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	209	<1	-	-				mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	86	<1	-	-				mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	167	<1	-	-				mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	100	<1	-	-				mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	45	1	-	-				mg/kg	1	A-T-055s
Total Aliphatics _A	614	1	-	-				mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	0.15	-	-				mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	-	-				mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	74	1	-	-				mg/kg	1	A-T-055s
Aro >C10-C12 _A	55	<1	-	-				mg/kg	1	A-T-055s
Aro >C12-C16 _A	188	<1	-	-				mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	224	1	-	-				mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	361	2	-	-				mg/kg	1	A-T-055s
Total Aromatics _A	901	5	-	-				mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	1510	6	-	-				mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	0.15	-	-				mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	-	-				mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	0.01	-	-				mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	0.03	0.02	-	-				mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	-	-				mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	-	-				mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

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 with the same delivery, will be disposed of six weeks after 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 the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples 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.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

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 analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

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.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. 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) quantification by sedimentation is performed. 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.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Subscript "A" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Clancy Consulting, Dunham Court, 2 Dunham Road, Altrincham, Cheshire, UK, WA14 4NX

Project: Paradise Wharf, Manchester

Clients Project No: 10/1836

Project No: 22/09751

Date Received: 05/10/2022 (am)

Cool Box Temperatures (°C): 15.1, 15.1, 15.5, 15.0

Lab Sample ID	22/09751/1	22/09751/4	22/09751/5
Client Sample No			
Client Sample ID/Depth	BH1 0.20m	BH2 1.00m	BH2 1.40m
Date Sampled	20/09/22	20/09/22	20/09/22
Deviation Code			
F	✓	✓	✓

Key

F Maximum holding time exceeded between sampling date and analysis for analytes listed below

HOLDING TIME EXCEEDANCES

Lab Sample ID	22/09751/1	22/09751/4	22/09751/5
Client Sample No			
Client Sample ID/Depth	BH1 0.20m	BH2 1.00m	BH2 1.40m
Date Sampled	20/09/22	20/09/22	20/09/22
PAH-16MS	✓	✓	✓
VPHCWG	✓		✓
PAH (total 17)			✓
BTEX (total)			✓

Note: 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 (for water samples $5 \pm 3^{\circ}\text{C}$), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	22/09751/1	22/09751/2	22/09751/3	22/09751/4	22/09751/5	22/09751/6	22/09751/7	22/09751/8	22/09751/9	22/09751/10	22/09751/11
Client Sample No											
Client Sample ID/Depth	BH1 0.20m	BH1A 0.20m	BH1B 0.40m	BH2 1.00m	BH2 1.40m	BH3 0.30m	BH3 1.60m	BH3 3.40m	BH3 4.40m	BH2 0.40m	BH3 1.20m
Date Sampled	20/09/22	22/09/22	26/09/22	20/09/22	20/09/22	22/09/22	22/09/22	22/09/22	22/09/22	20/09/22	22/09/22
A-T-004s		10/10/2022			10/10/2022			10/10/2022			
A-T-007s		07/10/2022			07/10/2022			07/10/2022			
A-T-019s	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022	10/10/2022		
A-T-022s	10/10/2022	10/10/2022			10/10/2022		10/10/2022	10/10/2022	10/10/2022		
A-T-024s	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022		
A-T-025w		17/10/2022			17/10/2022			17/10/2022			
A-T-026s		12/10/2022			12/10/2022			12/10/2022	12/10/2022	12/10/2022	12/10/2022
A-T-026w		17/10/2022			17/10/2022			17/10/2022			
A-T-027s	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022		
A-T-030s		06/10/2022			11/10/2022			11/10/2022			
A-T-031s	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022		
A-T-031w		17/10/2022			17/10/2022			17/10/2022			
A-T-032s	12/10/2022	12/10/2022			12/10/2022		12/10/2022	12/10/2022	12/10/2022		
A-T-032w		17/10/2022			17/10/2022			17/10/2022			
A-T-037w		17/10/2022			17/10/2022			17/10/2022			
A-T-040s	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022		
A-T-044	07/10/2022	07/10/2022	07/10/2022	07/10/2022	07/10/2022	07/10/2022	07/10/2022	07/10/2022	07/10/2022	07/10/2022	07/10/2022
A-T-045	06/10/2022	06/10/2022	06/10/2022	06/10/2022	06/10/2022	06/10/2022	06/10/2022	06/10/2022	06/10/2022		
A-T-050w		17/10/2022			17/10/2022			17/10/2022			
A-T-054	11/11/2022	11/11/2022									
A-T-055s	10/10/2022	10/10/2022			10/10/2022		10/10/2022	10/10/2022	10/10/2022		
A-T-ANCs		12/10/2022			12/10/2022			12/10/2022			
Calc-As Recd	10/10/2022	10/10/2022			10/10/2022		10/10/2022	10/10/2022	10/10/2022		
Calc-no stones		17/10/2022			17/10/2022			17/10/2022			
Probe (w)		17/10/2022			17/10/2022			17/10/2022			

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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/10805
Issue Number: 1

Date: 09 November, 2022

Client: Clancy Consulting
Dunham Court
2 Dunham Road
Altrincham
Cheshire
UK
WA14 4NX

Project Manager: Phil Hill/Sean Pilling
Project Name: Paradise Wharf, Manchester
Project Ref: 10 1836
Order No: TBC
Date Samples Received: 03/11/22
Date Instructions Received: 03/11/22
Date Analysis Completed: 09/11/22

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 22/10805

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10 1836

Lab Sample ID	22/10805/1							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1B									
Depth to Top	2.00									
Depth To Bottom	2.30									
Date Sampled	20-Oct-22									
Sample Type	Soil - ES									
Sample Matrix Code	6AB									
% Stones >10mm _A	13.1							% w/w	0.1	A-T-044
pH _D ^{M#}	7.96							pH	0.01	A-T-031s
Arsenic _D ^{M#}	12							mg/kg	1	A-T-024s
Beryllium _D	1.7							mg/kg	0.5	A-T-024s
Boron (water soluble) _D	1.2							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.6							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	68							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Lead _D ^{M#}	63							mg/kg	1	A-T-024s
Mercury _D	0.35							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	31							mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1							mg/kg	1	A-T-024s
Vanadium _D ^{M#}	37							mg/kg	1	A-T-024s
Zinc _D ^{M#}	60							mg/kg	5	A-T-024s

Envirolab Job Number: 22/10805/1

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10 1836

Lab Sample ID	22/10805/1							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1B									
Depth to Top	2.00									
Depth To Bottom	2.30									
Date Sampled	20-Oct-22									
Sample Type	Soil - ES									
Sample Matrix Code	6AB									
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	NAD									A-T-045
Asbestos Matrix (visual) _D	-									A-T-045
Asbestos Matrix (microscope) _D	-									A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A									A-T-045

Envirolab Job Number: 22/10805

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10 1836

Lab Sample ID	22/10805/1							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1B									
Depth to Top	2.00									
Depth To Bottom	2.30									
Date Sampled	20-Oct-22									
Sample Type	Soil - ES									
Sample Matrix Code	6AB									
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08							mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/10805/1

Client Project Name: Paradise Wharf, Manchester

Client Project Ref: 10 1836

Lab Sample ID	22/10805/1									
Client Sample No										
Client Sample ID	BH1B									
Depth to Top	2.00									
Depth To Bottom	2.30									
Date Sampled	20-Oct-22									
Sample Type	Soil - ES									
Sample Matrix Code	6AB									
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	3							mg/kg	1	A-T-055s
Total Aliphatics _A	3							mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<2							mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	1							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	1							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	5							mg/kg	1	A-T-055s
Total Aromatics _A	7							mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	10							mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

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 with the same delivery, will be disposed of six weeks after 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 the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples 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.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

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 analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

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.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. 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) quantification by sedimentation is performed. 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.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Subscript "A" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these

humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Clancy Consulting, Dunham Court, 2 Dunham Road, Altrincham, Cheshire, UK, WA14 4NX

Project No: 22/10805

Date Received: 03/11/2022 (am)

Project: Paradise Wharf, Manchester

Cool Box Temperatures (°C): 11.9

Clients Project No: 10 1836

Lab Sample ID	22/10805/1
Client Sample No	
Client Sample ID/Depth	BH1B 2.00-2.30m
Date Sampled	20/10/22
Deviation Code	
F	✓

Key

F Maximum holding time exceeded between sampling date and analysis for analytes listed below

HOLDING TIME EXCEEDANCES

Lab Sample ID	22/10805/1
Client Sample No	
Client Sample ID/Depth	BH1B 2.00-2.30m
Date Sampled	20/10/22
PAH-16MS	✓
VPHCWG	✓

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	22/10805/1
Client Sample No	
Client Sample ID/Depth	BH1B 2.00-2.30m
Date Sampled	20/10/22
A-T-019s	07/11/2022
A-T-022s	07/11/2022
A-T-024s	09/11/2022
A-T-027s	09/11/2022
A-T-031s	09/11/2022
A-T-040s	09/11/2022
A-T-044	04/11/2022
A-T-045	04/11/2022
A-T-055s	07/11/2022
Calc-As Recd	07/11/2022

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

APPENDIX V
GEOTECHNICAL LABORATORY TEST RESULTS



LABORATORY REPORT



4043

Contract Number: PSL22/6276

Report Date: 17 October 2022
Client's Reference: 10 1836
Client Name: Clancy Consulting
Dunham Court
2 Dunham Road
Altrincham
Cheshire
WA144NX

For the attention of: Sean Pilling

Contract Title: Paradise Wharf
Date Received: 28/9/2022
Date Commenced: 28/9/2022
Date Completed: 17/10/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)


T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: awatkins@prosoils.co.uk
rberriman@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Paradise Wharf

Contract No:

PSL22/6276

Client Ref:

10 1836

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



4043

PSL

Professional Soils Laboratory

Paradise Wharf

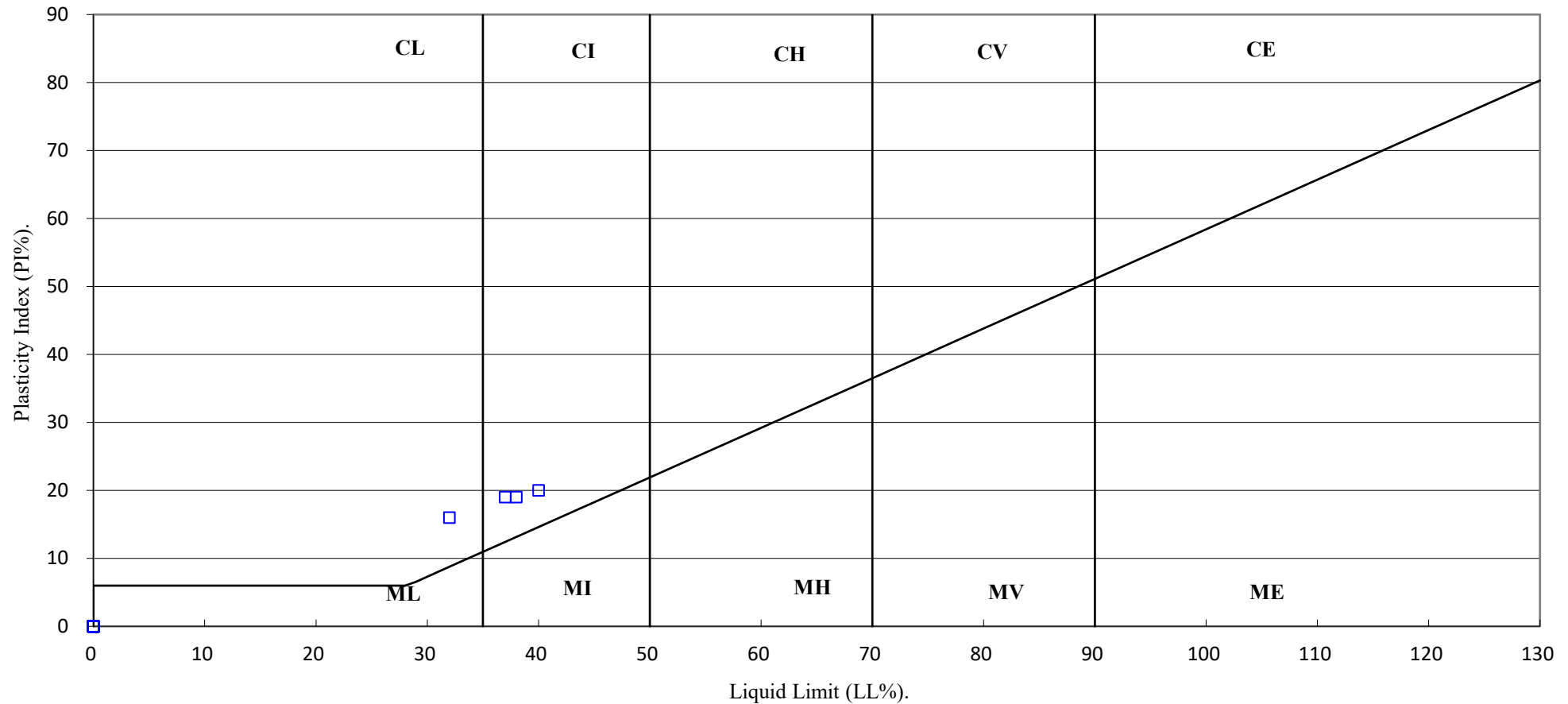
Contract No:

PSL22/6276

Client Ref:

10 1836

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Paradise Wharf

Contract No:

PSL22/6276

Client Ref:

10 1836

PARTICLE SIZE DISTRIBUTION TEST

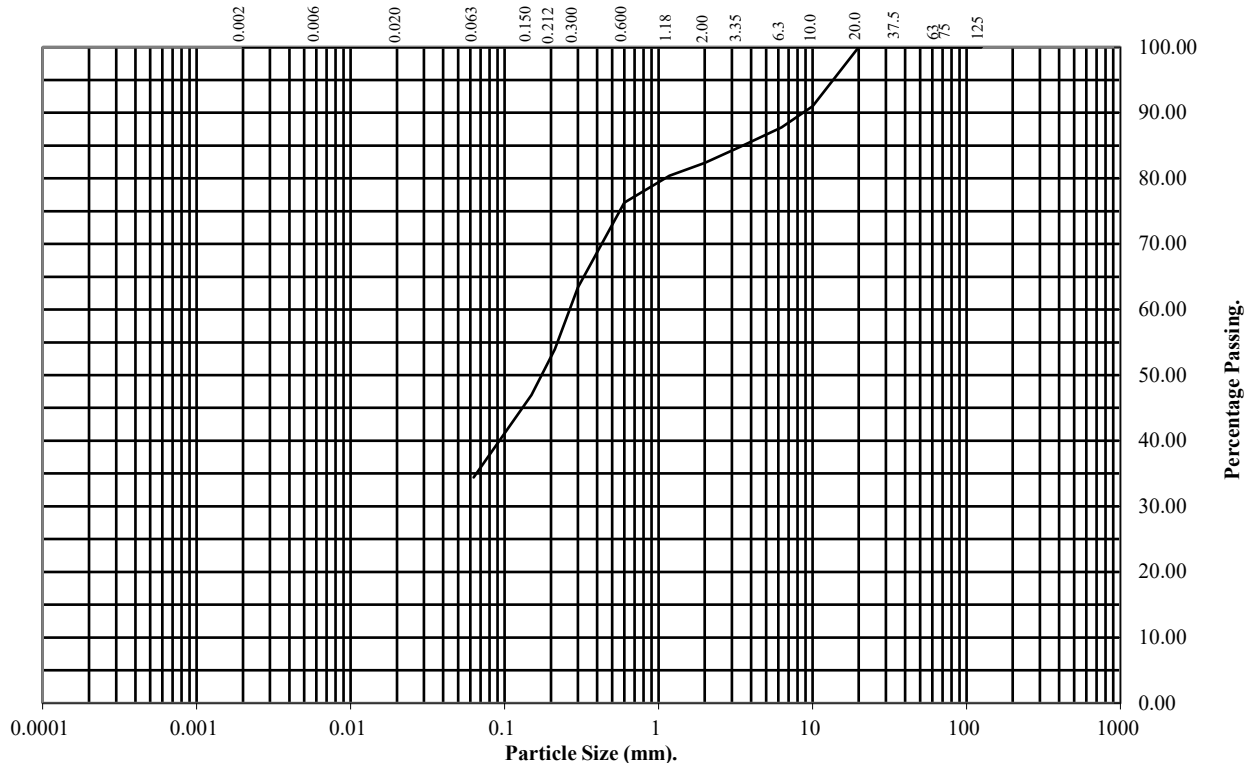
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BH2 Top Depth (m): 4.00

Sample Number: Base Depth(m): 4.45

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	91
6.3	88
3.35	85
2	82
1.18	80
0.6	76
0.3	63
0.212	54
0.15	47
0.063	34

Soil Fraction	Total Percentage
Cobbles	0
Gravel	18
Sand	48
Silt/Clay	34

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

Paradise Wharf

Contract No:
PSL22/6276
Client Ref:
10 1836

PARTICLE SIZE DISTRIBUTION TEST

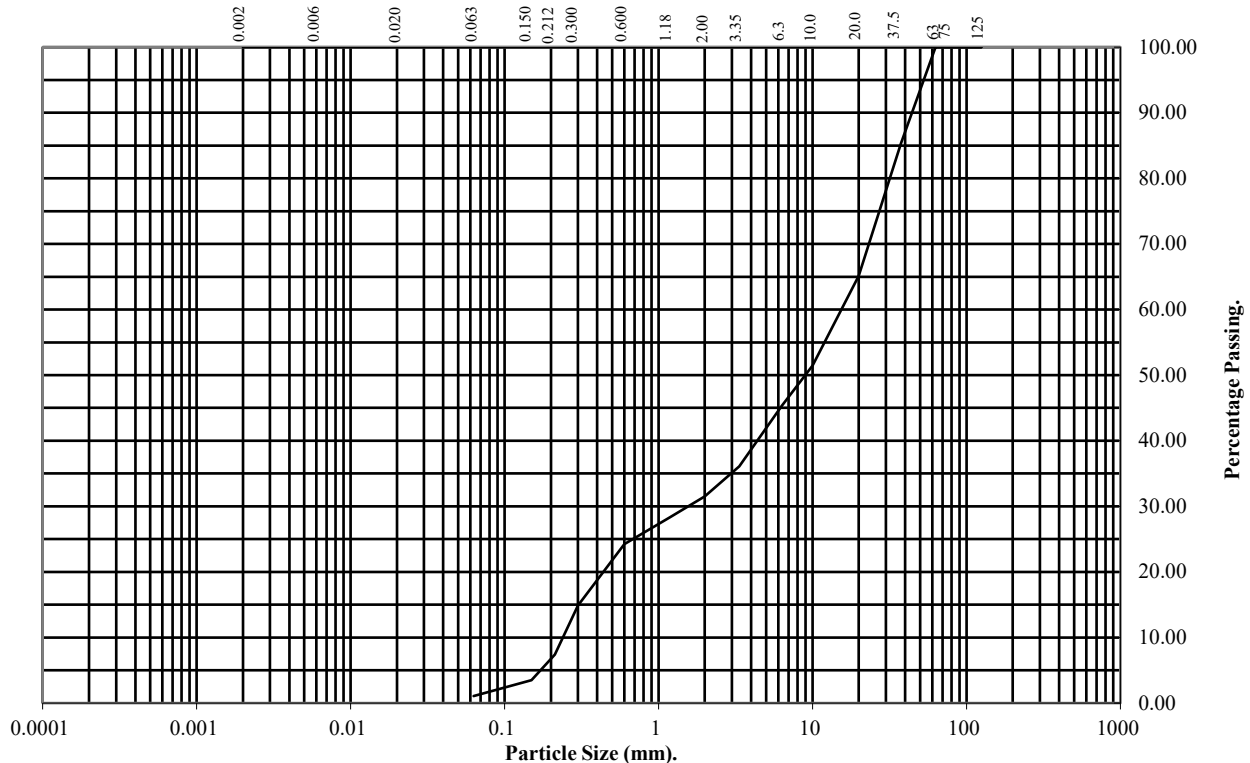
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BH3 Top Depth (m): 15.00

Sample Number: Base Depth(m): 15.45

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	85
20	65
10	51
6.3	45
3.35	36
2	32
1.18	28
0.6	24
0.3	15
0.212	7
0.15	3
0.063	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	68
Sand	31
Silt/Clay	1

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

Paradise Wharf

Contract No:
PSL22/6276
Client Ref:
10 1836

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

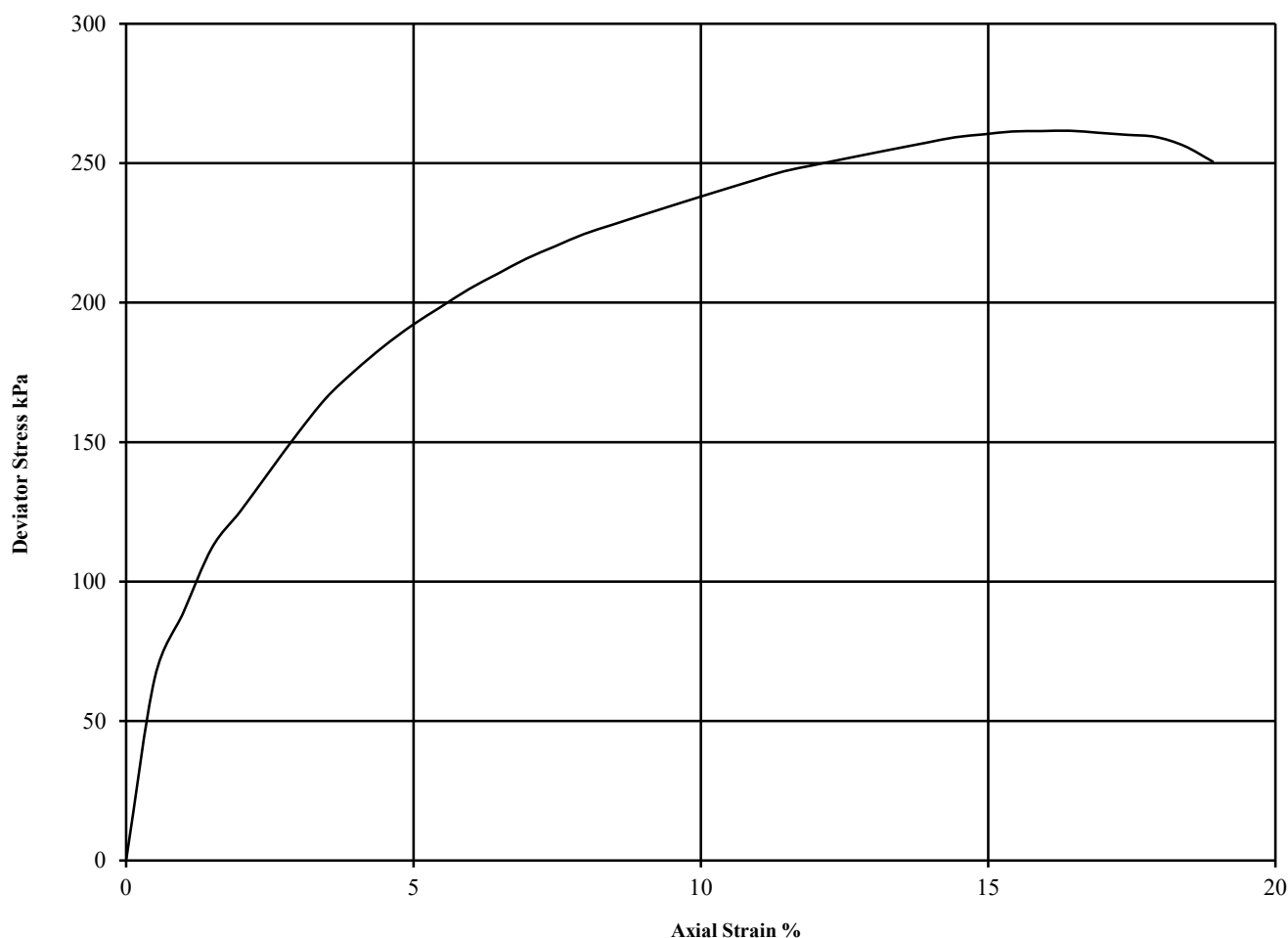
Hole Number: BH2

Top Depth (m): 5.50

Sample Number:

Base Depth (m): 5.95

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	17	2.16	1.85	200	262	131	16.4	Brittle	



4043

PSL

Professional Soils Laboratory

Paradise Wharf

Contract No:

PSL22/6276

Client Ref:

10 1836

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

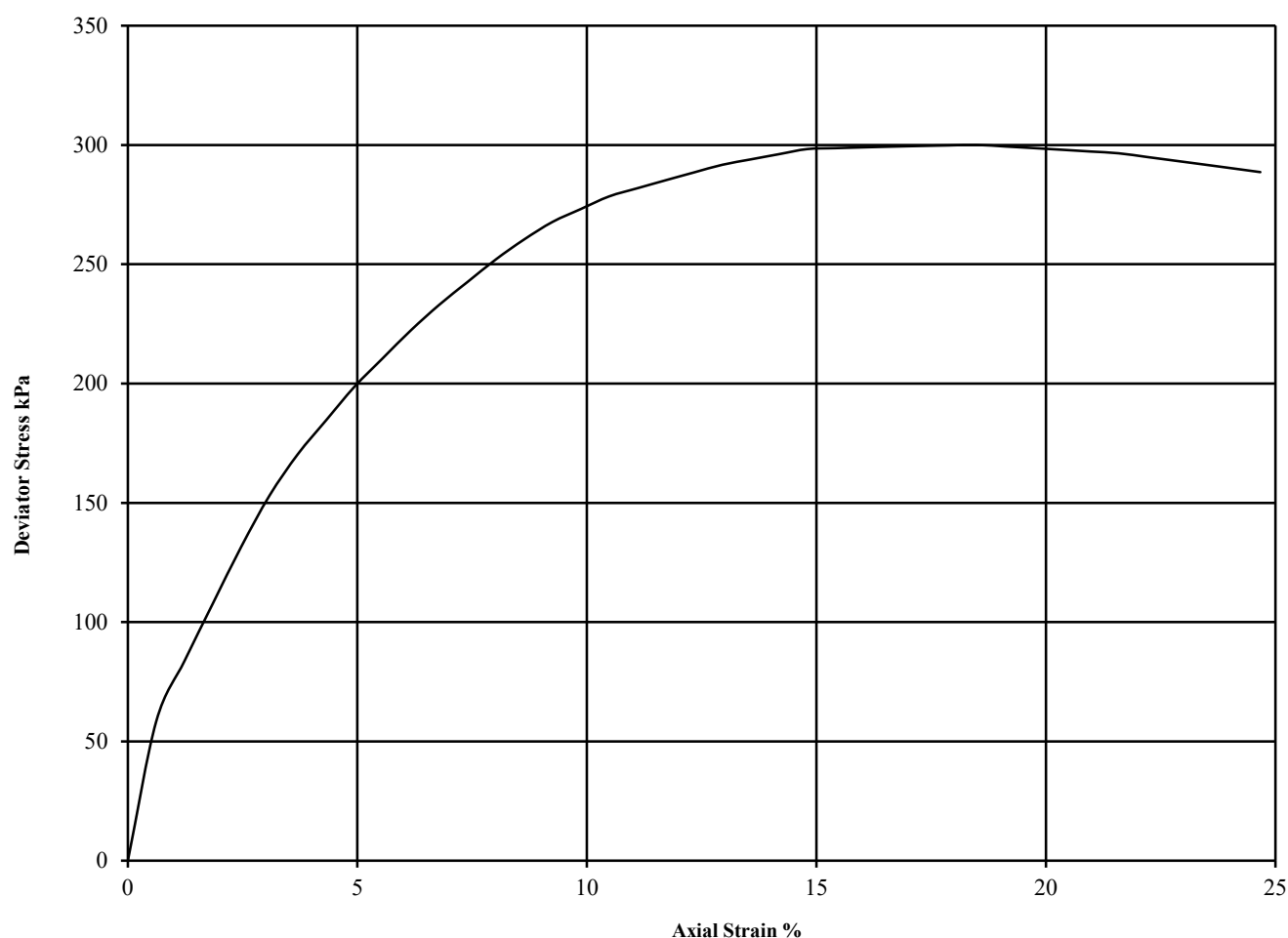
Hole Number: BH2

Top Depth (m): 10.00

Sample Number:

Base Depth (m): 10.95

Sample Type U



Diameter (mm):		103	Height (mm):		167	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.33 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	16	2.09	1.81	200	300	150	18.5	Brittle	



4043

PSL
Professional Soils Laboratory

Paradise Wharf

Contract No:

PSL22/6276

Client Ref:

10 1836

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

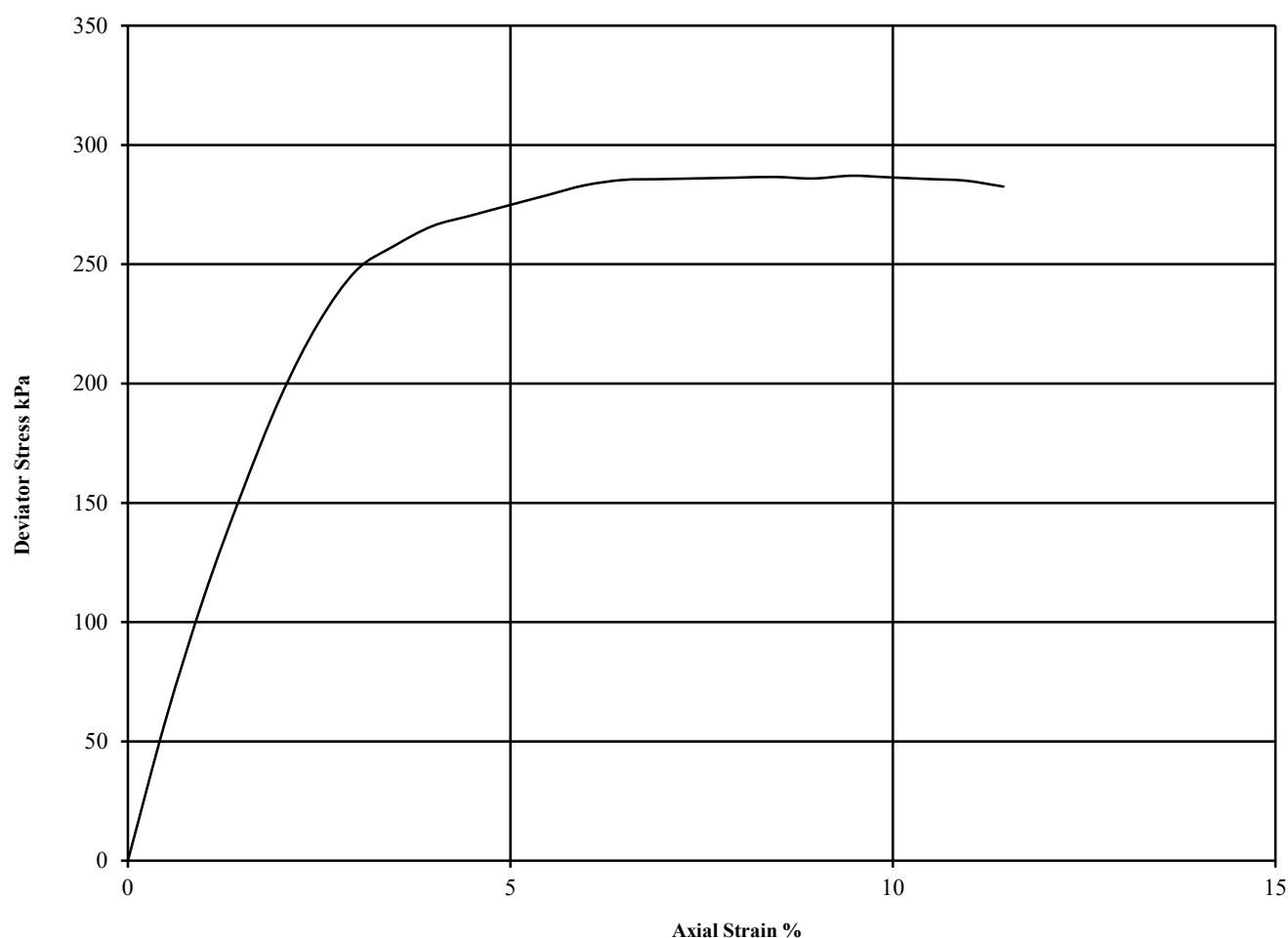
Hole Number: BH3

Top Depth (m): 7.00

Sample Number:

Base Depth (m): 7.45

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.35 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	16	2.15	1.86	140	287	144	9.5	Brittle	



4043

PSL

Professional Soils Laboratory

Paradise Wharf

Contract No:

PSL22/6276

Client Ref:

10 1836

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

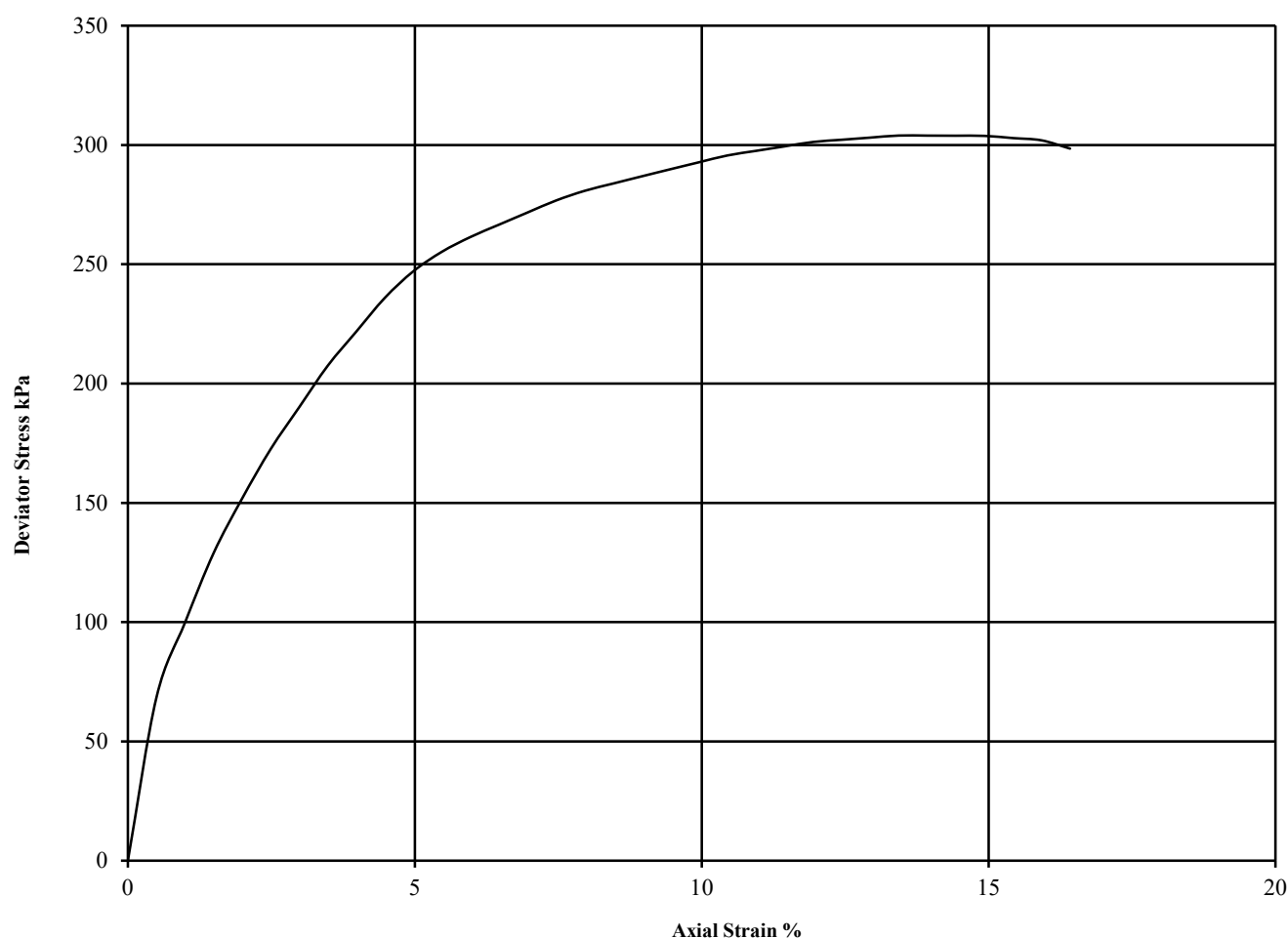
Hole Number: BH3

Top Depth (m): 11.50

Sample Number:

Base Depth (m): 11.95

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	11	2.16	1.95	230	304	152	13.4	Brittle	



4043

PSL

Professional Soils Laboratory

Paradise Wharf

Contract No:

PSL22/6276

Client Ref:

10 1836



Certificate of Analysis

Certificate Number 22-20356

Issued: 14-Oct-22

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 22-20356

Client Reference PSL22/6276

Order No (not supplied)

Contract Title Paradise Wharf

Description 6 Soil samples.

Date Received 11-Oct-22

Date Started 11-Oct-22

Date Completed 14-Oct-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 22-20356

Client Ref PSL22/6276

Contract Title Paradise Wharf

Lab No	2069852	2069853	2069854	2069855	2069856	2069857
Sample ID	BH2	BH2	BH2	BH3	BH3	BH2
Depth	6.00	8.50	10.50	12.00	17.50	15.00
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Inorganics									
pH	DETSC 2008#		pH	8.4	8.5	8.5	8.5	7.9	7.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	16	25	20	15	24	18

Information in Support of the Analytical Results

Our Ref 22-20356
 Client Ref PSL22/6276
 Contract Paradise Wharf

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2069852	BH2 6.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2069853	BH2 8.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2069854	BH2 10.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2069855	BH3 12.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2069856	BH3 17.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2069857	BH2 15.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/- 2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

APPENDIX VI
GROUND GAS MONITORING RECORDS

MONITORING RESULTS

CLIENT: Victor (M1) Ltd

JOB NO: 10/1836

SITE: Paradise Wharf, Ducie Street

SHEET: 1 of 6

DATE: 20/10/2022

Ambient Concentration (% Volume)		CH4	0.0	CO2	0.5
		O2	20.1		

Monitoring Point			Gas Concentration								Gas Flow Rate	Remarks
			Highest			Steady			Lowest	H2S		
Ref	GWL	Depth	CH4		CO2	CH4		CO2	O2			
	(m)BGL	(m) BGL	% LEL	% v/v	(%)	% LEL	% v/v	(%)	(%)	ppm	l/hr	
BH2 - New	3.97	5	0	-0.1	1.9	0	0.1	1.6	14.8	0	0.0	
BH3 - New	3.21	4.5	0	0.2	2.3	0	0.0	1.8	14.6	0	0.0	

Barometric Pressure (mb):	1007	Monitoring Equipment:	GFM435
Barometric Trend:	Falling	Date Of Last Calibration:	04/04/2022
Weather:	Fair	Operator:	TB
Ground Condition:	Dry		

KEY	Remarks
ND - None Detected NR - Not Recorded POS - Positive Flow NEG - Negative Flow	

Checked: SP	Approved: SHP
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MONITORING RESULTS

CLIENT: Victor (M1) Ltd

JOB NO: 10/1836

SITE: Paradise Wharf, Ducie Street

SHEET: 2 of 6

DATE: 31/10/2022

Ambient Concentration (% Volume)			CH4		0.0		CO2		0.5			
			O2		20.7							
Monitoring Point			Gas Concentration								Gas Flow Rate	Remarks
			Highest				Steady		Lowest	H2S		
Ref	GWL	Depth	CH4		CO2	CH4		CO2	O2			
	(m)BGL	(m) BGL	% LEL	% v/v	(%)	% LEL	% v/v	(%)	(%)	ppm	l/hr	
BH1B - New	1.89	3.5	0	-0.1	0.3	0	-0.1	0.3	20.1	0	0.0	
BH2 - New	2.93	5	0	-0.1	2.9	0	-0.1	2.9	16.1	0	0.0	
BH3 - New	3.32	4.5	0	-0.1	1.9	0	-0.1	1.9	17.6	0	0.0	

Barometric Pressure (mb):	1007	Monitoring Equipment:	GA94a Gas Analyser
Barometric Trend:	Steady	Date Of Last Calibration:	04/04/2022
Weather:	Fair	Operator:	SP
Ground Condition:	Dry		

KEY	Remarks
ND - None Detected NR - Not Recorded POS - Positive Flow NEG - Negative Flow	

Checked: RP	Approved: SHP
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MONITORING RESULTS

CLIENT: Victor (M1) Ltd

JOB NO: 10/1836

SITE: Paradise Wharf, Ducie Street

SHEET: 3 of 6

DATE: 09/11/2022

Ambient Concentration (% Volume)			CH4		0.0		CO2		0.5			
			O2		21.1							
Monitoring Point			Gas Concentration								Gas Flow Rate	Remarks
			Highest				Steady		Lowest	H2S		
Ref	GWL	Depth	CH4		CO2	CH4		CO2	O2			
	(m)BGL	(m) BGL	% LEL	% v/v	(%)	% LEL	% v/v	(%)	(%)	ppm	l/hr	
BH1B - New	1.82	3.5	0	0.0	0.4	0	0.0	0.4	20.1	0	0.0	
BH2 - New	2.82	5	0	0.0	1.5	0	0.0	1.5	17.1	0	0.0	
BH3 - New	3.10	4.5	0	0.0	3.9	0	0.0	3.9	12.1	0	0.0	

Barometric Pressure (mb):	992	Monitoring Equipment:	GFM435
Barometric Trend:	Falling	Date Of Last Calibration:	04/04/2022
Weather:	Sunny	Operator:	TB
Ground Condition:	Dry		

KEY	Remarks
ND - None Detected NR - Not Recorded POS - Positive Flow NEG - Negative Flow	

Checked: SP	Approved: SP
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MONITORING RESULTS

CLIENT: Victor (M1) Ltd

JOB NO: 10/1836

SITE: Paradise Wharf, Ducie Street

SHEET: 4 of 6

DATE: 01/12/2022

Ambient Concentration (% Volume)			CH4		0.0		CO2		1.6			
			O2		17.6							
Monitoring Point			Gas Concentration								Gas Flow Rate	Remarks
			Highest			Steady			Lowest	H2S		
Ref	GWL	Depth	CH4		CO2	CH4		CO2	O2			
	(m)BGL	(m) BGL	% LEL	% v/v	(%)	% LEL	% v/v	(%)	(%)	ppm	l/hr	
BH1B - New	1.90	3.5	0	0.0	1.9	0	0.0	0.8	18.8	0.0	0.0	
BH2 - New	2.98	5	0	0.0	0.0	0	0.0	0.0	17.5	0.0	0.0	
BH3 - New	2.90	4.5	0	0.0	4.1	0	0.0	0.2	17.1	0.0	0.1	

Barometric Pressure (mb):	1003	Monitoring Equipment:	GFM436
Barometric Trend:	Rising	Date Of Last Calibration:	09/11/2021
Weather:	Overcast	Operator:	TB
Ground Condition:	wet		

KEY	Remarks
ND - None Detected NR - Not Recorded POS - Positive Flow NEG - Negative Flow	-

Checked: NR	Approved: NR
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MONITORING RESULTS

CLIENT: Victor (M1) Ltd

JOB NO: 10/1836

SITE: Paradise Wharf, Ducie Street

SHEET: 5 of 6

DATE: 08/12/2022

Ambient Concentration (% Volume)			CH4		0.0		CO2		0.3			
			O2		17.1							
Monitoring Point			Gas Concentration								Gas Flow Rate	Remarks
			Highest				Steady		Lowest	H2S		
Ref	GWL	Depth	CH4		CO2	CH4		CO2	O2			
	(m)BGL	(m) BGL	% LEL	% v/v	(%)	% LEL	% v/v	(%)	(%)	ppm	l/hr	
BH1B - New	2.10	3.5	0	0.0	0.8	0	0.0	0.1	17.40	0.0	0.0	
BH2 - New	2.80	5	0	0.0	0.2	0	0.0	0.0	17.10	0.0	0.0	
BH3 - New	3.06	4.5	0	0.0	2.4	0	0.0	0.1	16.9	0.0	0.0	

Barometric Pressure (mb): 997	Monitoring Equipment: GFM436
Barometric Trend: Steady	Date Of Last Calibration: 09/11/2021
Weather: Snowing	Operator: TB
Ground Condition: Frozen	

KEY	Remarks
ND - None Detected NR - Not Recorded POS - Positive Flow NEG - Negative Flow	-

Checked: NR	Approved: NR
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MONITORING RESULTS

CLIENT: Victor (M1) Ltd

JOB NO: 10/1836

SITE: Paradise Wharf, Ducie Street

SHEET: 6 of 6

DATE: 06/01/2023

Ambient Concentration (% Volume)			CH4		0.0		CO2		0.2			
			O2		20.6							
Monitoring Point			Gas Concentration								Gas Flow Rate	Remarks
			Highest			Steady			Lowest	H2S		
Ref	GWL	Depth	CH4		CO2	CH4		CO2	O2			
	(m)BGL	(m) BGL	% LEL	% v/v	(%)	% LEL	% v/v	(%)	(%)	ppm	l/hr	
BH1B - New	1.90	3.5	0	0.1	0.3	0	0.1	0.3	14.8	0.0	0.0	
BH2 - New	2.85	5	0	0.1	2.3	0	0.1	2.3	17.2	0.0	0.0	
BH3 - New	3.05	4.5	0	0.1	1.5	0	0.1	1.5	16.8	0.0	0.0	

Barometric Pressure (mb):	1005	Monitoring Equipment:	GA94a Gas Analyser
Barometric Trend:	Falling	Date Of Last Calibration:	09/12/2022
Weather:	Fair	Operator:	SP
Ground Condition:	Dry		

KEY	Remarks
ND - None Detected NR - Not Recorded POS - Positive Flow NEG - Negative Flow	

Checked: NR	Approved: NR
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APPENDIX VII
WASTE SOIL CLASSIFICATION

Final Test Report

Envirolab Job Number: 22/09751
Issue Number: 1

Date: 17-Oct-22

Client: Clancy Consulting
Dunham Court
2 Dunham Road
Altrincham
Cheshire
UK, WA14 4NX

Project Manager: Phil Hill/Sean Pilling
Project Name: Paradise Wharf, Manchester
Project Ref: 10/1836
Order No: 13561 / PJH / ZMW

Date Samples Received: 5-Oct-22
Date Instructions Received: 5-Oct-22
Date Analysis Completed: 17-Oct-22

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in *italic font* they are associated with such quality control failures and may be unreliable.

A deviating samples 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

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

HWOL TPH Code: EH_CU_ID_AL: Extractable hydrocarbons - i.e. everything extracted by the solvent(s), Clean-up - e.g. by florisil, silica gel, GC - Single coil gas chromatography, Aliphatics only

Approved by:



Richard Wong
Client Manager

Sample Details					Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	22/09751/2				
Client Sample Number					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				BH1A				
Depth to Top				0.2				
Depth to Bottom								
Date Sampled				22/09/2022				
Sample Type				Soil				
Sample Matrix Code				4A				
Solid Waste Analysis								
pH (pH Units) _D	A-T-031	N	N	8.45	-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	1.34	-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.61	-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	NDP	-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	3.72	3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	46.5	100	-	-	
Mineral Oil (mg/kg) _{A EH, CU, ID, AL}	A-T-007	N	N	557	500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007	1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01	6	-	-	
Eluate Analysis				10:1 mg/l	10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	0.022	0.220	0.5	2	25
Barium	A-T-025	N	N	0.030	0.300	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.012	0.120	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.001	0.010	0.5	10	30
Nickel	A-T-025	N	N	<0.002	<0.02	0.4	10	40
Lead	A-T-025	N	N	0.017	0.170	0.5	10	50
Antimony	A-T-025	N	N	0.003	0.030	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.007	0.070	4	50	200
Chloride	A-T-026	N	N	4	39	800	15000	25000
Fluoride	A-T-026	N	N	0.5	5.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	4	42	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	91	910	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<2.0	<200	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	7.3				
Conductivity (µS/cm)	A-T-037	N	N	182				
Mass Sample (kg)				0.195				
Dry Matter (%)	A-T-044	N	N	89.7				
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation								

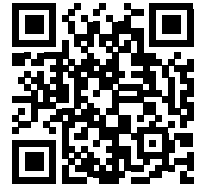
Sample Details					Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	22/09751/5				
Client Sample Number					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				BH2				
Depth to Top				1.4				
Depth to Bottom								
Date Sampled				20/09/2022				
Sample Type				Soil				
Sample Matrix Code				4A				
Solid Waste Analysis								
pH (pH Units) _D	A-T-031	N	N	8.12	-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.13	-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.13	-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	4.7	-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	2.77	3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	1.3	100	-	-	
Mineral Oil (mg/kg) _{A EH_CU_ID_AL}	A-T-007	N	N	<10	500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007	1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01	6	-	-	
Eluate Analysis				10:1 mg/l	10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	0.008	0.080	0.5	2	25
Barium	A-T-025	N	N	0.014	0.140	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.001	0.010	0.5	10	70
Copper	A-T-025	N	N	0.007	0.070	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.011	0.110	0.5	10	30
Nickel	A-T-025	N	N	<0.002	<0.02	0.4	10	40
Lead	A-T-025	N	N	0.010	0.100	0.5	10	50
Antimony	A-T-025	N	N	0.003	0.030	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.004	0.040	4	50	200
Chloride	A-T-026	N	N	<1.00	<10	800	15000	25000
Fluoride	A-T-026	N	N	0.6	6.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	9	91	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	55	550	4000	60000	100000
Phenol Index	A-T-050	N	N	0.01	0.10	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<2.0	<200	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	7.4				
Conductivity (µS/cm)	A-T-037	N	N	111				
Mass Sample (kg)				0.201				
Dry Matter (%)	A-T-044	N	N	87.2				
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation								

Sample Details								
Lab Sample ID	Method	ISO17025	MCERTS	22/09751/8	Landfill Waste Acceptance Criteria Limits			
Client Sample Number					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				BH3				
Depth to Top				3.4				
Depth to Bottom								
Date Sampled				22/09/2022				
Sample Type				Solid				
Sample Matrix Code				7				
Solid Waste Analysis								
pH (pH Units) _D	A-T-031	N	N	8.13	-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.72	-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.33	-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	5.5	-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	2.46	3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	3.5	100	-	-	
Mineral Oil (mg/kg) _{A EH_CU_ID_AL}	A-T-007	N	N	308	500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007	1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	0.03	6	-	-	
Eluate Analysis				10:1 mg/l	10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	0.003	0.030	0.5	25	
Barium	A-T-025	N	N	0.046	0.460	20	300	
Cadmium	A-T-025	N	N	<0.001	<0.01	0.04	5	
Chromium	A-T-025	N	N	<0.001	<0.01	0.5	70	
Copper	A-T-025	N	N	0.017	0.170	2	100	
Mercury	A-T-025	N	N	<0.0005	<0.005	0.01	2	
Molybdenum	A-T-025	N	N	0.023	0.230	0.5	30	
Nickel	A-T-025	N	N	<0.002	<0.02	0.4	40	
Lead	A-T-025	N	N	0.001	0.010	0.5	50	
Antimony	A-T-025	N	N	0.003	0.030	0.06	5	
Selenium	A-T-025	N	N	<0.001	<0.01	0.1	7	
Zinc	A-T-025	N	N	0.004	0.040	4	200	
Chloride	A-T-026	N	N	3	34	800	25000	
Fluoride	A-T-026	N	N	0.6	6.0	10	500	
Sulphate as SO ₄	A-T-026	N	N	39	388	1000	50000	
Total Dissolved Solids	A-T-035	N	N	152	1520	4000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-	
Dissolved Organic Carbon	A-T-032	N	N	<2.0	<200	500	1000	
Leach Test Information								
pH (pH Units)	A-T-031	N	N	7.4				
Conductivity (µS/cm)	A-T-037	N	N	304				
Mass Sample (kg)				0.228				
Dry Matter (%)	A-T-044	N	N	76.8				
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation								

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:

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



UB4UO-BKLUK-8LDKF

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

Job name

10/1836 Paradise Wharf

Description/Comments

Project

Site

Classified by

Name: **Robert Philip**
Date: **11 Nov 2022 10:06 GMT**
Telephone:

Company: **Clancy Consulting Limited**

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:

Course
Hazardous Waste Classification

Date

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	BH1	0.20	Non Hazardous		2
2	BH1A	0.20	Hazardous	HP 3(i), HP 7, HP 11	4
3	BH1B	0.40	Non Hazardous		7
4	BH2	1.00	Non Hazardous		9
5	BH2[2]	1.40	Non Hazardous		11
6	BH3	0.30	Non Hazardous		13
7	BH3[2]	1.60	Non Hazardous		15
8	BH3[3]	3.40	Hazardous	HP 3(i), HP 7, HP 11	17
9	BH3[4]	4.40	Non Hazardous		20
10	BH1B[2]	2.0	Non Hazardous		23

Related documents

#	Name	Description
1	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Robert Philip

Created date: 11 Nov 2022 10:06 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	25
Appendix B: Rationale for selection of metal species	26
Appendix C: Version	26

Classification of sample: BH1

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

Sample details

Sample name:	LoW Code:
BH1	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.20 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				28	mg/kg	1.32	36.969	mg/kg	0.0037 %		
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				0.8	mg/kg	2.775	2.22	mg/kg	0.000222 %		
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				1.1	mg/kg	1.142	1.257	mg/kg	0.000126 %		
	048-002-00-0	215-146-2	1306-19-0									
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<LOD
	024-017-00-8											
6	copper { dicopper oxide; copper (I) oxide }				58	mg/kg	1.126	65.302	mg/kg	0.00653 %		
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	171	mg/kg	1.56	266.728	mg/kg	0.0171 %		
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				2.27	mg/kg	1.353	3.072	mg/kg	0.000307 %		
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				19	mg/kg	2.976	56.549	mg/kg	0.00565 %		
	028-035-00-7	238-766-5	14721-18-7									
10	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									
11	zinc { zinc chromate }				108	mg/kg	2.774	299.608	mg/kg	0.03 %		
	024-007-00-3	236-878-9	13530-65-9									
12	TPH (C6 to C40) petroleum group				422	mg/kg		422	mg/kg	0.0422 %		
			TPH									
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
14	benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
15	toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
16	ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
17	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]									

#	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							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
18	pH		PH		8.36 pH		8.36 pH	8.36 pH		
19	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	acenaphthylene		205-917-1	208-96-8	0.01 mg/kg		0.01 mg/kg	0.000001 %		
21	acenaphthene		201-469-6	83-32-9	0.04 mg/kg		0.04 mg/kg	0.000004 %		
22	fluorene		201-695-5	86-73-7	0.02 mg/kg		0.02 mg/kg	0.000002 %		
23	phenanthrene		201-581-5	85-01-8	0.24 mg/kg		0.24 mg/kg	0.000024 %		
24	anthracene		204-371-1	120-12-7	0.07 mg/kg		0.07 mg/kg	0.000007 %		
25	fluoranthene		205-912-4	206-44-0	0.78 mg/kg		0.78 mg/kg	0.000078 %		
26	pyrene		204-927-3	129-00-0	0.72 mg/kg		0.72 mg/kg	0.000072 %		
27	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.48 mg/kg		0.48 mg/kg	0.000048 %		
28	chrysene	601-048-00-0	205-923-4	218-01-9	0.57 mg/kg		0.57 mg/kg	0.000057 %		
29	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.62 mg/kg		0.62 mg/kg	0.000062 %		
30	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.21 mg/kg		0.21 mg/kg	0.000021 %		
31	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.56 mg/kg		0.56 mg/kg	0.000056 %		
32	indeno[123-cd]pyrene		205-893-2	193-39-5	0.42 mg/kg		0.42 mg/kg	0.000042 %		
33	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.11 mg/kg		0.11 mg/kg	0.000011 %		
34	benzo[ghi]perylene		205-883-8	191-24-2	0.42 mg/kg		0.42 mg/kg	0.000042 %		
Total:								0.107 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- ND Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Unlikely to be flammable at concentrations of less than 0.1%.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0422%)

Classification of sample: BH1A

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

Sample details

Sample name:	LoW Code:
BH1A	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 03 * (Soil and stones containing hazardous substances)
0.20 m	

Hazard properties

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to hazardous because Unlikely to be flammable at concentrations of less than 0.1%.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.11%)

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.11%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.11%)

Determinands

Moisture content: 0% No 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 }				23 mg/kg	1.32	30.367 mg/kg		0.00304 %		
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				1 mg/kg	2.775	2.775 mg/kg		0.000278 %		
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg		<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				1.5 mg/kg	1.142	1.713 mg/kg		0.000171 %		
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1 mg/kg	2.27	<2.27 mg/kg		<0.000227 %		<LOD
	024-017-00-8										

#	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								
6	copper { dicopper oxide; copper (I) oxide }				115 mg/kg	1.126	129.477 mg/kg	0.0129 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	353 mg/kg	1.56	550.615 mg/kg	0.0353 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				3.19 mg/kg	1.353	4.318 mg/kg	0.000432 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				27 mg/kg	2.976	80.359 mg/kg	0.00804 %			
	028-035-00-7	238-766-5	14721-18-7								
10	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								
11	zinc { zinc chromate }				180 mg/kg	2.774	499.346 mg/kg	0.0499 %			
	024-007-00-3	236-878-9	13530-65-9								
12	TPH (C6 to C40) petroleum group		TPH		1100 mg/kg		1100 mg/kg	0.11 %			
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	603-181-00-X	216-653-1	1634-04-4								
14	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
15	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
16	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
17	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]								
18	pH		PH		8.45 pH		8.45 pH	8.45 pH			
19	naphthalene				0.08 mg/kg		0.08 mg/kg	0.000008 %			
	601-052-00-2	202-049-5	91-20-3								
20	acenaphthylene				0.09 mg/kg		0.09 mg/kg	0.000009 %			
		205-917-1	208-96-8								
21	acenaphthene				0.26 mg/kg		0.26 mg/kg	0.000026 %			
		201-469-6	83-32-9								
22	fluorene				0.18 mg/kg		0.18 mg/kg	0.000018 %			
		201-695-5	86-73-7								
23	phenanthrene				1.84 mg/kg		1.84 mg/kg	0.000184 %			
		201-581-5	85-01-8								
24	anthracene				0.55 mg/kg		0.55 mg/kg	0.000055 %			
		204-371-1	120-12-7								
25	fluoranthene				6.22 mg/kg		6.22 mg/kg	0.000622 %			
		205-912-4	206-44-0								
26	pyrene				5.63 mg/kg		5.63 mg/kg	0.000563 %			
		204-927-3	129-00-0								
27	benzo[a]anthracene				4.3 mg/kg		4.3 mg/kg	0.00043 %			
	601-033-00-9	200-280-6	56-55-3								
28	chrysene				4.32 mg/kg		4.32 mg/kg	0.000432 %			
	601-048-00-0	205-923-4	218-01-9								
29	benzo[b]fluoranthene				5.35 mg/kg		5.35 mg/kg	0.000535 %			
	601-034-00-4	205-911-9	205-99-2								
30	benzo[k]fluoranthene				1.81 mg/kg		1.81 mg/kg	0.000181 %			
	601-036-00-5	205-916-6	207-08-9								
31	benzo[a]pyrene; benzo[def]chrysene				5.08 mg/kg		5.08 mg/kg	0.000508 %			
	601-032-00-3	200-028-5	50-32-8								
32	indeno[123-cd]pyrene				4.29 mg/kg		4.29 mg/kg	0.000429 %			
		205-893-2	193-39-5								
33	dibenz[a,h]anthracene				0.94 mg/kg		0.94 mg/kg	0.000094 %			
	601-041-00-2	200-181-8	53-70-3								

#	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							
34	benzo[ghi]perylene				4.5 mg/kg		4.5 mg/kg	0.00045 %		
		205-883-8	191-24-2							
Total:								0.225 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH1B

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

Sample details

Sample name:	LoW Code:
BH1B	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.40 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				25 mg/kg	1.32	33.008 mg/kg	0.0033 %			
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				1.4 mg/kg	2.775	3.885 mg/kg	0.000389 %			
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %			<LOD
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				1.1 mg/kg	1.142	1.257 mg/kg	0.000126 %			
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %			<LOD
	024-017-00-8										
6	copper { dicopper oxide; copper (I) oxide }				99 mg/kg	1.126	111.463 mg/kg	0.0111 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	249 mg/kg	1.56	388.394 mg/kg	0.0249 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				1.63 mg/kg	1.353	2.206 mg/kg	0.000221 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				31 mg/kg	2.976	92.264 mg/kg	0.00923 %			
	028-035-00-7	238-766-5	14721-18-7								
10	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								
11	zinc { zinc chromate }				76 mg/kg	2.774	210.835 mg/kg	0.0211 %			
	024-007-00-3	236-878-9	13530-65-9								
12	pH				8.33 pH		8.33 pH	8.33 pH			
			PH								
13	naphthalene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
14	acenaphthylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
		205-917-1	208-96-8								
15	acenaphthene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
		201-469-6	83-32-9								
16	fluorene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
		201-695-5	86-73-7								
17	phenanthrene				0.1 mg/kg		0.1 mg/kg	0.00001 %			
		201-581-5	85-01-8								

#	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							
18	anthracene	204-371-1	120-12-7		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
19	fluoranthene	205-912-4	206-44-0		0.25 mg/kg		0.25 mg/kg	0.000025 %		
20	pyrene	204-927-3	129-00-0		0.24 mg/kg		0.24 mg/kg	0.000024 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.14 mg/kg		0.14 mg/kg	0.000014 %		
22	chrysene	601-048-00-0	205-923-4		0.15 mg/kg		0.15 mg/kg	0.000015 %		
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.15 mg/kg		0.15 mg/kg	0.000015 %		
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.14 mg/kg		0.14 mg/kg	0.000014 %		
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.1 mg/kg		0.1 mg/kg	0.00001 %		
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		0.1 mg/kg		0.1 mg/kg	0.00001 %		
Total:								0.0714 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH2

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

Sample details

Sample name:	LoW Code:
BH2	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.00 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				31	mg/kg	1.32	40.93	mg/kg	0.00409 %		
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				1.9	mg/kg	2.775	5.273	mg/kg	0.000527 %		
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				1	mg/kg	1.142	1.142	mg/kg	0.000114 %		
	048-002-00-0	215-146-2	1306-19-0									
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<LOD
	024-017-00-8											
6	copper { dicopper oxide; copper (I) oxide }				81	mg/kg	1.126	91.197	mg/kg	0.00912 %		
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	162	mg/kg	1.56	252.69	mg/kg	0.0162 %		
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				0.29	mg/kg	1.353	0.393	mg/kg	0.0000393 %		
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				40	mg/kg	2.976	119.051	mg/kg	0.0119 %		
	028-035-00-7	238-766-5	14721-18-7									
10	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									
11	zinc { zinc chromate }				76	mg/kg	2.774	210.835	mg/kg	0.0211 %		
	024-007-00-3	236-878-9	13530-65-9									
12	pH				7.97	pH		7.97	pH	7.97 pH		
			PH									
13	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
14	acenaphthylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		205-917-1	208-96-8									
15	acenaphthene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
		201-469-6	83-32-9									
16	fluorene				0.01	mg/kg		0.01	mg/kg	0.000001 %		
		201-695-5	86-73-7									
17	phenanthrene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
		201-581-5	85-01-8									

#	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							
18	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	fluoranthene	205-912-4	206-44-0		0.33 mg/kg		0.33 mg/kg	0.000033 %		
20	pyrene	204-927-3	129-00-0		0.27 mg/kg		0.27 mg/kg	0.000027 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.15 mg/kg		0.15 mg/kg	0.000015 %		
22	chrysene	601-048-00-0	205-923-4		0.15 mg/kg		0.15 mg/kg	0.000015 %		
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.13 mg/kg		0.13 mg/kg	0.000013 %		
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.1 mg/kg		0.1 mg/kg	0.00001 %		
26	indeno[123-cd]pyrene	205-893-2	193-39-5		0.06 mg/kg		0.06 mg/kg	0.000006 %		
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.0641 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH2[2]

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

Sample details

Sample name:	LoW Code:
BH2[2]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.40 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				28 mg/kg	1.32	36.969 mg/kg	0.0037 %		
	033-003-00-0	215-481-4	1327-53-3							
2	beryllium { beryllium oxide }				1.5 mg/kg	2.775	4.163 mg/kg	0.000416 %		
	004-003-00-8	215-133-1	1304-56-9							
3	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
4	cadmium { cadmium oxide }				0.9 mg/kg	1.142	1.028 mg/kg	0.000103 %		
	048-002-00-0	215-146-2	1306-19-0							
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		<LOD
	024-017-00-8									
6	copper { dicopper oxide; copper (I) oxide }				146 mg/kg	1.126	164.38 mg/kg	0.0164 %		
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead chromate }			1	182 mg/kg	1.56	283.886 mg/kg	0.0182 %		
	082-004-00-2	231-846-0	7758-97-6							
8	mercury { mercury dichloride }				0.22 mg/kg	1.353	0.298 mg/kg	0.0000298 %		
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel chromate }				30 mg/kg	2.976	89.288 mg/kg	0.00893 %		
	028-035-00-7	238-766-5	14721-18-7							
10	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							
11	zinc { zinc chromate }				103 mg/kg	2.774	285.737 mg/kg	0.0286 %		
	024-007-00-3	236-878-9	13530-65-9							
12	TPH (C6 to C40) petroleum group				59 mg/kg		59 mg/kg	0.0059 %		
			TPH							
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
14	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
15	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
16	ethylbenzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
17	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]							

#	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							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
18	pH		PH		8.12 pH		8.12 pH	8.12 pH		
19	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	acenaphthylene		205-917-1	208-96-8	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
21	acenaphthene		201-469-6	83-32-9	0.03 mg/kg		0.03 mg/kg	0.000003 %		
22	fluorene		201-695-5	86-73-7	0.02 mg/kg		0.02 mg/kg	0.000002 %		
23	phenanthrene		201-581-5	85-01-8	0.19 mg/kg		0.19 mg/kg	0.000019 %		
24	anthracene		204-371-1	120-12-7	0.04 mg/kg		0.04 mg/kg	0.000004 %		
25	fluoranthene		205-912-4	206-44-0	0.29 mg/kg		0.29 mg/kg	0.000029 %		
26	pyrene		204-927-3	129-00-0	0.23 mg/kg		0.23 mg/kg	0.000023 %		
27	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.13 mg/kg		0.13 mg/kg	0.000013 %		
28	chrysene	601-048-00-0	205-923-4	218-01-9	0.13 mg/kg		0.13 mg/kg	0.000013 %		
29	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.11 mg/kg		0.11 mg/kg	0.000011 %		
30	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
31	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.08 mg/kg		0.08 mg/kg	0.000008 %		
32	indeno[123-cd]pyrene		205-893-2	193-39-5	0.04 mg/kg		0.04 mg/kg	0.000004 %		
33	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
34	benzo[ghi]perylene		205-883-8	191-24-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.0832 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Unlikely to be flammable at concentrations of less than 0.1%.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0059%)

Classification of sample: BH3

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

Sample details

Sample name:	LoW Code:
BH3	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.30 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				29 mg/kg	1.32	38.289 mg/kg	0.00383 %			
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				1.7 mg/kg	2.775	4.718 mg/kg	0.000472 %			
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %			<LOD
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				1.3 mg/kg	1.142	1.485 mg/kg	0.000149 %			
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %			<LOD
	024-017-00-8										
6	copper { dicopper oxide; copper (I) oxide }				110 mg/kg	1.126	123.848 mg/kg	0.0124 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	310 mg/kg	1.56	483.543 mg/kg	0.031 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				2.14 mg/kg	1.353	2.896 mg/kg	0.00029 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				27 mg/kg	2.976	80.359 mg/kg	0.00804 %			
	028-035-00-7	238-766-5	14721-18-7								
10	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								
11	zinc { zinc chromate }				111 mg/kg	2.774	307.93 mg/kg	0.0308 %			
	024-007-00-3	236-878-9	13530-65-9								
12	pH		PH		8.32 pH		8.32 pH	8.32 pH			
13	naphthalene				0.08 mg/kg		0.08 mg/kg	0.000008 %			
	601-052-00-2	202-049-5	91-20-3								
14	acenaphthylene				0.07 mg/kg		0.07 mg/kg	0.000007 %			
		205-917-1	208-96-8								
15	acenaphthene				0.36 mg/kg		0.36 mg/kg	0.000036 %			
		201-469-6	83-32-9								
16	fluorene				0.28 mg/kg		0.28 mg/kg	0.000028 %			
		201-695-5	86-73-7								
17	phenanthrene				5.13 mg/kg		5.13 mg/kg	0.000513 %			
		201-581-5	85-01-8								

#	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							
18	anthracene	204-371-1	120-12-7		1.5 mg/kg		1.5 mg/kg	0.00015 %		
19	fluoranthene	205-912-4	206-44-0		17.7 mg/kg		17.7 mg/kg	0.00177 %		
20	pyrene	204-927-3	129-00-0		15.9 mg/kg		15.9 mg/kg	0.00159 %		
21	benzo[a]anthracene	601-033-00-9	200-280-6		9.23 mg/kg		9.23 mg/kg	0.000923 %		
22	chrysene	601-048-00-0	205-923-4		8.62 mg/kg		8.62 mg/kg	0.000862 %		
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		8.84 mg/kg		8.84 mg/kg	0.000884 %		
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		3.1 mg/kg		3.1 mg/kg	0.00031 %		
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		8.03 mg/kg		8.03 mg/kg	0.000803 %		
26	indeno[123-cd]pyrene	205-893-2	193-39-5		5.01 mg/kg		5.01 mg/kg	0.000501 %		
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		1.13 mg/kg		1.13 mg/kg	0.000113 %		
28	benzo[ghi]perylene	205-883-8	191-24-2		4.32 mg/kg		4.32 mg/kg	0.000432 %		
Total:								0.0967 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH3[2]

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

Sample details

Sample name:	LoW Code:
BH3[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.60 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				21	mg/kg	1.32	27.727	mg/kg	0.00277 %		
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				1.5	mg/kg	2.775	4.163	mg/kg	0.000416 %		
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.9	mg/kg	1.142	1.028	mg/kg	0.000103 %		
	048-002-00-0	215-146-2	1306-19-0									
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<LOD
	024-017-00-8											
6	copper { dicopper oxide; copper (I) oxide }				102	mg/kg	1.126	114.841	mg/kg	0.0115 %		
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	243	mg/kg	1.56	379.035	mg/kg	0.0243 %		
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				0.68	mg/kg	1.353	0.92	mg/kg	0.000092 %		
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				36	mg/kg	2.976	107.146	mg/kg	0.0107 %		
	028-035-00-7	238-766-5	14721-18-7									
10	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									
11	zinc { zinc chromate }				70	mg/kg	2.774	194.19	mg/kg	0.0194 %		
	024-007-00-3	236-878-9	13530-65-9									
12	TPH (C6 to C40) petroleum group				33	mg/kg		33	mg/kg	0.0033 %		
			TPH									
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
14	benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
15	toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
16	ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
17	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]									

#	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							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
18	pH		PH		8.3 pH		8.3 pH	8.3 pH		
19	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	acenaphthylene		205-917-1	208-96-8	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
21	acenaphthene		201-469-6	83-32-9	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
22	fluorene		201-695-5	86-73-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
23	phenanthrene		201-581-5	85-01-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	anthracene		204-371-1	120-12-7	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
25	fluoranthene		205-912-4	206-44-0	<0.08 mg/kg		<0.08 mg/kg	<0.000008 %		<LOD
26	pyrene		204-927-3	129-00-0	<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
27	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
28	chrysene	601-048-00-0	205-923-4	218-01-9	<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
29	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
30	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
31	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
32	indeno[123-cd]pyrene		205-893-2	193-39-5	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
33	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
34	benzo[ghi]perylene		205-883-8	191-24-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.0735 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Unlikely to be flammable at concentrations of less than 0.1%.

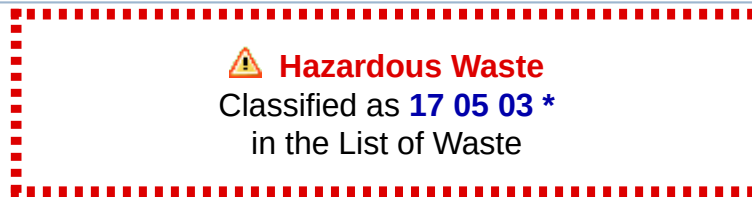
Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0033%)

Classification of sample: BH3[3]



Sample details

Sample name:	LoW Code:
BH3[3]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 03 * (Soil and stones containing hazardous substances)
3.40 m	

Hazard properties

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to hazardous because Unlikely to be flammable at concentrations of less than 0.1%.

Hazard Statements hit:

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

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.151%)
xylene: (conc.: 3.0e-06%)

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.151%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.151%)

Determinands

Moisture content: 0% No 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 }				15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
	033-003-00-0	215-481-4	1327-53-3							
2	beryllium { beryllium oxide }				1.6 mg/kg	2.775	4.441 mg/kg	0.000444 %		
	004-003-00-8	215-133-1	1304-56-9							
3	boron { diboron trioxide; boric oxide }				<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
4	cadmium { cadmium oxide }				0.9 mg/kg	1.142	1.028 mg/kg	0.000103 %		
	048-002-00-0	215-146-2	1306-19-0							
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		<LOD
	024-017-00-8									

#	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									
6	copper { dicopper oxide; copper (I) oxide }				76	mg/kg	1.126	85.568	mg/kg	0.00856 %		
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	562	mg/kg	1.56	876.616	mg/kg	0.0562 %		
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				0.45	mg/kg	1.353	0.609	mg/kg	0.0000609 %		
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				31	mg/kg	2.976	92.264	mg/kg	0.00923 %		
	028-035-00-7	238-766-5	14721-18-7									
10	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									
11	zinc { zinc chromate }				45	mg/kg	2.774	124.837	mg/kg	0.0125 %		
	024-007-00-3	236-878-9	13530-65-9									
12	TPH (C6 to C40) petroleum group				1510	mg/kg		1510	mg/kg	0.151 %		
			TPH									
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
14	benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
15	toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
16	ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
17	xylene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
	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]									
18	pH				8.13	pH		8.13	pH	8.13 pH		
			PH									
19	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
20	acenaphthylene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		205-917-1	208-96-8									
21	acenaphthene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
		201-469-6	83-32-9									
22	fluorene				0.38	mg/kg		0.38	mg/kg	0.000038 %		
		201-695-5	86-73-7									
23	phenanthrene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
		201-581-5	85-01-8									
24	anthracene				0.21	mg/kg		0.21	mg/kg	0.000021 %		
		204-371-1	120-12-7									
25	fluoranthene				0.62	mg/kg		0.62	mg/kg	0.000062 %		
		205-912-4	206-44-0									
26	pyrene				0.82	mg/kg		0.82	mg/kg	0.000082 %		
		204-927-3	129-00-0									
27	benzo[a]anthracene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
	601-033-00-9	200-280-6	56-55-3									
28	chrysene				0.3	mg/kg		0.3	mg/kg	0.00003 %		
	601-048-00-0	205-923-4	218-01-9									
29	benzo[b]fluoranthene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
	601-034-00-4	205-911-9	205-99-2									
30	benzo[k]fluoranthene				<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
	601-036-00-5	205-916-6	207-08-9									
31	benzo[a]pyrene; benzo[def]chrysene				0.21	mg/kg		0.21	mg/kg	0.000021 %		
	601-032-00-3	200-028-5	50-32-8									
32	indeno[123-cd]pyrene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
		205-893-2	193-39-5									
33	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									

#		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							
34	•	benzo[ghi]perylene				0.11 mg/kg	0.11 mg/kg	0.000011 %			
			205-883-8	191-24-2							
Total:								0.241 %			

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Hazardous result
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- ND** Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: BH3[4]

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

Sample details

Sample name:	LoW Code:
BH3[4]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
4.40 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				<1	mg/kg	1.32	<1.32	mg/kg	<0.000132 %		<LOD
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				1.2	mg/kg	2.775	3.33	mg/kg	0.000333 %		
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.9	mg/kg	1.142	1.028	mg/kg	0.000103 %		
	048-002-00-0	215-146-2	1306-19-0									
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<LOD
	024-017-00-8											
6	copper { dicopper oxide; copper (I) oxide }				29	mg/kg	1.126	32.651	mg/kg	0.00327 %		
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	23	mg/kg	1.56	35.876	mg/kg	0.0023 %		
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				<0.17	mg/kg	1.353	<0.23	mg/kg	<0.000023 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				42	mg/kg	2.976	125.003	mg/kg	0.0125 %		
	028-035-00-7	238-766-5	14721-18-7									
10	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									
11	zinc { zinc chromate }				60	mg/kg	2.774	166.449	mg/kg	0.0166 %		
	024-007-00-3	236-878-9	13530-65-9									
12	TPH (C6 to C40) petroleum group				6	mg/kg		6	mg/kg	0.0006 %		
			TPH									
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
14	benzene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
	601-020-00-8	200-753-7	71-43-2									
15	toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
16	ethylbenzene				0.01	mg/kg		0.01	mg/kg	0.000001 %		
	601-023-00-4	202-849-4	100-41-4									
17	xylene				0.02	mg/kg		0.02	mg/kg	0.000002 %		
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]									

#	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							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
18	pH		PH		8.38 pH		8.38 pH	8.38 pH		
19	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	acenaphthylene		205-917-1	208-96-8	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
21	acenaphthene		201-469-6	83-32-9	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
22	fluorene		201-695-5	86-73-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
23	phenanthrene		201-581-5	85-01-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	anthracene		204-371-1	120-12-7	<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
25	fluoranthene		205-912-4	206-44-0	<0.08 mg/kg		<0.08 mg/kg	<0.000008 %		<LOD
26	pyrene		204-927-3	129-00-0	<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
27	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
28	chrysene	601-048-00-0	205-923-4	218-01-9	<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
29	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
30	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
31	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
32	indeno[123-cd]pyrene		205-893-2	193-39-5	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
33	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
34	benzo[ghi]perylene		205-883-8	191-24-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.0368 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- ND Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Unlikely to be flammable at concentrations of less than 0.1%.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

benzene: (conc.: 0.00001%)

ethylbenzene: (conc.: 1.0e-06%)

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

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.0006%)

xylene: (conc.: 2.0e-06%)

Classification of sample: BH1B[2]

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

Sample details

Sample name:	LoW Code:
BH1B[2]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.0 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No 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 }				12 mg/kg	1.32	15.844 mg/kg	0.00158 %			
	033-003-00-0	215-481-4	1327-53-3								
2	beryllium { beryllium oxide }				1.7 mg/kg	2.775	4.718 mg/kg	0.000472 %			
	004-003-00-8	215-133-1	1304-56-9								
3	boron { diboron trioxide; boric oxide }				1.2 mg/kg	3.22	3.864 mg/kg	0.000386 %			
	005-008-00-8	215-125-8	1303-86-2								
4	cadmium { cadmium oxide }				0.6 mg/kg	1.142	0.685 mg/kg	0.0000685 %			
	048-002-00-0	215-146-2	1306-19-0								
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %			<LOD
	024-017-00-8										
6	copper { dicopper oxide; copper (I) oxide }				68 mg/kg	1.126	76.56 mg/kg	0.00766 %			
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead chromate }			1	63 mg/kg	1.56	98.268 mg/kg	0.0063 %			
	082-004-00-2	231-846-0	7758-97-6								
8	mercury { mercury dichloride }				0.35 mg/kg	1.353	0.474 mg/kg	0.0000474 %			
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel chromate }				31 mg/kg	2.976	92.264 mg/kg	0.00923 %			
	028-035-00-7	238-766-5	14721-18-7								
10	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								
11	zinc { zinc chromate }				60 mg/kg	2.774	166.449 mg/kg	0.0166 %			
	024-007-00-3	236-878-9	13530-65-9								
12	TPH (C6 to C40) petroleum group				10 mg/kg		10 mg/kg	0.001 %			
			TPH								
13	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	603-181-00-X	216-653-1	1634-04-4								
14	benzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
15	toluene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
16	ethylbenzene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
17	xylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]								

#	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							
		203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
18	pH		PH		7.96 pH		7.96 pH	7.96 pH		
19	naphthalene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
20	acenaphthylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		205-917-1	208-96-8							
21	acenaphthene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-469-6	83-32-9							
22	fluorene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-695-5	86-73-7							
23	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
24	anthracene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
		204-371-1	120-12-7							
25	fluoranthene				<0.08 mg/kg		<0.08 mg/kg	<0.000008 %		<LOD
		205-912-4	206-44-0							
26	pyrene				<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
		204-927-3	129-00-0							
27	benzo[a]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
28	chrysene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
29	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
30	benzo[k]fluoranthene				<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
31	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							
32	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5							
33	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							
34	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2							
Total:								0.044 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Unlikely to be flammable at concentrations of less than 0.1%.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.001%)

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)

beryllium {beryllium oxide}

Reasonable case CLP species based on hazard statements/molecular weight. Industrial sources include: most common (non alloy) form, used in ceramics (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (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: 2022.263.5340.9974 (20 Sep 2022)
HazWasteOnline Database: 2022.273.5362.10003 (03 Oct 2022)

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