REPORT TITLE:	**Remediation Method Statement**
REPORT NUMBER:	**1874HAR RMS Rev A**
CLIENT NAME:	**Harron Homes Ltd**

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Issue 1	Revision A	15/12/2021
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1.0 Introduction

1.1 Background

1.1.1 Vertase FLI Limited (VertaseFLI) have been commissioned by Harron Homes Ltd (the Client) to produce a Remediation Method Statement (RMS) to support the remediation and facilitate the proposed development at Merchant Fields, Cleckheaton.

1.1.2 This Remediation Method Statement deals solely with issues regarding contamination at the site. For remedial action addressing the treatment of shallow mineworkings and mine entries the Vertase FLI *Specification for Treatment of Mineworkings – Merchant Fields, Cleckheaton* (ref: 1874/001RevA), dated December 2020, should be consulted.

1.2 Site Description

1.2.1 The site is located at Merchant Fields off Kilroyd Drive, Cleckheaton, NGR 418987 426493. The site is located approximately 1.2km north of Cleckheaton Town centre and comprises approximately 12 hectares of disused, pastoral farmland. The site is accessed from the north off Kilroyd Drive. The site slopes down from Kilroyd Drive toward Nann Hall Beck at the eastern site boundary, is generally flat lying in the centre of the site and slopes down toward the south western, southern and south eastern site boundaries.

1.3 Previous Reports

1.3.1 Previous investigations have been carried out at the site by Lithos Consulting Ltd and Vertase FLI:

- Geoenvironmental Appraisal - Land at Merchant Fields, Cleckheaton by Lithos Consulting Ltd (ref: 2828/1A) dated July 2019;
- Specification for the treatment of shallow workings & mine entries – Land at Merchant Fields, Cleckheaton by Lithos Consulting Ltd (ref: 2828/2A) dated January 2020; and
- Specification for Treatment of Mineworkings – Merchant Fields, Cleckheaton (ref: 1874/001RevA) – dated December 2020.

1.4 Development Proposals

1.4.1 The development proposals for the site comprise low-rise residential housing and associated infrastructure. Planning has been applied for 287 dwellings with associated infrastructure. The proposed development plan, Drawing no. 122-PL-01-D dated May 2019 by Harron Homes Ltd, is attached at Appendix A.

1.5 Legislative Context

1.5.1 Given that the land is intended for future residential development, the RMS presented herein has been undertaken with due regard to the requirements under the National Planning Policy Framework (NPPF).

1.5.2 The NPPF is underpinned by the concept that land affected by contamination must be suitable for its proposed use. As an absolute minimum, this means that the land must be incapable of being designated as Contaminated Land as define under Part 2A of the Environmental Protection Act (EPA) 1990.

2.0 Previous Investigations and Risk Assessments

2.1 Introduction

2.1.1 Previous investigations have been carried out at the site by Lithos Consulting Ltd and Vertase FLI:

- Geoenvironmental Appraisal - Land at Merchant Fields, Cleckheaton by Lithos Consulting Ltd (ref: 2828/1A) dated July 2019;
- Specification for the treatment of shallow workings & mine entries – Land at Merchant Fields, Cleckheaton by Lithos Consulting Ltd (ref: 2828/2A) dated January 2020; and
- Specification for Treatment of Mineworkings – Merchant Fields, Cleckheaton (ref: 1874/001RevA) – dated December 2020.

2.1.2 In terms of contamination and the recommendations for remediation (not including treatment of mineworkings) the Geoenvironmental Appraisal by Lithos Consulting Ltd is the most relevant previous report. A summary of findings from the Lithos report relevant to proposed remedial measures is presented below.

2.2 Geoenvironmental Appraisal by Lithos Consulting Ltd

Scope of Testing

2.2.1 The scope of contamination testing carried out by Lithos is outlined in the table below.

Type of sample	No. of samples	Determinands
Made ground	6	pH, water soluble boron, and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc), TOC, Speciated Polycyclic Aromatic Hydrocarbons (PAH)
	3	Asbestos ID, Water soluble sulphate, chloride, nitrate and magnesium
	2	Calorific Value (CV)
Topsoil (incl. Made Ground Topsoil)	18	pH, water soluble boron, and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc) & Asbestos ID, TOC, Speciated Polycyclic Aromatic Hydrocarbons (PAH)
	3	Clay/sand/silt content and visible contaminants, sharps (glass etc) to check compliance with BS3882:2015 Phenoxy Acetic Acid Herbicides (PAAHs)

Chemical Analysis Results

2.2.2 Contaminant concentrations across the site were generally below the assessment criteria. However, concentrations of arsenic, lead and zinc that were elevated with respect to the screening criteria were recorded in made ground in one location in the far east of the site.

2.2.3 Elevated concentrations of metals were also recorded in isolated areas of burnt material observed at the site surface.

2.2.4 The results from samples of topsoil submitted for laboratory analysis indicate that it is suitable for use as topsoil in the subsequent residential development.

Conclusions and Recommendations

2.2.5 A revised conceptual site model was produced by Lithos that showed there was a plausible source-pathway-receptor linkage between the contamination observed in made ground and the future occupiers of the site. Therefore, remediation/mitigation measures would be required.

2.2.6 At the time of the Lithos report the area of contaminated made ground was to be Public Open Space with an underground surface water attenuation tank. Therefore, it was recommended that the made ground be excavated and temporarily stockpiled during excavation of the underground storage tank and subsequently replaced and isolated beneath a geotextile membrane and a 500mm thick surface cover of "clean" soil within POS.

2.2.7 As an alternative Lithos suggested that the Made Ground would be suitable for redistribution beneath concrete oversite or areas of hardstanding.

2.2.8 Material excavated from areas of burnt ground should be redistributed beneath 500mm of "clean" soil cover within POS, concrete oversite or areas of hardstanding, where they would be satisfactorily isolated from end users, or disposed offsite.

3.0 Conceptual Site Model

3.1 Introduction

3.1.1 A Conceptual Site Model was presented in the Lithos Geoenvironmental Appraisal Report. This has been reviewed and a simplified version is presented below.

Table 3-1 Revised Conceptual Site Model

Source	Pathway	Receptors
Metals in shallow Made Ground beneath the far east of the site	Ingestion (Direct and Homegrown Produce) Dermal Contact Inhalation	Construction Workers and Future Occupiers

4.0 Remediation Methodology

4.1 Objectives

4.1.1 The Site is proposed for residential development and a risk to human health from metal contamination in shallow made ground beneath the far east of the site has been identified. In order to make the Site suitable for its intended end-use, it is necessary to undertake remediation works at the Site.

4.1.2 The remediation scheme must break the Source-Pathway-Receptor linkage by removing at least one element of that relationship. There are numerous ways in which this may be achieved. The aim will be to develop a remediation methodology that is both appropriate for the Site and economical to implement.

4.2 Remediation Recommendations

4.2.1 The proposed remediation methodology, which is considered to achieve the remediation objectives, is the placement of contaminated made ground beneath an area of lower sensitivity, beneath the proposed area of Public Open Space (POS) in the east of the site, with capping of the made ground. This will reduce the risk of exposure of future site occupiers to the contamination and reduce the number of pathways by which contamination can reach the future occupiers.

4.2.2 A capping layer of clean soil materials should be provided to isolate the made ground placed in the POS. In accordance with *BRE Report 465 Cover Systems for Land Regeneration,* the current best practice document, and assuming that the capping materials contain contaminants in concentrations that are less than or equal to appropriate human health screening criteria, the thickness of the capping layer should be a minimum of 300 mm in public open spaces. Dependent on finished ground levels, this may require localised removal of existing material.

4.2.3 Should made ground be removed from garden areas and clean natural subsoil be exposed, the full capping thickness is not required and only soil thick enough to provide a plant growing medium is required.

4.3 Subsoil and Topsoil Sources

4.3.1 The capping layer/growth medium can comprise any combination of clean subsoil and topsoil. However, the minimum thickness of topsoil required by the NHBC is 100 mm.

4.3.2 Previous testing has demonstrated that the topsoil on site is suitable for use. However, should there be a need to import topsoil it should be from a certified source and contain little to no man-made materials such as brick, plastic or metal etc. A topsoil provider with documented quality control procedures and certification, such as British Sugar, is strongly recommended.

4.3.3 The subsoil component can comprise any suitable, certified clean subsoil of natural origin, including natural subsoil arising from excavations on the site.

4.3.4 Offers of cheap or free subsoil and topsoil from other development sites should be viewed with caution, as experience shows that these often contain contaminant concentrations that are unsuitable for use on residential sites.

4.3.5 Where import occurs a record of soil delivery tickets should be maintained and provided for inclusion in the verification report, to confirm the source and volume of soils imported to Site.

4.4 Soil Chemical Suitability Criteria

4.4.1 Clean natural subsoils excavated on the Site for drains, foundations, etc., originating at the Site can be used within the capping layer. Any subsoils with visual or olfactory evidence of hydrocarbon contamination should not be placed in garden areas.

4.4.2 For imported soils the current Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) guidance document *'Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners and Consultants'* (Version 3.4, November 2017) provides chemical testing frequencies for soils of different sources. These are summarised in Table 4. The number of samples required to be tested is per material and per source, therefore, the same soil type imported from two sources would require twice the testing compared to a single source.

Table 4-1 YALPAG Sample Frequency

Soil Type / Source	Number of Samples	Scope of Testing
Virgin quarried material	2 samples	Standard metals / metalloids
Crushed hardcore, stone, brick	1 sample per 1,000m^3	Standard metals / metalloids PAH (USEPA 16, speciated) Asbestos
Greenfield / manufactured soils	1 sample per 250m^3, minimum of 3 tests	
Brownfield / screened soils	1 sample per 100m^3, minimum of 6 tests	Standard metals / metalloids PAH (USEPA 16, speciated) TPH (CWG banded) Asbestos Additional testing as may be relevant to the history of the donor site

4.4.3 Topsoil and other types of subsoil materials imported to the site should be analysed for the contaminants as listed in Table 4-2/4-3.

4.4.4 The chemical concentrations of each soil should not exceed the end use dependent C4SLs and S4ULs referenced in Tables 4-2 and 4-3. If more up to date guideline values are published before the development proceeds, these may be applicable.

4.4.5 Where the soils destined for rear gardens are to be tested for PAH and/or TPH, the testing should also include soil organic matter to determine the appropriate screening values, as per Table 4-2.

4.4.6 Soils that are temporarily imported to facilitate construction, such as a Type 1 fill used to support scaffold, should also be subject to testing for chemical suitability to ensure that it does not introduce contamination to the Site. This is required whether or not such materials would remain as part of the permanent works or be stripped off prior to placement of the final topsoil / subsoil cover.

4.4.7 All chemical testing should be undertaken by a suitable laboratory with United Kingdom Accreditation Service (UKAS) and Monitoring Certification Scheme (MCERTS) accreditation where available.

Table 4-2: Chemical testing thresholds for imported soils - Gardens

	Contaminant	Threshold (mg/kg)		
Metals	Arsenic	37		
	Cadmium	11		
	Chromium (total)	910		
	Chromium VI	6		
	Copper	2,400		
	Lead	200		
	Mercury	1.2		
	Nickel	130		
	Selenium	250		
	Zinc	3,700		
	Soil Organic Matter	**1 %**	**2.5 %**	**6 %**
PAH USEPA 16	Naphthalene	2.3	5.6	13
	Acenaphthylene	170	420	920
	Acenaphthene	210	510	1,100
	Fluorene	170	400	860
	Phenanthrene	95	220	440
	Anthracene	2,400	5,400	11,000
	Fluoranthene	280	560	890
	Pyrene	620	1,200	2,000
	Benzo(a)anthracene	7.2	11	13
	Chrysene	15	22	27
	Benzo(b)fluoranthene	2.6	3.3	3.7
	Benzo(k)fluoranthene	77	93	100
	Benzo(a)pyrene	2.2	2.7	3.0
	Indeno(123-cd)pyrene	27	36	41
	Dibenzo(ah)anthracene	0.24	0.28	0.30
	Benzo(ghi)perylene	320	340	350
TPHs	Aliphatic C5-C6	42	78	160
	Aliphatic C6-C8	100	230	530
	Aliphatic C8-C10	27	65	150
	Aliphatic C10-C12	130	330	760
	Aliphatic C12-C16	1,100	2,400	4,300
	Aliphatic C16-C35	65,000	92,000	110,000
	Aromatic C5-C7	70	140	300
	Aromatic C7-C8	130	290	660
	Aromatic C8-C10	34	83	190
	Aromatic C10-C12	74	180	380

	Contaminant	Threshold (mg/kg)		
	Aromatic C12-C16	140	330	660
	Aromatic C16-C21	260	540	930
	Aromatic C21-C35	1,100	1,500	1,700
	Asbestos	No fibres detected		

Table 4-3: Chemical testing thresholds for imported soils - POS

	Contaminant	Threshold (mg/kg)
Metals	Arsenic	79
	Cadmium	120
	Chromium (total)	1,500
	Chromium VI	8
	Copper	12,000
	Lead	630
	Mercury	16
	Nickel	230
	Selenium	1,100
	Zinc	81,000
	Soil Organic Matter	**1% / 2.5% / 6%**
PAH USEPA 16	Naphthalene	4,900
	Acenaphthylene	15,000
	Acenaphthene	15,000
	Fluorene	9,900
	Phenanthrene	3,100
	Anthracene	74,000
	Fluoranthene	3,100
	Pyrene	7,400
	Benzo(a)anthracene	29
	Chrysene	57
	Benzo(b)fluoranthene	7.1
	Benzo(k)fluoranthene	190
	Benzo(a)pyrene	5.7
	Indeno(123-cd)pyrene	82
	Dibenzo(ah)anthracene	0.57
	Benzo(ghi)perylene	640
TP	Aliphatic C5-C6	570,000

	Contaminant	Threshold (mg/kg)
	Aliphatic C6-C8	600,000
	Aliphatic C8-C10	13,000
	Aliphatic C10-C12	13,000
	Aliphatic C12-C16	13,000
	Aliphatic C16-C35	250,000
	Aromatic C5-C7	56,000
	Aromatic C7-C8	56,000
	Aromatic C8-C10	5,000
	Aromatic C10-C12	5,000
	Aromatic C12-C16	5,100
	Aromatic C16-C21	3,800
	Aromatic C21-C35	3,800
	Asbestos	No fibres detected

4.4.8 Topsoil or subsoil with olfactory evidence of petroleum hydrocarbon or other contamination is not acceptable.

4.5 Unidentified Contamination

4.5.1 In the event of significant unexpected contamination being encountered, the works will be halted until:

- A suitably qualified person is able to assess the situation;
- The regulatory authorities are consulted; and
- An agreed plan is put in place to deal with the contamination.

5.0 Site Establishment

5.1 Site Access and Vehicle Movements to and from Site

5.1.1 Access routes leading to the site will be clearly identified to ensure construction plant has minimal impact on the surrounding residents.

5.1.2 A copy of the client Site Traffic Management Plan will be retained on site for reference and/ or review at any time.

5.1.3 Heavy goods vehicles access to site will be restricted to the hours specified in the planning approved Construction Environmental Management Plan

5.1.4 Site haul roads will be established by the client to ensure that road going vehicles entering the site are segregated from site plant wherever practicable. This will also limit the potential for road going vehicles to collect mud and debris that may be deposited on the public highway on leaving the site.

5.1.1 In order to maintain the quality of site haul roads further measures detailed below may be employed by the client:

- Road sweeper will be employed, if required;
- Maintain good drainage / runoff;
- Backfill / grade any area in which road surface becomes uneven;
- Keep road damp in dry conditions to prevent dust generation;
- Spill of debris onto haul roads will be removed and treated;
- Enforced speed limit.

5.2 Security

5.2.1 Site security is to be managed by the client.

5.3 Welfare Compound

5.3.1 Welfare facilities will consist of site offices, canteen, washing facilities, decontamination facilities, toilets, storage containers and parking areas as required. This has been provided by the client.

5.3.2 The welfare compound will be fenced and isolated from the remainder of the site using heras type fencing and suitable signage erected for the health and safety of site operatives. Vehicles parking at the compound will be segregated from site traffic with barriers erected as required.

5.3.3 A suitable integrally bunded fuel generator and integrally bunded fuel tank will be commissioned to provide a suitable power supply to the welfare compound where mains electricity cannot be provided.

5.3.4 The welfare compound will be maintained as a 'clean' area, i.e. plant and materials will not be permitted within the welfare compound and personnel will require passing through a changing area prior to admission to the site canteen during breaks and at the end of the working day.

5.4 Utilities/Services

5.4.1 All services, if identified within the site boundary, will be traced and clearly demarcated prior to commencing site works.

5.4.2 All service information will be provided by the Client.

5.5 Plant Storage Area

5.5.1 All plant operating on-site will be required to return to a designated plant storage area at the end of the working day.

5.5.2 The plant storage area will comprise a suitable running surface for the plant and will incorporate an impermeable refuelling area where static bunded fuel tanks will be present.

5.5.3 Where refuelling takes place or fuel storage is required, emergency spill kits and containment measures will be available for use in emergencies.

6.0 Enabling Works

6.1 Introduction

6.1.1 Prior to commencing the remediation works, a number of activities will be undertaken to ensure the site has been adequately prepared for the works.

6.1.2 Enabling works shall be undertaken by VertaseFLI. The main enabling works are summarised below:

- Preparation of Material Management Plan (MMP) in accordance with CL:AIRE Definition of Waste Code of Practice for approval by a suitable appointed Qualified Person;
- Preparation of relevant Health and Safety information as required under CDM Regulations 2015;
- Preparation of an asbestos work assessment and plan of work in accordance with the Control of Asbestos Regulations 2012;
- Mobilisation of plant and equipment and establishment of environmental monitoring equipment around working area.

6.2 Site Survey

6.2.1 A detailed topographic survey of the site will be undertaken prior to works commencing. This initial survey will be utilised to provide information for the on-going tracking of materials at the site.

6.2.2 Further information including additional site surveys and monitoring will be gathered during the works, including the volumes of stockpiles of processed materials and soils and the extent of any excavation works.

6.2.3 A site grid system will also be used along with a materials tracking system to ensure that materials can be tracked and recorded.

7.0 Remedial Measures

7.1 Excavation and Soil Assessment

7.1.1 It is proposed that all soils that are not suitable for within the top 600mm of gardens or 300mm of Public Open Space are excavated and placed beneath the area of POS in the east of the site.

7.1.2 All works will be supervised by suitably qualified persons who will make continual visual and olfactory assessment of soils and assessment for the presence of visible asbestos containing materials.

7.1.3 It is intended that all soils are re-used on site.

7.2 Offsite disposal

7.2.1 Any unsuitable materials, metal, plastic, etc., if encountered, will be disposed of off-site to an appropriately licensed waste management facility.

7.3 Materials Management Plan

7.3.1 The works will be managed under a CL:AIRE Definition of Waste Code of Practice (DoWCoP) Materials Management Plan (MMP).

7.3.2 MMP's are live documents and can be updated throughout the work to reflect any changes in the working procedure. It will therefore be a stand-alone document.

8.0 Validation and Reporting

8.1 Validation Requirements

8.1.1 Validation of the works will be required to demonstrate that the works have been carried out satisfactorily.

Excavation of Made Ground

8.1.2 Excavation of shallow made ground will be carried out in the previously identified hotspot of contamination to the far east of the site. Excavations will initially extend to cover the areas outlined on Drawing D4626_01 and to depths of 600mm below finished levels in rear gardens and 300mm below finished levels in front gardens.

8.1.3 Topographic site levels of the base of the excavation should be recorded in residential gardens (both front and rear) and soft landscaped areas, prior to capping/topsoil application.

8.1.4 Following placement of capping/topsoil, topographic site levels should again be recorded in residential gardens (both front and rear) and soft landscaped areas.

8.1.5 Photographs should be taken of residential gardens (both front and rear) and soft landscaped areas that adequately illustrate the formation and capping layer/s, in relation to reference points such as brick / block courses and driveway edges.

8.1.6 Waste transfer / haulage tickets for soils removed from site should be retained as confirmation of the volume of material removed. This will allow for comparison against the volume of material imported. The tickets should be included in the Validation Report.

Placement of Made Ground Beneath Area of Public Open Space

8.1.7 Topographic site levels of the formation layer in the area of POS should be recorded prior placement of made ground from the identified hotspots and again prior to placement of capping/topsoil.

8.1.8 Following placement of capping/topsoil, topographic site levels should again be recorded in the POS.

Provision of Clean Capping Layer

8.1.9 Topographic site levels of the formation layer (whether top of natural or base of capping layer), should be recorded in residential gardens

(both front and rear) and soft landscaped areas, prior to capping/ topsoil application.

8.1.10 Following placement of capping/topsoil, topographic site levels should again be recorded in residential gardens (both front and rear) and soft landscaped areas.

8.1.11 Photographs should be taken of residential gardens (both front and rear) and soft landscaped areas that adequately illustrate the formation and capping layer/s, in relation to reference points such as brick / block courses and driveway edges.

8.1.12 Waste transfer / haulage tickets for soils removed from site should be retained as confirmation of the volume of material removed. This will allow for comparison against the volume of material imported. The tickets should be included in the Validation Report.

8.2 Imported Fills

8.2.1 The key stages in the validation of imported fills may be summarised as follows:

- Sufficient chemical testing certificates should be provided, based on Table 4-1, to confirm that soils proposed for importation meet required chemical specification before importation occurs;
- Soils failing to meet the specification should be rejected and not permitted to be imported to site;
- Supplementary sampling and testing of the materials may be required where there is a shortfall in the number of test certificates provided by the supplier;
- All chemical testing certificates should be dated within 3 months of importation to Site, to ensure that they are relevant to the materials being imported; and
- Haulage tickets showing the origin and volume of imported soils should be retained for inclusion in the Verification Report.

8.3 Remediation Verification Report

8.3.1 On completion of the works a Verification report will be prepared which will detail the works undertaken at the site. Details of any unexpected

contamination encountered will also be detailed, along with the agreed contingency plan utilised to manage this.

8.3.2 The report will also include consignment notes of all materials disposed of from the site, records from the material management plan and copies of all chemical validation testing and environmental monitoring undertaken at the site.

8.3.3 The report will also include the following:

- Consignment notes of all materials disposed of from the site;
- Records from the Material Management Plan;
- Photographs of Made Ground excavation and placement and subsequent placement of capping / topsoil;
- Relevant photographs and location plans;
- Laboratory soil analysis certificates;
- Where applicable, confirmation that the contaminant concentrations in imported soils meet the acceptance criteria;
- Confirmation that the remediation has been undertaken satisfactorily;
- Confirmation that the remediation objectives have been achieved;
- Any necessary precautions to be taken considering that some potentially contaminated soil may remain on site at depth;
- Revised conceptual model showing no significant potential contaminant linkages remain; and
- Statement that there is (post remediation) unlikely to be a significant possibility of significant harm associated with contamination on the site.

9.0 Health Safety and Management

9.1 Health and Safety Management

9.1.1 VertaseFLI will act as a remediation-contractor on the remediation project under the CDM Regulations 2015 and will be responsible for the management and enforcement of all Health & Safety controls for all phases under our control.

9.1.2 All assessments and controls associated with Health & Safety will apply equally to VertaseFLI employees, subcontractors, visitors and any other party who may be affected by the actions or inactions of our works.

9.1.3 Health & Safety Risk Assessments and Method Statements will be produced for all necessary activities and disseminated to all appropriate personnel.

9.1.4 All individuals working on or visiting the project will undertake comprehensive site inductions and training as necessary. Daily toolbox talks and Health & Safety liaison meetings will be held throughout the project. The Health & Safety plan will be regularly reviewed and updated as necessary.

9.1.5 The Site Manager will undertake daily site inspections and audits. The Project Lead and senior Company Directors will regularly visit the works and undertake unannounced audits of Health & Safety, environmental performance and compliance with contract specifications

9.1.6 VertaseFLI employ an in-house fully qualified Health & Safety Manager who will make regular unannounced visits and undertake comprehensive audits. Any corrective actions of improvements will be followed up by the Health & Safety Manager.

9.1.7 There will be a minimum PPE requirement for this project. Risk Assessments and Method Statements may also identify the need for additional PPE if the increased risk cannot be reduced or removed by operational management changes.

9.1.8 Regular equipment checks will be undertaken to ensure that plant and machinery used on site is well maintained, serviced and acceptable for use. Plant operatives will be required to complete a daily plant

inspection sheet following inspection of the plant, with the site manager undertaking a weekly inspection of plant to confirm its suitability for use on-site.

10.0 Environmental Management and Control

10.1 Environmental Management Overview

10.1.1 Works will be carried out in accordance with the planning approved Construction Environmental Management Plan produced by Harron Homes which identifies the environmental receptors in and around site that will be protected by the management systems described below.

10.1.2 VertaseFLI operates an Integrated Management System in accordance with BS EN ISO9001, 14001 and OHSAS 18001.

10.1.3 The procedures and records contained therein ensure all works are undertaken in a manner that minimises impact on the environment and generates adequate and accurate records to demonstrate remediation works have been carried out to the required standard and in accordance with all applicable legislation. All such records are collated on contract completion (or sooner as required) and are included within the contract completion and validation report.

10.1.4 All works will be supervised by suitably qualified and experienced personnel at all times. Specific technically qualified and operationally competent VertaseFLI site managers and environmental engineers will be present on site at all times to oversee site operations.

10.1.5 Due to the nature of the works, there is the potential to generate emissions during delivery, excavation and processing activities on-site.

10.2 Noise Control

10.2.1 Due to use of mobile plant there is the potential for the works to generate fugitive noise. It is considered that although the works will generate noise it will not be at a level to cause a nuisance beyond the site boundary.

10.2.2 A number of management procedures will be implemented to minimise the impact of noise generation at source and ensure noise is not fugitive noise is not generated beyond the site boundary.

10.2.3 The correct selection of plant and equipment will ensure noise generation is minimised. This selection process will include:

- The use of only modern and properly maintained mobile plant and tools;
- All plant and machinery will be fitted with adequate silencers and will not be operated unless in good condition;
- The use of silenced generators and pumps where practicable.

10.2.4 Activities that may potentially generate excessive noise will only take place during normal working hours 08.00 – 18.00 Monday to Friday and when necessary 08.00 – 13.00 on Saturdays.

10.2.5 Throughout the working day, the Site Manager / Environmental Engineer shall assess noise levels by taking spot values around the working area and site boundary using portable monitoring equipment.

- Noisy operations will be restricted to less sensitive times of day where possible.
- Noisy plant will be positioned away from boundaries with sensitive receptors when possible.

10.2.6 Should the local residents make any complaints regarding noise associated with the works, the Site Manager shall investigate. Such investigations may include the use of portable monitoring equipment to record noise levels at the location of the complainant and comparison with baseline monitoring undertaken at the site boundary. The nature of the complaint and findings of the investigation shall be discussed with the Client. Appropriate remedial action shall be taken if the complaint is upheld, such as the adjustment of working hours or the alteration of site practices and working methods.

10.2.7 VertaseFLI will react accordingly to any noise monitoring results, and/or any complaints made by members of the public and / or regulatory authorities.

10.3 Dust Control

10.3.1 There is the potential for dust to be generated during the remediation earthworks, particularly during prolonged periods of dry weather.

10.3.2 Dust generation is considered to be generated primarily through: on-site vehicle movements, tipping of materials from vehicles, screening and crushing, stockpiling and reinstatement activities.

10.3.3 The Site Manager / Environmental Engineer shall assess dust and its impact upon neighbours throughout the working day. Real-time dust monitoring will also be carried out, consisting of daily visual inspections at the site boundary and downwind of the active works.

10.3.4 The following mitigation measures will be employed on site as required:

- The use and maintenance of good quality site/haul roads, and the suppression of dust on haul roads through the implementation of a tractor and bowser to dampen down running surfaces;
- Enforcing speed limits of site plant along site access and haulage roads;
- Suspending certain works during unfavourable weather conditions if wind is blowing towards or dust is identified beyond site boundaries;
- Covering stockpiles if they are contributing to fugitive dust;
- Carrying out operations with the potential to generate significant dust away from the sensitive receptors whenever possible;
- Use of modern and properly maintained mobile plant;
- Implementation and maintenance of wheel washing facilities to minimise the deposition of dust on the public highway.

10.3.5 Daily site logs will also contain a record of daily site activities and weather conditions which will be completed by the site manager.

10.4 Odour / Vapour Control Measures

It is not anticipated to encounter significant odour/vapour that will become a nuisance issue and no specific control measures are deemed necessary. However, should significant odours be identified, the requirements for control measures will be reassessed.

11.0 Environmental Monitoring

11.1 Introduction

11.1.1 For the duration of the works mobile environmental monitoring will be undertaken by VertaseFLI. This monitoring will be comprehensive and will provide assurance that the works are not inadvertently impacting on the surrounding environs.

11.1.2 All monitoring will be undertaken by experienced competent VertaseFLI Engineers, trained in the use of the monitoring equipment. To identify potentially polluting materials and activities throughout the works, VertaseFLI will undertake a watching brief and will implement control measures should such materials be encountered.

11.1.3 A detailed assessment of the weather conditions will be made daily to include wind speed, wind direction, estimate of cloud cover, precipitation and temperature. Weather data will be utilised on-site to determine the positioning of mobile monitoring instrumentation and to assess the monitoring results. Monitoring positions will also be dictated by the location of on-site operations.

11.1.4 All monitoring data will be reported in a clear format and where applicable, alongside trigger levels. Due to the extensive volume of data expected, it will be kept either electronically and / or in hard copy format.

11.2 Noise Monitoring

11.2.1 Noise monitoring will be conducted throughout the duration of the remediation works.

11.2.2 Noise will be monitored using portable monitoring equipment. Data will be recorded on monitoring sheets and also recorded in electronic format. Noise monitoring will be undertaken at spot levels around the site boundary and in areas of mobile plant activities.

11.2.3 Alongside this, the VertaseFLI Site Manager will undertake audible assessments of noise levels throughout the working day and implement mitigation measures as required.

11.3 Dust and Particulate Monitoring

11.3.1 Dust monitoring will also be carried out, consisting of daily visual inspections at the site boundary and downwind of the active works. A record will be kept of any visual dust seen to be leaving the site boundary. Prior to the commencement of works, dust monitoring will be undertaken in order to achieve a baseline level.

11.3.2 A Nephelometer will be used to undertake real-time monitoring of particle mass fractions including PM_{10} concentrations. Nephelometers provide real-time concentrations of particulate matter in various size fractions by operating on a light-scattering principle. The Nephelometer will be fully calibrated prior to use on site and will receive regular services as per the manufacture's recommendations.

11.3.3 A level of 250ug/m^3 PM10's will be adopted as a trigger limit, as described in *The Control of Dust and Emissions During Construction and Demolition – Supplementary Planning Guidance, July 2014, Mayor of London,* will be used for the assessment of results, and dust mitigation measures will be employed should this be exceeded.

11.4 Odour Monitoring

11.4.1 Throughout the project regular odour monitoring will be conducted, at the site boundary downwind of active works. All site personnel will be appropriately trained in identifying on-site odours, and a suitable reporting procedure established to ensure these odours are reported to and recorded by the site Environmental Engineer.

11.4.2 Should odour complaints be raised, VertaseFLI will record the nature and location of the odour complaint in the site diary and inform the Site Manager/Environmental Engineer.

11.4.3 In order to monitor the above a quantitative method will be adopted, an engineer will also complete an olfactory odour assessment in which an engineer will assess the odour intensity, odour type and the sensitivity of the location sensitivity.

11.5 Asbestos Fibres

11.5.1 Where asbestos is identified and remedial works undertaken to address the contamination, monitoring for asbestos fibres, primarily for the

purpose of reassurance, will be undertaken. It should be noted that as work is being undertaken outdoors on an exposed open site, there should be limited asbestos fibre liberation.

11.5.2 A limit of 0.01 fibres/cm^3 averaged over a continuous 4-hour period shall be adopted throughout the works. Ambient monitoring will be undertaken close to and downwind of relevant excavation, stockpiling or placement works and, consistent with the prevailing weather conditions, asbestos fibre boundary monitoring will also be undertaken. Personal monitoring shall also be undertaken. If the air quality limit is exceeded then the works shall stop and the working methodology revised.

11.5.3 Further detail on personal and fugitive asbestos in air monitoring will be included in the asbestos risk assessment and plan of work.