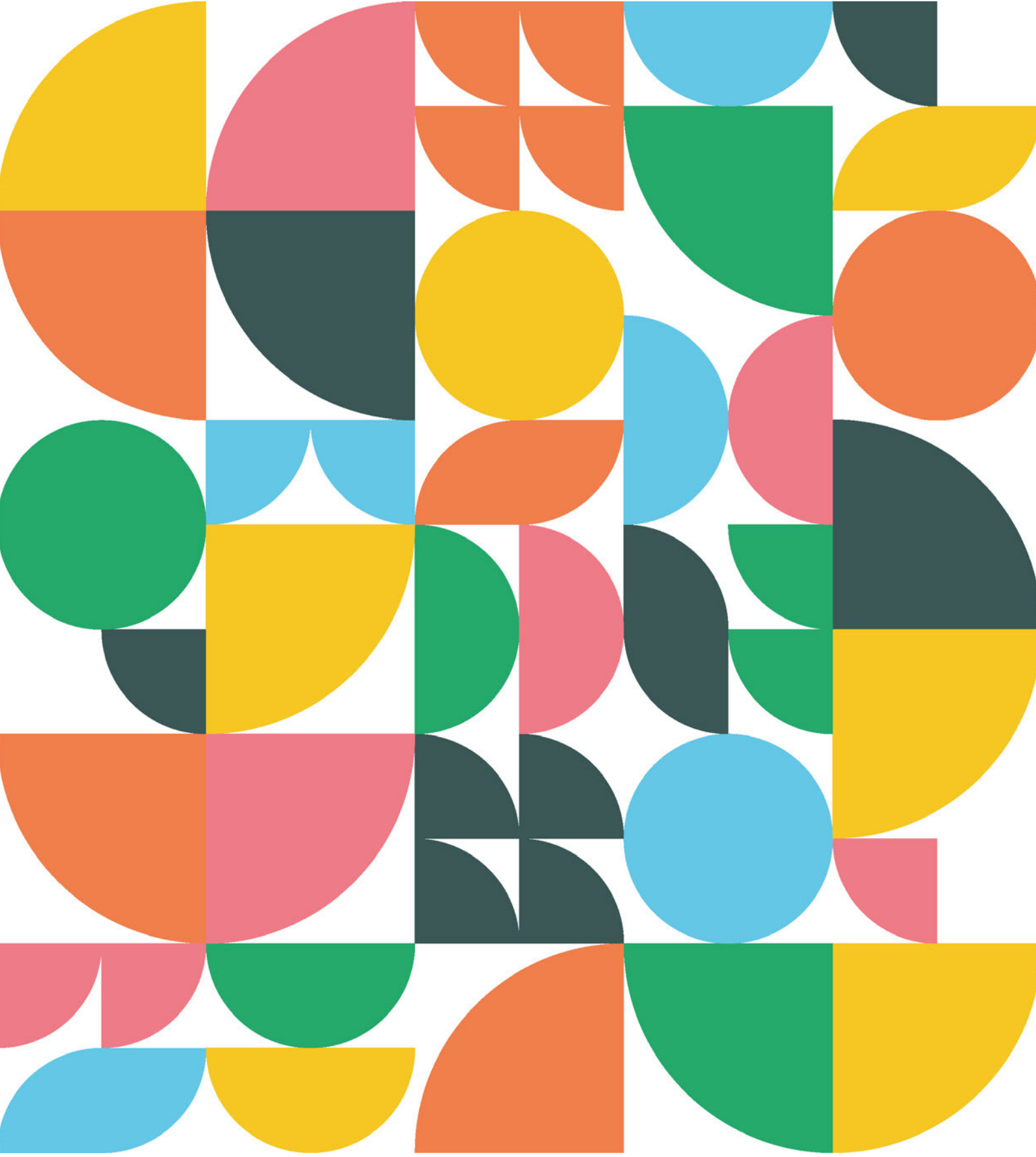

Desktop Study Report

YEX2354 – Land at Halifax Road, Liversedge

February 22

	Name	Position	Date
Responsible	James von Mehren	Geo-Environmental Engineer	21 February 2022
Authorised	Colin Hiscock	Technical Director	21 February 2022

Issue	Date	Description	Contributors	Responsible	Authorised
01	21 February 2022	Final Report	JvM	JvM	CH

Contents

Executive Summary

The below table shows a snapshot of the recommendations concerning contamination. It is advised that the report is read in its entirety to gain a better understanding of our findings.

	No Investigation	Investigation Required
Soil		✓
Ground Gas		✓

Investigation Recommended

We have identified potential sources of contamination that may represent a risk of harm to receptors. Investigation of the site is required to enable an assessment of this risk to be made. Works should not take place until this investigation has been completed

Introduction

*Your*Environment was instructed by Studio91 Architecture Ltd to produce a Phase 1: Desktop Study and Preliminary Risk Assessment Report for the Land at Halifax Road, Liversedge, WF15 8HE.

It is understood plans for the redevelopment of the site comprise:

- Construction of a detached dwelling with associated parking and amenity space

The objectives of this report are to:

- Establish the environmental setting, including sensitivity in relation to human health, surface water, groundwater and ecological receptors
- Review historical and recent uses to assess the potential for contamination to be present from past and current land-use
- Assess by qualitative means the potential nature and extent of contamination from those uses and the environmental risk and liabilities which may affect the site redevelopment
- Identify the prevalent source-pathway-receptor linkages present on site by means of a Tier 1 Contamination Risk Assessment which incorporates the formulation of a Conceptual Site Model (CSM)

During the production of this report the following information sources have been utilised:

- Data obtained from Groundsure
- Historical Ordnance Survey (OS) mapping
- Site walkover
- Zetica bomb risk maps

The full information from these sources can be reviewed within Appendices B & C.

Environmental and Geological Setting

Information on the environmental and geological setting of the site is presented in Appendix B.

Site Geology

Site geology has been assessed using information from British Geological Survey (BGS) mapping and is summarised below:

Artificial/Made Ground	There are no records of artificial or Made Ground underlying the site.
Superficial Ground and Drift Deposits	There are no superficial deposits underlying the study site.
Bedrock Geology	Underlying the superficial drift deposits is bedrock comprised of the Pennine Lower Coal Measures formation (mudstone, siltstone and sandstone).
Landslips	There are no records within 250m
Linear Features	There are four (4no) records within 250m which referred to an inferred normal fault 160m northeast, inferred coal seems 160m and 206m northeast, and a further inferred normal fault 223m south.

The following hazard ratings on site are:

Shrink swell clays	Very low
Running sands	Negligible
Compressible deposits	Negligible
Collapsible deposits	Very low
Landslides	Very low
Ground dissolution	Negligible

Site Hydrogeology and Hydrology

These records are derived from Environment Agency and BGS data. Details of the source and coverage of specific records are provided in the Appendices.

Principal Aquifer	Layers with high intergranular and/or secondary permeability capable of supporting water supplies at strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Major Aquifers
Secondary (A) Aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers
Secondary (B) Aquifer	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water bearing parts of former Non-Aquifers
Secondary Undifferentiated Aquifer	Layers that cannot be attributed to a category A or B rock type. These layers could have previously been described as a minor or a non-aquifer due to their variable characteristics
Unproductive strata	Rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

Aquifer and geological permeability are summarised below:

Aquifer within Superficial Deposits	There are no superficial deposits underlying the study site.
Permeability of Superficial Deposits	There are no superficial deposits underlying the study site.
Aquifer within Bedrock Geology	As a result of the bedrock geology on site, the Pennine Lower Coal Measures formation is designated as being a Secondary (A) aquifer.
Water Framework Directive Groundwater Bodies	The site is within the Aire & Calder Carb Limestone/Millstone Grit/Coal Measures.

Permeability of Bedrock Deposits	The minimum permeability is recorded as being low with the maximum permeability recorded as being moderate.
Groundwater Vulnerability	The groundwater vulnerability in the vicinity of the site is classified as medium due to the productive bedrock aquifer.
Groundwater Abstraction Licences	There are no groundwater abstractions within 1000m of the site.
Surface Water Abstraction Licences	There are no records within 1000m.
Potable Water Abstraction Licences	There are no potable abstraction licences within 1000m.
Source Protection Zones	There are no records within 250m.
OS Water Network	There are no records within 250m.
Surface Water Features	There are no records within 250m.
Water Framework Directive Surface Water Bodies and Catchments	The site is within the GB104027062710 and GB104027062631 river waterbody catchment.

Environmentally Sensitive Areas

These records are derived from Environment Agency, Natural England, Historic England, English Heritage, Forestry Commission and UK Government data. Details of the source and coverage of specific records are provided in Appendices.

Environmental and Habitat Designations	The site is within a nitrate vulnerable zone for surface water (Spen Beck from Source to River Calder NVZ).. There are two (2no) records of the South and West Yorkshire Green Belt within 250m, located 0m and 148m southwest.
Visual and Cultural Designations	There are no records within 250m.

Past Land Use and Potential Contaminant Sources

Information on past land use and potential contaminant sources is presented in Appendix B.

Land Use Records

These records are derived from historical mapping and each record corresponds to a particular map revision date.

Historical land use records are summarised below:

Land Use	Distance and Direction	Sources Summary
Unspecified mills (3)	On site, 134m-178m north	Y
Smithy (2)	On site, 232m northwest	Y
Unspecified works (2)	39m-81m east	Y
Unspecified warehouse	41m southeast	Y
Unspecified factory	134m north	Y
Refuse heap	195m northwest	Y
Nursery	243m southeast	Y

An additional significant record for an unspecified quarry 298m south.

Current land uses are summarised below:

Land Use	Distance and Direction	Sources Summary
Airline and airline services	18m northwest	Y
Electrical substation	47m northwest	N
Vehicle hire and rental (2)	90m northwest 124m southeast	N
Construction completion services	169m northwest	N

Land Use	Distance and Direction
Historical Tanks	There is one record within 250m located 46m southeast.
Historical Energy Features	There is one record of an electrical substation located 38m northwest.
Historical Petrol Stations	There are no records of historical petrol stations within 250m
Historical Garages	There are two (2no) records on site. There are two (2no) additional records within 250m, located 146m and 147m east.
Historical Military Land	There are no records of historical military land within 250m
Current or Recent Petrol Stations	There is one on site record for an obsolete petrol station.
Electricity Cables	There are no records of high voltage underground electricity cables within 250m
Gas Pipelines	There are no records of high-pressure underground gas pipelines within 250m
Railway Infrastructure	There are no records within 250m.

Environmental Permits, Incidents and Registers

These records are derived from local authority, Health and Safety Executive and Environment Agency data. Details of the source and coverage of specific records are provided in the Appendices.

These data are summarised below:

Sites Determined as Contaminated Land	There are no records of sites determined as contaminated land under Part 2A of the Environmental Protection Act 1990 within 250m
Control of Major Accident Hazards (COMAH)	There are no records within 250m
Regulated Explosive Sites	There are no records within 250m. Note that details of some sites may be redacted for security reasons
Planning Hazardous Substances Consents	There are no records within 250m
Historic IPC Licensed Activities	There are no records within 250m
Part A (1) Licensed Activities	There are no records within 250m
Part A (2)/B Licensed Activities and Pollutant Release	There are no records within 250m. Further afield, there are two (2no) records of respraying road vehicles located 355m and 464m northeast.
Radioactive Substance Authorisations	There are no records within 250m.
Licensed Discharges to Controlled Waters	There are no records within 250m
Pollutant release to Surface Waters (Red List)	There are no records within 250m
Pollutant Release to Public Sewer	There are no records within 250m
List 1 and List 2 Dangerous Substances	There are no records within 250m
Substantiated Pollution Incidents	There are no records within 250m. A record of construction and demolition pollution was identified 282m north, which had a minor impact to land. An incident involve slurry and dilute slurry was identified 450m southwest, which had a significant impact to water and a minor impact to land.
Pollution Inventory Substances	There are no records within 250m
Pollution Inventory Waste transfers	There are no records within 250m
Pollution Inventory Radioactive Waste	There are no records within 250m

Waste and Landfill

These records are derived from Environment Agency, BGS, OS and local authority data. Details of the source and coverage of specific records are provided in the Appendices.

Active or Recent Landfill	There are no records within 500m.
Historic Landfill	There are no records within 500m.
Non-Landfill Waste Records	There are no records within 250m.

Mining, Ground Workings and Natural Cavities

These records are derived by from BGS, OS, Coal Authority, Peter Brett Associates, Johnson Poole and Bloomer, Cheshire Brine Subsidence Compensation Board, British Gypsum, Mining Searches UK, Kaolin and Ball Clay Association and local authority data. Details of the source and coverage of specific records are provided in the Appendices. The data are summarised below:

Natural Cavities	There are no records within 250m.
Mining Cavities	There are no records within 250m.
BritPits Data (Surface and Underground Mineral Workings)	There are no records within 500m.
Historic Mineral Planning Areas	There are no records within 500m.
Surface Ground Workings	There is one record within 250m for a refuse heap located 195m northwest.
Underground Workings	There are no records within 250m.
Coal Mining	A record of coal mining was identified, as defined by the Coal Authority.
Non-Coal Mining	A record of localised small scale mining for (bedded) iron ore was identified 301m northeast. Potential for difficult ground conditions are unlikely or localised and at a level where they need not be considered. There are no records within 250m for brine extraction or gypsum, tin or clay mining.

Radon and Background Soil Chemistry

These records are derived by from BGS and Public Health England data. Details of the source and coverage of specific records are provided in the Appendices.

Radon

The study site is not located within a Radon Affected Area, as less than 1% of properties are above the Radon Action Level. No radon protective measures are necessary for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment.

Background Soil Chemistry (estimated by BGS)

Arsenic	25-35 mg/kg
Bio-accessible arsenic	No data
Lead	100 mg/kg
Bio-accessible lead	60 mg/kg
Cadmium	1.8 mg/kg
Chromium	90-120 mg/kg
Nickel	15-30 mg/kg

Unexploded Ordnance (UXO)

The site is in an area considered to be at low risk from wartime unexploded ordnance. The Zetica bomb risk map is reproduced in Appendix E.

Historic Mapping

The object of this search is to report on the evidence of site history and redevelopment of the site and its environs from available County Series, OS Maps and aerial photography.

Year	On site	Off site
1854	Unspecified buildings	The surrounding is mostly undeveloped and part of a large field area.
1892	No discernible changes	No relevant changes
1893 to 1894	No discernible changes	Smithy 50m northeast
1905	No discernible changes	No relevant changes
1907	No discernible changes	Smithy 225m northwest
1922 to 1932	No discernible changes	No relevant changes
1933	No discernible changes	Mills 200m north
1938	No discernible changes	No relevant changes
1948	Incomplete map- no discernible changes	Incomplete map- no relevant changes
1951 to 1955	No discernible changes	No relevant changes
1956	Reduction in onsite buildings	Mills 50m southeast Works 95m east
1957 to 1967	No discernible changes	No relevant changes
1968	Incomplete map- no discernible changes	Incomplete map- works 50m southeast
1974 to 1975	More unspecified buildings towards the south	Garage 10m east Warehouse 50m southeast Warehouse 75m south Builder's Yard 100m northeast
1983 to 1985	No discernible changes	No relevant changes
1990 to 1994	No discernible changes	Electrical substation 50m northwest Warehouse 60m southeast Garage 175m east
1999		

2000 to 2003	No discernible changes	No relevant changes
2010 to 2022	No discernible changes	No relevant changes

The Historical OS Maps are available in Appendix B.

Walkover Survey

Date	28 h February 2022
Weather	Dry and Sunny
Current Use	The site is currently used as a public access driveway which supports the immediate adjacent (east) site where they are storing some construction materials and some vehicles, and there is a couple of small history buildings.
Access	The site is accessible via a public access driveway south of the A649, near New Street.
Topography	The general groundslope is flat and level.
Structures	A medium sized metal structure was identified for an unspecified purpose. It appears to be comprised of some corrugated materials, which could contain potentially asbestos containing materials.
Ground Covering	The area is predominantly hard-surfaced, comprised of concrete and asphalt. Small patch of soft-landscaping was identified at the southeast of the study site. It is estimated that 70% of the site is comprised of hard surfacing and 30% is laid to permeable grass.
Vegetated Areas	Non hard surfaced areas of the site are laid to grass.
Drainage	No drainage covers were identified during the walkover.
Services	No services were noted on site.

Direction	Boundary
North	No defined boundary
East	Metal fence/no defined boundary
South	1m stone wall
West	1m stone and wooden wall

Direction	Surrounding Land Use
North	Residential area
East	Industrial area
South	Field area
West	Residential area

Potential on site sources

- PACMs from metal structure to the southeast.

Potential off-site sources

- Hydrocarbons from oil drum and vehicle storage 5m east
- Construction and waste materials (unlikely to be a credible source) 5m east

Sources, Pathways and Receptors

Potential Sources

Source	Identified by	Location	Description
Historical development/PACMs	Walkover/historic mapping	On site 5m east	Made ground associated with historic development may contain variety of contaminants including, heavy metals and asbestos.
Mills/unspecified mills/nursery	Historical mapping/enviro-search report	On site 50m-243m southeast 134m-178m north	Potential for agrochemical contaminants such as pesticides, herbicides, heavy metals, VOCs, and SVOCs although potential is considered low. Other associated contaminants include Asbestos, PAH, and TPH.
Various industrial activities including Smithy, works, Garage, warehouse, unspecified factory, airline services, vehicle, facilities, service area, petrol station	Walkover/historic mapping/enviro-search report	On site 5m-175m east 18m-275m northwest 41m-124m southeast 50m northeast 75m south	Due to the high use of Hydrocarbon based products, A wide variety of contaminants are associated with these types of land use. TPH, BTEX, MTBE, heavy metals, VOCs, SVOCs, and PAH, and Asbestos, are all associated with these types of land use.
Refuse heap, coal mining	Enviro-search report	On site 195m northwest	Depending on the material used as the fill, this material can generate ground gas, and if close enough, with a viable pathway, be a source of contaminants.
Builder's yard	Historical mapping	100m northeast	Due to the wide range of activities carried out at these sites, there is a board spectrum of contaminants associated with them.
Tanks	Enviro-search report	46m southeast	Due to the wide variety of products that can be stored within tanks, there is a board spectrum of contaminants associated with them.

The following contaminants are potentially associated with the on-site sources:

- Heavy Metals
- Potential Asbestos Containing Material (PACM's)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Gas – H (Hydrogen), CH_4 (Methane), CO (Carbon Monoxide), CO_2 (Carbon Dioxide) and H_2S (Hydrogen Sulphide)
- Volatile Organic Compounds (VOC)
- Semi Volatile Organic Compounds (sVOC's)
- Benzene, toluene, ethylbenzene and xylene (BTEX)
- Methyl tert-butyl ether (MTBE)
- Agrochemicals (pesticides, herbicides, and insecticides)

The following contaminants are potentially associated with off-site sources:

- Heavy Metals
- Potential Asbestos Containing Material (PACM's)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Gas – H (Hydrogen), CH_4 (Methane), CO (Carbon Monoxide), CO_2 (Carbon Dioxide) and H_2S (Hydrogen Sulphide)
- Volatile Organic Compounds (VOC)
- Semi Volatile Organic Compounds (sVOC's)
- Benzene, toluene, ethylbenzene and xylene (BTEX)
- Methyl tert-butyl ether (MTBE)
- Agrochemicals (pesticides, herbicides, and insecticides)

Pathways

Pathway	Medium	Properties
Direct Contact	Dust, solid and liquid phase	There may be direct contact with potentially impacted soil and Made Ground across the site. There is a possibility of dust fumes being produced during earthworks in the construction phase. Dermal contact and ingestion of potentially contaminated soils during construction or operational phase of the site.
Leaching through Made Ground	Unsaturated flow	Potential for leaching and migration of potential contaminants along preferential flow paths in the ground.
Foundations and Underground Infrastructure and Obstructions	Preferential flow	Contaminants will flow the path of least resistance which can be gaps around foundations, services, and floor construction
Migration of Ground Gas	Gaseous flow	Infilled land material is likely to be variable in composition. Migration through granular material within superficial deposits is possible.

Receptors

Category	Receptor	Properties
Humans	End users (such as residents and visitors)	Potential contact with contaminated soils in existing/proposed soft landscaping areas. Potential contact with ground gas within enclosed buildings
	Construction workers	Reworking of contaminant impacted materials in underlying soil during construction works can expose workers to contamination.
Property	Materials and site structures	Foundations and site services may be damaged by potentially aggressive compounds present in soils.
Controlled Waters	Underlying superficial / bedrock Aquifer and surface water	The site is recorded as having a Secondary (A) Aquifer within bedrock deposits underlying the site.
Plant (species and uptake) and Wildlife	Various	Attributes will be influenced by factors such as relative quality, scale, rarity and substitutability.

Preliminary Conceptual Site Model (CSM)

The assessment is undertaken based on the current proposals for the site.

Proposed Land use Assessment Criteria

Residential with consumption of homegrown produce

Any change in the development proposals for the site involving a change in end use class will result in a requirement for this assessment to be revised.

On Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Made Ground possibly containing metals, TPH, PAH, VOC's and sVOC's	Ingestion, dermal contact, inhalation of dusts and vapours	Future end users and site visitors	Medium	Likely	Moderate	Due to the commercial history on site, contamination of onsite soils may be possible. In addition, contact may be possible between future end users and shallow soils and the consumption of homegrown produce.
		Construction Workers	Medium	Likely	Moderate	Construction workers are likely to come into direct contact with soils during groundworks. Safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from contact with soils and shallow/perched groundwater
	Leaching through soils and migration via groundwater or soil pores	Controlled Waters	Medium	Low	Moderate to Low	A low risk has been assessed due to the absence of any nearby abstraction licences and a Secondary (A) aquifer within the bedrock deposits.
	Permeation of water pipes	Construction materials, future end users and site visitors	Medium	Low likelihood	Moderate to Low	Hydrocarbons, especially aromatics are known to permeate plastic pipes. Provision of water supply pipes and proprietary barrier pipes may be required by the water supply company
	Uptake	Plant and Wildlife	Medium	Likely	Moderate	Uptake may be possible in areas of proposed soft landscaping.

On Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Asbestos at/near ground surface in Made Ground	Inhalation of fibres in airborne dust	Future end users and site visitors	Severe	Low likelihood	Moderate to Low	Some corrugated material was identified during the site walkover. It is possible that future end users would have direct contact with fibres in soft landscaping areas materials. Roofing materials appear in tact, therefore probability is considered low.
		Construction Workers	Severe	Low likelihood	Moderate to Low	Some corrugated material was identified during the site walkover. It is also possible that traces of asbestos fibres may have been deposited within the soft-landscaping. Construction workers are likely to come into direct contact with soils. During subsequent normal groundworks, safe working practices should be implemented, and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from residual asbestos in soils.
Ground Gases: From Made Ground: H, CH_4, CO, CO_2 and H_2S	Gas migration and build up within buildings (explosion/ asphyxiation risk)	Future end users and building structures	Medium	Very Low	Low	There is a potential for ground gas generation due to the history of coal mining within the study site. The absence of any shafts or other mining features on historical mapping results in a low probability for the site.

Off Site

Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Land uses in the vicinity possibly containing metals, TPH, PAH, VOC's and sVOC's	Leaching through soils and migration via groundwater or soil pore moisture	Future end users and site visitors	Medium	Likely	Moderate	It is likely that contaminants may migrate onto the study site through leaching due to the volume and proximity of offside contaminative sources. Therefore, a moderate risk rating has been assessed.
	Ingestion, dermal contact, inhalation of dusts/vapours	Future end users and site visitors	Medium	Likely	Moderate	It is likely that contaminants may migrate onto the study site through leaching due to the volume and proximity of offside contaminative sources. Therefore, a moderate risk rating has been assessed.

Off Site						
Source	*Pathways*	*Receptor*	*Severity*	*Probability*	*Risk*	*Justification*
Ground Gases: From Made Ground: H, CH_4, CO, CO_2 and H_2S	Gas migration and build up within buildings (explosion/ asphyxiation risk)	Future end users and building structures	Medium	Low likelihood	Moderate to Low	There is a history of iron ore mining in the surrounding area, however potentially for difficult ground conditions is unlikely. There are also records of refuse heaps and an unspecified quarry.

Recommendations

The site is located within an area of coal mining activity, and it may be prudent to obtain coal mining reports from the Coal Authority which may be required by the Local Authority and Building regulations.

Based on the information obtained in this report, we would recommend that a Site Investigation (SI) is undertaken to determine the actual pollution linkages and to quantify the risk to the receptors as outlined with the Preliminary Conceptual Site Model.

The intrusive investigation may reveal on-site sources of contamination that were not established in this report. Therefore, the CSM will be updated with contamination data obtained from the site works.

Scope of Proposed Investigation

Testing Regime

The testing regime has been devised in accordance with BS10175:2017 Guidelines for the Code of Practice for Contaminated Land and CLR Report No. 4 Sampling Strategies. The objective will be to identify the extent of any possible contamination that may exist at the site.

Sampling Strategy

A service search should be completed prior to any subsequent investigation to determine the service locations. Service plans must be provided by the site owner.

- The SI should incorporate the drilling of four (5no) shallow boreholes to gain a suitable spread of the site. These will be completed to 5 metres below ground level or refusal or where groundwater is encountered.
    - At least two of these locations should be near the eastern boundary of the site to target possible contaminants from the adjacent garage.
- All positions will be logged, and samples removed. Groundwater conditions shall be logged, and visual/olfactory observations noted. A Photo Ionisation Detector (PID) (MiniRae 2000 lamp 10.6eV) meter should also be used during monitoring rounds to analyse for the presence of Volatile Organic Compounds (VOC's).
- Three (3no) of these boreholes will be installed with gas and groundwater monitoring equipment.

The locations will be based on this report to enable a broad and focused coverage of the site.

Monitoring Regime

The installed positions will be monitored for gases and groundwater. Monitoring will commence approximately 10 days following site works to enable equilibration of the underlying soils and groundwater.

Monitoring will be completed on a fortnightly basis for six (6no) occasions. Depending on a review of the results from these six (6no) rounds, further monitoring rounds may be required.

Gas monitoring should be completed in accordance with CIRIA C665 (Assessing Risks Posed by Hazardous Ground Gases to Buildings) when atmospheric pressure is either falling and/or below 1005 millibars.

A portable Gas Analyser (GA5000) will be used to monitor soil gases within the positions during these visits. A PID will also be used during monitoring rounds to analyse for the presence of VOC's.

Once gas monitoring has been completed, a dip meter will be used to test for groundwater depth. If groundwater is encountered, the positions will be adequately purged, and samples subsequently removed in accordance with BS6068-6.18: 2001 Water Quality Sampling: Part 18 – Guidance on Sampling of Groundwater at Contaminated Sites.

Alternatively, if agreeable with the local authority, continuous gas monitoring equipment can be installed within two of the windowless sampler holes, with ground gasses to be monitored continuously over a three-week period.

Laboratory Analysis

An appropriate and consistent analytical suite of contaminants will be applied to any soil samples retrieved from the site.

Based on the findings contained within this report, we would recommend that the analytes be:

- Heavy metals
- Potential Asbestos Containing Materials (PACM's)
- Total Petroleum Hydrocarbons – Criteria Working Group TPH(CWG)
- Speciated Polycyclic Aromatic Hydrocarbons (PAH)
- Soil Organic Matter (SOM)
- Volatile Organic Compounds (VOCs)
- Semi Volatile Organic Compounds (sVOC's)
- BTEX
- MTBE

Not all samples retrieved from the proposed investigative works will be laboratory analysed and a UKAS / MCERTS accredited laboratory testing organisation will carry out all analysis.

Guidance

The results from the proposed SI shall be compared against standards, such as the revised LQM/CIEH S4UL criteria .

Results from gas monitoring shall be used to calculate a Gas Screening Value (GSV) in accordance with BS8485:2015.

Consultees

This report must be sent to the relevant Local Authority (LA) to seek their comments and subsequent approval. Works may be delayed, or additional SI required should the LA not be able to provide comment, or the works are commenced prior to obtaining comment.

Groundworks Watching Brief

If during construction works any material is noted to show visual and/or olfactory signs of contamination, *Your*Environment must be contacted for advice.

If any landscaping materials are to be imported on site, they must be tested to check that they are suitable for the intended use.

Notes and Limitations

The following table details the applicable distances relevant to sections to focus on the information directly relevant to the site. Information from outside these radii will be referenced when relevant.

Section	*Reference Distance*
Geology	50m (underlying geology) or 250m (structural features, borehole records)
Hydrogeology	250m (aquifers, surface water) or 1,000m (abstractions)
Environmentally Sensitive Areas	500m (environmental designations) or 250m (habitat, visual and cultural designations)
Land Use Records	250m. Several records may refer to the same feature where it is present over time. Differences in distances quoted from the study site may be due to geolocation errors
Environmental Permits, Incidents and Registers	250m
Waste and Landfill	500m (landfills) or 250m (non-landfill waste operations)
Mining, Ground Working and Natural Cavities	250m
Radon and Background Soil Chemistry	50m
Historic Mapping	100m. Each map represents a snapshot of the site and its environs at the date of the survey. Changes that had occurred at other times may not have been recorded on the maps and could represent an unidentified hazard to the site. The information reported might not represent all pertinent information that could be obtained. The interpretation of the maps and other data commented on in this report is subjective

Framework for Assessment

Risks are assessed within the risk management framework established in Part IIA of the Environmental Protection Act (EPA) 1990 introduced by Section 57 of the Environment Act 1995 which provides a statutory definition of contaminated land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

"Significant harm is being caused or there is a significant possibility of such harm being caused; or Pollution of controlled water is being or is likely to be caused."

Risk from contamination is assessed in accordance with the Land Contamination Risk Management Framework (LCRM) prepared by the Environment Agency on 8 October 2020. This considers possible linkages between contaminant sources and potential receptors which could be harmed or polluted.

The key aspect of the framework is the development of a Conceptual Site Model (CSM) which considers the potential contaminant linkages between potential contaminant sources, the receptors, and the pathways by which the receptors could be exposed to the contaminants.

For a risk of environmental harm to occur due to of ground contamination, ***all*** the following elements must be present:

Source	A substance that can cause pollution or harm
Pathway	A route by which the contaminant can reach the receptor
Receptor	Something which could be adversely affected by the contaminant

If all are present then the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

The qualitative risk assessment (QRA) and conceptual site model (CSM) has been undertaken in accordance with Annex 4 of the R&D publication 66, Guidance for the Safe Development of Housing on Land Affected by Contamination (NHBC/EA/CIEH, 2008) which updates and supersedes CIRIA C552: Contaminated Land Risk Assessment, A Guide to Good Practice (Rudland et al., 2001).

Where it is considered that there is no credible linkage, this is indicated in the table. In accordance with the R&D66 guidance, if there is no pollution linkage then there is no requirement to apply tests for probability and consequence.

Flood Risk

This report does not replace a hydrogeological survey or Flood Risk Assessment and specialist studies may need to be undertaken to ascertain the risks posed from flooding.

Limitations and Uncertainties

This report has been prepared by Your Environment with all reasonable skill, care and diligence. The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources, together with a site walkover of the site.

The opinions given in this report have been dictated by the finite data on which are they based and are relevant only to the purpose for which the report was commissioned.

Information reviewed should not be considered exhaustive and should be accepted in good faith as providing true and representative data with respect to site conditions. Should additional information become available which may influence the opinion expressed in this report, Your Environment reserves the right to review such information and, if warranted, to alter the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site. This report is an environmental phase 1 report and does not consider the geotechnical implications.