

Earth Science Partnership

Consulting Engineers | Geologists | Environmental Scientists

Phillips and Son Roofing, Neath Proposed Commercial Development Contamination Assessment

Report Reference: ESP.9766.4630

This page is left intentionally blank

Earth Science Partnership

Consulting Engineers | Geologists | Environmental Scientists

33 Cardiff Road, Taff's Well, CARDIFF, CF15 7RB ☎ 029 2081 3385
✉ enquiries@earthsciencepartnership.com www.earthsciencepartnership.com

Phillips and Son Roofing, Neath Proposed Commercial Development Contamination Assessment

Prepared for:
Phillips and Son Roofing
Canal Side Yard,
Canal Road,
Neath,
SA11 1LJ



Report Reference: **ESP.9766.4630**

Revision	Status	Date	Written by	Checked by	Approved by
0	Draft	July 2026	Gabriella Rossi BSc FGS / Emily Wilson BSc / Danilo Bettosi BSc Msc CGeol CSci FGS RoGEP Professional	Danilo Bettosi BSc MSc CGeol CSci FGS RoGEP Professional	Giles Sommerwill BSc MSc CGeol CSci FGS RoGEP Specialist SiLC
Signature:					
Notes:	1. The status of this report is not final and is issued for comment only; as such, it is subject to change therefore it should not be relied up on. For a checked and authorised version please contact the Earth Science Partnership. 2. Once issued this document is Uncontrolled, for the latest version and/or to confirm you have authorisation to use it please contact the Earth Science Partnership at enquiries@earthsciencepartnership.com or by telephone at 029 2081 3385. 3. This document has been optimised for double sided printing and therefore may produce some blank pages when printed single sided.				

Contents

1	Introduction	1
1.1	Background	1
1.2	Objective and Scope of Works.....	1
1.3	Report Format	2
1.4	Limitations of Report	3
2	Desk Study and Field Reconnaissance Visit	4
2.1	Site Location and Description	4
2.2	Site History	8
2.3	Previous Investigations and Assessments	10
2.4	Hydrology	10
2.5	Flooding	10
2.6	Geology	11
2.7	Hydrogeology	12
2.8	Environmental Setting	13
2.9	Unexploded Ordnance	16
3	Preliminary Geo-Environmental Risk Assessment	18
3.1	Phase One Conceptual Site Model	18
3.2	Preliminary Risk Evaluation & Plausible Pollutant Linkages.....	20
4	Exploratory Investigation	22
4.1	Investigation Points.....	22
4.2	Instrumentation.....	23
4.3	Sampling Strategy	23
4.4	Evidence of Site Contamination Found During Site Works	23
4.5	Geo-environmental Laboratory Testing.....	24
5	Development of the Revised Conceptual Model	25
5.1	Conceptual Ground Model - Geology	25
5.2	Conceptual Ground Model - Hydrogeology	25
5.3	Chronic Risks to Human Health – Generic Quantitative Risk Assessment (GQRA).....	25
6	Phase Two Geo-Environmental Risk Assessment	29
6.1	Discussion on Occurrence of Contamination and Distribution	29
6.2	Revised Risk Evaluation & Relevant Pollutant Linkages	29
7	Remedial Strategy for Contamination Risks	31
7.1	Risks to Health	31
7.2	Risks to Controlled Waters	32
7.3	Ground Gas.....	33

7.4	Re-Use of Materials/Disposal of Excess Arisings.....	33
8	Recommendations	34
9	References	35

Figure 1 – Investigation Point Plan

Appendix A	Risk Assessment Methodology
Appendix B	Proposed Development
Appendix C	Extracts from Historical Maps
Appendix D	Groundsure Data Report
Appendix E	Borehole Records Available from the British Geological Survey (BGS, 2026)
Appendix F	Windowless Sample Drillhole Records
Appendix G	Geo-environmental Laboratory Test Results
Appendix H	Preliminary UXO Risk Assessment (1st Line Defence, 2026)
Appendix I	Service Records
General Notes	

Executive Summary

Phillips and Son Roofing require a contamination assessment to meet the Neath Port Talbot Council's planning conditions for the client's redevelopment. ESP have undertaken a geo-environmental assessment and the key potential land quality issues identified by the assessment are summarised below:

	Potential Hazard	Anticipated Risk	Discussion
Site Setting	Current Site Status. (Section 2.1)	-	The site is currently occupied by the current Phillip and Son Roofing building in the north with the south of the site being utilised for site storage of material.
	Identified Ground Conditions. (Section 5.1)	-	The site investigation encountered Made Ground to a maximum depth of 3.7m bgl over fine and coarse grained Tidal Flat Deposits proven to 5.0m bgl.
	Groundwater Conditions. (Section 5.2)	-	Groundwater was encountered in two locations, at 0.7m in the Made Ground and 3..5m bgl within the Tidal Flat Deposits. It should be noted that the site is located next to a tidal effected river and the groundwater conditions are likely effected by this movement.
	Historical Land Use. (Section 2.2)	-	The majority of the site's boundary is located in close proximity (circa 10m) to the River Neath, Neath Canal and a dock connecting to the River Neath. Prior to 1919 the site was used as part of Dinas Brick Works. By 1935 the site was an active concrete factory which stopped operating between 1963 and 1965.
Geo-environmental	Potential Contamination Sources (Section 3.1.2)	High	The site has been developed with historical heavy industry and tanks present on site. Widespread Made Ground is likely present beneath the current site footprint.
	Chronic Risks to Human Health (Section 7.1)	Moderate	One sample tested for Commercial / Industrial GAC screening levels identified lead levels exceeding the values. No other samples or contaminants exceeded the threshold values.
	Risks to Controlled Waters (Section 7.2)	Moderate	Previous industrial uses and historical tanks have been identified at the site alongside significant thicknesses of Made Ground. Localised exceedance of lead has been identified on site alongside perched groundwater within the Made Ground.
	Asbestos (Section 3.1.2)	Moderate	No asbestos has been identified in laboratory testing, however WS03 terminated in suspected asbestos containing material.
	Invasive Plants (Section 2.1)	Low	While no invasive species were identified, it should be noted their presence is seasonal.
	Further Investigation Required?	Yes	See section 8

Note: The above is intended to provide a brief summary of the conclusions of the assessment. It does not provide a definitive assessment and must not be referenced as a separate document. Refer to the main body of the report for details.

1 Introduction

1.1 Background

Phillips and Son Roofing (hereafter known as the Client) currently own and are proposing to locally redevelop the southern extent of an existing commercial site. The Earth Science Partnership Ltd (ESP), Consulting Engineers, Geologists and Environmental Scientists, were instructed by the Client, to undertake an geo-environmental investigation and assessment to identify and evaluate potential ground hazards which could impact on the proposed development. The site location is shown on Insert 1 in Section 2.1.

The proposed development will comprise of retention of cladding and re-sheeting of the roof on the existing building, construction of a warehouse which will connect to the original building through a raised corridor connecting the mezzanine floors and converting hardstanding areas into parking.

It is understood that there will be no significant changes to the current ground levels and the proposed development layout is presented as Appendix B.

ESP were instructed to investigate the southern portion of the site footprint in relation to a new planning application for the development. The area to the north was not investigated as part of this report. The area of the investigation is shown in Figure 1- Investigation Point Plan.

1.2 Objective and Scope of Works

The objective of the investigation was to obtain information on the potential risks posed by contamination and ground gas, and to allow an assessment of these ground conditions with reference to the potential impact on the proposed development.

The Client has obtained planning permission for the proposed development and the Local Planning Authority (LPA) have imposed ground related planning conditions as follows:

“LC01 – Contaminated Land Site Investigation - Prior to the commencement of work on site a scheme to assess the nature and extent of any contamination on the site, and confirmation of whether or not it originates on the site shall be submitted to and agreed in writing with the Local Planning Authority. The investigation and risk assessment must be undertaken by competent persons in accordance with the following document:- Land Contamination: Development of Land Affected by Contamination Developers Guide 2023 and shall be submitted as a written report which shall include:

(i) A desk top study to identify all previous uses at the site and potential contaminants associated with those uses and the impacts from those contaminants on land and controlled waters. The desk study shall establish a ‘conceptual site model’ (CSM) identifying all plausible pollutant linkages to be assessed.

(ii) A comprehensive intrusive site investigation of the extent, scale and nature of contamination. an assessment of the potential risks to:

(iii) An assessment of the potential risks to:

- human health,
- ground waters and surface waters
- adjoining land,
- property (existing or proposed) including buildings, crops, livestock, pets,

- woodland and service lines and pipes,
- ecological systems,
- archaeological sites and ancient monuments

(iv) *An appraisal of remedial options, and proposal of the preferred remedial option(s)."*

LC03 - Site Remediation Scheme - Prior to the commencement of work on site a remediation scheme to bring the site to a condition suitable for the intended use by removing any unacceptable risks to human health, buildings, other property and the natural and historical environment shall be prepared and submitted to and agreed in writing with the Local Planning Authority. The scheme shall include all works to be undertaken, proposed remediation objectives, remediation criteria and site management procedures. The measures proposed within the remediation scheme shall be implemented in accordance with an agreed programme of works.

LC04 - Implementation and Verification of Approved Remediation Scheme - Prior to beneficial use of the proposed development commencing, a verification report which demonstrates the effectiveness of the agreed remediation works carried out in accordance with condition shall be submitted to and agreed in writing with the Local Planning Authority.

At present, ESP have been instructed to consider the contamination potential of soils only and have not been instructed to consider geotechnical elements, ground gas or any other elements not specifically addressed in the above project brief or within this report.

The scope of works for the investigation was mutually developed with the Client by ESP within an agreed budget, and comprised a desk study review of available historical Ordnance Survey maps, environmental data, geological maps, memoirs and data, and further desk study information, a field reconnaissance visit, the supervision and direction of windowless sample boreholes and geo-environmental laboratory testing, assessment and reporting.

The contract was awarded based on a competitive tender quotation. The terms of reference for the assessment are as laid down in the Earth Science Partnership emailed proposal costing of the 21st of April 2026 (Ref: ESP.9766 BofQ (Phillips & Son)).

1.3 Report Format

This report includes the desk study and field reconnaissance reports (Section 2), and details of the investigation undertaken of BS5930:2020 (Section 4), along with the Preliminary Risk Assessment stage (Section 3) and Generic Quantitative Risk Assessment (Section 5) of the land contamination risk management (LCRM) guidelines. A preliminary evaluation of the resulting contamination risks and any remedial measures potentially required is included in Sections 6 and 7. It should be appreciated that this is a preliminary evaluation and will not generally meet the requirements of the LCRM guidelines.

A preliminary geo-environmental risk register, based on the desk study review, is presented as Section 3, with a full assessment of the geoenvironmental conditions using the findings of the investigation and assessment and the report concludes with a summary of any further surveys/ investigations/ assessments recommended.

The contamination assessment relative to the proposed end use has been undertaken using the guidance published by CIRIA (2001). This is discussed in more detail in Section 3.2.1 and in Appendix A.

This report is issued as a digital version only.

Limitations of Report

This report represents the findings of the brief relating to the proposed end use and did not require an assessment of the implications for any other end use or structures, nor is the report a comprehensive site characterisation and should not be construed as such. Should an alternative end use or structure be considered, the findings of the assessment should be re-examined relating to the new proposals.

Where preventative, ameliorative or remediation works are required, professional judgement will be used to make recommendations that satisfy the site-specific requirements in accordance with good practice guidance.

Consultation with regulatory authorities will be required with respect to proposed works as there may be overriding regional or policy requirements which demand additional work to be undertaken. It should be noted that both regulations and their interpretation by statutory authorities are continually changing.

This report represents the findings and opinions of experienced geo-environmental and geotechnical specialists. Earth Science Partnership does not provide legal advice and the advice of lawyers may also be required.

2 Desk Study and Field Reconnaissance Visit

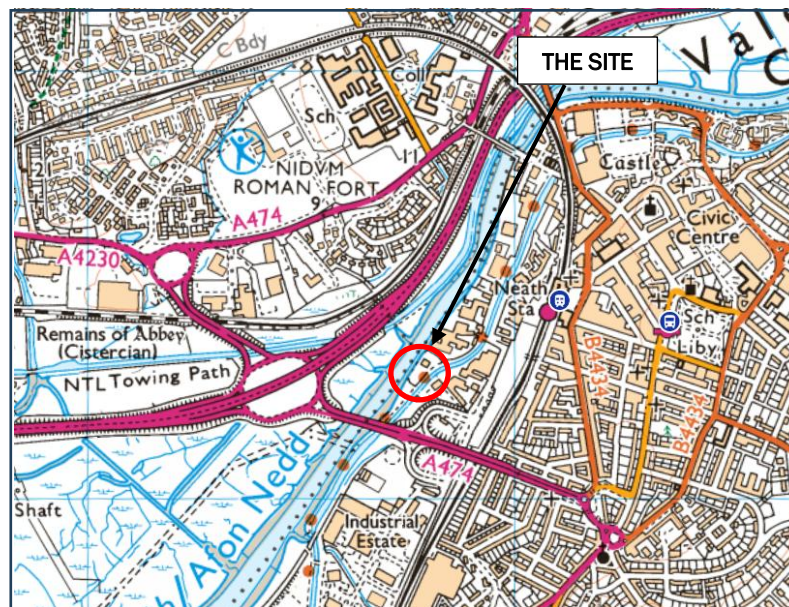
The information in this section was obtained from desk-based research of sources detailed in the text, including historical maps, a combined environmental and geological data reports. Further desk study reports/data/records are included as subsequent appendices as referenced in the text.

The site description is largely based on a field reconnaissance and site inspection visit made at the site on the 4th of June 2026 during wet and cloudy weather, and general views of the site are included as a series of inserts.

It is understood that the site has belonged to the Client for circa three years and since owning the land the Client has installed security fencing, private services and a tarmacked car park. Site previously was used by a plant hire company. The previous warehouse on site burnt down in a fire.

2.1 Site Location and Description

The site is located on the southeast side of the River Neath, located in the western industrial area of Neath. The National Grid Reference of the centre of the site is (SS) 274802 197285 and the postcode is SA11 1LJ. A Site Location Plan is presented as Insert 1 below.



Insert 1 - Site Location Plan from Ordnance Survey 1:25,000 scale map.
Reproduced with permission (OS License No.: AL100015788).

The site is irregular in shape, composing of a larger area, circa 49 m wide to the northeast that becomes narrower towards the southwest, reaching circa 24 m wide. The shape most closely resembles an elongated rectangular-like shape striking NE-SW with a length of circa 88m.

The site comprises of 0.28 ha made up of a warehouse containing a mezzanine office, a series of small, corrugated metal buildings, a small area of outdoor shelved storage of roofing material and an area for material disposable, containing several skips and bins.

The surrounding area consists of non-permeable hardstanding concrete surface which spans from the east of the warehouse to the southeast of the site and the north section of the site comprised tarmacked carparking. Circa 30% of the site consists of a permeable gravel surface inferred to be made ground.

A Site Plan is presented in Appendix B showing the main, existing site features.

It is bounded by:

- To the northeast: A commercial site
- To the southeast: Canal Road or grass on the side of the canal walk.
- To the southwest: Area of woodland.
- To the northwest: A row of trees that run parallel to the River Neath.



Insert 2 – Area used to store roofing materials, small storage buildings, and waste management. View towards the southwest.

Vehicular access to the site is currently gained via an intercom electric gate on the southeastern boundary via Canal Road. Care must be taken when driving through Canal Road as it crosses over a public walkway and bike path which continues down the canal. The boundaries generally comprise a circa 2.4m high silver palisade metal security fencing, brick free-standing wall which appears to have been raised to circa 2m height using breeze blocks and a further circa 0.4m of razor wire and an electric metal gate. Vehicles frequently enter and leave site.

ESP are not aware of a topographic survey, however, LiDAR data was used by Vale Consultancy in the Flood Consequence Assessment (FAC) (2026) report to develop a Digital Terrain Model. This indicated site levels are circa 5.49 – 7.88mAOD, the site is generally flat with a slight central depression. The topography slightly falls in a south-westerly direction with the lowest topography running along the northwestern boundary next to the River Neath. The gravel area is circa 0.1 to 0.2m lower than the surrounding concrete. A localised depression is visible surrounding the manhole east of the warehouse.



Insert 3 – Side of warehouse. View to the northeast.

Vegetation growth is generally sparser within the southeast section of gravelled ground. A number of mature trees line the western boundary of the site. One tree appears distressed/declining, with very few live branches.

Butane and Propane are stored in 13kg and 18kg cylinders in the southwest of the site. A 1000 gallon fluid tank of AdBlue is stored south of the electric gate.

As part of this assessment, service plans have been obtained by ESP from the utility companies – copies of this service information are presented in Appendix I at the rear of this report.

Site observations and the utility plans indicate that the site is crossed by the following services:

- Sewer runs northeast to southwest circa 1-2 m southeast of the southeast boundary.
- BT cables enter the site for circa 10m from the most eastern point, striking east-northeast approximately along the site boundary
- Low voltage cable enters site from the most eastern point, where it extends southwest circa 10m where it diverts west northwest for circa 15m, then diverts circa 5m to terminate at the Eastern-most point of the warehouse building.
- High Voltage (33kV) and high voltage (11kV) run northeast to southwest circa 0-2 m southeast of the southeast boundary.
- Low voltage cables are locally present near the gate entrance.

Additionally, the Client has provided ESP with a series of plans that show locations of recorded underground services in the vicinity of the site, these include the following services:

- Surface and water foul drain which runs from the southeast corner of the warehouse east southeast to exit site and connect to a public sewer.



Insert 4 – Tarmacked car park. View to the northwest.

Furthermore, information gathered from observations during the site reconnaissance and talking to the client, ESP have been made aware of the following private installed services:

- Electric cable runs northeast from the door on the northeastern section of the warehouse to the southwest corner of the northeast building located on the northeast boundary of site.
- Above-ground electric and water pipes often located on the wall/boundary of the site, and at points run underground, such as the electric cable running underground from the storage building in the southwest of site to the outdoor storage area for roofing materials, and the water pipe which runs underground from the southwest of the warehouse to the smaller building directly west of the warehouse.
- The foul drain runs from the west of the warehouse, around the southern edge of the warehouse.
- The water tank is located underground on the southern side of the warehouse.
- Private services have been identified on site, including small diameter water pipes encountered during the investigation works. These have not been formally traced.

2.2 Site History

2.2.1 Published Historical Maps

The site history has been assessed from a review of available historical Tithe, Ordnance Survey County Series, National Grid maps and Google Satellite Imagery. Extracts from the historical maps are presented in Appendix C and the salient features are summarised in the table below.

Table 1: Review of Historical Maps

Date	On-Site	In Vicinity of Site
1877-1878	A series of building are present in the central portion with a crane indicated at the west boundary. .	The River Neath is indicated at the west boundary and the Tenant Canal is indicated to the east. Circa 15m and 200m northeast of site are two brick factories. Circa 250 m northwest of site there is a smelting works producing tin waste. There is a dock circa 5m northeast of site. To the Southeast across the canal there is another brick and tile factory. The southeast boundary of site runs alongside the towing path of the canal. Timber yards and saw are present circa 150m – 250m to the north northeast. Train tracks run north northeast – south southwest circa 150 m to the east of the site. The River Neath flows southwest at the west site boundary and . Shingles are present on riverbank. Circa 140 m northwest of site is the Tennant Canal. 250m south southwest is a clay pit.
1899	Only 3 buildings are on site. 3 have been removed.	To the east southeast across the canal a smelting factory is present. A train station is present 100m east from site. Residential terraced housing is present to the east of the train tracks. Circa 200m north northeast is an engineering works. Circa 200 m south of site are gas works.
1919	Site is referred to as “Dinas Brick Works (Disused)”. A new large building is present on site with smaller buildings within the vicinity.	Factory southeast across the canal has changed to an oil and grease factory (Previously a pottery factory). Factory east southeast across the canal is described as engineering works (previously a smelting factory).
1935	Site large building has been converted into a concrete factory. Trams are on site and exit the site through the southeast boundary. Two of the smaller building have been removed.	A storage tank is present within the wider site footprint to the north although is not within the planning boundary. Northeast of site is described as Engineering Works. The dock is no longer shown by the northeast boundary of the site.
1950	A small building has been added to the northeast of the site.	Coal yard is present circa 150m south southeast of site.
1965	Main factory building has changed shape. Tram no longer depicted. No longer labelled a concrete works.	Cira 150m to the north east is a cattle market and an engineering's works.
1978	2 buildings in the northeast have been removed. The main building has decreased in size. Site is described as a scrap yard.	The Engineering Works directly northeast of the site is now labelled as Saw Mills.
1989 – 2003	Main building has reduced in size again. Eastern building has been removed. Storage tanks are present on site.	No significant changes are indicated.
2015 (Google Satellite)	Main building has burnt down with wall and roof reinforcement structure left.	No significant changes are indicated.
2023 - 2025 (Google Satellite)	Main building has been rebuilt and the north area of the site has been converted into tarmacked parking.	No significant changes are indicated.
Notes: 1. Historical maps presented in Appendix C. 2. Features may have been present on site before or between the dates of the mapping that may not have been identified.		

The historic maps show that in 1877 the site is located in an industrial area of Neath with brick and tile factories, smelting works, gas works and engineering works operating within 250 m of site. The majority of the site's boundary is located in close proximity (circa 10m) to the River Neath, Neath Canal and a dock connecting to the River Neath. Prior to 1919 the site was used as part of Dinas Brick Works. By 1935 the site was an active concrete factory which stopped operating between 1963 and 1965. The site was then used as a scrap yard. Presently the site is a warehouse/office area.

2.2.2 Other Sources

No further relevant information on the site history has been identified as part of this assessment.

2.3 Previous Investigations and Assessments

ESP are not aware of any previous geotechnical or geo-environmental investigations or assessments at the site.

2.4 Hydrology

2.4.1 Surface Water Features

The nearest major surface water feature to the site is the River Neath which flows from northwest to southwest approximately 24m to the northwest. There are two canals present, the Neath Canal approximately 12 m to the southeast and the Tennant Canal is approximately 100 m to the northwest. Approximately 1km to the west of site the River Clydach flows north to south and connects to the River Neath. There are 5 small tidal rivers/streams within 50 m of the west and northwest of site. A number of manmade drains and streams are also present in the area, the closest of which lies some 66m to the west (see Appendix D).

The river level of the River Neath is approximately 3mOD and the approximate site level varies between 8 to 11mOD (Google Earth, 2026). The Flood Consequence Assessment (FCA) produced by Vale Consultancy (2026) used Lidar data to determine that ground level of the site was between 5.49 and 7.88 mAOD.

2.4.2 Surface Water Abstractions

The data report (Appendix D) indicates that there are no surface water abstractions within 250m of the site.

2.5 Flooding

2.5.1 Rivers and Seas

From a review of topographical plans and flooding maps presented in the data report and on the Natural Resources Wales (NRW) (2026), the site is indicated to be at risk flooding from rivers and/or seas and is located within a Flood Zone 2 and Flood Zone 3.

The Pennant Sandstone Formation is expected to consist of green-grey to blue-grey feldspar, mica and lithic rich sandstone with minor conglomerates, with thin mudstone and thin coals and associated seatearth. The site is located within the Swansea Member, which is likely to consist of green-grey lithic sandstone with thin mudstone, siltstone, seatearth and thin coal interbeds. The strata is expected to dip between 10° and 15° between the north and the north northeast.

The Swansea Five Feet Coal seams outcrops at the surface striking northwest-south east circa 600 m to the southwest of the site.

2.6.2 Available BGS Borehole Records

The British Geological Survey website (BGS, 2026) indicates the available records of 1 borehole (SS79NW-302) located on the southwest boundary of the site and 10 boreholes within 90 - 200m of the site. Copies of the available borehole records along with a plan showing their positions relative to the site are presented in Appendix D.

SS79NW-302 (Drilled in 1969 to a depth of 7m)

- **0 – 2.1m Made Ground:** loose ash.
- **2.1 – 2.6m Tidal Flat Deposits:** loose SAND and GRAVEL with silty clay.
- **2.6 – 5.5m Tidal Flat Deposits:** soft dark grey silty slightly CLAY with some fine sand.
- **5.5 – 6.7m Tidal Flat Deposits:** loose dark grey sandy SILT.
- **6.7 – 7.0m Tidal Flat Deposits:** medium dense clayey sandy GRAVEL.

2.7 Hydrogeology

2.7.1 Aquifer Classification

The data report (Appendix D) indicates that the superficial deposits beneath the site (Tidal Flat Deposits) are classed as Secondary Undifferentiated, whilst the bedrock (Pennant Sandstone Formation) is classed as a Secondary A.

Secondary A Aquifers generally correspond with the previously classified minor aquifers, and comprise permeable layers capable of supporting water at a local, rather than strategic, scale and in some cases form an important base flow to rivers. Secondary A Aquifers are sensitive to pollution.

Secondary Undifferentiated Aquifers are assigned by the Environment Agency where it has not been possible to categorise an aquifer in either Secondary A or B. In most cases this is attributable to a unit being classified as both minor and non-aquifers in different locations due to the variable characteristics of the rock type. These strata can be sensitive to pollution.

2.7.2 Anticipated Groundwater Bodies

It is considered that the shallowest main groundwater body is likely to be located within the tidal flat deposits. However, localised perched water bodies within the overlying Made Ground cannot be discounted. Given proximity to the River Neath, groundwater levels are likely to be heavily influenced by tidal activity.

The British Geological Survey indicated a borehole record (SW79NW302) located on or near the southwestern boundary of the site. It is noted that at 2.1m groundwater seepage is observed.

2.7.3 Abstractions and Groundwater Vulnerability

The data report (Appendix D) indicates that there are no groundwater abstractions or Source Protection Zones within 2000m of the site.

2.7.4 Groundwater Movement

Groundwater movement within the tidal flat deposits will be controlled by intergranular flow similarly, in the Pennant Sandstone Formation bedrock intergranular flow is likely to be dominant. Fluid flow pathways may occur in-between interbedded layers such as mudstone and coal beds within the Pennant Sandstone Formation.

The regional area has experienced extensive faulting, the steeply dipping Neath Disturbance Fault strikes northeast-southwest and is circa 200 m southeast of the site. The Cwm Felin Fault strikes north south and is located circa 900 m to the west from site. Damage zones produced by the faults may increase fracture/joint density resulting in additional permeability through fracture flow within the Pennant Sandstone Formation.

Given the site setting, which consider that the groundwater within the tidal flat deposits secondary undifferentiated aquifer may be providing base flow to the River Neath.

The site is located in former mining areas, groundwater conditions may still be changing in response to the cessation or reduction in pumping from underground coal workings.

2.8 Environmental Setting

2.8.1 Summary of Environmental Data

A data report has been obtained for the site and is presented in Appendix D, and the relevant data therein is summarised in the table below. The report should be consulted for further detail.

Table 2 - Summary of Environmental Data

Feature	On the Site	In the Immediate Vicinity
Potentially Contaminative Land Use	Previous used as a Brick Works (Prior to 1919) and Concrete Works (1935 – 1963) .	7 recorded works (Brick, Engineering, Smelting and Gas) within 250m of the site, including brick works on the neighbouring site to, some 20 m, to the northeast and Gas works some 150m to the southwest.
Historical Tanks	Tanks stored in the southeast of site (1989 – 2003)	36 historic tanks are present within 250 m of the site, including to the north of the wider site footprint in the north of the site (1919 – 1952)
Historic Garages	None identified.	Garage present between 1989 and 1993 circa 130m NE of site.
Energy Facilities	None identified.	Gas works recorded 250m south of the site.
Waste and Landfill	Historic maps (1978) show site was used as a Scrap Yard.	Historic landfill circa 400m west of site, Operated in 1980. Historic map (1978) show Scrap yard circa 180m NE of site.
Current Industrial/ Commercial Sites	Site is presently occupied by a roofing company.	10 recent industrial land uses within 20m to 250m of the site.
Contaminated Land under Part 2A EPA 1990.	None identified.	None recorded within 500m of the site.
Licensed Industrial Activities/Pollutant Release (IPC, Part A (1), Part A (2)/B)	None identified.	Three sites with 25,000 annual tonnage licenced waste, 100m NE, 180m NE and 200m NE, of site. Six sites within 80m to 480m which have/had licensed pollutant release.
Radioactive Substance Sites	None identified.	None recorded within 500m of the site.
Discharge Consents	None identified.	11 recorded within 60 and 500m of the site.
List 1 and 2 Dangerous Substances Sites	None identified.	None recorded within 500m of the site.
Pollution Incidents	None identified.	10 incidents are recorded within 500m of the site ranging from a category 4 (no impact) to a category 3 (minor impact).
Environmentally Sensitive Sites ^{2,3}	None identified.	None recorded within 500m of the site.
Notes: 1. Full details of features presented in the data report (Appendix D). 2. Sensitive land uses include Sites of Special Scientific Interest, Nature Reserves, National Parks, Special Areas of Conservation, Special Protection Areas, Ramsar sites, World Heritage sites and Ancient Woodland. 3. Nitrate vulnerable areas relate to the agricultural use of fertilizers and are not considered further in this assessment.		

2.8.2 Further Discussion on Salient Environmental Features

Previous Industrial Use on Site:

Historical maps show In 1919, the site was referred to as 'Dinas Brick Works (Disused). The neighbouring site was also referred to as 'Dinas Brick Works' in 1878 and in 1899 was referred to as being disused.

In 1935 through to 1963, the site was a Concrete works. It is assumed that between 1919 and 1935 the concrete works opened and between 1963 and 1965 it is assumed the concrete works closed.

Previous Industrial Use in the Immediate Vicinity:

- Dinas Brick Works, circa 10m east of site, active in 1877-1897. In 1935 – 1970 site is an engineering works. 1978 area is a Saw Mill. 1989 - 2003 described as unspecified works.
- Mill lands smelting works, circa 70m to the east southeast of site, active in 1899 – 1919. In 1935 site is an engineering works. Site appears to expand in 1950 – 1970 and the area previously described as a station is now an engineering works. 1978 – 2003 referred to as unspecified works.
- Old Mill-lands Brick and Tile Works, circa 50m southeast of site, active in 1887-1919. In 1935 - 1950 site is an oil and grease works. In 1965 – 1970 area is a coal yard.
- Unspecified Works, circa 15m south of site, 1964-1992
- Train Station, circa 100m to the east of site, 1899 – 1935. 1950 area is referred to as engineering works.
- Two Timber Yards, circa 100m and 150m to the north northeast of site, active in 1899 – 1965 and 1877 - 2003
- Further industrial works present between circa 200m and 230m of site; Brick Works (1887 – 1919), Smelting Works (1877), two Engineering Works (1899) and (1965-1970).
- Gas Works, circa 250m south southwest of site, 1899 – 1970

Historical Tanks:

In 1989 through to 2003 two tanks are depicted in the southeast section of the site.

36no. tanks are recorded within 250m of the site, the closest being some 1m (1899) to the northeast likely associated with the historic brick works directly NE of the site.

Current Industrial/ Commercial Sites:

Within 20m to 250m 10 recent industrial land uses are present, including electrical features, unspecified works, tools including machine shops, metal manufactures, vehicle repairs, livestock markets, cutting, drilling and welding.

Licensed Pollutant Release:

Circa 90m southeast of site has a current permit associated with surface cleaning and metal works. 330m east of site has a current permit associated with dry cleaning. 410m southeast of site is a which permit is affected by new legislation, associated with waste oil burner. Three additional sites had historic permits within 240m and 480m of site associated with surface cleaning and gas supplier.

Discharge Consents:

12 are recorded within 500m of the site, the closest being some 65m to the west and related to a sewage works. Discharge events are described as sewage (4), trade discharge (1) and unspecified (6).

Pollution Incidents:

10 events are recorded within 500m of the site, the closest being some 93m (May, 2003) to the northeast and related to an atmospheric pollutant resulting in a category 3 air impact (minor). Of the 10 pollution incidents (July 2001 to February 2016), five were category 4 (no impact), three were category 3 (minor air impact), one was category 3 (minor land impact) and one was category 3 (minor water impact).

2.8.3 On-Site Bulk Liquid Storage

One above ground 1000 gallon tank filled with Adblue and 5 13kg to 18 kg butane and propane cylinders were observed on site during the field reconnaissance visit. In 1989 to 2003 historic maps indicate two tanks by the southeast margins of the site.

2.8.4 On-Site Bulk Materials and Waste Storage

Observations during the field reconnaissance visit indicated the waste storage of three skips, a steel bin, four bulk bags filled with insulation located in the southern part of the site. The skips contained general waste, slate tiles, plastic guttering and bricks.

To the east of the site, outdoor shelf storage of roofing material was present. Pile of wooden pallets, scrap wood, corrugated metal and plastic piping are observed in piles on a grassed area to the southwest of site.

Unexploded Ordnance

The data report does not consider the potential risk from unexploded ordnance at the site.

A Preliminary (Pre-Desk Study) UXO Desk Study assessment of risk has been completed by a specialist Ordnance consultant in accordance with CIRIA guidelines (Stone et al, 2009) and is presented in Appendix H (1st Line Defence, 2026).

The assessment concludes that 'Given the findings of this preliminary report, it is not considered likely that undertaking further study in the form of a Detailed UXO Risk Assessment would significantly alter the findings of low/minimal risk from UXO at this site.'

2.9 Radon Hazard

Radon is a colourless, odourless, radioactive gas, which can pose a risk to human health. It originates in the bedrock beneath the site, where uranium and radium rich minerals are naturally present, and can move through fractures in the bedrock, and overlying superficial deposits, to collect in spaces within/beneath structures.

The data report (Appendix D) indicates that the site lies in a radon affected area as defined by the Health Protection Agency, with between 10 and 30% of properties above the action level and requires full radon protection measures in new buildings (domestic or non-domestic).

3 Preliminary Geo-Environmental Risk Assessment

3.1 Phase One Conceptual Site Model

3.1.1 Background

The Phase One Conceptual Site Model lists the potential sources of geo-environmental risk (both contamination and hazardous gas), the receptors at risk (both human and non-human), and any feasible pathways between the two (BS EN ISO 21365, 2020). These are discussed in the following sections.

3.1.2 Potential Soil Contamination Sources

The site history has indicated that it has been developed as brick works and concrete works, which is a potentially contaminative use. These former industrial buildings have been fully demolished on-site and redeveloped into smaller building. No reports have been provided to confirm if asbestos containing materials (ACM) were present within their structures, or if any ACM was removed by a licenced contractor prior to redevelopment.

It is considered that the following features on site could prove sources of diffuse and point source contamination that could impact on the development, environment or site users, and were targeted during the site investigation:

- Made Ground – general diffuse contamination;
- Two historic above ground tanks (Both recorded between 1989 and 2003): on the east margin of the site)– on-site point source;
- Current above ground adblue tank and butane/propane cylinders – on-site point source;
- Historic tram track (entering from the south of site and terminating at the southwest corner of the main building) – on-site point source;
- Historic brick (1878) works which was converted into a concrete works between 1919 and 1935. The building was reduced in size in 1965 and again in 1978 and further reduced again in 1989. It is likely demolition of parts/whole building containing asbestos containing materials (ACMs) occurred. ACMs may be present in the made ground – diffuse source;
- Any infill material associated with partial filling of areas of the adjacent canal following its decommissioning.
- Any infill material associated with former dock to the north.

3.1.3 Potential Contaminants Present

The potential contaminants associated with the above potential sources have been identified from various guidelines published by DEFRA, the Environment Agency and others. The particular guidance referenced includes the Industry Profile for Railway Land (CL:AIRE, 2026) and the Industry Profile for Ceramics, Cement and asphalt manufacturing works (DoE, 1996).

Based on this guidance and our experience, the following contaminants could be present on the site:

- heavy metals and semi-metals (arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc);
- cyanide, sulphate, sulphide;

- polyaromatic hydrocarbon (PAH) compounds;
- petroleum hydrocarbons, including methyl-tert-butyl-ether (MTBE);
- phenols;
- asbestos.

No evidence has been identified from the desk study to suggest that radioactive substances may be present on the site.

The potential presence of radon is discussed in Section 2.9

3.1.4 Potential Receptors

The most vulnerable receptors with regards to any contamination or hazardous ground gas present are likely to be as follows.

- Present and future employees and site visitors, the critical receptors being employees outside during loading and unloading of vans, handling material stored outside, employees outside on their break periods.
- Construction and maintenance workers.
- The water quality in the River Neath located within 10m to the west and canal to the east.
- The groundwater within the superficial (Secondary Undifferentiated) and bedrock (Secondary A Aquifer) strata beneath the site.

3.1.5 Potential Migration Pathways

Based on the Conceptual Site Model the following are considered the most likely migration pathways for any contamination or hazardous ground gas present beneath the site.

Site Users:

- Ingestion of soils and inhalation of dust in gravelled area (Made Ground).
- Dermal contact with contaminated soils.
- Exposure to asbestos containing materials within the shallow soils.
- Dermal contact and with contaminated soils and ingestion of soils.

Construction and Maintenance Workers:

- Exposure to asbestos containing materials within the shallow soils.
- Ingestion of soils and inhalation of dust across site.
- Dermal contact with contaminated soils.

Groundwater:

- Leaching of mobile contaminants into the water-bearing strata within the bedrock.

River Neath/Canal:

- Leaching of mobile contaminants to the groundwater beneath the site, and then on to the River Neath directly to the west of the site.
- Surface run-off of contaminated leachate to the River Neath.

Leaching of contaminants may occur within the permeable gravel (Made Ground) and historically may have leached from the ground in the north which has now been tarmacked, and from the ground in the south and east of the site prior to the concrete hardstanding ground being installed. Although the

majority of the site is now hard-surfaced, any soakaways existing within the development have the potential to leach contaminants from the infiltration strata, which could then impact on the groundwater beneath the site.

3.2 Preliminary Risk Evaluation & Plausible Pollutant Linkages

The land use history of the site and surrounding area, as established from the desk study and walkover, has identified potential contamination linkages due to ground conditions or former operations either on, adjacent to, or in the vicinity of the site. Note that these potential linkages will need to be later assessed and re-established using actual site data obtained from an exploratory investigation.

3.2.1 Introduction to Risk Evaluation Methodology

The general methodology set out in CIRIA C552 *Contaminated Land Risk Assessment – A Guide to Good Practice* (Rudland et al, 2001), has been used to assess whether or not risks are acceptable, and to determine the need for collating further information or remedial action.

Whilst at a later stage, this methodology may be informed by quantitative data (such as laboratory test results) the assessment is a qualitative method of interpreting findings to date and evaluating risk. The methodology requires the classification of:

- The magnitude of the potential consequence (severity) of risk occurring (Table A1 in Appendix A):
- The magnitude of the probability (likelihood) of risk occurring (Table A2 in Appendix A).

The classifications defined above are then compared to indicate the risk presented by each pollutant linkage, allowing evaluation of a risk category (Tables A3 and A4 in Appendix A). These tables have been revised slightly by ESP from those presented in CIRIA C552, to allow for the circumstances where no plausible linkage has been identified and, therefore, no risk would exist.

The methodology described above has been used to establish Plausible Pollutant Linkages (PPL) based on the Conceptual Site Model generated for the site and proposed development, and to evaluate the risks posed by those linkages, using information known about the site, at this desk study stage. This is presented as Table 3 in Section 3.2.2 below.

3.2.2 Tabulated Preliminary Risk Evaluation & Plausible Pollutant Linkages

Table 3: Preliminary Risk Evaluation & Plausible Pollutant Linkages (PPL)

Source	Pathway	Receptor	Classification of Consequence	Classification of Probability	Risk Category	Further Investigation or Remedial Action to be Taken
Potential general contaminants in shallow soils on site and potential adjacent off site sources.	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Site Users (employees)	Medium – potential for chronic levels.	Likely ²	Moderate/High Risk	Sampling of near-surface soils to confirm levels of total contamination present.
	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Construction/ Maintenance Workers	Minor – standard PPE likely to be sufficient	High likelihood ²	Moderate/ Low Risk	
	Leaching of soil contaminants	Impact on Groundwater	Medium – site lies on Secondary Undifferentiated and Secondary A Aquifer	Low likelihood ²	Moderate/ Low Risk	Sampling of near-surface soils to confirm levels of leachable contamination present.
	Leaching of soil contaminants	Impact on River Neath	Medium – site lies adjacent to river	Low likelihood ²	Moderate/ Low Risk	
Hydrocarbon / chemical contamination in shallow soils and groundwater near former tanks or due to previous uses	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Site Users (employees)	Medium – potential for chronic levels.	Likely ³	Moderate/High Risk	Sampling of near-surface soils to confirm levels of total contamination present.
	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Construction/ Maintenance Workers	Minor – standard PPE likely to be sufficient	High likelihood ³	Moderate/ Low Risk	
	Leaching of soil contaminants	Impact on Groundwater	Medium – site lies on Secondary Undifferentiated and Secondary A Aquifer	High likelihood ³	High Risk	Sampling of near-surface soils to confirm levels of leachable contamination present.
	Leaching of soil contaminants	Impact on River Neath	Medium – site lies adjacent to river	Likely ³	Moderate Risk	
Asbestos in shallow soils	Inhalation of fibres	Site End Users	Medium – potential for chronic levels	Low likelihood ⁴	Moderate/ Low Risk	Sampling of shallow soils for asbestos.
		Construction/ Maintenance Workers		Likely ⁴	Moderate Risk	

Notes:

1. Methodology and details of risk consequence, probability and category based on CIRIA C552 (2001) and presented in Section 3.2.1.
2. Although Made Ground is anticipated, the presence of contamination has yet to be confirmed on site. See Section 3.1.
3. Three historic on-site tanks, one tank (Tank A) in the north area of the site and two tanks (Tank A and Tank B) on the east margin of the site. It is unknown what these tanks contained although it is possible hydrocarbon / chemically contaminated soils and groundwater may exist in their vicinity. See section 3.1.
4. No obvious asbestos materials have been observed in the Made Ground soils. See Section 3.1.

4 Exploratory Investigation

4.1 Investigation Points

4.1.1 Introduction

The intrusive investigation was undertaken between 16th and 17th June 2026 in accordance with BS5930:2020 and BS10175:2017, and was designed to investigate both geo-environmental and geotechnical hazards identified in the desk study (Section 2). At this stage the investigation has comprised only windowless sample boreholes.

The investigation points were supervised and logged by an engineering geologist in general accordance with BS5930:2020, BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2018, and BS EN ISO 14689:2018. The investigation point positions are shown on Figure 1.

The ground levels and coordinates shown on the investigation point records are approximate only and have been interpolated from recent Ordnance Survey maps.

4.1.2 Investigation Strategy

The desk study identified a number of potential contaminant sources/geotechnical hazards at the site including:

- Potential Made Ground across the site;
- Above-ground storage tanks (AST) in the south east;
- Estuarine alluvial soils, possibly including peat bands;
- Potentially shrinkable/swelling soils across the site;
- Possible expansive slag in the south of the site;

The investigation points were selected to maximise the information obtained on these hazards, as well as obtaining a general overview of the general ground conditions present. In this regard, a number of the investigation points were targeted at the above sources (see Figure 1).

ESP were made aware by the Client during the works that the investigation area should not include the far north of the site as the planning application boundary does not include the full site footprint but to focus on the southern and western extents of the site .

4.1.3 Windowless Sampling

Seven windowless sample drillholes (WS01 to WS07) were constructed between the 16th and 17th June 2026 to depths between 0.16m and 5.00m. The borehole records are presented as Appendix F, and their positions are shown on Figure 1.

A hydraulically powered rig was used to drive plastic lined sampling tubes into the ground, with the soil recovered within the tubes, which are then split to allow sampling and logging. Disturbed samples were obtained throughout the boreholes for identification and laboratory testing purposes, as shown on the borehole records. SPTs were undertaken at around 1m intervals (see Section **Error! Reference source not found.** for details).

The windowless sampling provided generally good recovery to the depth of refusal.

At the commencement of each borehole, the surface tarmacadam or concrete was broken out using a hydraulic breaker, and a service inspection pit excavated by hand to a depth of 1.2m.

On completion, the boreholes were backfilled with arisings, with the concrete reinstated at the surface. In three location, monitoring instrumentation was installed in the boreholes as detailed in Section 4.2. Below the instrumentation, the borehole was backfilled with arisings.

4.2 Instrumentation

4.2.1 Well Installations

A 50mm diameter monitoring well was installed in selected boreholes in accordance with BS8576:2013 in order to allow monitoring of hazardous ground gases. The wells, comprising slotted plastic pipe with a gravel surround (the response zone), bentonite seals above and below the response zone, and a lockable vandal proof cover, were installed as detailed on the borehole records and summarised in the table below.

Table 4: Gas Well Installations

Well ID	Date of Installation	Response Zone depth	Response Zone Stratum	Rationale
WS01	16/06/2026	0.50 – 2.00m	Made Ground	2
WS02	16/06/2026	0.50 – 2.00m	Made Ground	2
WS06	17/06/2026	0.50 – 2.50m	Made Ground	2
Notes: 1. Details of each monitoring well are presented on the individual borehole records. 2. Well installed in Made Ground strata.				

At present and further to discussions with the Client, the installed wells have not been utilised.

4.3 Sampling Strategy

4.3.1 Soil Sampling

Soil samples were collected from the investigation points as discussed in the previous sections. The sampling procedures were selected on the basis of the suitability for the laboratory testing proposed (see Section 0).

A non-targeted, random stratified sampling strategy was used to obtain representative information on soil contamination in the various strata encountered across the site as a whole.

Environmental samples (denoted as ES on the investigation points records) were collected for possible geo-environmental laboratory testing and generally comprised a plastic tub, an amber glass jar and an amber glass vial. The sample containers provided clean by the testing laboratory appropriate for the proposed testing to be scheduled. Immediately after collection the samples were placed in sealed cool boxes with ice packs where they remained during storage and transport to the laboratory.

Samples for logging and geotechnical laboratory testing purposes were collected at regular intervals within the investigation points.

4.4 Evidence of Site Contamination Found During Site Works

With regard to potential hazards identified in the desk study and Preliminary Risk Assessment, the following observations were made.

Made Ground was encountered across the site, with direct visual or olfactory evidence of contamination identified in the investigation points as summarised in the table below.

Table 5 - Site Evidence for Contamination

Hole ID	Stratum	Comment on contamination encountered
WS01	Made Ground	Strong to moderate hydrocarbon odour between 0.70m and 1.0m bgl
WS03	Made Ground	Possible asbestos containing material encountered between 0.25m and 0.65m bgl.
Notes: Samples of contaminated material were sent for laboratory testing and the results are discussed in Section below.		

4.5 Geo-environmental Laboratory Testing

Laboratory testing has been undertaken to identify the levels of selected contaminants within samples of soil recovered during the investigation.

The geo-environmental analyses were carried out by a UKAS accredited testing laboratory with detection limits being generally compatible with the relevant guideline values adopted in the assessment (see Sections 5.3).

To allow an assessment of the potential chronic risks posed to human health, a selection of samples have been analysed for the contaminants identified in Section 3.1.3, plus other determinands typically present on brownfield sites in the UK.

5 Development of the Revised Conceptual Model

5.1 Conceptual Ground Model - Geology

The investigation points have identified the site to be generally underlain by Made Ground, over typically soft fine-grained Tidal Flat Deposits. These strata are discussed in more detail in the following sections.

Made Ground: encountered to a maximum depth of 3.7m bgl as a bands of clayey gravelly sands and sandy gravelly clay. Typical gravel inclusions including concrete, red and yellow brick fragments, metals, possible slag and rare glass. WS03 in the south west terminated in this strata at 0.80m bgl on possible asbestos containing material. WS05 also terminated in this strata at 0.16m bgl after finding a private service pipe.

Tidal Flat Deposits: encountered beneath the Made Ground, and proven to a maximum depth of 5.0m bgl as a series of soft light brown grey clays, and loose fine to coarse rounded sands and gravels. Field SPT N-values within the Tidal Flat Deposits varied between 3 and 28 with most results less than 12.

5.2 Conceptual Ground Model - Hydrogeology

The groundwater conditions identified in the investigation are summarised in the table below.

Table 6 - Summary of Groundwater Ingress in the Investigation

Hole ID	Stratum	Comment on groundwater encountered
WS01	Tidal Flat Deposits.	Seepage at 3.50m
WS07	Made Ground	Seepage at 0.70m

Based on the Conceptual Ground Model, it is considered that the main groundwater body beneath the site is within the Tidal Flat Deposits, at around 3.5m depth. However, a perched water table also appears to be present within the Made Ground soils at around 0.70m bgl. It should be noted that the site sits adjacent to the tidal River Neath and groundwater is likely to be affected by the tidal variation.

5.3 Chronic Risks to Human Health – Generic Quantitative Risk Assessment (GQRA)

The assessment criteria used as part of this GQRA are presented on the tables in the following section(s).

The proposed development comprises redevelopment of a commercial unit, with external hardstanding. Therefore, the GAC appropriate for the commercial land use have been adopted in this assessment.

The GAC for most organic compounds are dependent on the organic content of the soil. Analysis has shown that the soil organic content in the soils analysed ranged from 10 to 59%. Therefore, for the purposes of this assessment, GAC for a soil organic content of 1% has been adopted. This again is considered a conservative approach for the majority of the soils at the site.

5.3.1 Generic Quantitative Risk Assessment

The samples analysed for soil contaminants have been considered across the site as one averaging area. The risks from asbestos are considered further in Section 5.3.2.

The results of the GQRA for the proposed development are presented in the table below. It should be appreciated that if the development were to change, the following assessment should be reviewed and, if necessary, updated.

Table 7 - Generic Assessment of Human Health Risks (Commercial/Industrial)

Determinand	Minimum Recorded (mg/kg)	Maximum Recorded (mg/kg)	GAC (mg/kg)	Source of GAC	Exceedances
Metals and Semi-metals					
Arsenic	11	150	640	C4SL ²	None
Beryllium	< 0.5	1.6	12	S4UL ⁴	None
Boron	< 0.40	3.7	240,000	S4UL ⁴	None
Cadmium	0.25	140	410	C4SL ²	None
Chromium (total) ⁵	11	140	8,600	S4UL ⁴	None
Chromium (hexavalent)	< 0.50	0.25	49	C4SL ²	None
Copper	100	3500	68,000	S4UL ⁴	None
Lead	52	5300	2,300	C4SL ²	1 of 10
Mercury ⁶	0.1	1.6	1,100	S4UL ⁴	None
Nickel	23	190	980	S4UL ⁴	None
Selenium	0.3	2.6	12,000	S4UL ⁴	None
Vanadium	12	190	9,000	S4UL ⁴	None
Zinc	70	9600	730,000	S4UL ⁴	None
Polyaromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.05	0.36	84,000*	S4UL ^{4,7}	None
Acenaphthylene	< 0.05	0.18	83,000*	S4UL ^{4,7}	None
Anthracene	< 0.05	0.91	520,000	S4UL ^{4,7}	None
Benzo(a)anthracene	0.07	4	170	S4UL ^{4,7}	None
Benzo(a)pyrene	< 0.05	3.8	77	C4SL ^{2,7}	None
Benzo(b)fluoranthene	0.09	6.2	44	S4UL ^{4,7}	None
Benzo(ghi)perylene	< 0.05	2.1	3,900	S4UL ^{4,7}	None
Benzo(k)fluoranthene	< 0.05	2	1,200	S4UL ^{4,7}	None
Chrysene	0.13	4.5	350	S4UL ^{4,7}	None
Dibenzo(a,h)anthracene	< 0.05	0.72	3.5	S4UL ^{4,7}	None
Fluoranthene	0.09	6.3	23,000	S4UL ^{4,7}	None
Fluorene	< 0.05	0.94	63,000*	S4UL ^{4,7}	None
Indeno(123-cd)pyrene	< 0.05	2.4	500	S4UL ^{4,7}	None
Naphthalene	< 0.05	0.14	1,600*	C4SL ^{2,7}	None
Phenanthrene	0.09	3.3	22,000	S4UL ^{4,7}	None
Pyrene	0.09	5.8	54,000	S4UL ^{4,7}	None
BTEX Compounds					
Benzene	<1.0	<1.0	98	C4SL ^{2,7}	None
Toluene	<1.0	<1.0	56,000*	S4UL ^{4,7}	None
Ethyl benzene	<1.0	<1.0	5,700*	S4UL ^{4,7}	None
Xylene ⁸	<1.0	<1.0	5,900*	S4UL ^{4,7}	None
Aliphatic Petroleum Hydrocarbons (Equivalent Carbon Number)					
Ali EC 5-6	< 0.05	< 0.05	3,200*	S4UL ^{4,7}	None
Ali EC 6-8	< 0.05	< 0.05	7,800*		None
Ali EC 8-10	<0.05	0.19	2,000*		None
Ali EC 10-12	<2.0	96	9,700*		None
Ali EC 12-16	<2.0	600	59,000*		None
Ali EC 16-35	41	1,150	1,600,000		None
Aromatic Petroleum Hydrocarbons (Equivalent Carbon Number)					
Aro EC 5-7	< 0.05	< 0.05	26,000*	S4UL ^{4,7}	None
Aro EC 7-8	< 0.05	< 0.05	56,000*		None
Aro EC 8-10	< 0.05	< 0.05	3,500*		None
Aro EC 10-12	<2.0	18	16,000*		None
Aro EC 12-16	4.60	470	36,000*		None
Aro EC 16-21	16	310	28,000		None

Aro EC 21-35	32	180	28,000		None
Other Organic Compounds					
Phenol	< 0.10	0.44	0.44	760	S4UL ^{4,7} None
Notes: 1. Assessment for commercial/industrial land use. 2. C4SL: Category 4 Screening Level, published by CL:AIRE. 3. SGV: Soil Guideline Value published by Environment Agency. 4. S4ULs Suitable 4 Use Levels. Copyright Land Quality Management Limited, reproduced with permission; Publication No. S4UL3156. All Rights Reserved. 5. In the absence of Chromium VI, all chromium present likely to be Chromium III. GAC for Chromium III adopted. 6. GAC for inorganic mercury adopted. 7. GAC for organic compounds based on 1% soil organic content. 8. GAC for xylene based on p-xylene (lowest S4UL). 9. Exceedances highlighted in red and bold. 10. Laboratory results presented in Appendix G * GAC exceeds solubility or vapour saturation limit.					

The levels of lead were found to be elevated above the adopted GAC in one sample of Made Ground in WS06 at 0.40m bgl.

5.3.2 Asbestos

Possible asbestos containing material was observed on site in WS03 in the south western corner of the site, and the position was abandoned. No samples sent to the laboratory were positively identified for asbestos.

6 Phase Two Geo-Environmental Risk Assessment

6.1 Discussion on Occurrence of Contamination and Distribution

A review of the site history has indicated a number of potential contaminative sources including historic uses of the site as a concrete works, industrial site and adjacent land uses that include a wide range of industrial and commercial land uses and an infilled dock to the north. Whilst still present to the east, there is also the potential for infilling of the canal since its decommissioning.

The ground investigation has identified a significant cover of variable Made Ground at the site with some evidence of olfactory/visual contamination identified.

Laboratory testing has indicated a localised exceedance for Lead in WS06 at 0.40m bgl

6.2 Revised Risk Evaluation & Relevant Pollutant Linkages

As discussed in Section 3.2.1, the methodology set out in CIRIA C552 (2001) has been used to assess whether or not risks are acceptable, and to determine the need for collating further information or remedial action.

The risks evaluated at the desk study stage of this report (Table 3, Section 3.2.2) have been updated and revised in Table 8 following information learned from the exploratory works and results of monitoring and laboratory testing.

Table 8 - Revised Risk Evaluation & Relevant Pollutant Linkages (RPL)

Source	Pathway	Receptor	Classification of Consequence	Classification of Probability	Risk Category	Further Investigation or Remedial Action to be Taken
Potential general contaminants in shallow soils on site and potential adjacent off site sources.	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Site Users (employees)	Medium – potential for chronic levels.	Likely ²	Moderate Risk	See Section 7.1.2
	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Construction/ Maintenance Workers	Minor – standard PPE likely to be sufficient	High likelihood ²	Moderate/ Low Risk	
	Leaching of soil contaminants	Impact on Groundwater	Medium – site lies on Secondary Undifferentiated and Secondary A Aquifer	Likely ²	Moderate / Low Risk	See Section 7.2
	Leaching of soil contaminants	Impact on River Neath	Medium – site lies adjacent to river	Likely ²	Moderate / Low Risk	
Hydrocarbon / chemical contamination in shallow soils and groundwater near former tanks or due to previous uses	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Site Users (employees)	Medium – potential for chronic levels.	Low Likelihood ³	Moderate/Low Risk	See Section 7.1.2
	Direct contact/ inhalation/ ingestion of contaminated soil or dust	Construction/ Maintenance Workers	Minor – standard PPE likely to be sufficient	Low Likelihood ³	Moderate/ Low Risk	
	Leaching of soil contaminants	Impact on Groundwater	Medium – site lies on Secondary Undifferentiated and Secondary A Aquifer	Low Likelihood ³	Moderate / Low Risk	See Section 7.1.2
	Leaching of soil contaminants	Impact on River Neath	Medium – site lies adjacent to river	Low Likelihood ³	Moderate / Low Risk	
Asbestos in shallow soils	Inhalation of fibres	Site End Users	Medium – potential for chronic levels	Low likelihood ⁴	Moderate/ Low Risk	See Section 7.1
		Construction/ Maintenance Workers		Low likelihood ⁴	Moderate / Low Risk	

Notes:

1. This table updates Table 3 in Section 3.2.2 using results of the investigation. Methodology and details of risk consequence, probability and category presented in Appendix A.
2. GAC exceedance of Lead in laboratory tested samples.
3. No GAC exceedances of hydrocarbons in laboratory tested samples.
4. No Asbestos detected within laboratory tested samples.

7 Remedial Strategy for Contamination Risks

The following recommendations are based on interpretations made from the relatively limited site investigation data obtained to-date, and do not form the full Options Appraisal stage of the Land contamination risk management (LCRM) guidelines. If at any stage of the construction works, contamination or a potential for such contamination is identified that is different to that presented within this report, all of the following should be reviewed and the advice of ESP should be sought.

7.1 Risks to Health

7.1.1 Asbestos

No evidence of asbestos was detected at the site. However, it cannot be discounted that during the construction, excess building materials could have been placed on the site. Given the date of construction these should not have included significant amounts of asbestos, however, this cannot be totally discounted.

The following sections presume that any risks from asbestos materials at the site are mitigated.

7.1.2 Site End Users

Although there has been localised exceedances of the Commercial / Industrial GAC values for Lead, assuming an end use of a industrial unit with significant areas of concrete hardstanding and open space the identified levels of soil contamination at the site are not considered to pose a risk to future site users. Therefore, no specific remedial measures are considered necessary for the development.

7.1.3 New Service Connections

The current water industry guidance for the suitability of pipe materials on potentially contaminated sites (Blackmore et al, 2010) has onerous requirements and it is likely/possible, based on this guidance, that the levels of contaminants on site may prevent the use of plastic pipework. It is recommended that enquiries are made to the local water authority to confirm their requirements for underground service materials for this development.

7.1.4 Risk to Construction and Maintenance Workers

Due to the locally elevated levels identified within the shallow soils, in accordance with best practice, prevention of exposure to the soils to mitigate any potential health risks is recommended. The recommendations contained within the Health and Safety Executive Document: *Protection of Workers and the General Public During the Development of Contaminated Land* (HSE, 1991) should be implemented.

These are likely to comprise, as a minimum, the use of overalls, boots, gloves etc. to prevent dermal exposure and washing facilities to prevent ingestion (i.e. at lunch-times). These controls must be strictly implemented at this site.

The above precautions would be required for both construction workers during development and maintenance workers following development. A copy of this report and these recommendations should be included in the Health and Safety File for the development and provided to all future ground workers, including utility companies so that they may undertake their own assessment of risks to their operatives.

7.1.5 General Public/Neighbouring Properties

Significant risks to the general public from the development of the site are not anticipated. However, careful dust control measures should be adopted during construction to minimise the risk (and nuisance) to the general public and neighbouring residents.

7.2 Risks to Controlled Waters

No specific assessment of the risks to controlled waters has been undertaken to date. However, the following points are considered salient as a preliminary assessment in line with planning requirements.

- Previous industrial uses and historical tanks have been identified at the site.
- Made Ground has been identified on the site.
- The typical levels of soil contaminants are low, well below the GAC adopted, however a localised exceedance of lead has been identified.
- The proposed development comprises a industrial / commercial development which will include areas of car parking and material storage which are anticipated to be hard surfaced – surface drainage from these areas could contain leached oils and fuels from vehicle spills and leaks.
- The site is underlain by fine- and coarse grained Tidal Flat Deposits.
- The bedrock beneath the site is classified as a Secondary A aquifer. The glacial soils are defined as Unproductive Strata. Groundwater was encountered both as a perched water table in the Made Ground and within the Tidal Flat Deposits.
- The River Neath lies along the western boundary

Given the above, it is considered that the overall risk to controlled waters from the development of the site is likely to be Moderate however, given the context of the wider area no further remedial action is considered warranted.

7.3 Ground Gas

Given the numerous sources comprising varied industrial land uses around the site including infilling of ground surrounding and on the study site itself, the risk of ground gas to enclosed structures should be considered and assessed.

7.4 Re-Use of Materials/Disposal of Excess Arisings

7.4.1 General Comments on Re-use/Disposal

All soils or other materials excavated from site are generally classified as waste under the Waste Framework Directive (European Union, 2008) and their re-use is controlled by this legislation.

If the soils are to be re-used on site (e.g. within the red-line planning boundary), provided that they are 'uncontaminated' or other naturally occurring deposits and they are certain to be used for the purposes of construction in their natural state on the site from which they are excavated, they may be excluded from waste regulation (Duckworth, 2011). A Materials Management Plan (MMP) may be required, which may also enable the re-use of materials classed as waste on excavation (e.g. Made Ground or re-worked soils) if in accordance with the CL:AIRE Definition of Waste, Development Industry Code of Practice (DoWCoP). If excavated soils or materials are contaminated, their re-use potential on-site may be limited.

If the soils are to be removed from site, they are automatically classified as waste, and they may only be:

- Disposed at a licensed landfill;
- Disposed at a licensed, permitted soil treatment centre; or
- Removed to a Receiver Site for beneficial re-use.

Prior to removal from site, the excavated arisings would need to be classified as either 'hazardous' or 'non-hazardous' waste based on a WM3 assessment. Waste Acceptability Criteria (WAC) testing would be required to determine the type of landfill in which the arisings could be disposed.

Re-use of soils on a receiver site could be undertaken via an Environmental Permit or Exemption, however, these can take time and are costly to arrange. In certain circumstances, it is permissible to use the protocols laid down in the CL:AIRE DoWCoP (Duckworth, 2011) which is generally more efficient (in terms of time and cost) to implement.

Demolition materials and rubble created as part of the development would be initially classified as waste and cannot be managed under the DoWCoP protocols. If it can be demonstrated (by further testing and assessment) that the materials are compliant with the WRAP protocols, they may be declassified as waste. Exemptions from the waste legislation may also be applicable.

Further guidance on the legislative requirements of the re-use/disposal of materials generated by the development can be provided by ESP once the development proposals have been finalised.

7.4.2 Imported Materials

Any soils or materials to be imported to site (including Topsoil) should be certified clean and inert, and suitable for use. An appropriate number of samples (depending on the volume of soils imported) should be analysed for an appropriate suite of contaminants, and verification certificates should be provided. Further guidance can be provided by this office if required.

8 Recommendations

It is considered that the following further investigation and assessment would be required or prudent prior to development:

- Watching brief during excavation works for unexpected materials
- Consideration of Ground Gas hazards.
- Verification testing of any soils imported to site.
- WM3 assessment of soils to be disposed of off-site.
- Materials management plan for re-use of soils on site and WM3 assessment of soils to be disposed of/re-used off-site, followed by WAC testing if disposal to landfill.

9 References

ALLEN D J, BREWERTON L J, COLEBY L M, GIBBS B R, LEWIS M A, MacDONALD A M, WAGSTAFF S J and WILLIAMS A T. 1997. The Physical Properties of Major Aquifers in England & Wales. BGS Technical Report WD/97/34 - EA R&D Publication 8. BGS and Environment Agency.

BLACKMORE K, BRIERE DE L'ISLE B, GARROW D, JONSSON J, NORRIS M, TURRELL J, TREW J and WILCOX S. 2010. Guidance for the Selection of Water Supply Pipes to be Used in Brownfield Sites. UK Water Industry Research Ltd. Report ref. No 10/WM/03/21.

BOYLE R and WITHERINGTON P. 2007. Guidance on the evaluation of development proposals in sites where methane and carbon dioxide are present. NHBC rpt no 4, March 2007. NHBC Amersham.

BRITISH GEOLOGICAL SURVEY (BGS). 2026. Website accessed July 2026.

BRITISH STANDARDS INSTITUTION (BSI). 2017. Investigation of Potentially Contaminated Sites – Code of Practice. BS 10175:2011+A2:2017, HMSO, London.

BRITISH STANDARDS INSTITUTION (BSI). 2020. Code of Practice for Ground Investigation. BS 5930:2015+A1:2020. HMSO, London.

British Standards Institution (BSI), 2018. Soil Quality – Sampling, BS ISO 18400-104:2018.

British Standards Institution (BSI), 2020. Soil Quality – Conceptual Site Models for Potentially Contaminated Sites. BS EN ISO 21365:2020.

CHARTERED INSTITUTE OF ENVIRONMENTAL HEALTH. 2008. Guidance on Comparing Soil Contamination Data with a Critical Concentration. CIEH/CL:AIRE.

CL:AIRE, 2020. Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration. CL:AIRE, Buckinghamshire. ISBN 978-1-905046-35-5.

CONTAMINATED LAND: APPLICATIONS IN REAL ENVIRONMENTS (CL:AIRE) and THE ENVIRONMENTAL INDUSTRIES COMMISSION. 2010. Soil Generic Assessment Criteria for Human Health Risk Assessment.

CONTAMINATED LAND: APPLICATIONS IN REAL ENVIRONMENTS (CL:AIRE). 2013. Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. CL:AIRE Report SP1010.

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS (DEFRA) AND THE ENVIRONMENT AGENCY. 2002b. Potential Contaminants for the Assessment of Land. R&D Publication CLR8.

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS (DEFRA) AND THE ENVIRONMENT AGENCY. 2004. The Model Procedures for the Management of Land Contamination. R&D Publication CLR11.

DUCKWORTH G. 2011. The Definition of Waste: Development Industry Code of Practice. CL:AIRE. Version 2.

HEALTH & SAFETY EXECUTIVE. 1991. Protection of Workers and the General Public During the Development of Contaminated Land. HMSO, London.

INTERDEPARTMENTAL COMMITTEE ON THE REDEVELOPMENT OF CONTAMINATED LAND (ICRCL). 1990. Asbestos on Contaminated Sites. (ICRCL 64/85, 2nd Edition).

JONES H K, MORRIS B L, CHENEY C S, BREWERTON L J, MERRIN P D, LEWIS M A, MacDONALD A M, COLEBY L M, TALBOT J C, McKENZIE A A, BIRD M J, CUNNINGHAM J and ROBINSON V K. 2000. The

Physical Properties of Minor Aquifers in England & Wales. BGS Technical Report WD/00/4 - EA R&D Publication 68. BGS and Environment Agency.

NATHANAIL P, JONES A, OGDEN R, and ROBERTSON A. 2014. Asbestos in Soil and Made Ground. A Guide to Understanding and Managing Risks. CIRIA C733.

NATHANAIL P, McCAFFREY C, GILLET A, OGDEN R and NATHANAIL J. 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.

NATIONAL HOUSE BUILDING COUNCIL (NHBC). 2021. NHBC Standards, Technical Guidance. Chapter 4.1, Land Quality.

NATIONAL HOUSE BUILDING COUNCIL (NHBC). 2014. Publication of Category 4 Screening Levels for Land Affected by Contamination. Technical Extra Issue 15.

NORBURY D. 2010. Soil and Rock Description in Engineering Practice. Whittles Publishing.

RUDLAND D J, LANCEFIELD R M and MAYELL P N. 2001. Contaminated Land Risk Assessment. A Guide to Good Practice. *Construction Industry Research and Information Association*. CIRIA Report C552.

SPINK T.W. and NORBURY D.R. 1993. The Engineering Geological Description of Weak Rocks and Over-consolidated Soils. *Proceedings 26th Regional Meeting of Engineering Group of Geological Society, Leeds*.

STROUD, M.A.1975, The Standard Penetration Test in Insensitive Clays and Soft Rocks, *Proceedings of the European Symposium on Penetration Testing*, 2, 367 –375.

STONE K, MURRAY A, COOKE S, FORAN J and GOODERHAM L. 2009. Unexploded Ordnance (UXO). A Guide for the Construction Industry. CIRIA, rpt C681.

WELSH DEVELOPMENT AGENCY. 1998. The Eradication of Japanese Knotweed. WDA: Cardiff.