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Old Shoulder Of Mutton

Remediation Strategy

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Contents Page

1.0	Introduction.....	4
2.0	Report Objectives	4
3.0	Proposed Development.....	4
4.0	Existing Information.....	5
5.0	Site Specific Risk Assessment.....	6
6.0	Remedial Objectives.....	7
7.0	Remedial Recommendations	8
8.0	Validation of Remedial Measures	8
9.0	Waste Removal.....	11
10.0	Validation Report.....	11

Appendix A - Proposed Development Plan

Appendix B - Soil Guideline Values

Remediation Strategy

Disclaimer

This report was produced by **RB Geotechnical** for TMU Property Ltd (The client) for the specific purposes of a Remediation Strategy for the proposed residential redevelopment at the former Old Shoulder of Mutton Pub in Batley, West Yorkshire. This report may not be used by anyone else other than the client without their express permission. In any event, **RB Geotechnical** accepts no liability for any costs, liabilities or losses arising from the use of reliance upon the contents of this report by anyone other than the client.

1.0 Introduction

RB Geotechnical has been commissioned by TMU Property Ltd (The client) to prepare a Remediation Strategy for the proposed residential re-development at the Old Shoulder of Mutton Pub in Batley, West Yorkshire.

The site has been the subject of a Phase I Desk Study and a Phase II Intrusive Investigation, sources referenced below:

- **RB Geotechnical**, Phase I Desk Study Report, Development at Old Shoulder of Mutton, RBG271, January 2022; and
- **RB Geotechnical**, Phase II Interpretative Report, Development at Old Shoulder of Mutton, RBG315, July 2023.

2.0 Report Objectives

The purpose of this Remediation Strategy is to identify and evaluate feasible remedial methods and to validate the successful implementation of site remediation to ensure a safe and regulatory compliant redevelopment of the site.

3.0 Proposed Development

The proposed development is to comprise redevelopment of the current Old Shoulder of Mutton Pub building into a new residential property, with the addition of two storey flats to the East of the main building. The North of the site will be used as private amenity space, with soft landscaped gardens.

The proposed development and exploratory hole location plan is included as Appendix A.

Remediation Strategy

4.0 Existing Information

The Phase I Desk Study identified that the site had been a pub since the earliest available maps. An old quarry and other ground workings are mapped within 250m of the site boundary. Therefore, a risk of potential on-site sources of contamination was identified as possible fuel leaks from vehicles using the site over the years. Possible off-site sources of contamination were identified as possible ground gas accumulations due to nearby infilled land features.

It was therefore recommended that Phase II Intrusive Investigation be carried out to assess these potential risks.

A Phase II Intrusive Investigation was carried out comprising three windowless sample boreholes and one hand dug trial pit.

The following ground model was established:

- Made Ground of a mixed slightly gravelly silty clay with brick, sandstone and coal was encountered in all exploratory holes from ground level, extending to depths of 0.25mbgl to 0.30mbgl (metres below ground level);
- The Made Ground was found to be underlain by a highly weathered bedrock of a firm to stiff slightly gravelly silty CLAY, extending to the base of the boreholes at depths from 1.50mbgl to 1.80mbgl.
- Groundwater was not encountered in any exploratory holes undertaken; and
- A total of seven soil samples were collected and tested for a range of soil contaminants. Elevated levels of TPH, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-c,d)Pyrene and Dibenzo(a,h)anthracene were measured in the Made Ground of WS01 (which is located in the North East corner of the site). This area is proposed to be soft landscaped, and therefore remedial measures are deemed necessary here.
- Ground Gas Monitoring on site recorded maximum Carbon Dioxide Levels of 3.70%, with a maximum measured flow rate of 4.30l/hr. The site has therefore been classified as having a CS

score of CS2, whereby appropriate gas protective measures would be required in order meet a minimum gas protection score of 3.5 points .

5.0 Site Specific Risk Assessment

Table 5.1 sets out the site-specific risk pathways identified that could potentially be present on the following the construction of the new houses on this site. These pathways are based on the findings of the intrusive investigations.

Table 5.1 Identified Site Specific Risks

Source	Receptor	Pathway	Comment
Elevated levels of TPH, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3- c,d)Pyrene and Dibenzo(a,h)anthracene.	End Users	Ingestion of contaminated soil or dust, through skin contact or inhalation in proposed new soft landscaped areas.	Excavation of top 450mm of Topsoil in proposed soft landscaped area (highlighted in plan shown in Appendix A) and replacement with 150mm of clean imported sub-soil and 300mm of clean imported Topsoil.
			Excavation of all Made Ground soils in any other proposed new soft landscaped garden areas of the site and replacement with 150mm of clean imported sub-soil and 150mm of clean imported Topsoil.

	Construction Workers	Ingestion of contaminated soil or dust, through skin contact or inhalation.	Skin contact will be minimised through the use of PPE and suitable washing facilities. The presence of all elevated contaminants will be noted on the construction file.
Elevated flow levels resulting in gas risk level to CS2	End Users	Accumulation of soil and water derived vapours/and or ground gas in enclosed spaces	In order to obtain the minimum 3.5 points required for a CS2 standard, protection measures in the form of a pressure relief system or sub-floor void ventilation in addition to a suitable gas protective barrier to meet the standards of CS2. This should be designed by a suitably qualified specialist and verified in accordance with BS8485:2015+A1:2019.

6.0 Remedial Objectives

Based on the above risk assessment, the following remedial objectives have been established for this site:

- Break any potential human exposure pathways to contaminated soils;
- To protect all construction and ground workers who will be exposed to the soil and thus be potentially exposed to the contaminants within it; and

Remediation Strategy

- To satisfy the requirements of the regulatory authorities (i.e., the Local Planning Authority, Environment Agency and National House Builders Council).

7.0 Remedial Recommendations

The Phase II Intrusive Investigation identified potential risks to the future end users of the site and therefore remedial measures will need to be implemented to ensure safe development. The following remedial measures have been devised for the site:

- In currently proposed soft landscaped areas in the North East of the site (shown in Appendix A) the excavation of the top 450mm of current soils is required across the whole garden area to ensure a sufficient thickness has been removed and replacement with clean imported sub-soil (150mm thickness) and a clean imported topsoil (300mm thickness).
- Suitably installed ground gas protective measures in the form of a sub-floor ventilation and ground gas protective barrier.

All site workers will be made aware of the potential for contamination in the soils and a programme of works will be identified to protect workers handling any soil. The method of site working will be in accordance with all necessary guidelines set out by HSE and CIRIA. Washing facilities will be provided and site workers will be encouraged to wash prior to eating and use appropriate PPE when on site to minimise any skin contact with the soil.

8.0 Validation of Remedial Measures

8.1.1 Site Workers

All site works will be carried out in accordance with HSE and CIRIA, with appropriate PPE worn at all times and suitable washing facilities made available. Where any additional areas of odorous, discoloured or suspicious material is identified during construction, **RB Geotechnical** must be contacted and will return to site to investigate and make necessary recommendations.

8.1.2 Excavation of Contaminated Soils

Following removal of minimum 300mm thickness of soils in proposed soft landscaped areas in the North East corner of the site, an **RB Geotechnical** engineer will attend site to inspect and verify the new

Remediation Strategy

formation level to ensure it is adequate for placement of the agreed capping layer. The RB Geotechnical engineer will take photographs of the new formation level in this new proposed soft landscaped area. These photos will be included within the validation report. Upon excavating, all known contaminated soils must either be immediately transported off site to an appropriate place of disposal, or placed in a suitably quarantined area on site, whereby cross contamination with non-contaminated soils is not possible.

8.1.3 Imported soils to site

Prior to importation of any soils to the site which are to be used to backfill the excavated areas, suitable certification will be provided by the client or whomever is providing the imported material, in accordance with YALPAG (verification requirements for cover systems), and to be included within the validation report and approved by RB Geotechnical.

As the proposed imported soils are to be greenfield sourced, the suitability of this material will be assessed following guidance by YALPAG, where 1 sample per 250m³ or minimum 3 samples will be tested for a range of contaminants. Laboratory testing will include assessment of metals, TPH, PAH and Asbestos, with the provider of the imported soils providing the test results. Test results will be assessed against the same screening values used to assess the underlying soils during the Phase II Intrusive Investigation (for a residential end use), shown in Appendix B.

In accordance with YALPAG, it is essential that the imported material is either placed in its intended area straightaway or stockpiled in a suitable quarantine area to prevent on-site contamination.

8.1.4 Placement of Imported Soils

A clean capping layer of at least 300mm thickness of clean topsoil will be placed in proposed soft landscaped areas in the North East of the site, underlain by a minimum of 150mm thickness of clean imported sub-soil. As stated in section 8.1.3, the suitability of this imported material will be assessed following guidance by YALPAG, where a minimum of 1 sample per 250m³ or minimum 3 samples will be tested for a range of contaminants. Laboratory testing will include assessment of metals, TPH, PAH and Asbestos, with the provider of the imported soils providing the test results. Test results will be assessed against the same screening values used to assess the underlying soils during the Phase II Intrusive Investigation (for a residential end use) in Appendix B. Imported topsoil's must also be as specified in BS3882:2007, which relates to nutrient content of topsoil and phytotoxic contamination

Remediation Strategy

As before, suitable test certification will be provided by the client or whomever is providing the material, to be approved by **RB Geotechnical**.

8.1.5 Physical Validation

Following completion of the placement of this clean imported material, an **RB Geotechnical** engineer will verify the thickness of the placed capping layer by excavating one hole from per 20m² area. The excavations must show that a minimum of 150mm of sub-soil has been placed along with 300mm of clean topsoil. The excavations must be sufficient to enable **RB Geotechnical** to physically confirm that the correct specified thickness of imported material has been placed. **RB Geotechnical** will record the depths placed by measuring with a tape measure and by taken photographs of each pit.

All soft landscaped gardens will also be digitally photographed by an **RB Geotechnical** engineer following placement of the new capping layer.

All photographs and records will be included within the validation report.

The client must also provide photographic evidence of the excavation and removal of Made Ground soils from around newly placed utility supply routes, along with replacement of clean imported pea gravel or imported fill.

8.1.6 Other proposed soft landscaped areas

Should Made Ground be encountered in any other proposed soft landscaped garden areas, then the remedial measures detailed above will also apply to these areas of the site.

8.1.7 Unexpected Contamination

Should Made Ground or unexpected soil contamination be encountered in any other proposed soft landscaped garden areas, then the remedial measures noted in sections 8.1.2 to 8.1.5 must also be followed here. If significant levels of unexpected contamination are encountered, then the remediation strategy may need to be amended accordingly and the Contaminated Land Team of Kirklees Council shall be notified.

Remediation Strategy

8.1.8 Gas Protective Measures

In order to obtain the minimum 3.5 points required for a CS2 standard, protection measures in the form of a sub-floor ventilation void in addition to a suitable gas protective barrier to meet the standards of CS2 will be installed.

This should be designed by a suitably qualified specialist and verified in accordance with BS8485:2015+A1:2019.

9.0 Waste Removal

In accordance with the European Waste Directive, all waste removed from site will be disposed of to a suitably licenced tip. All waste transfer documentation must be provided by the client. This will be included within the validation report.

10.0 Validation Report

Following successful implementation of the above remedial measures RB Geotechnical will produce a validation report which will set out the works carried out and will assess the significance of any further risks that remain. All data received during the remedial works will form part of the Validation Report. This will include all waste transfer notes detailing the quantity of soils excavated from site and proof that they have been appropriately disposed of. Photographic evidence of the whole remedial works will be required, including during excavation of the contaminated soils and during placement of the newly imported soils. The validation report will also include all additional soil lab testing results where applicable.

Following completion of the installation of ground gas protective measures, a suitably qualified specialist will attend site to verify that all ground gas protective measures have been installed correctly to ensure they are suitable to obtain the minimum 3.5 points required for a CS2 classified standard. The specialist will compile a gas verification report summarising and confirming its successful installation.