



Interchange 26, Oakenshaw

**Construction Environmental Management Plan
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1.0 INTRODUCTION

This Construction Environmental Management Plan (CEMP) has been prepared by Professional Remediation Ltd (PRL) and provides details of our proposed environmental monitoring and protection measures to be employed during the enabling works to the formerly North Bierley Waste Water Treatment Works) on behalf of Opus North.

In drafting this report, PRL has reviewed the requirements prescribed by legislation and the clients contract requirements. This is a live document and will continue to be reviewed and revised during the works.

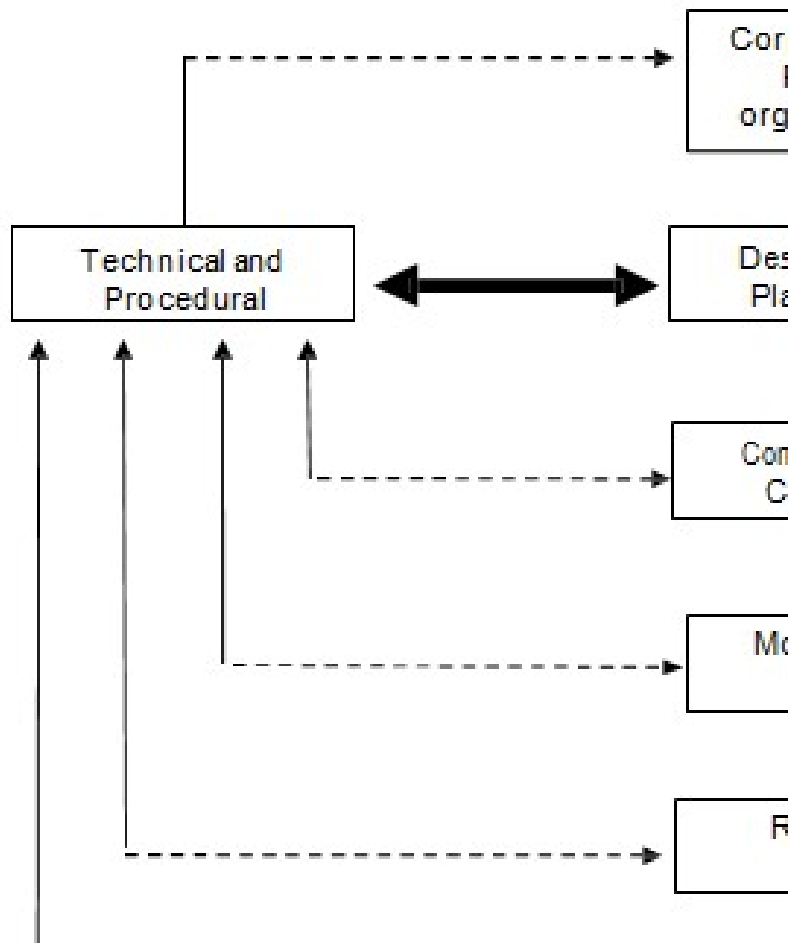
1.1 Proposed Management Strategy

PRL will manage environmental risks associated with enabling works at the site by a well-considered strategy of design, control, monitoring and review. An outline strategy indicating the proposed planning and management is presented in Figure 1.

This document has been prepared to mitigate risks to receptors such as site operatives, visitors, residents, trespassers, groundwater, services and surface water receptors. The document includes the risks identified and the proposed mitigation measures to be employed, including the trigger levels and actions which will be undertaken should these be exceeded during the works.

Each potential environmental risk / statutory nuisance identified as part of our strategy design is addressed in discrete sections throughout the course of this document which describes the risk, control measures, trigger levels and potential mitigation measures to be undertaken should trigger levels be exceeded.

Figure 1 – Proposed Management Strategy



2.0 SITE UNDERSTANDING

2.1 Site Location

The site is the former North Bierley Waste Water Treatment Works, Oakenshaw, BD12 7ET. The site is located on approximate National Grid Reference (NGR) SE 17984 27441. The site is approximately 16 hectares.

2.2 Site History and Land Use

Historical plans show that a sewage works was present on part of the site in 1893. The Valley Pit Coal and Ironstone workings were also present in the west of the site currently along with an Old Coal pit in the south.

A tramway is reported extending across the western part of the site. By 1908 the pits were reported to be closed and the sewage works had expanded. Subsequent maps show further expansion and changes to the layout up until 2004. Directly prior to these works the site was occupied by the North Bierley Waste Water treatment Works.

2.3 Previous Investigations

Over the preceding years several site investigations have been undertaken and reports produced making recommendations for the site. These reports are as listed below:

- Former North Bierley WWTW Phase II Geo-Environmental Assessment, produced by Wardell Armstrong on behalf of Keyland Developments, November 2017.
- North Bierley WWTW, Bradford, Ground Investigation Report, Curtins Ref: 065646-CUR-00-XX-RP-GE-001 on behalf of Opus North, December 2019.
- Interchange 26 Earthworks Specification, Curtins Ref: 065646-CUR-00-XX-RP-GE-003, on behalf of Opus North, May 2020.
- Design Statement – Interchange 26, produced by Curtins on behalf of Opus North, June 2020.

2.4 Contamination

The site investigation works have not identified the presence of contamination. The site investigation confirmed the presence of cohesive made ground generally comprising dark grey and brown sandy gravelly clay. This was underlain by natural soils comprising predominantly soft to firm dark grey and brown sandy gravelly clay.

Following a review of the supporting information, it has been confirmed that both the made ground and natural soils are confirmed to be below generic assessment criteria. The made ground and the natural soils are therefore deemed suitable for the proposed reuse of the site-won soils at the site.

Based on the findings of the previous intrusive ground investigations, no remediation or remedial strategy is required with respect to contamination.

3.0 ENABLING WORKS

The proposed demolition and enabling earthworks to accommodate the new development require extensive cut/fill to achieve the desired formation levels across the development site.

With respect to geotechnical performance suitability a detailed Earthworks Specification and associated appendices have been prepared to ensure that site won soils are suitable. Site won material that does not meet the performance specification (for example existing made ground or organic rich natural soils) will be retained onsite in the form of bunds and/or areas of landscape fill in accordance with the proposed development detailed in the planning application, for example as an over bund to the currently uncovered sewer pipe in the south of the site.

Natural soils assessed as being suitable for the proposed development area will be placed without the requirement for pre-treatment.

The Enabling Specification provides a comprehensive specification for the regeneration of the land to construct a development platform that will be geotechnically suitable for the proposed end use.

The salient features are summarised below:

- Secure the site boundary and undertake general vegetation clearance.
- Topsoil strip and stockpile.
- Excavate filter media from the former treatment works and stockpile.
- Breakout all below ground structures.
- Process hardstanding and concrete to produce aggregate in accordance with the WRAP protocol.
- Undertake earthworks cut and fill to achieve desired development platform.
- Validation sampling and testing to confirm earthworks specification has been achieved.

3.1 Material Management

A Materials Management Plan will be produced in accordance with the CL:aire Code of Practice. All material movements will be recorded in accordance with this and the verification plan, with material movements detailed in the final Verification Report. This will be produced by Curtains Consulting.

3.2 Verification Plan

During the site enabling works, PRL & the appointed consultant will undertake the following record keeping protocols:

- Detailed daily site diary including material movements;
- Sampling register, testing results, photographs, details of locations of stockpiles, consignment notes; and,
- Detailed surveys (volumes).

Record keeping on site, movements and analysis of specific material types, will be in the form of site diaries, an excavation record and site surveys. These records will remain on site and will be completed by PRL / appointed consultant during the site enabling works.

The records listed above will be used to produce a Verification Report produced by the appointed consultant. The verification report will clearly reference the origin of the materials used and testing carried out to confirm its suitability for use, where required.

PRL will prepare an as built development drawing clearly detailing the materials present onsite to be cross referenced with the supporting verification documentation.

The Verification Report will include the following:

- Earthworks Specification
- Detailed surveys of all excavations and production of 'as built' drawings for the earthworks;
- Copy of Consignment Notes relating to the movement of wastes to a licensed waste management facility;
- Detailed drawings showing all sampling locations for chemical and geotechnical testing;
- Chemical test results;
- Geotechnical test results;
- Details of Qualified Persons signed declaration; and,
- Monitoring results if undertaken (i.e. Dust, asbestos in air, gas water etc.)

4.0 ENABLING WORKS RISK ASSESSMENT

The proposed work activities and potential impacts have been reviewed to determine appropriate environmental management and monitoring procedures for the works. A site-specific assessment of the enabling works is summarised in the Table 1 overleaf.

Table 1 – Environmental Risk Assessment

ACTIVITY	ASPECT	RECEPTOR / IMPACT	MITIGATION AND CONTROL
Earthworks and movement of Made/Natural Ground	Removal of surface cover	Site Workers, visitors, local residents, trespassers / Noise, Dust, Vibration & runoff from rainfall.	Management, monitoring and control measures as presented in this Environmental Management Plan
	Stockpiling of material	Site Workers, visitors, local residents, trespassers / Noise, Dust, Vibration & runoff from rainfall	Management, monitoring and control measures as presented in this Environmental Management Plan
	Materials transport	Site Workers, visitors, local residents, trespassers / Noise, Dust and vibration	Management, monitoring and control measures as presented in this Environmental Management Plan
	Materials screening	Site Workers, visitors, local residents, trespassers / Noise and Dust	Management, monitoring and control measures as presented in this Environmental Management Plan
	Storage of fuels & refuelling plant	Site Workers, visitors, trespassers, groundwater, Hunsworth Beck / Odour and potential leaks or spillage	Fuel to be stored in bunded tank with 110% capacity. Dedicated refuelling area and spill kits provided on site in the event of spillage/leak
surface water run- off and dust control	Water treatment / containment	Site Workers, visitors, trespassers, groundwater, Hunsworth Beck / Noise, and loss of water to site surface.	Management, monitoring and control measures as presented in this Environmental Management Plan. Covering of drains which leave site. Placement of bunds to prevent off site migration.

ACTIVITY	ASPECT	RECEPTOR /IMPACT	MITIGATION AND CONTROL
	Excavation digging	Site Workers, visitors, trespassers, groundwater, Hunsworth Beck / Noise, and loss of to site surface in the event .	Management, monitoring and control measures as presented in this Environmental Management Plan.
Storage of Waste/Unsuitable material for Disposal	Storage of unsuitable/contaminated materials	Site workers, visitors, local residents, trespassers, groundwater, river / Noise, Dust, odour	Management, monitoring and control measures as presented in this Environmental Management Plan.
		Site workers, visitors, trespassers, local residents, groundwater, river / Loss of runoff/leachate to the site surface and/or drainage	Secure storage of material within dry enclosures and within impermeable bunded stockpiles. Any redundant drains leaving site will be sealed.

5.0 ROLES AND RESPONSIBILITIES

PRL regards the environmental management of the works as a key aspect of the site works. All staff have a responsibility to ensure that the measures detailed in this site environmental management plan are implemented appropriately during the works and that the requirements of environmental legislation are complied with. This document has been prepared by the companies Technical Manager in conjunction with the Health, Safety & Environmental Manager. This document compliments the Construction Phase Health & Safety Plan, Site Specific Method Statements and Risk Assessments.

5.1 Management Review

This environmental site management plan will be reviewed monthly, as a minimum, during the enabling works programme. The plan will be updated with the following:

- Changes to the schedule of works;
- Any changes made to the Scope by the client's project team;
- Comments from the regulators or other stakeholders; and
- Changes in legislation.

5.2 Site Management Structure

Detailed below is the site Management Structure

Project Director –	Andrew Shepherd
Contract Management –	Andrew Shepherd
Site Manager –	Trevor Proctor
Operations Director –	Stuart Hall
Health, Safety & Environment –	Michael Clements
Technical Manager –	Dr Jane Crossley

An appointed consultant will provide independent supervision and verification reporting of all works undertaken on site. The Local Authority, Environment Agency and all parties are welcome to visit site at any time.

The resources required for individual tasks will be assessed on an on-going basis throughout the duration of the job with appropriate additional employees utilised as appropriate.

6.0 SITE MANAGEMENT

6.1 Introduction

The proposed work activities and potential impacts have been reviewed to determine appropriate environmental management and monitoring procedures for the works.

The following sections detail the management practices that will be adopted when conducting site works. Refer to the Construction Phase Health and Safety Plan (CPHSP) and site-specific method statements & risk assessments (RAMs) for additional information. The practices identified within this document will be implemented in addition to the CPHSP & RAMs.

6.2 Working Hours

Working hours for the duration of the works will be restricted to the requirements detailed within the CPHSP. Working hours will be as below or as stipulated in the Planning Permission:

- Monday - Friday: 07.00 to 1800 hours;
- Saturday: 08.30 to 13.30 hours.

Works will not be undertaken during Sundays and Bank Holidays.

6.3 Good Housekeeping

To maintain a clean site, which is imperative in operating a safe site, a standard set of housekeeping rules will be implemented. These are, but not limited to:

- Provision of adequate waste disposal receptacles;
- Provision of clean / dirty changing rooms so that contamination is not spread into the canteen and office areas;
- Frequent cleaning of workspaces and communal areas;
- Disposal of rubbish at regular intervals;
- No smoking anywhere on site.
- Smoking will be permitted in the designated area within the site compound;
- No fires;
- Cleaning of roads and access ways; and
- Safe and practical storage of materials.

6.4 Pest Control

- The risks of pest infestation are minimal due to the nature of the materials being treated. These do not offer a food source nor should they attract vermin. There will be no specific active pest control during treatment.

6.5 Bird and Scavenger Control

- Birds and other scavengers will not be attracted to the contaminated materials or the treatment area at the site. There will be no active bird or scavenger control within the operating area.

6.6 Control of Litter

- The nature of the work does not pose a risk of litter migration outside the site boundary. The site will be operated in a safe and hygienic manner with all waste streams controlled.
- A site office will contain facilities for storing general waste. A skip will be used for any large items of general waste.
- The site diary will record that monitoring checks have been carried out daily to confirm the prior points.

6.7 Lighting

The enabling works predominantly will be carried out during the time of year where artificial lighting is not required to allow a full day's work to be undertaken.

If works are carried out at times where mobile lighting towers are required to be used the lights will be directed to the task being undertaken and facing inwards to the site.

6.8 Prevention of Mud on Roads

During the initial enabling works it is not envisaged there will be significant vehicle movement on and off site and there is no requirement for import of material.

Site working vehicles will be maintained in a separate compound to site staffs vehicles who will come and go from site on a daily basis. The site compound will be a designated clean area, whilst the site will be classed as dirty.

Mud however, from clean areas may still pose a hazard and a wheel cleaning facility will be provided to allow mud debris to be removed prior to vehicles leaving site.

Wheel washing will comprise a dedicated area with a labourer and jet powered bowser which would only be operated at low pressure (very gently to mitigate spray generation).

A road sweeper will be employed as necessary to ensure the approach to the site is kept clean.

6.9 Security

The site will be secured by fencing along its boundary's. The site compound creating a clean working area will be separately fenced from the working site area to provide segregation between clean and dirty areas. Where practicable excavations will be backfilled immediately, where there is a requirement to leave an excavation open the excavation will be separately fenced.

A security guard will be stationed on site overnight and at weekends.

6.10 Material Storage

To maintain a safe and organised site the storage of materials will adhere to the following principles:

- Ensure the correct quantity of material is ordered to minimise storage volume and reduce waste;
- Monitor and order material stocks as required to prevent a build-up of materials on site;
- Store materials in designated storage areas;
- Store all materials in accordance with the manufacturer's guidelines;
- Cover all materials that have the potential to create dust or be moved by wind;
- Ensure relevant COSHH assessments and Material Safety Data Sheets are stored with materials that have the potential to cause harm;
- Ensure all storage areas are secured to prevent unlawful/uncontrolled removal; and
- Maintain an accurate inventory of materials to allow monitoring of stock levels.

6.11 Environmental Records and Documentation

A site-specific Construction Phase Health and Safety Plan will be prepared along with site-specific method statements and risk assessments to ensure the works are completed in line with the employer's requirements and all applicable UK legislation and regulations.

This document will remain 'live' for the duration of the works and any updates or modifications to the plan will be clearly identifiable. All modifications and/or updates will be communicated to all site staff and the wider project team.

References will be made to stand alone documents that include but not limited to:

- Construction Phase Health & Safety Plan;
- Material Management Plan (MMP);
- Site Specific Method Statements & Risk Assessments.

6.12 Reporting

Throughout the duration of the works several reports will be drafted and submitted to the wider Project Team. The list below details the minimum reports that will be drafted:

- Construction Phase Safety, Health, & Safety Plan;
- Material Management Plan
- Progress Report(s) to be issued monthly for the duration of the works;
- Environmental Monitoring Results and Reports; and
- Verification Report.

6.13 Auditing and Monitoring

Throughout the course of the works PRL will implement a site auditing regime which will be undertaken by the PRLs Project Manager, Site Manager and Health Safety & Environmental Manager.

Records of the audit will be circulated to the wider Project Team. Periodically through the course of the works the site will be subjected to an audit by a PRL member of staff not directly involved with the project.

6.14 Accreditations and Registrations

- Contractors Health and Safety Assessment Scheme (CHAS)
- Safety Management Advisory Services Ltd (SMAS)
- Construction Line
- The Royal Society for the Prevention of Accidents (ROSPA)
- British Safety Council

7.0 COMMUNICATION & COMMUNITY LIAISON

Throughout the course of the works PRL will implement a communication strategy detailing the progress of works. The communication strategy will incorporate the dissemination of the project information to the Client, Consultant and Project Management Team, Regulators and Key Stakeholders.

Regular progress meetings will be called to maintain an open and efficient dialogue with all Project Team members.

Consultations with statutory consultees and with stakeholders will take place in a timely and efficient manner such that views and requirements can be discussed and taken account within the proposed works.

A letter drop will be undertaken to local residents if required.

8.0 ENVIRONMENTAL PROTECTION MEASURES AND MANAGEMENT

All activities undertaken during the works will be undertaken in a way that will protect the atmospheric, human health, aquatic and terrestrial environments from any adverse impacts and statutory nuisances.

The works will be carried out in general accordance with key, relevant good practice guidance, including, but not limited to:-

- CIRIA C692, Environmental Good practice on Site.
- CIRIA C532, Control of Water Pollution from Construction Sites.
- CIRIA 132, Guide for Safe Working on Contaminated Sites.
- HSE 1991 Protection of Workers and General Public During Development of Contaminated Land.

8.1 Relevant Statutory Bodies

Table 2 below presents details of all relevant statutory bodies which will be notified in the event of an emergency:

Table 2 – Relevant Statutory Bodies

Statutory Body	Contact Number
HSE (Construction)	0845 300 9923
The Environment Agency	03708 506506
Local Authority	01484 414746
Fire Authority	0300 330 1000

8.2 Storage of Hazardous Materials

All hazardous materials used or stored on site either as a result of the recovery of contaminants for the site works or materials used in the enabling works of the site will be contained in a manner which is in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001. Section 10.9 of the CPHSP explains how PRL will “Control Substances Hazardous to Health”. All fuel on site will be stored in a locked and bunded bowser, with 110% capacity.

8.3 Assessment of Potential Incidents

The following section outlines the potential incidents that could occur during the site works.

Spillages

The use and recovery of liquids throughout the works increases the risk of spillages. The following mitigation and protection measures will be implemented to prevent spillages:

-
- Strategic placement of emergency spill kits throughout the site, including the designated refuelling area and each piece of plant;
 - Use of drip/drum trays when using hand-held liquid containers;
 - Re-fuelling of all plant and machinery in designated areas only;
 - Use of pumps only when re-fuelling plant and equipment;
 - Use of funnel systems where appropriate/necessary; and
 - Assessing the load and traffic route when transporting liquids across the site avoiding rough ground and trip hazards.

8.4 Relevant Legislation, Standards and Guidance

- PPG 1: Understanding Your Environmental responsibilities (July 2013);
- GPP2: Above Ground Oil Storage Tanks (January 2018);
- PPG3: The Use and Design of Oil Separators in Surface Water Drainage Systems (Environment Agency, 2006);
- GPP5: Works and Maintenance in or Near Water (January 2017);
- PPG6: Working at Construction and Demolition Sites (2012);
- GPP8: Safe Storage and Disposal of Used Oils (July 2017)
- GPP21: Pollution Incident Response Planning (July 2017)
- ATEX Equipment Directive;
- The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR);
- Waste Regulations as amended 2019;
- The Control of Pollution Act 1974;
- The Environmental Protection (Duty of Care) Act 1991;
- The Environmental Noise Act 2006;
- The Construction (Design and Management) Regulations 2015.
- GPP 4: Treatment and Disposal of wastewater Where there is no Connection to Sewer.
- The Control of Asbestos Regulations 2012.

9.0 ASBESTOS

No asbestos has been identified on site. Should asbestos be encountered to mitigate the risks to site workers, visitors, trespassers and local residents during this phase of enabling works the following will be implemented;

- A site-specific Asbestos Management Plan (AMP) will be prepared and implemented.

10.0 WASTE AND MATERIALS

Materials Management Plan (MMP)

PRL will implement and maintain a MMP prepared in accordance with the CL:AIRE Definition of Waste - Industry Code of Practice. The MMP will include the following:

- Material Management in practice;
- Quality control;
- General waste;
- Contaminated soils; and
- Relevant legislation.

11.0 NOISE AND VIBRATION

All works undertaken during the programme will be undertaken in a way which is considerate to sensitive receptors and strict limitations will be imposed with regards to generation of noise and vibration.

11.1 Control of Noise and Vibration

To control and minimise the generation of noise and vibration a series of minimum requirements will be self-imposed on the works. These minimum requirements are:

- All vehicular and mechanical plant exhaust systems will be fitted with manufacturer's standard silencing equipment. All silencing equipment will be maintained and operated in line with manufacturer's specifications and guidelines;
- All power generation systems, electrical and pneumatic, will be of a 'super-silenced' specification. Acoustic covers will be installed to all power generation plant and covers will remain closed when in operation;
- The operation of equipment will be in accordance with the site operating hours as detailed in the planning permission. The use of mains power, where possible, will be utilised in place of mobile power generation systems;
- All plant and machinery used on an intermittent basis will be shut down and isolated during times of inactivity;
- Stationary plant and machinery will be housed with acoustic containers as far as practicably possible. Where the housing of equipment is not possible and noise assessment indicates that intervention measures are necessary, acoustic screens will be erected around all plant and equipment; and
- Noisy plant will be sited as far from sensitive receptors as practicable.

To minimise noise at the site, all activities associated with remedial works will be carried out utilising low intensity works where possible. Normal operational work hours are specified in section 6.2 of this document. Should works/ plant operation be required outside of these hours works would be discussed and agreed in advance with the appropriate regulator/s.

11.2 Monitoring of Noise

The monitoring of noise will be undertaken by a suitably qualified Engineer using fully calibrated and approved noise meter. The equipment used will undergo regular calibration and records of calibration will be maintained within the site file.

Baseline monitoring within and external to the site boundary close to sensitive receptors will be undertaken before the site works commence.

Trigger levels for noise will be set in compliance with The Control of Noise at Work Regulations 2005 (the Noise Regulations) which came into force on 6 April 2006. A review of all applicable planning conditions for the site will be undertaken to determine if there are any site-specific requirements that need to be incorporated into the noise monitoring regime. The minimum noise monitoring trigger values are:

Lower Exposure action values:

- Action at which employers must assess the risk to workers' health.
- Average exposure of 80dB(A) and peak sound pressure of 135dB(C)

Upper Exposure action values:

- Action at which employers must provide hearing protection and hearing protection zones.
- Average exposure of 85dB(A) and peak sound pressure of 137dB(C)

Exposure limits NOT to be exceeded are:

- Average exposure of 87dB(A) and peak sound pressure of 140dB(C)
- 10 dB (5 min TWA) above background monitoring data at site perimeter monitoring locations.

Monitoring of noise will also be undertaken as close to sensitive receptors (local properties) as reasonably practicable.

Monitoring will be carried out at nominated monitoring points using a hand-held calibrated sound level meter. Noise will be monitored over a 15 minute period at each location and the average, and peak, level recorded. After the collation and interpretation of the initial data the monitoring frequency will be reviewed and either increased or decreased as deemed necessary.

Monitoring will also be undertaken in the work areas as a minimum weekly but more frequently if required.

Mitigation Plan

Actions will include cessation of works on site to identify the source of excessive noise creation.

The erection of additional acoustic barriers.

Restricting the periods of time where noisy activities e.g. breaking are undertaken.

11.3 Monitoring of Vibration

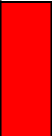
The planned works are not expected to produce significant ground vibration. However, should ground vibration become apparent because of the works the following general procedure will be implemented.

Vibration monitoring will be undertaken using a portable seismometer (Vibrocock V901 or similar). The seismometers will be deployed during times when activities are deemed to pose a risk. The vibration monitors will be located at strategic locations along the boundaries, or within the site, adjacent to identified receptors.

Baseline monitoring within and external to the site boundary close to sensitive receptors will be undertaken before the site works commence.

Vibration monitoring will be assessed against the following action levels are proposed taken at a minimum of 10m within the site boundary:

Table 3 – Vibration Action Levels

Action level, PPV	'Traffic light' reference	Action level, PPV	
≥ 25 mm/s	Red		Stop work. Restart works while closely observing logger. Continue if below 25mm/s; stop work and reconsider methodology if above. Investigate causes of highest vibration levels.
≥ 20 mm/s	Amber		Raised level of attention to works. Closely observe activity and logger output to establish what causes peaks exceeding 20mm/s. Minimise these activities if possible.
< 20 mm/s	Green		Works proceed as normal.

11.4 Relevant Legislation, Standards and Guidance

- The Control of Pollution Act 1974;
- The Environmental Protection (Duty of Care) Act 1991;
- The Noise Act 2006;
- BS5228-2, 2009: A1 2014.
- The Control of Noise at Work Regulations 2006;

12.0 AIR QUALITY

Control of air quality is of importance during the works. Dust is a particular nuisance.

Issues of concern which may affect air quality are:

- (i) Control of Dust;
- (ii) Vapours especially (VOCs); and
- (iii) Control of Nuisance Odours.

Strategy to Minimise Impact to Air Quality and Environment

Site controls will be implemented to address potential impact of air quality adequately and appropriately on:

- a. Site workers;
- b. Site visitors;
- c. Trespassers;
- d. Local residents;
- e. Residential and commercial users of neighbouring sites; and
- f. Traffic/passers-by in the vicinity of the site.

The strategy proposed for addressing the above issues includes the following elements:

- Ensuring a well thought-through and rapid/efficient overall programme of works to ensure that exposure and nuisance, particularly to neighbours, is minimised.
- Careful phasing of the overall programme so that each part of the site is managed carefully in terms of health, safety and environmental controls.
- Appropriate methods of works to ensure minimisation and control of impacts during excavations, ground-processing, in-filling, soils stockpiling and on-site treatment.

Examples of the mitigation methods to be used but not limited to include:

- Sealing of stockpiled materials to prevent weathering and dust generation.
- Appropriate covering of temporary stockpiles of contaminated soils, if encountered.
- Dust abatement measures;
 - damping down via the use of a
 - Tractor and bowser
 - Rain guns
 - Specific high-powered mist generators free standing or fixed to site fencing.
- Odour abatement measures;

-
- Odourising sprays / foams as contingency measures (where necessary). Careful management of off-siting methods (loading and lorry-type / lorry-covers).
 - Monitoring and reporting of air quality in real-time (where possible) and to suitable standards (which also requires laboratory analysis). See Table 4 below.
 - Appropriate response measures to deal with problems if they arise.

Monitoring strategies are presented for vapours, dusts, and other emissions in following sections of this report. In summary, monitoring will comprise:

- Semi-continuous workplace ambient vapour (VOC) monitoring by photo-ionisation detector (PID), with establishment of trigger values for stopping work and emergency contingencies. No VOCs are anticipated, this procedure will be implemented in the case of previously unidentified contamination being encountered.
- Semi-continuous boundary ambient vapour (VOC) monitoring by photoionisation detector (PID), with establishment of trigger values for stopping work and emergency contingencies. No VOCs are anticipated, this procedure will be implemented in the case of previously unidentified contamination being encountered.
- Clean area and boundary ambient dust monitoring by laser- nephelometer, with establishment of trigger values for stopping work and contingency measures.
- Routine boundary monitoring of total and respirable dusts at upwind and downwind boundary locations using static monitors.

Monitoring data will be compared with published exposure standards and site-specific exposure levels which will be risk-based where appropriate. These will form the basis for establishing trigger values at which point working practices will need to be re-assessed and contingency measures implemented.

Proposed site trigger levels are summarised in Table 4. Trigger levels have been derived to be protective of site workers as well as mitigating significant cross- boundary risks. PRL recognises that intrusive works into areas of significant chlorinated solvent, chlorinated phenols and phenolic compounds contamination is an activity which needs to be closely managed to prevent deterioration of air quality. The proposed trigger levels will be discussed with the Regulators and other Stakeholders prior to works commencing and up-dated accordingly.

Table 4 – On-site trigger Levels

Type of Emission	Method	Action Level	Stop Work / Revise Working Method
Dust	Inhalable Dust	10mg/m ³	250 µg/m ³
	Respirable Dust	4mg/m ³	
	Directional, Depositional and gravimetric for nuisance		Guidance for gravimetric 200mg/m ² /day
Noise	Regular Monitoring	80 dB(A)	85 dB(A)
Odour	If VOCs encountered Daily Monitoring	Intensity 3 Extent 3	Intensity 4 Extent 4
VOCs	If VOCs encountered Daily Monitoring	Work Area = 1 ppm (8 hour TWA) [∞] Site Boundary = 1 ppm (5min TWA) ⁺	Site Boundary > 5 ppm (15min TWA) ⁺

[∞]Note – trigger level to be reviewed in light of guidance for protection of workers from mixtures of chlorinated solvents provided in EH40/2005, Second Edition prior to works commencing

+ Note – proposed site boundary criteria to be reviewed following risk assessment if required

Asbestos – see the asbestos management plan.

12.1 Air Quality Standards and Guidelines

Workplace Exposure Limits

No ambient air quality standards have been set for VOCs (except benzene) or ammonia. However, Workplace Exposure Limits (WELs) have been determined in order to protect the health of workers. These are expressed as an 8-hour Time Weighted Average (TWA) reference period and as Short Term Exposure Limit (STEL) which is based on 15-minute reference period. These are not relevant for the current works.

For the purpose of this report, it is important to derive long term exposure limits from the WELs in order to set a level below which no harm is likely occur to the general public. The Horizontal Guidance Note (IPPC H1) indicates that two safety factors needs to be taken into consideration when deriving long term exposure limits from WELs; the first is the duration of exposure of the general population compared with the workforce and the second is the sensitivity of the group at risk.

Combining the two safety factors for exposure and sensitivity of the general population gives a long term air quality limit of 1/100th of the 8-hour WEL. Accordingly, the WELs are converted into long term exposure limits prior to any comparison with the monitoring results.

Dust Nuisance

Dust consists of particulate matter in the size range 1 – 75 µm (micrometers) in diameter. Dust nuisance occurs as a result of the noticeable settlement of this particulate matter. There are currently no standards or guidelines for the nuisance of dust in the UK, nor are formal dust deposition standards specified. An informal value of 200 mg/m²/day (as monthly average) is often applied in the UK as an indicator of potential nuisance. Should the trigger limits be exceeded works will cease whilst the level of damping down is increased. Haul roads will be wetted down to minimise the generation of dust during vehicular movements.

Static dust monitoring stations will be set up on the site boundary to record directional, depositional and Gravimetric dust. These results will be undertaken as background and then fortnightly throughout the site works. A hand-held dust monitor (Dustmate) will also be available on site for daily measurements to be undertaken within the site working areas and site boundary to demonstrate dust is being controlled. Please see the asbestos monitoring plan for proposed asbestos monitoring.

12.2 Relevant Legislation, Standards and Guidance

- Environmental Protection (Duty of care) Act 1991
- Clean Air Act 1993
- Clean Neighbourhoods & Environment Act 2005
- Control of Pollution Act 1974
- Anti-Social Behaviour Act 2003
- The Control of Asbestos Regulations 2012.

