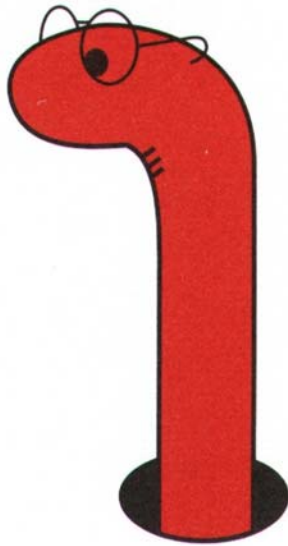
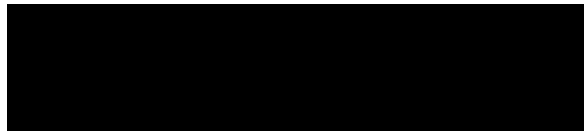


Electronic Report



WORMS EYE

Worms Eye Limited
PO Box 1157
COLNE
BB9 4HS



Our Ref: Club Street/BB7 9AY/2024
Date: 18 July 2024

Simon Gill
Barrowbridge Construction Ltd
Barrowbridge House
Club Street
Barrow, Clitheroe
BB7 9AY



BARROW BRIDGE HOUSE, CLUB STREET, BARROW, CLITHEROE, BB7 9AY
PROPOSED INVESTIGATION

INTRODUCTION

A residential development is proposed. Following a PRA (18/7/24) the objective is to design a suitable investigation to consider contamination, hydrocarbon vapours and geotechnical issues.

SITE DESCRIPTION

The site is 'U' shaped, about 55 by 50m, located to the northwest of Club Street in Barrow, Clitheroe, and at OS Grid Reference 373740, 438500. The site comprises a builders yard with buildings at the southwest and southeast and a yard on the remainder comprising tarmac and concrete, poor quality and broken in places. There are various items of building materials, equipment and machinery spread around the site.

Building 1 (northwest) – concrete block with metal cladding above and concrete floor. Used as a vehicle workshop with vehicle, tools and equipment inside there are used oil tanks at the west corner.

Building 2 – brick built and rendered office extension to the southeast of building 1.

Building 3 – dilapidated brick walls with suspected asbestos cement roof and cladding, broken in places and concrete flood. Used for storage, very untidy.

The area slopes down to the southwest. There are fields to the northeast and northwest and houses to the southeast and southwest.

PROPOSED DEVELOPMENT

It is proposed to demolish the existing buildings and build four detached houses, one at the southeast corner and three along the northwest, with detached garages, driveways and associated gardens.

INDUSTRY PROFILE

The site was originally developed as a bowling green, where made ground may have been imported, and had been used as a builders yard (including vehicle maintenance) for about 60 years.

Industry	Possible Contaminants
Builders Yard	Metals: e.g. arsenic, cadmium, copper, lead, zinc Inorganic compounds : cyanide, sulphate Phenols Organic solvents (VOC) Fuel oil, diesel, petrol (TPHs) Asbestos General Hydrocarbons (PAH)
Bowling Green/Made Ground	Metals: copper, zinc, chromium, nickel, lead, cadmium, arsenic, Inorganic compounds: cyanide, sulphates Phenols Mineral oils, fuel oils (TPHs) Asbestos General hydrocarbons (PAHs) Pesticides

CONCEPTUAL MODEL

Source	Receptors	Pathway	Potential/Likely Pollutant Linkage
Asbestos	End-users	Inhalation	Yes
	Off-site	Migration off-site	Possible
Inorganic contaminants	Householders	Direct contact, ingestion, from home grown vegetables, ingestion and inhalation of dust	Yes
	Groundwater	Leaching towards	No
	River/stream	Leaching towards	Unlikely
Sulphate	Building fabric	Concrete directly in contact with soil	Yes
Hydrocarbons	Householders	Direct contact, ingestion, from home grown vegetables, ingestion and inhalation of dust	Yes
	Service pipes	Seeping into drinking water pipes	Yes
	Groundwater	Leaching towards	No
	River/stream	Leaching towards	Unlikely
Hydrocarbon vapours	Householders	Inhalation of vapours indoors and outdoors	Possible
Landfill gas	End-users (inside)	Seeping into buildings, explosion, asphyxiation	No
Radon	End-users (inside)	Seeping into buildings	No

PROPOSED INVESTIGATION

It is recommended that investigations are carried out after demolition of the existing buildings to prevent locations being impeded and new contaminants being introduced after the investigation.

Contamination

The findings suggest it is likely that contamination will be present on the site at raised levels. An intrusive investigation is required, consisting of boreholes/trial holes and tests to confirm the presence/absence and extent of contamination on the site. The oil tanks are specific point sources for contamination and the investigation will need to target these, proposed gardens (most sensitive part of the development), proposed houses and provide all round coverage.

Proposed Action

- *Drill 10 boreholes to about 6m deep and excavate 6 trial holes up to 0.6 - 1.0m deep.*
- *Test 16 shallow samples (about 0.25m deep) and 3 deeper samples for :heavy metals, cyanide, sulphate, PAHs, TPHs, phenols and asbestos.*
- *Test 5 shallow samples for Pesticides*
- *Test 3 deeper samples for TPHs and PAHs.*
- *Test 4 samples at about 0.9m for a suite of contaminants suitable for selecting water pipes.*
- *Screen the boreholes for VOC using hand-held PID monitor.*
- *Test the 5 worst case samples from the PID screen, >5ppm, for a more detailed analysis.*
Maximum 1 per BH.

Controlled Waters

A very low risk to groundwater and low risk to surface water is expected and no further action is considered necessary at this stage. This will need to be reviewed following the soil tests and it is expected that leachate tests will be required to investigate this further.

Proposed Action

- *Allow for carrying out leachate tests on samples with worst case contaminants suggesting a potential risk to controlled waters.*
- *Allow for testing 3 shallow water samples, if water is present.*

Landfill Gas/Ground Gas

The findings show no credible on or off-site landfill or ground gas sources and suggest no gas risk to the development.

Subject to Local Authority approval it is considered that gas testing is not needed and no special precautions are required.

Radon

Radon protection measures are not required.

Foundations

A series of boreholes are required in the area of the proposed building to allow the most suitable foundations to be designed. Plasticity tests are required to confirm the shrinkage potential of the clay.

Proposed Action

- *Supplement boreholes with 2 dynamic probes.*
- *Carry out plasticity tests on 4 samples of clay.*

General

The PRA, and these proposals, should be issued to the Local Authority for their comments before proceeding with the investigation.

Yours faithfully

on behalf of Worms Eye Ltd



David Lord
BSc (Hons)
FGS, MEnvSc, AIEMA