Remediation Statement
For
Land Adjoining 23 Jagger Lane
Emley Moor, Huddersfield
West Yorkshire
HD8 9SY

Planning Reference 2012/62/90390/E

Introduction

Planning consent was granted for the demolition of existing buildings and the erection of 2 no. detached dwellings at the property on 27th June 2012.

This statement follows the recently completed Phase 2 investigation and has been prepared in accordance with Condition 7 of the planning consent to outline the options and recommended actions to minimise the risk to human health and the wider environment from the contaminants that have been identified or which may potentially exist at the site during the proposed redevelopment.

It is anticipated that these measures will be implemented within the next 6 to 12 months, but in any case prior to the construction of the residential dwellings.

Remedial Measures

The required measures to address the identified risks are presented as follows and will need to be agreed with the Contaminated Land Officer (CLO) of Kirklees Council prior to commencing:

1. **Protection to Construction Workers From Contaminants**
   To protect construction workers from direct human contact with soil contaminants via direct contact or inhalation and ingestion, contractors must be required to use the appropriate personal protection equipment (overalls, gloves, hard hat and where warranted, a face mask) and adhere to good site hygiene practice with the use of washing facilities before the consumption of food. Notices should be issued advising adherence to this requirement to encourage compliance.

2. **Asbestos Containing Materials (ACMs)**
   The demolition of the existing buildings will need to be preceded with a refurbishment / demolition survey for ACMs in accordance with the Control of Asbestos Regulations 2012. A risk to construction workers has been identified from the proposed dismantling of the corrugated asbestos cement (chrysotile) sheet roofing and cladding to the large shed during demolition. Contractors should preferably be licensed for asbestos removal and be provided with the appropriate personal protection equipment (overalls, gloves, hard hat, face mask). A stockpile of corrugated asbestos cement sheeting adjoining the external northern elevation of the large shed has also been identified. The asbestos cement roof and cladding should be carefully dismantled and all sheeting and any other ACMs that may be identified, removed by a registered waste carrier to an appropriately licensed waste management facility for which copies of the waste consignment notes should be provided and retained.

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A risk to neighbouring residents has also been identified from potential windblown dust during dismantling of the asbestos roofing and cladding which should be minimised by careful dismantling by experienced licensed contractors. Careful dismantling will also minimise the breaking of asbestos cement sheeting and dispersal of fibres.

No asbestos fibres have been identified from laboratory screening of soil samples, but if any ACMs are encountered during excavations on site, these should be double bagged and clearly labelled 'Asbestos' and removed to an appropriately licensed waste management facility.

3. Vehicle Inspection Pit and Floor Slab

The site inspection undertaken as part of the Phase 2 investigation identified a water filled brick lined vehicle inspection pit within the larger shed. Although this appeared to be well constructed with no obvious visual or olfactory evidence of hydrocarbon contamination, the following should be undertaken:

a. Prior to demolition commencing, removal of the water from the vehicle inspection pit by a registered gully sucking vehicle for appropriate offsite disposal to a licensed waste management facility. The contents of the 2 old 205 litre rusted metal drums located outside the large shed should be emptied by the vehicle at the same time (if accessible) to enable the drums to be more readily disposed of by registered waste carrier to a suitably licensed waste management facility along with the several small containers located within the large shed;
b. Maintaining a watching brief during the lifting of the concrete floor slab to the large shed and during excavation of the inspection pit base and sidewalls to observe for any evidence of significant contamination. If any suspicious material is encountered, the procedure outlined in item 9 (below) should be followed.

4. Investigation of Soils Within the Brick Barn

The site inspection identified the top of a small single span brick arch structure at ground level within the south eastern corner of the brick barn which was partially backfilled with soil and some slate tiles. Although the soil backfill appeared to be of reasonable quality with no obvious visual or olfactory evidence of potential contamination, the soils at this location should be investigated further by excavation and chemical testing by a suitably qualified and experienced professional in accordance with the testing suite below (1 sample) following demolition of the barn.

Since the floor of the barn appeared to be un-surfaced, following demolition, the soils elsewhere across the floor of the barn should also be investigated by excavation and chemical testing by a suitably qualified and experienced professional in accordance with the same testing suite (2 samples).

Soil Testing Suite for Further Investigation of the Barn[1]
Acidity / alkalinity (pH), metals (arsenic, boron, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, zinc), sulphate, sulphide, thiocyanate, free cyanide, total cyanide, total phenol, speciated PAHs, organic matter

1. May be expanded to include TPHs CWG, VOCs or other substances dependent on observations made during sampling

5. Surface Soils Contaminated with Arsenic, Lead and PAHs

The chemical assessment has identified soil contamination from arsenic, lead, polyaromatic hydtocarbons (PAHs) and isolated petroleum hydrocarbons (TPHs).

With the exception of the TPHs associated with TP6, the contaminants generally appear to be associated with old tarmac, gravelly ash, road scalpings, sandstone hardcore and brick fill within the top 0.27-0.40m which appears to extend across a large area of the site. This material would be physically unsuitable to be retained on site within the proposed garden areas regardless of the levels of contamination and would normally be destined for removal off site by a registered waste carrier to a suitably licensed waste management facility.

In terms of the lateral extent of the contaminated surface fill, based on the trial pit information, it is presently estimated that this may be between approximately 550 and 850m². With an average depth of 0.35m this could equate to a possible volume of between 190 and 300m³ requiring to be dealt with.

Hotspot locations have also been identified at the following locations around which some over-digging will be required following removal of the top 0.27-0.40m:

- TP1 - 16m^2 to 0.40m to remove soils elevated in lead;
- TP3 - 16m^2 to 0.75m to remove soils elevated in arsenic, lead and PAHs;
- TP6 - 25m^2 to 0.60m to remove soils significantly elevated in TPHs.

It is estimated to remove the hotspots around TP1, TP3 and TP6, approximately 33m³ of soil would need to be removed.

Following excavation, unsuitable materials should be removed by a registered waste carrier to a suitably licensed waste management facility and all waste consignment notes retained for the validation report. Following excavation, validation testing of excavation bases (and sidewalls to deeper point locations) will need to be undertaken by a suitably qualified and experienced professional to verify that the concentrations in the relevant substances have been reduced to acceptable levels.

It is considered that the deeper bottle ash fill encountered from 0.37m at TP2 is suitable for the proposed use in terms of contamination levels and can remain, although it will be necessary to provide a suitable thickness of topsoil cover (approximately 0.35m) which will need to be chemically validated to be clean.

It should be possible for the arsenic and benzo(a)pyrene concentrations identified within the mudstone fill from 0.79m at TP4 to remain since they are only slightly above their Category 4 Screening Levels for residential use, and isolated at this depth, are unlikely to present a risk to end users following removal of the top 0.27m and replacement with topsoil chemically validated to be clean. Arsenic and benzo(a)pyrene are also none leachable at this location and therefore do not present a risk to groundwater.

6. Other Options for Dealing with Contaminated Soils

Soil leachability testing on soil samples elevated in arsenic, lead and PAHs indicate that as an alternative to excavation and removal from site, it may be possible to deal with at least some of the contaminated surface fill (excluding hotspot excavations at TP1 (leachable lead) and TP6 (elevated TPHs)) by considering the following:

a. Burial beneath the proposed driveway / entrance and building footings and reuse of any suitable clay soils excavated from this location to make way for the contaminated fill for landscaping elsewhere on site.

b. Excavation of a void beneath the proposed building footprints, reusing (subject to chemical testing) any suitable materials arising from such excavations for landscaping elsewhere on site and using the void for the backfill compaction of the contaminated surface fill followed by capping with a concrete floor.
c. Slightly raising ground floor levels within the proposed buildings to accommodate a larger volume of fill, although it is recognised that the planning officer would also need to be consulted to avoid the development being in contravention of the planning permission.

In considering the further options a, b and c (above), a waste exemption from the Environment Agency may be required to permit the use of the contaminated 'waste' soil as a construction material on site.

7. Importation of Fill Material

If natural stone gravel sourced from a retail outlet or a natural source is to be used on site, chemical testing will not be required, although proof of the source should be provided. If recycled aggregate is to be brought onto site which falls outside the WRAP Protocol (quality protocol for the production of aggregates from inert construction, demolition and excavation waste), then the material should be chemically validated to be free from contamination in accordance with testing at a frequency of one sample per load for the following. This can also apply to imported soils not acquired from a retail outlet:

Validation Testing Suite For Imported Soils and Recycled Aggregate
Acidity / alkalinity (pH), metals (arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc), total phenols, speciated PAHs, TPHs (aliphatic / aromatic split to CWG), asbestos screen

8. Drinking Water Supply Pipes

A risk assessment for drinking water supply pipes undertaken as part of the Phase 2 site investigation in accordance with the Contaminated Land Guidance - Protocols published by agreement between Water UK and the Home Builders Federation in January 2014 has shown that protective measures are required in the selection of water supply pipes for the site whether or not it has been remediated. These could include the following:

a. The selection of more suitable pipe materials (such as a polyethylene barrier pipe); or
b. An engineering solution to protect the pipe work (such as enclosing the pipe by ceramic or other suitable piping to prevent soil contact with the water pipe) supported by an adequate assessment of risk.

9. Unexpected Significant Contamination

If during any excavations on site suspicious material is encountered indicating the possible presence of significant contamination previously unforeseen, the material should be sampled for chemical analysis by a suitably qualified and experienced professional (testing suite to be dictated by observations). If the chemical analysis results confirm the presence of unacceptable levels of contamination, depending on the nature and extent of the contamination, the material should either be removed to an appropriately licensed waste management facility (see points 5 and (subject to leachability) 6 above) or dealt with by an alternative method to be agreed with the CLO.

10. Sulphate Resistant Cement

There may be a risk to building structures since elevations in sulphate have been identified in 2 from 13 of the soil samples which indicates that the use of sulphate resistant cement should be considered for building work.

11. Validation Report

It will be necessary to maintain a detailed record of all remedial works recording dates, parties and organisations involved, photographs, drawings, chemical testing results, waste transfer / consignment notes etc, for inclusion in a report for submission to the CLO to validate that the agreed measures have been completed as specified in Condition 9 of the planning consent.

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