

Environmental
Geotechnical
Specialists



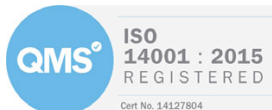
PHASE 3

REMEDIATION STRATEGY REPORT

job number	C3581/23/E/5633	date	02/08/23
site address	O'Cot Farm, O'Cot Ln Scammonden Huddersfield, HD3 3FW		
written by	J.Finch	checked by	R.Palmer
issued by	J.Finch		



Please consider the environment before printing this report.



Environmental
Geotechnical
Specialists

Rogers Geotechnical Services Ltd
Offices 1 & 2 Barncliffe Business Park, Near Bank, Shelley, Huddersfield, HD8 8LU
☎ 01484 604354 Company No. 5130864

<ENVIRONMENTAL> <GEOTECHNICAL>

Contents

		Page
1.	Introduction	1
2.	Remediation Strategy	2
2.1	Remediation Objectives	2
2.2	Development Requirements	2
3.	Scope	2
3.1	Groundworks	2
3.2	Construction	3
3.3	Gas Protection Measures	3
3.4	Fill Materials	5
4.	Verification Report	6
4.1	Ground Works	6
4.2	Areas of Hardstanding	6
4.3	Ground Gas Protection System	6

Appendices

1.	Screening Levels Summary Sheet
----	--------------------------------



Phase 3: Remediation Statement

Location: O'Cot Farm, O'Cot Ln
Scammonden, Huddersfield, HD3 3FW

For: R & R Wood

Consultants: Brunswick Architectural

Report No. C3581/23/E/5427

Report date: August 2023

For and on behalf of **Rogers Geotechnical Services Ltd**

James Finch BSc FGS
Graduate Engineer

Rob Palmer MSc FGS ACIEH
Senior Geo-environmental Engineer

1. Introduction

Further to the site specific risk assessment provided within the geo-environmental report (C3581/23/E/5427, June 2023) it is considered that some remediation will be required at this site. This report provides the strategy for that remediation.

From the geo-environmental investigation, it was considered that the made ground present at the site was contaminated. Though this is not anticipated to impact the users of the commercial structure to be constructed onsite, there is a requirement to protect site operatives and neighbours during the construction process. In addition, it was considered that the site possessed a Characteristic Situation Level of 2, thus protection from bulk ground gasses (CO₂) is also required.

2. Remediation Strategy

2.1 Remediation Objectives

Based on the site specific risk assessment provided in the geo-environmental report, the object of remediation at the site is as follows:

- To protect the site operatives during the construction process from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust and vapours.
- To protect the end user from the elevated levels of carbon dioxide.
- To protect neighbours from the inhalation and ingestion of dust during the construction process.
- To ensure that contamination cannot enter the former services occupying the site which may return to controlled waters.
- To protect plastic services from being penetrated by, or degrading due to the presence of, contamination in the soil or groundwaters.

2.2 Development Requirements.

The site is to be developed by the construction of an extension to the meat processing facilities already present onsite. Therefore, it is considered that the site may be classified as being a commercial development.

3. Scope

In order to fulfil the objectives defined above the following remedial strategy will be utilised. A pragmatic approach will be undertaken, with observational techniques being employed at each stage of the work.

3.1 Groundworks

During the ground-works phase of the development, protection to the site operatives is required. The risk to site operatives is considered under the Health and Safety at Work Act 1974, together with regulations made under the act, which includes the Control of Substances Hazardous to Health (COSHH) regulations. Therefore the risks to site personnel will be considered under the Construction Design and Management (CDM) regulations at the planning stage and be included in the contractor's Health and Safety Plan and site specific Method Statements. These documents shall include the following main elements.

- Site operatives at all levels will be made aware of the hazards of working with contaminated soils.
- Personal hygiene facilities, including washing and messing, must be provided and site operatives be encouraged to use them.
- Where work is undertaken in dry weather the site will be dampened down to avoid dust. In addition, dust masks must be provided to all site operatives for use in dry weather.
- In order for contaminated soils to be disposed of to an appropriate landfill, it may be necessary to carry out Waste Acceptance Criteria (WAC) testing in accordance with BS EN 12457.
- Any stockpiles of contaminated soil on site shall be sheeted over to prevent excessive amounts of airborne dust and cross contamination of imported fill.

- Where vehicles are transferring soil to the landfill site they should be covered to prevent contamination of the surrounding area by dust.
- Where work is undertaken in wet weather, vehicle and wheel washing facilities are required to ensure that the vehicles leaving the site do not transfer contamination to surrounding areas.

On completion of the ground-works a careful site inspection of the sub-grade will take place. Should visual or olfactory evidence of contamination be revealed, then suitably qualified specialists will be consulted. Further testing and updates to the site specific ground model, risk assessment, and remediation strategy will be undertaken where necessary

3.2 Construction

During the construction phase of the contract the following items are required to protect the end user from the potential contaminants revealed at this site.

- Beneath buildings, pavements and hard-standings clean inert granular sub-base should be employed.
- Any redundant services revealed at this site should be de-commissioned and piped services sealed. Any existing services that are to be employed in the new development should be carefully inspected to ensure that they are serviceable.
- New plastic services should be constructed in a surround of clean inert material and selected in accordance with the recommendation given in the United Kingdom Water Industry Research (UKWIR) website under Report Ref. No. 10/WM/03/21 - 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'. The statutory water authority for the area in which site is located may have a risk assessment form to complete which allows these recommendations to be met. However, further determinand specification contamination testing may be necessary.
- For buried concrete the results of the sulphate and pH testing indicate that the design sulphate class for the site should be DS-1.

3.3 Gas Protection Measures

In order to assess the protection measures required BS8485: 2015+A1:2019: *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* has been employed. In accordance with Table 3, *Building types*, of the code, the development may be considered to conform to Type D. Therefore, on the basis of Table 4 *Gas protection score by CS and type of building*, the minimum gas protection score (points) is 1.5. The gas protection system should consist of at least two different elements. The elements work independently and collaboratively, and a single element should not be used because there would be no redundancy to allow for defects in the component.

In order to achieve this score the following shall be undertaken.

Table 1: Combination of Protection Elements (BS8485: 2015) for CS2		
Reference	Protection Element	Score
Table 5	Cast in situ ground bearing floor slab	0.5
Table 6	Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building)	0.5
Table 7	Gas resistant membrane complying with the requirements given in Table 7 (Note 1)	2
		Total Score
		Min: 2.5 Max: 3.5

Note 1:

The gas resistant membrane shall meet the following criteria:

- Sufficiently impervious (methane gas transmission rate <40.0ml/day/m²/atm (average) BS ISO 15105-1 manometric method).
- Sufficiently durable and strong to remain serviceable for the anticipated life of the building, to withstand in-service stresses and installation process.
- Capable, after installation, of providing a complete barrier to the entry of the relevant gas.
- Verified in accordance with CIRIA C735: 2014: *Good practice on the testing and verification of protection systems of buildings against hazardous ground gasses*.

In addition to the above, the following points shall be considered.

- Technical drawings of the incorporation of the gas protection measures into the sub-structure will be provided by a suitably qualified engineer/architect and produced in accordance with the guidance given in BRE 414.
- The sequence of construction indicating when the gas protection system will be installed will be included with the relevant CDM documentation. Where possible the installation of membranes will take place as a unique activity on site and shall not take place until sub-structure construction is complete.
- During and following the installation of the membrane, all parties in attendance at the site shall be made aware that a gas protection system is to be employed within the construction. Such communications should include, but not be limited to, the CDM documentation for the site and site inductions.
- The installation of the membrane shall be carried out only by suitable personnel. The suitability of personnel will be assessed in accordance with Annex 1 of CIRIA C735.
- The installation shall be in strict accordance with manufacturer specifications and recommendations.
- The membrane system employed will not be an ensemble (i.e. a system comprising a mixture of products from different manufacturers will not be employed).
- Membranes shall be supplied to site on a single wound roll, creased product will not be accepted or employed.
- Whilst membranes are exposed, signage will be provided to indicate the access to the installation area is prohibited unless authorised. Footwear will be checked prior to accessing the membrane surface to ensure no sharp objects are apparent, such as stones caught in treads. The use of sharp objects or hot-works around the exposed membrane will be strictly prohibited unless the risk of damaging the membrane has been fully assessed and mitigated.
- Non-conformance of manufacturer recommendations shall be discussed and agreed as acceptable, in writing, with a suitably qualified person from the manufacturer.

Verification of the installation of the gas protection system will be carried out on each plot, unless agreed with any statutory authorities prior to construction.

3.4 Fill Materials

It should also be appreciated that any fill material, either site-won or imported, to be employed at the site should be subjected to the following assessment to determine its suitability.

Fill materials should be initially screened, by a suitably qualified engineer to establish that:

- It is a suitable growing media if it is to be employed as such, including compliance with BS3882 (2015)
- It is free from obvious contamination i.e. visual or olfactory evidence
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants are suspected to be growing
- It is not a statutory nuisance, such as being odorous
- It is free from unsuitable material i.e. whole bricks, brick ties, timber or glass.

It should also be appreciated that any fill should be subjected to validation testing to assess its suitability. The following table has been taken from YALPAG¹ documentation and may be used as a guide. Depending on the origin and nature of the material, not all fill will require the sampling frequency and testing indicated, although this should be in agreement with any regulatory bodies (such as the Local Authority).

Table 2: Validation Sampling and Testing

Fill Type	Frequency	Minimum Determinands
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)
Crushed Hardcore, Stone, Brick	Minimum 1 per 500m ³	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).
Greenfield/ Manufactured Soils	Minimum 3 Dependent on source and receptor, between 1 per 50m ³ and 1 per 250m ³	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).
Brownfield/ Screened Soils	Minimum 6 Dependent on source and receptor, between 1 per 50m ³ and 1 per 100m ³	Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).

It should be noted that screening values for the above regime have been included within Appendix 1 of this report. The screening values will need to be agreed with any regulatory bodies. It is anticipated, for example, that 1% SOM values will be employed for typical granular fill and 6% SOM

¹ YALPAG Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems V4.1 Appendix 1a, June 2021

for topsoil. However, organic matter testing will determine which screening values are appropriate for each material. Moreover, testing will comply with UKAS and MCERTS, where applicable, and undertaken by an accredited laboratory.

Where the material has been derived from a commercial company, certificates or other industry quality protocol compliance i.e. WRAP shall be obtained. However, it will be necessary to ensure that this documentation is specifically related to the material being imported, is no more than two months old and complies with the screening and frequency requirements given above.

Suitable fill materials will either be placed immediately or sufficiently quarantined to prevent cross-contamination. If it is necessary, the quarantined material will be placed on appropriate sheeting and covered to prevent it becoming mixed with contaminated soils or dust, or penetrated by mobile contaminants.

4. Verification Report

In order to demonstrate that the remediation has been sufficiently carried out and risks highlighted in the conceptual ground model are mitigated, a verification report will be produced and submitted to any statutory authorities.

The report will be produced by a suitably qualified engineer or engineers and will include the following:

4.1 Ground Works

- A record of the measures taken to cap and seal any disused services.
- The methods used for handling and final destination of any contaminated soils removed from the site.
- The qualifications or relevant experience/training of the persons carrying out the verification.

4.2 Areas of Hardstanding

- Photographic evidence that hardstanding has been installed over the contaminated soils. This should be at the time of placement or after. Photographs shall include visual site references or reference boards to prove the location and date taken.

4.3 Ground Gas Protection System

- The qualifications or relevant experience/training of the persons carrying out the installation.
- The independence of the person carrying out the verification, along with evidence of their qualifications or relevant experience/training.
- Details of the verification process including the dates of inspections and findings.
- Signed statements to confirm that protection measures were constructed as agreed. These statements shall also include confirmation that:
 - Membranes were free from tears and punctures, and installed in accordance within manufacturer guidelines.
 - Underfloor voids were clear and free from debris.

- Clear photographic evidence of the construction of membranes and/or underfloor voids, which should include key details such as air vents, membrane penetrations etc.
- Details of non-conformances and how they were rectified.
- A declaration that remedial objectives set out in the conceptual site model have been achieved.

We trust that this information is of interest, clearly Rogers Geotechnical Services Ltd would be happy to offer advice with respect to the above and assist where necessary.

Appendix 1

Screening Levels Summary Sheet

Atkins ATRISK Soil Screening Values (SSVs) - Commercial Landuse

D - Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 7.95 should be used.