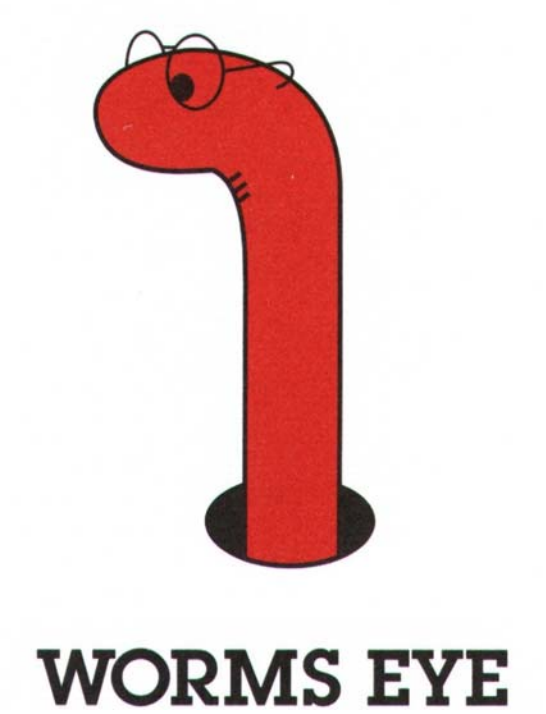
Electronic Report



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Our Ref: Broad Lane/O16 4PG/2020
Date: 23 December 2020

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LAND AT 7 BROAD LANE, ROCHDALE, OL16 4PG
REMEDIATION STRATEGY

INTRODUCTION

A residential development is proposed. Following an intrusive report (23/12/20) instructions were to prepare a remediation strategy.

SITE LOCATION

The site is an 'L' shaped plot, about 45 by 37 metres, to the north of Broad Lane in Rochdale and at OS Grid Reference 390500, 411365. The site is a former, domestic, garage colony with concrete slabs at the west and east/middle and a central tarmac/bitmac drive. Demolition rubble from the garages is present around the site, including broken asbestos, probably asbestos sheet cement. To the east is a sub-station and to the north are allotments, Sudden Brook forms the northwest boundary.

PROPOSED DEVELOPMENT

It is proposed to build four houses, a block of three town houses along the south and a detached house at the northwest. There will be a small parking area at the northeast. Each property will have associated gardens and there will be landscaped areas along the east and northwest boundaries.

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INTRUSIVE REPORT

Worms Eye carried out an intrusive investigation (report dated 23/12/20) the salient points were:

Ground Conditions

A series of ten trial holes were carried out, up to 1.0m deep. These showed show similar conditions having about 0.5m of made ground (typically sandy topsoil with brick and gravel) overlying sand with gravel in TH1, 2, 5, 6, 7, 8 and 9, and silt with gravel in TH3 and TH10.

Contaminated Soils

Results show raised levels of lead and PAHs across the site. These pose a risk to householders arising from direct contact and remedial works are required. The following are suggested:

- Excavate to 600mm deep in gardens and non-permanent hard-surfaced areas to each plot.
- Excavate to 600mm deep up to a root protection zone on the east of the site.
- Back fill with clean, imported, soils.
- Complete landscaping on the west of the site with clean, imported, soils.

Sulphate resistant concrete is not required.

There are no risks from hydrocarbon vapours.

Subject to approval the site is suitable for the use of normal PE water pipes.

Conceptual Model

Source	Receptors	Pathway	Complete Pollutant Linkage
Asbestos (none seen)	End-users	Inhalation	No
	Off-site	Migration off-site	No
Inorganic contaminants (raised lead)	Householders	Direct contact, ingestion, from home grown vegetables, ingestion and inhalation of dust	Yes
	Groundwater	Leaching towards	Possible
	Surface Water	Leaching towards	Possible
Sulphate (low)	Building fabric	Concrete directly in contact with soil	No
Hydrocarbons (raised TPH and PAH)	Householders	Direct contact, ingestion, from home grown vegetables, ingestion and inhalation of dust	Yes
	Service pipes	Seeping into drinking water pipes	No
	Groundwater	Leaching towards	Possible
	Surface Water	Leaching towards	Possible
Hydrocarbon vapours (low)	Householders	Inhalation of vapours indoors and outdoors	No
Landfill gas	End-users - in buildings	Seeping into buildings, explosion, asphyxiation	No
Radon	End-users - in buildings	Seeping into buildings	No

End of Intrusive Report Re-Cap

REMEDIATION STRATEGY

Construction Workers

Site workers should be made aware of the hazards of working with contaminated soils. Personal hygiene should be observed and suitable personal protective equipment (PPE) should be worn. Normal precautions for an urban renewal type project are required, including the use of gloves and the provision of washing facilities to avoid ingestion of contaminants.

Garden/Landscaped Areas

Contamination by lead, TPHs and PAHs was found to be present in the made ground. Remedial works are required to remove risks to householders and plants should be provided with a medium in which they can safely grow. The following is suggested:

- Excavate soils to a minimum 600mm deep below gardens, paths, patios and other non-permanent hard-surfaced areas on each plot, and up to a root protection zone on the east of the site (see plan).
- Dispose excavated soils off-site.
- Backfill with clean, imported soils, comprising (bottom up):
    - Geotextile (or similar) warning barrier.
    - 100mm single size gravel to act as capillary break.
    - 350mm sub-soil (gardens) or 450mm sub-soil (non-garden areas).
    - 150mm topsoil (gardens).

Following enabling works, complete the landscape on the west of the site with clean, imported, soils.

Disposal of Excavated Soils

Test results have been compared with hazardous waste levels and a Hazwaste report is enclosed. This suggests excavated soil would not be classed as waste.

Levels of organic carbon (TOC) are raised in THs 1, 3, 6 and 7 which may pose problems for disposal at landfill. Disposal of soil is now a complex matter and the analysis should be submitted to the receiving site for confirmation of its status.

Vehicles carrying contaminated material should have their wheels/ undercarriages cleaned before leaving site.

Imported Soils

All soils (e.g. topsoil, bulk fill hardcore) and similar materials imported on-site to be proved to be uncontaminated. Imported material will require testing as follows:

- Greenfield soils – minimum of 3 tests or 1 test per 100m^3 (whichever is greater). Testing to include arsenic, cadmium, chromium (total), chromium VI, copper, mercury, nickel, lead, selenium, zinc, PAH (16 USEPA speciation), asbestos, TPHs (speciated), boron, cyanide, thiocyanate, sulphide, sulphur, sulphate, pH, Som.
- Brownfield/screened/manufactured soils – minimum of 3 tests or 1 test per 50m^3 (whichever is greater). Testing to include arsenic, cadmium, chromium (total), chromium VI, copper, mercury, nickel, lead, selenium, zinc, PAH (16 USEPA speciation) asbestos, TPHs (speciated), boron, cyanide, thiocyanate, sulphide, sulphur, sulphate, pH, Som.

Soil Screen Values

Tests carried out on the imported material, either by the supplier or the consultant, to be screed against residential values, based on 1% SOM. If these are exceeded, site specific value may be derived, subject to them being appropriate.

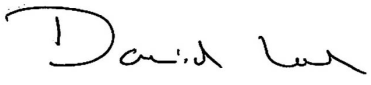
Validation

A validation report will be required on completion, this will require but not necessarily be limited to:

- Tickets from waste removal contractor and receiving landfill.
- Photographs of excavation to confirm depth.
- Contamination test results for tests on imported soils.
- Photographs to confirm thickness of imported soil types.
- Document (receipt, delivery notes) to show soil types and sources.
- Documented site inspection, including photographs.
- Conformation from the Water Authority of final water pipe connection.
- Certificate/invoice from suppler to confirm appropriate water pipes have been used.

This report is usually a collaboration between the contractor, who will collect the above documentation and Worms Eye, who can assist in preparing the Validation Report

Yours faithfully
on behalf of Worms Eye Ltd



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List of Appendices – Remediation Strategy

List of Acronyms

Plan Showing Area of Proposed Remedial Works

CONTAMINATION TEST UNITS

Conversion factor	Name	Symbol	Numerical Value	Alternative description	Commonly used for:
	per cent	%	1 in 100 (10^2)		total sulphur, hazardous waste
% x10	parts per thousand	‰	1 in 1000 (10^3)	g/l (grams per litre)	water soluble sulphate test
‰ x 1,000	parts per million	ppm	1 in 1,000,000 (10^6)	mg/kg (milligrams per kilogram)	most soil tests
				mg/l (milligrams per litre)	water tests
ppm x 1,000	parts per billion	ppb	1 in 1,000,000,000 (10^9)	μg/kg (micrograms per kilogram)	PAH soil tests
				μg/l (micrograms per litre)	water/leachate tests
ppb x 1,000	parts per trillion	ppt	1 in 1,000,000,000,000 (10^{12})	ng/kg (nanograms per kilogram)	PAH soil tests
				ng/l (nanograms per litre)	water/leachate tests

ABBREVIATIONS

Chemical	BAP	Benzo(a)pyrene
	BTEX	Benzene, toluene, ethylbenzene, xylene
	DAHA	Dibenzo(ah)anthracene
	MTBE	Methyl tertiaryt-butyl ether (additive to petrol)
	EPH	Extractable petroleum hydrocarbons (formerly diesel range organics – DRO)
	NFD	No fibres detected (asbestos test)
	PAH	Polycyclic aromatic hydrocarbons
	PCB	Polychlorinated biphenyls
	PCE	Perchloroethylene or tetrachloroethylene
	PID	Photo ionisation detector (screen for VOC)
	PRO/GRO	Petrol range organics/gasoline range organics
	SVOC	Semi-volatile organic compounds
	TCE	Trichloroethylene
	TPH	Total petroleum hydrocarbons
	VOC	Volatile organic compounds
Other	AGS	Association of Geotechnical Specialists
	BGS	British Geological Survey
	BRE	Building Research Establishment
	CBR	California Bearing Ratio
	CIEH	Chartered Institute of Environmental Health
	CIRIA	Construction Industry Research and Information Association
	CLEA	Contaminated Land Exposure Assessment (Environment Agency/DEFRA)
	CLR 8	Contaminated Land Research Report 8 (Environment Agency/DEFRA)
	DWQ	Drinking water quality
	EA	Environment Agency
	EQS	Environmental quality standards (for rivers etc.)
	ICRCL	Inter-departmental Commission for the Reclamation of Contaminated Land
	LQM	Land Quality Management Ltd (Land and Environmental Consultancy).
	NHBC	National House Builders Council
	SGV	Soil Guideline Values
	SPT	Standard penetration test

TPHWG TPH Working Group

1. This report should be considered in relation to the objectives agreed between Worms Eye and the Client, outlined in the introduction.

2. For the work, reliance has been placed on publicly available data, obtained from the sources identified in the report. The information is not exhaustive and further information may be available from other sources. When using the information it has been assumed it is correct, and no attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and guidelines, for land and groundwater contamination, enforced by the Local Authority and the Environment Agency.

4. During the site walkover, reasonable effort was made to obtain an overview of the site. However, no attempt was made to enter areas that are unsafe, a risk to health and safety, locked, barricaded, overgrown, or areas not made accessible.

5. Access, the presence of services and activities on the site, limited locations where sampling could be carried out and the techniques that could be used.

6. Assessments are based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. The conclusions and recommendations provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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9. New information, revised practices, or changes in legislation, may necessitate the re-interpretation of the report, in whole or in part.

Plan Showing Proposed Remedial Works
Broad Lane
Rochdale
OL16 4PG

Areas Requiring Remedial Works



SITE PLAN AS PROPOSED
1 : 100

Rev B Site layout revised 25.01.2020

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Project Title
LAND AT 7 BROAD LANE, ROCHDALE, OL16 4PG

Drawing Title
PROPOSED SITE PLAN

Scale @ A1: As indicated
Date: 09/07/19

Drawing Number: 743-19-02
Revision: B