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Edwin Richards Quarry – Soil Treatment Centre

Noise and Vibration Management Plan

Waste Recycling Group (Central) Limited

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1 Introduction

1.1 Report Objectives

This Noise and Vibration Management Plan supports an application by Waste Recycling Group (Central) Limited (WRG) to vary the current permit referenced EPR/HP3632RP to:

- Allow additional 30,000 tonnes per annum to be accepted at the facility and increase overall throughput to 180,000 tonnes per annum inclusive of either hazardous and/or non-hazardous waste.
- Remove the split of hazardous / non-hazardous waste treated at the facility from 89,998 tpa for hazardous waste and 60,002 tpa for non-hazardous waste to 180,000 tonnes per annum inclusive of either hazardous and/or non- hazardous waste. The amended ratio relates to the list of wastes in Table S2.2 and S2.3 of the permit (physical treatment of wastes and wastes for treatment in the bioremediation process respectively). This will impact the following listed activities:
    - AR1 S5.3A(1)(a)(ii) Physical treatment of hazardous waste
    - AR2 S5.3A(1)(a)(ii) Asbestos removal from soils
    - AR3 S5.4A(1)(a)(ii) Physical treatment of non-hazardous waste
    - AR4 S5.3 A(1)(a)(i) Bioremediation of hazardous waste for disposal
    - AR5 S5.3 A(1)(a)(i) Bioremediation of hazardous waste for recovery
    - AR6 S5.4A(1)(a)(i) Bioremediation of non-hazardous waste for disposal
    - AR7 S5.4A(1)(b)(i) Bioremediation of non-hazardous waste for recovery
- Addition of new soil treatment pad for biological treatment and soil washing.
- Addition of a point source emission to air to Table S3.1 to account for the biofilter from the new soil treatment area.
- Addition of soil washing activity for the soil washing of soils contaminated with heavy metals comprising the following listed activities and waste operations to be subject to the 180,000 tonnes per annum inclusive of either hazardous and/or non-hazardous waste.
    - S5.3 A(1)(a)(ii) – recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving physico-chemical treatment via soil washing
    - S5.3 A(1)(a)(ii) – disposal of hazardous waste with a capacity exceeding 10 tonnes per day involving physico-chemical treatment via soil washing

  Associated waste operations will be:
    - Treatment of non-hazardous waste soils by soil washing for recovery.
- Amendment to Table S1.1 Activity AR8 regarding the temporary external storage of up to 20,000 tonnes to include soils contaminated with heavy metals (10,000 tonnes) and activities AR9 and AR10 in the limits of specified activity and waste types.
- Allow the use of a mechanical screener for the pre-screening of soils containing asbestos.

- Remove pre-operational condition 1 as listed in Table S1.3 of the Permit.
- Undertake mechanical screening of non-hazardous soils in the area currently used for storage of non-hazardous soils. It is proposed to use this area for storage and screening of non-hazardous soils. Screening is already regulated under activity reference AR3 physical treatment of non-hazardous waste.
- Amend drawing reference in Table S3.3 of the Permit to remove reference to plan 100993 – Asbestos DWG1 dated January 2018 and replace with reference to an Emissions Monitoring Plan.

The proposed changes to the Permit at the Soil Treatment Centre (STC) better reflect current market conditions and reflect the activities permitted by the extant planning permission.

This Noise and Vibration Management Plan will also discharge Condition 5.a) and b) of Planning Permission DC/21/66058 which approves the new bioremediation area. The conditions are reproduced below for reference.

5.a) Before the development is brought into use a noise assessment shall be carried out in accordance with BS4141: 2014+A1:2019 to identify and quantify the noise impacts associated with the soil treatment plant. The assessment shall identify appropriate mitigation measures to limit noise to nearby residents and may include an acoustic barrier and enclosures for external plant and equipment. The assessment shall be submitted to and approved in writing by the local planning authority.

5.b) The approved mitigation measures shall be implemented before the development is brought into use

The new bioremediation area will be within the boundary of the existing waste management facility, to manage up to 30,000 tonnes at any one time of contaminated soil (classified as hazardous) through the process of bioremediation and physical treatment. The bioremediation and physical treatment of soils has been undertaken at the Site since 2016. The operations proposed for the extension are identical to those already approved at the Site through existing planning consents and an environmental permit.

A Noise Management Plan (Report Ref: 33012rr726i1, October 2016) was submitted with a previous planning application. A Planning Statement (Report Ref: 2596-01, August 2021) was submitted with this planning application for the new bioremediation area and includes measures for controlling noise.

The proposed changes to the Permit at the STC are to better reflect current market conditions and reflect the activities permitted by the extant planning permission.

In accordance with Environment Agency guidance a noise assessment is required where it is considered likely that there may be a risk of noise and vibration pollution beyond the site boundary.

A Noise Impact Assessment (NIA) was undertaken by Noise and Vibration Consultants Ltd in September 2022 (Report ref: R22.0905/DRK) to specifically address the new bioremediation area. The NIA was undertaken in accordance with BS4142:2014+A1:2019. A copy is provided at Appendix B.

The results of noise predictions of the STC site determined by the construction of a noise model using the empirical noise measurements recorded on site has shown the following:

a) The predicted noise levels vary between 20dB to 44dB $LAeq_{1hr}$ at Nearest Sensitive Receptors (NSRs).

b) The noise prediction results show that the rating noise levels at the NSRs are shown to be between 4dB and 27dB below representative background sound levels and therefore a **low impact** would occur in accordance with BS4142:2014+A1:2019.

c) The predicted noise levels are between 11dB and 32dB below the residual LAeq levels at NSRs.

The NIA has been utilised to develop this Noise and Vibration Management Plan. Reference has also been made to Environment Agency guidance[1] (dated 31 January 2022).

[1] Noise and vibration management: environmental permits - GOV.UK (www.gov.uk)

2 Scope of the Activities

2.1 Operational Overview

2.1.1 Current Activities

The STC is currently permitted to accept a mixture of hazardous and non-hazardous waste for treatment pending disposal off-site at the directly adjacent Edwin Richards Landfill Site also operated by WRG or reused on site as restoration soils. The treatment technologies employed include bioremediation of hazardous waste soils in biopiles and handpicking discrete fragments of asbestos material from soils (not contaminated with asbestos fibres).

The entirety of the area inside the current permit boundary, including inside the building comprises approximately 8.6 ha comprising a large hard surfaced level platform, which was used as part of the quarrying activities and now the STC. The STC is currently accessed via the entrance on Portway Road.

2.1.2 Proposed Activities

WRG propose to add a new soil treatment area which will be located to the southeast of the existing STC within the permit boundary. It is occupied by an area of hard standing within the current permit boundary and will use the existing access road from Portway Road. The location is shown on the Site Layout Plan.

The new soil treatment pad area will be able to treat 30,000 tonnes via either bioremediation or soil washing dependent on the contract. Soil will be treated on an impermeable surface with sealed drainage. It is occupied by an area of hard standing within the current permit boundary and will use the existing access road from Portway Road. The new soil treatment area will be within the boundary of the existing waste management facility, to treat up to 30,000 tonnes at any one time of soil contaminated with hydrocarbons or heavy metals through the process of bioremediation or soil washing dependent on the contract. The bioremediation of soils has been undertaken at the Site since 2016.

The Site Permit Boundary is shown on drawing reference K0182.1.002 and remains unchanged as part of this application.

The material to be treated at the STC is predominantly classified as hazardous. WRG would first consider the description of the soils provided by the customer. If the soils are permitted and likely to be capable of treatment the customer would be issued with the terms and conditions for acceptance of the soils.

The materials will predominantly arrive at the Site in articulated vehicles. All vehicles would arrive sheeted and would only remove their sheets once at the point of material inspection / deposition.

All vehicles would pass over the existing weighbridge before travelling along the internal access road and entering the STC. Soils delivered to the STC would be visually inspected. If the soils are provisionally accepted based upon the initial visual assessment, chemical sampling would be undertaken by an accredited laboratory as deemed necessary by WRG. If the soils are rejected for treatment at the STC they would be required to be taken away by the customer for disposal at a suitable facility. All activities would take place on the soil treatment pads, with the exception of the samples which are sent for chemical testing.

The biotreatment area works by biologically treating contaminated soils to reduce the concentrations of hydrocarbons to levels that would not pose a risk to the environment and allow a suitable restoration soil to be generated. The process utilises industry standard static technology and works by stockpiling soil impacted by hydrocarbons on an impermeable hardstanding surface. The soil is placed on a pipework system that creates a vacuum to aerate the soil and allow the natural soil bacteria to grow on the hydrocarbons and convert them to common by-products such as water vapour and carbon dioxide.

The air that is extracted from the soils is treated using a biofilter. The biofilter comprises a relatively simple air filter system. The effluent pipe from the blower connects to a manifold with several perforated pipes covered in stone. An oversize compost or woodchip mixture, nutrients and small amount of hydrocarbon impacted soil (<5%) is placed on top of the pipes to an average height of 1.5m. Above this is an irrigation pipe network to maintain the moisture content and a tarpaulin to ensure the biofilter does not dry out.

Water resulting from the bioremediation process, along with rainwater that falls on the wider soil treatment area, would be collected by the drainage gully and pipe and treated through primary settlement and sand/carbon filtration in the existing water treatment plant before being discharged to the foul sewer under the existing consent.

Soils accepted for biotreatment would be subject to a process of bioremediation for a period of 8-12 weeks. Once the soil has commenced treatment the soil is turned to aerate settled soils, typically every 4-8 weeks. Occasionally there may be a need to add an organic additive such as a woodchip to clayey soils to break up the cohesive nature and aid aeration. When the bioremediation process has been completed the soils would either be disposed of in the Edwin Richards Landfill Site or removed from site for use in land reclamation projects.

The soil washing activity will comprise the treatment of up to 30,000 tonnes per batch. Soils contaminated with heavy metals will be bought in for treatment in the soil wash plant. The soil wash plant is to be located on an area of hardstanding with sealed drainage which is the proposed new soil treatment area when not utilised for bioremediation. The duration of treatment is likely to be 6-8 weeks for each batch. The soil wash plant is to be intermittently located on the new bioremediation pad area based on the contract arrangements.

The physical screening of material (treated and untreated) using a mechanical screener would allow for the removal of oversize fractions. Any hazardous substances remaining in the soil after screening will be treated either by bioremediation or on the picking station within the asbestos treatment building on site. Pre-screening of soils containing asbestos is proposed within the Soil

Treatment Building. The pre-screening will increase the efficiency of the soil processing. It will also significantly decrease the timescales for picking thereby significantly reducing exhaust emissions from mobile plant.

On-site noise sources associated with the activities are discussed in section 3.1.1.

3 Potential Emissions

3.1 Noise and Vibration

3.1.1 On-Site Sources

The current and proposed activities associated with the STC that have the potential to produce noise and vibration emissions are:

- Vehicle movements to, from and within the Site;
- Waste deposition;
- Operation of plant as part of the bioremediation and physical treatment process (e.g. dumper, lorry, excavator, screener);
- Operation of soil wash plant;
- Containerised air extraction blower and associated pipework; and,
- Water treatment system.

Noise and vibration emissions are also associated with operations associated with Edwin Richards Landfill Site. These are not the subject of this assessment or this management plan however the control measures provided are applied to the landfill activities where applicable.

Condition 6 of Planning Permission DC/21/66058 details specific noise limits for the Site and is reproduced below:

6. The rating level of operational noise from the site, when measured as a 60- minute LAeq between the hours of 07:00 and 23:00, shall not exceed the background 60-minute LA90 by more than 5 dBA on any day. The rating level of operational noise, when measured as a 15-minute LAeq between the hours of 23:00 and 07:00, shall not exceed the background 15-minute LA90 on any day. All measurements are to be taken in accordance with BS4142:2014+A1:2019 at the nearest noise sensitive premises. In case of doubt, the background level LA90 shall be determined or agreed by the local planning authority in each case.

An Emissions Management and Monitoring Plan is already in place onsite and is attached as Appendix C. Noise monitoring is undertaken weekly at the Site.

Condition 8 of Planning Permission DC/21/66058 details the operational hours of the STC and is reproduced below:

The soil treatment facility hereby approved shall only operate between the hours of 06:30 and 17:30 Monday to Saturday and shall not operate at any time on Sundays or public or bank holidays. This restriction also applies to deliveries to the site.

A NIA was undertaken in September 2022 in accordance with BS4142:2014+A1:2019. The noise levels associated with the on-site activities are summarised below.

Noise prediction results show that the rating noise levels at the Nearest Sensitive Receptors (NSRs) are shown to be below background sound levels and therefore a low impact is predicted in accordance with BS4142:2014+A1:2019.

The NIA assessed the cumulative effect from the soil wash plant, biofilter and pumping chamber and general STC plant.

Noise prediction results show that noise levels at the NSRs during the highest likely noise generation show that the rating noise levels do not exceed the representative background sound levels and therefore a low impact is concluded in accordance with BS4142:2014+A1:2019.

The results of the survey and analysis have shown the following:

- Subjective observations of the background noise climate during daytime operating periods at the NSRs show that non-site noise sources are generally formed by local and distant road traffic noise.
- Background sound levels at the north-eastern to south-eastern NSRs are 48dB LA90 and at greater distance to the west 47dB LA90. Corresponding residual levels at NSRs vary between 51dB to 59dB LAeq.
- Subjective observations at NSR monitoring positions when the STC plant was operating normally, showed no significant perceptible noise or no perceptible or distinctive noise character from Site and therefore no noise character penalty was deemed to be required.
- Due to the ambient noise levels at NSRs being too high to be able to measure the noise contribution from the STC site, it has been necessary to undertake noise prediction modelling using computer-based modelling software with appropriate settings in accordance with ISO9613-2 and industry.
- On-site noise monitoring has been undertaken of fixed and mobile plant noise sources to inform the noise prediction modelling.
- The results of noise predictions of the STC site determined by the construction of a noise model using the empirical noise measurements recorded on site has shown the following:
    - The predicted noise levels vary between 20dB to 44dB LAeq1hr at NSRs.
    - The noise prediction results show that the rating noise levels at the NSRs are shown to be between 4dB and 27dB below representative background sound levels and therefore a low impact would occur in accordance with BS4142:2014+A1:2019.
    - The predicted noise levels are between 11dB and 32dB below the residual LAeq levels at NSRs.

- The soil washing plant would be utilised on a temporary basis and treatment of stockpiled soils would occur approximately 6-8 weeks for each batch of soil, which is likely to occur once a year. The washing plant would only be brought onto site when the temporary activity is required.

- The cumulative effect of the temporary soil washing activity and the day-to-day operation of the STF plant has been assessed (with mitigation measures proposed) and a noise prediction model generated to calculate the noise impact and the results show the following: a)The cumulative noise levels at the NSRs during the highest likely site noise generation during the temporary use of the Soil Washing Plant show rating noise levels are between 28dB and 48dB LAeq1hr.

- The rating levels do not exceed the representative background sound levels and therefore a low impact would occur in accordance with BS4142:2014+A1:2019.

3.1.2 Off-Site Sources

Edwin Richards Landfill Site is located to the southwest and commercial premises are located to the south on Portway Road. There are several roads surround the Site including the B4171 (Dudley Road) 650 m to the southwest. The industrial / commercial facilities and the roads surrounding the Site have the potential for generating noise.

4 Potential Receptors and Pathways

4.1 Site Setting

The Site is situated in a suburban location, with two golf courses located to the northwest and southeast. The Site is located at an elevated level behind a belt of mature trees which screens the Site from residential properties, including those closest to the north and east of the Site. Edwin Richards Landfill Site is located to the southwest and commercial premises are located to the south on Portway Road. Portway Hill, Portway Road and Dudley Road are located to the north, east and south of the site. Rowley Hills Local Wildlife Site is located to the north and consists of deciduous woodland, woodland and semi-improved grassland.

4.2 Receptor Locations

When choosing the receptors, the closest or the most sensitive (if different from the closest) have been considered in each direction from the hazard. Account has been taken of the mechanism of transport to the sensitive receptor e.g. wind direction or a physical connection to the Site. The probability of exposure is determined by the distance of the receptor to the Site and the likelihood of the hazard reaching the receptor. This stage of the assessment assumes that exposure has resulted from an uncontrolled emission i.e. without mitigation.

The nearest sensitive receptors to the Site and the distance of these receptors to the Site boundary and their direction relative to the Site is detailed in Table 1.

Meteorological data from Rowley Regis[2] which is located approximately 400 m to the south of the Site and is expected to provide representative meteorological data for the area has been used to determine the prevailing wind direction which is from the south-southeast.

Table 1 – Potential Sensitive Receptors

No.	Receptor Description	Receptor Type	Direction from Site	Distance to Building	Frequency downwind of site
1	Tower Road off Portway Hill	Residential properties	NNE	360 m	6.3 %
2	Dudley Golf Club House	Recreational facility	NNW	125 m	22.1 %
3	Portway Hill	Residential and Commercial Properties	NE	10 m	7.4 %
4	Old Portway House and Barn	Listed building	NE	10 m	7.4 %
5	Portway Road	Residential and Commercial Properties	E to S	10 m	5.5 % to 2.1 %
6	Warren Hall Country Park	Local Nature Reserve	W	610 m	0.7 %
7	Bumble Hole	Local Nature Reserve	W	990m	0.7 %
8	Rowley Hills	Local Wildlife Site	NE	225 m	7.4 %
9	Dudley Golf Course	Recreational	W to NW	40 m	0.7 % to 8.6 %

[2] Rowley Regis Wind Forecast, West Midlands B65 9 - WillyWeather

No.	Receptor Description	Receptor Type	Direction from Site	Distance to Building	Frequency downwind of site
10	Rowley Regis Golf Course	Recreational	SE to S	120 m	3.6 % to 2.1 %
11	Rowley Hall Primary School	School	SE	360 m	3.6 %
12	Grace Mary Primary School	School	NNE	420 m	6.3 %
13	Dudley Road	Residential and Commercial Properties	SW	440 m	4.2 %
14	Deciduous woodland, woodland & good quality semi-improved grassland (nonpriority)	Priority Habitats	NE, S & W	0-500m	4.2 % to 0.7 %

4.3 Receptor Types

4.3.1 Residential, recreational, industrial, commercial and educational premises

The potential noise emissions from the Site are likely to have a similar impact on persons occupying residential, recreational, industrial, commercial or educational premises. Exposure of emissions to persons at industrial or commercial premises may be lower as they are more likely to be inside during the working day or they may be transient visitors to the premises. Certain industrial premises may generate similar emissions similar to the STC.

The closest residential areas to the STC are properties on Portway Hill, Portway Road and Dudley Road. Two primary schools are also within the 500 m radius of the STC. It is likely that the combination of waste types and operational controls, physical barriers (building, treeline and fences), and distance to the receptor prevent most potential emissions from reaching receptors.

4.3.2 Highways and footpaths

The transitory nature of highways means receptors using those locations will be exposed to potential emissions from the Site for shorter (albeit variable) periods of time than residences or businesses. Pedestrians will have longer and more direct exposure to emissions compared to vehicle users. The highways and footpaths are close to the STC, and this places a more immediate need for the operational effectiveness of Site controls.

4.3.3 Habitats

The potential noise emissions from the Site are likely to have similar impacts on wildlife occupying Local Wildlife Sites (LWS), Local Nature Reserves (LNR) and Priority Habitats. Studies suggest that disturbances such as noise can have an impact on wildlife.

The closest habitats are the woodlands and grasslands to the north of the site and associated with LWS, Rowley Hills. The LNR, Warren Hall Country Park and Bumble Hole are over 500 m from the Site. It is likely that the combination of waste types and operational controls, physical barriers

(building, treeline and fences), and distance to the receptor prevent most potential emissions from reaching receptors.

5 Noise Risk Assessment

The risk potential to each receptor from noise and vibration generated at the is presented in Table 2 below. This table evaluates the nuisance to sensitive receptors from noise and vibration emissions and the control measures to be implemented at the STC in order to minimise this risk, producing a revised residual risk to receptors.

A NIA was undertaken by Noise and Vibration Consultants Ltd in September 2022 (Report ref: R22.0905/DRK) to specifically address the proposed activities as detailed in Section 2.1.2. The NIA was undertaken in accordance with BS4142:2014+A1:2019. A copy is provided at Appendix B.

The NIA stated that the results of noise predictions of the STF site determined by the construction of a noise model using the empirical noise measurements recorded on site has shown the following:

a) The predicted noise levels vary between 20dB to 44dB $LAeq_{1hr}$ at NSRs.

b) The noise prediction results show that the rating noise levels at the NSRs are shown to be between 4dB and 27dB below representative background sound levels and therefore a **low impact** would occur in accordance with BS4142:2014+A1:2019.

c) The predicted noise levels are between 11dB and 32dB below the residual LAeq levels at NSRs.

Table 2 – Noise and Vibration Risk Assessment and Management Plan

Hazard / Pathway	Receptor				Probability of exposure	Unmitigated Consequence	Initial Risk / Reason	Risk Management	Mitigated Risk
	No.	Dist.	Direc.	Freq.					
Noise through air and Vibration through ground from: Vehicle movements associated with the delivering and handling of waste onsite. Site plant.	1	360 m	NNE	6.3 %	Low – distant from site	High - noise nuisance to residents	Medium – potential noise nuisance	Noise and Vibration Controls provided in Section 6.	Low
	2	125 m	NNW	22.1 %	High – close to site	Medium – some nuisance to users of golf course	Medium – potential noise nuisance		
	3	10 m	NE	7.4 %	High – close to site	High - noise nuisance to residents	High – potential noise nuisance		
	4	10 m	NE	7.4 %	High – close to site	High - noise nuisance to residents	High – potential noise nuisance		
	5	10 m	E to S	5.5 % to 2.1 %	High – close to site	High - noise nuisance to residents	High – potential noise nuisance		
	6	610 m	W	0.7 %	Low – distant from site	Medium – disturb local wildlife	Low – distance from site		
	7	990 m	W	0.7 %	Low – distant from site	Medium – disturb local wildlife	Low – distance from site		
	8	225 m	NE	7.4 %	Medium – proximity to site	Medium – disturb local wildlife	Medium – potential noise nuisance		
	9	40 m	W to NW	0.7 % to 8.6 %	High – close to site	Medium – some nuisance to users of golf course	Medium – potential noise nuisance		
	10	120 m	SE to S	3.6 % to 2.1 %	High – close to site	Medium – some nuisance to users of golf course	Medium – potential noise nuisance		
	11	360 m	SE	3.6 %	Low – distant from site	High - noise nuisance to students	Medium – potential noise nuisance		
	12	420 m	NNE	6.3 %	Low – distant from site	High - noise nuisance to students	Medium – potential noise nuisance		
	13	440 m	SW	4.2 %	Low – distant from site	High - noise nuisance to residents	Medium – potential noise nuisance		
	14	0-500 m	NE, S & W	4.2 % to 0.7 %	High – close to site	Medium – disturb local wildlife	Medium – potential noise nuisance		

6 Noise and Vibration Controls

6.1 Overview

The bioremediation and physical treatment of soils has been undertaken at the Site since 2016. The Site is located at an elevated level behind a belt of mature trees. Existing Planning Permission DC/21/66058 specifies noise limits, requires noise monitoring and stipulates operational hours. The NIA provides recommendations for further controls related to the proposed activities and these are provided below.

6.2 Controls

As part of the site development and operation, the following measures are in place to minimise noise and vibration from the Site:

- The new soil treatment area will be located on the existing footprint of the STC.
- All plant on Site consists of modern machinery fitted with efficient silencers / insulation designed to minimise noise levels that are generated during operations. Mobile plant would have noise emission levels that comply with limit levels as defined by the EC Directive 2000/14/EC and subsequent amendments.
- The mechanical screen to be used for pre-screening of soils containing asbestos will be undertaken within the Soil Treatment Building.
- All plant is properly serviced, maintained, and operated in accordance with the manufactures' instructions to ensure that the occurrence of malfunctions which can give rise to elevated noise levels is reduced and any malfunctions that do occur are swiftly repaired.
- The effectiveness of acoustic insulation and silencers fitted to plant will be qualitatively assessed and recorded as part of the Site Manager's Weekly Report. Any items of plant with defective insulation or silencers will be identified for immediate investigation and remediation.
- All reasonable steps will be taken to limit the amount of vehicle queuing or waiting to enter / exit the Site, this will be achieved through the management of the weighbridge at Site.
- Internal haul roads are, where possible, routed to allow maximum acoustic screening and separation distances to noise sensitive receptors. Haul roads are kept clean and maintained in a good state of repair and subject to a 10 mph speed limit so as to avoid unwanted noise and vibration from vehicles.
- Local communities to be kept informed of general site activities, including working hours via the Edwin Richards Quarry Liaison Committee.

- Any pumps used onsite will be powered by electricity wherever practicable, and all pumps and generators will be placed at locations to minimise noise emissions to sensitive receptors.
- With the exception of acoustically enclosed generators, pumps and electric plant, all static plant should be shut down when not in use.
- Appointment of a site contact to whom complaints or queries about operational activities can be directed. Any complaints to be investigated and action taken where appropriate (see Section 7.3).
- Where possible, use equipment with lowest sound power level and without any dominant tonal or impulsive characteristics available for the required purpose.
- If necessary and practicable, emissions from sources of significant noise can be controlled using acoustic enclosures.
- All mobile plant fitted with non-tonal reversing alarms when operating on site (i.e. broadband, SMART or `white noise' type reversing alarms).
- The site boundary retaining wall and embankment to be retained that exists around the Biotreatment area.
- Wherever practicable maintain the one-way system for dump trucks to move around the Site and minimise reversing for HGVs offloading soils in the Biotreatment area.
- The southern boundary and the southeast and southwest boundary of the proposed soil treatment area would be fitted with an acoustic screen. The screen height would be 5m in height and the location shown in Figure 3. The screen can be formed from a solid material having a minimum mass of 15kg/m2 (e.g. concrete, brickwork, close-boarded fencing etc.)

Additional controls are in place for vehicles. Vehicles arriving or exiting the Site or drivers of mobile should consider the following general management procedures based on guidance within the 'quiet deliveries demonstration scheme':

- Consideration to noise and the neighbours is shown as you approach the site and manoeuvring in the facility.
- The vehicle horn is not to be used to alert the site on your arrival/waiting at the entrance to the Site.
- Wherever practicable avoid reversing of vehicles.
- Engines are switched off when not manoeuvring.
- Radios are switched off and doors not slammed when alighting the cab.
- Load retaining straps/bars/chains are carefully restrained or placed in stowage points and not allowed to drop onto the floor.

- Minimise excessive air braking noise.
- Switch off engines for prolonged stops but minimize unnecessary start-ups and engine revving. Start-up plant and vehicles sequentially rather than simultaneously.
- Minimise drop height of materials.
- Always unload in the designated delivery area, unless instructed by the site management to do otherwise.
- Report any circumstances to management where adherence to these instructions cannot be fulfilled.
- Where front loaders are being used to move waste, driver's instructed to avoid unnecessary scraping, `rattling' or `banging' of loading bucket to minimise impact noise.

7 Community Engagement, Reporting and Contingencies

7.1 Overview

Prevention will be viewed as the most effective means of controlling noise and vibration before an impact occurs. The Source → Pathway → Receptor model determined above allows for the identification of the critical control points where noise and vibration can arise, how it can travel to a receptor and the likely impact.

The performance of a Noise and Vibration Management Plan will ultimately be judged by the impact of the site on the receptors. Should complaints be received, a procedure will be in place to effectively deal with the issue in a sensitive, efficient and auditable manner.

The controls are detailed in previous sections of this report. The management of those controls will be based on the on-going monitoring regime on Site. The monitoring regime can work as an early warning system against potential problems (e.g. meteorological monitoring) or a diagnostic tool to establish the cause of a noise or vibration event (e.g. perimeter monitoring).

7.2 Noise Monitoring

This section provides the procedures, instrumentation and specification for undertaking noise monitoring where required.

Noise monitoring may be undertaken where the following occur:

- Complaints are received with no substantiated on-site activities to account for noise and vibration emission i.e. faulty plant for example
- Emissions limits in the NIA are exceeded
- Introduction of new plant or activities that could create more emissions
- New receptors around the Site are developed therefore changing the site setting.

7.2.1 Noise Monitoring Instrumentation

Ambient noise levels would be monitored using an integrating-averaging sound level meter (SLM) or equivalent system of BS EN 61672-1 & 2 (or the equivalent UK adopted standard in force at the time of the monitoring). This would be set to monitor using the fast time weighted response as specified in BS EN 61672-1 & 2 (or the equivalent UK adopted standard in force at the time of the monitoring).

The SLM would be field calibrated before and at the end of each survey by applying the acoustic calibrator or pistonphone conforming to Type 1 of the current versions of BS EN 60942 (Electroacoustics – Sound Calibrators) or any subsequent update, to the microphone to check the

sensitivity of the measuring equipment. Any drift in calibration levels would be noted and survey repeated where necessary in the event that the drift was outside of acceptable tolerances.

The equipment used for the noise monitoring should also have undergone more extensive independent laboratory test of performance within 2 year period as specified in BS EN 61672 (Electroacoustics. Sound level meters - Pattern evaluation tests) or any subsequent update, although 1 ear is advisable for acoustic calibrators.

Monitoring of meteorological parameters (including wind speed and direction) should be made by the use of a handheld anemometer or a site based meteorological station if available.

7.2.2 Noise Survey Specification

Noise monitoring during site operations would be the responsibility of the Site Manager or their appointed representatives. If noise monitoring would only be undertaken by suitably experienced or qualified personnel.

Noise monitoring would be undertaken during the normal working day. Periods would be chosen to avoid meal breaks and times when plant and equipment on site is not operating.

The microphone heigh would be between 1.2 m and 1.5 m above ground level. To minimise the influence of reflections the microphone position would be at least 3.5 m from any reflecting surface other than the ground. In the event of monitoring having to be made within 3.5 m of reflecting facades, a correction of 3 dB would be made to all results to convert them to free-field levels.

To minimise the influence of extraneous sources of physical interference on monitored noise levels, the following would be adopted:

- Providing a suitable foam windshield is fitted to the microphone, monitoring would only be undertaken when wind speeds were below $5ms^{-1}$;
- No monitoring would be undertaken during periods of heavy precipitation; and
- No monitoring would be undertaken immediately adjacent to sources of electrical interference such as overhead power cables or radio transmitters.

At each monitoring location, noise levels would be measured in sample periods of not less than 15 minutes during the daytime. Sufficient sample periods would be accumulated to determine the site attributable L_{Aeq}, other additional noise parameters would also be simultaneously measured in order to more accurately define the acoustic environment. These would include L_{A90}, $L_{A10, T}$ and L_{AFmax}.

Wherever possible noise monitoring would be made during calm conditions (average wind speeds of less than 5 m/s) or at location with a positive wind component from the site operations. However, due to the variability of the British climate, the latter may not always be possible and such occasions should make a note of the uncertainty introduced by weather conditions on monitored sound levels and repeated where necessary.

Notwithstanding the above, as part of the monitoring schedule, a note of the prevailing weather conditions during the monitoring period would be made. This would include details such as wind speed, wind direction, estimate of cloud cover, presence of precipitation or fog and details of any other factors such as conditions likely to lead to a temperature inversion. These observations would be corroborated by data from the onsite meteorological station if available.

A note of the type of instrumentation used for the surveys would be made including manufactures model and serial number and any calibration details.

Observations would be made regarding the audibility of the site and the items of plant operating at the time of the surveys. A detailed log of any extraneous events affecting noise levels would also be made. Any use of the 'pause' feature on the SLM to limit the influence of extraneous noise events on the monitoring results would be recorded.

7.2.3 Frequency of Monitoring

As a minimum, noise monitoring would be undertaken for the following activities:

- Construction Operations;
- Normal Operations every month;
- In response to any complaint, if the complaint has not been fully resolved by the initial visit by staff.

The frequency and / or duration of monitoring may be amended once sufficient data has been gathered to indicate that operations comply with the relevant noise limit criteria. This would be agreed in writing with the Local Planning Authority.

7.2.4 Noise Limit Criteria

The Noise Limit Criteria for occupational exposure monitoring in close proximity to working plant id 85 dBA.

7.2.5 Noise Limit Criteria Exceedance Reaction Process

In the unlikely event that unacceptable noise emissions arise from the Site, as indicated by a noise complaint or by noise monitoring, one or more of the following remedial actions will be undertaken:

- An investigation will be undertaken to identify the operations and/or plant that is causing the unacceptable noise emission;
- Operations identified as generating unacceptable noise will be reduced or suspended until effective remedial actions have been taken to limit the noise emissions from the site;

- Additional noise monitoring will be undertaken to determine whether the noise levels are exceeding the noise limit criteria;
- On Site vehicle movement routes may be reconsidered with regard to location (i.e. relocating further from the receptor at risk), speed limits may be further reduced,
- Additional inspection of vehicles may be undertaken to ensure that all vehicular noise and vibration controls are being applied;
- Waste handling procedures may be altered to further limit placement to specific hours of operation; and
- Provision of temporary acoustic barriers to be erected at the Site if noise cannot be further limited.

A record of all complaints and / or exceedances will be kept by WRG, and it shall include a record of the investigation and the remedial measures taken. All communication will also be kept as a record.

7.3 Complaint Process

Any complaints received at the STC or via the Regulatory bodies including the Environment Agency and Local Authority, will be recorded using the Compliant Report Form contained in the Site Management System. This will instigate further monitoring at the location of the complaint and on site to determine the extent of the noise and / vibration and whether any of the actions outlined in Section 7.2 should be employed. Where possible, as much information and detail about the complaint will be recorded, whether this is from the relevant authority or complaint direct to site. This information will assist in the investigation and determining the source of the noise and / or vibration e.g. differentiating between potential off-site sources.

All complaints and queries will be logged in accordance with the management system as soon as is practicably possible. All complaints logged will be subject to investigation and complainants responded to within 48 hours of receipt, where possible.

In the event that a substantiated noise complaint is received arising from the site, additional monitoring will be undertaken at the nearest sensitive receptors to determine any off-site noise emissions.

Complaints regarding noise and / or vibration from the Site will be investigated in accordance with the protocol, and appropriate records maintained which may include:

- Complaints received including name and contact details of complainant (if known), and complainants description of the noise and / or vibration;
- Nature of problem including date, time, duration, prevailing weather conditions and cause of the problem;
- Onsite activities and operational condition at the time of the complaint;

- Records of the likely source of the emission even if it is clearly not from the Site;
- Details on the corrective action taken, and any subsequent changes to monitoring and operational procedures;

The Environment Agency will be informed by WRG of the complaint and WRG will confirm to the best of its knowledge the information described above.

WRG will ensure that the complainant has all the relevant contact details of the site (i.e. the Site Manager) and the officer responsible at the Environment Agency. WRG will be in regular contact with the complainant and the Environment Agency whilst the cause of the emission is being investigated and remediated.

An evaluation of the effectiveness of the techniques used will be carried out on completion of any remedial measures or if the complaints persist. Records of the above will be retained by site for future reference.

7.4 Means of Contact

The Site will be readily contactable to outside organisations and to members of the public. The Site signage board (placed in a readily visible location) will contain the necessary contact details for both the Site operations and Environment Agency. The company website also contains the necessary contact details for each individual Site.

Any complaints received directly to Site will be notified to the Environment Agency. Should an off-site issue arise, therefore, the complainant has a readily available means of getting in touch with WRG.

7.5 Complaints Investigation

As part of each complaint received, these will be objectively assessed against the wider environment to ensure that the source of the emission is traced back to the correct source. As discussed earlier, it is essential that the source is correctly identified in order that mitigating measures can be applied effectively and correctly. The complaint will also be assessed against previous records to place the nature of the complaint into context.

7.6 Records and Review

A daily record relating to the management and monitoring of noise and / vibration will be maintained. It will include the following details:

- The results of inspections and noise monitoring carried out by installation personnel;
- Weather conditions including atmospheric pressure, wind speed and wind direction;

- Problems including date, time, duration, prevailing weather conditions and cause of the problem;
- Complaints received including address of complainant; and
- Details of the corrective action taken, and any subsequent changes to operational procedures.

The Noise and Vibration Management Plan will be reviewed on an annual basis with the scheduled review of the site management system or with every major increase, or alteration to the noise and / or vibration generated at site (i.e. a change to source term, pathways or receptors).

Appendix A – Drawings

A3

GENERAL NOTES

1. SURVEY INFORMATION SUPPLIED BY THE WASTE RECYCLING GROUP .
2. DO NOT SCALE
3. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM
4. ANY ANOMALIES ON THIS DRAWING ARE TO BE BROUGHT TO THE ATTENTION OF BYRNE LOOBY

KEY

- PERMIT BOUNDARY
- NEW BIOREMEDIATION AREA
- 85.0 / 86.0 EXISTING GROUND CONTOURS
- BUFFER ZONE
- 9 RECEPTOR MARKER

Rev	Date	Description	By	Chk	App
01	23/12	BOUNDARIES ADDED	GH	EG	CF

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CLIENT
waste recycling GROUP

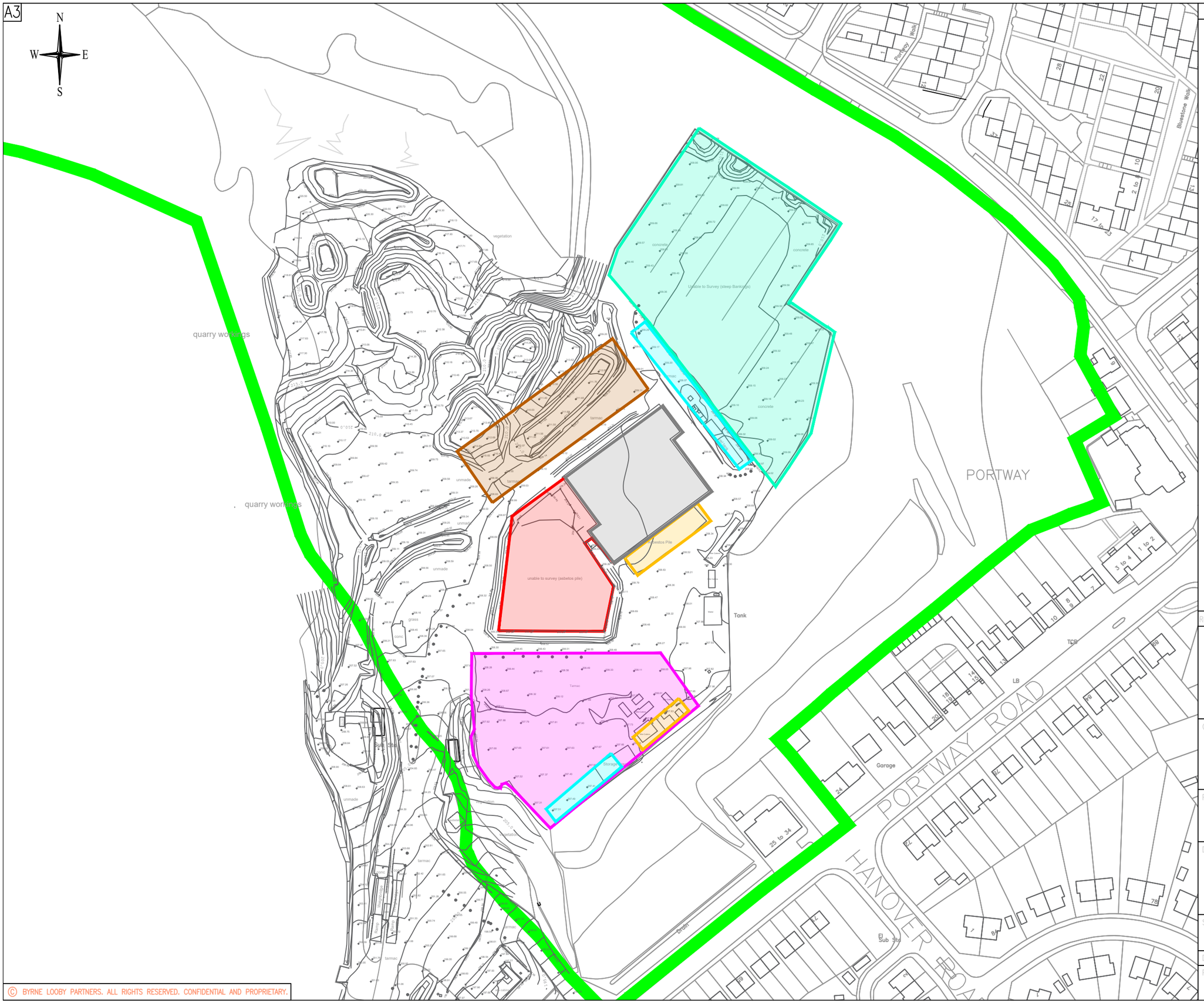
PROJECT
EDWIN RICHARDS QUARRY
SOIL TREATMENT CENTRE

DRAWING TITLE
SENSITIVE RECEPTOR PLAN

STATUS
FINAL

Date: 21.12.22	Scale: N/A	Drawn: JM	Chk: JW	App: JW
Project No: K0182	Drg. No: K0182.1.001			Rev: 01

A3



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KEY

- PERMIT BOUNDARY
- NON–HAZARDOUS SOIL STORAGE AND SCREENING AREA
- BIOLOGICAL TREATMENT AREA
- BIOFILTERS
- HAZARDOUS SOILS STORAGE AREA
- BIOLOGICAL TREATMENT AREA/SOIL WASHING AREA
- WATER TREATMENT PLANTS
- SOIL TREATMENT BUILDING

Rev	Date	Description	By	Chk	App

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CLIENT

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PROJECT

EDWIN RICHARDS QUARRY
SOIL TREATMENT CENTRE

DRAWING TITLE

SITE LAYOUT PLAN

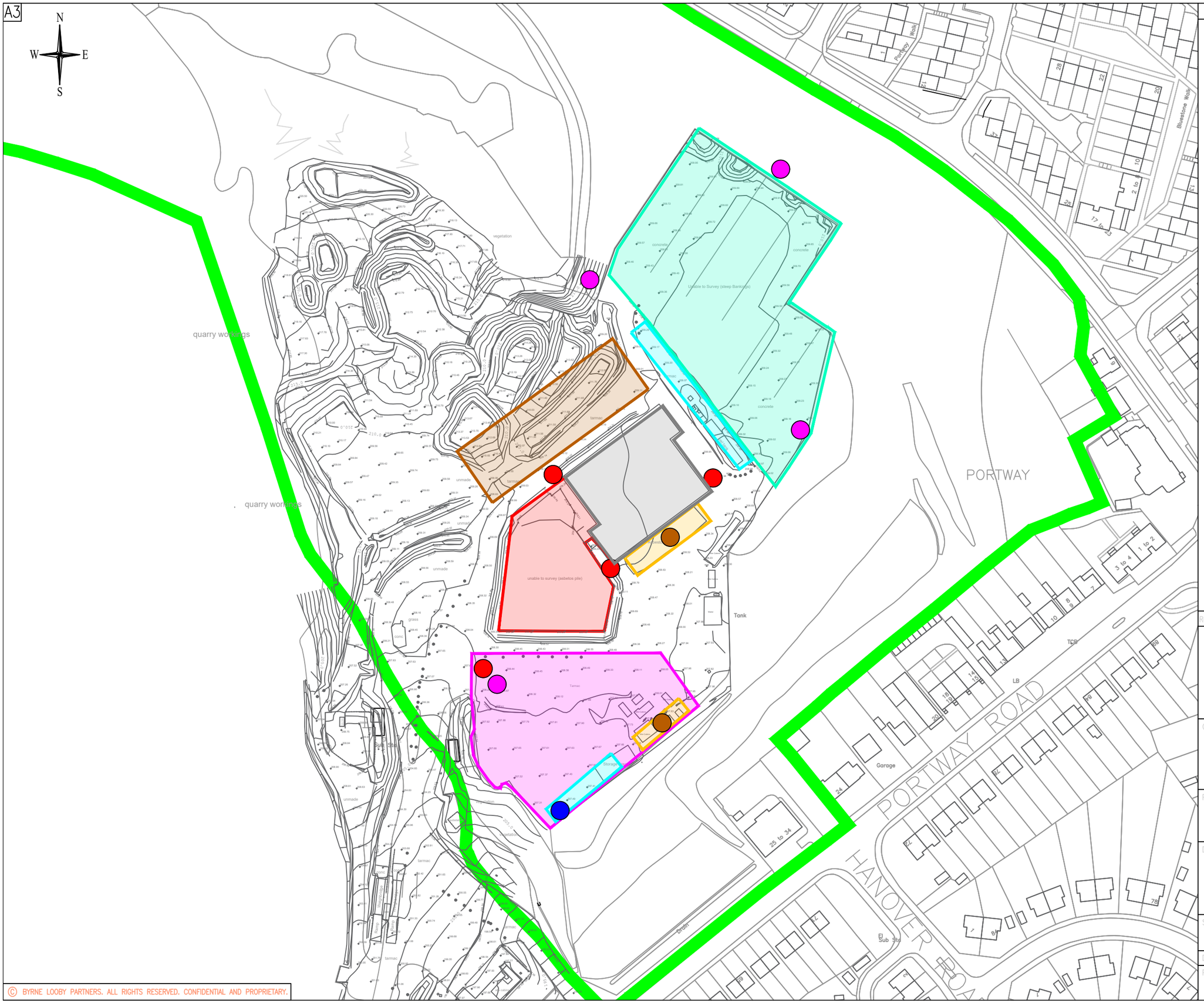
STATUS

FINAL

Date: 20.06.23	Scale: 1:1500	Drawn: JM	Chk: JW	App: JW

Project No:	Drg. No:	Rev:
K0182	K0182.2.002	01

A3



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- BIOFILTERS
- HAZARDOUS SOILS STORAGE AREA
- BIOLOGICAL TREATMENT AREA/SOIL WASHING AREA
- WATER TREATMENT PLANTS
- SOIL TREATMENT BUILDING
- AIR SAMPLING: ASBESTOS/PM10
- AIR SAMPLING: TPH/BTEX/PAH'S
- AIR SAMPLING: DUST/NOISE/ODOUR
- WATER SAMPLING: SEVERN TRENT

Rev	Date	Description	By	Chk	App

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PROJECT

EDWIN RICHARDS QUARRY
SOIL TREATMENT CENTRE

DRAWING TITLE

EMMISIONS MONITORING PLAN

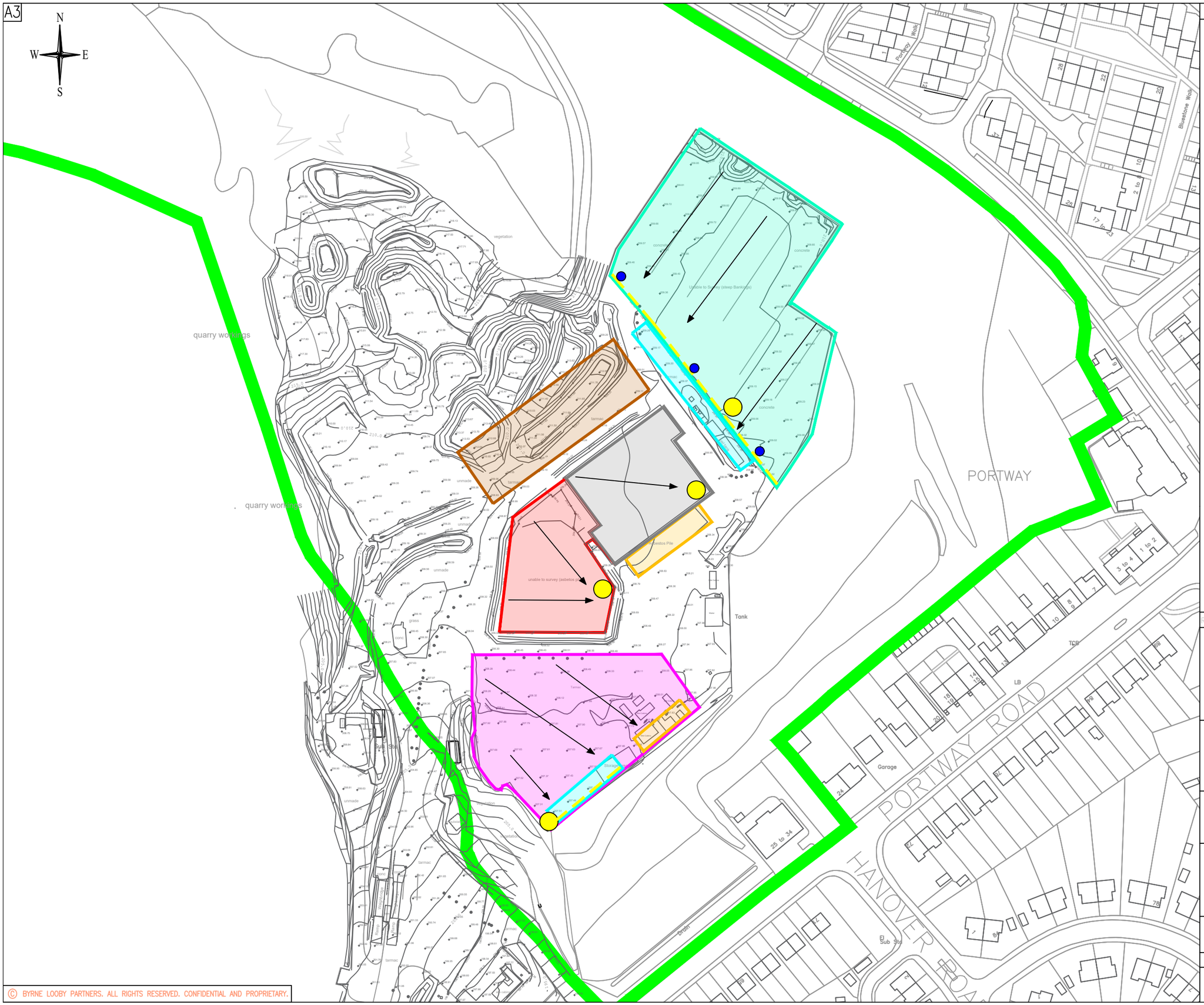
STATUS

FINAL

Date: 20.06.23	Scale: 1:1500	Drawn: JM	Chk: JW	App: JW

Project No:	Drg. No:	Rev:
K0182	K0182.2.003	01

A3



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- HAZARDOUS SOILS STORAGE AREA
- BIOLOGICAL TREATMENT AREA/SOIL WASHING AREA
- WATER TREATMENT PLANTS
- SOIL TREATMENT BUILDING
- PUMPING CHAMBERS
- DRAINAGE GULLY
- DRAINAGE DIRECTION
- SURFACE WATER DRAINAGE PIPE

Rev	Date	Description	By	Chk	App

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CLIENT

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PROJECT

EDWIN RICHARDS QUARRY
SOIL TREATMENT CENTRE

DRAWING TITLE

DRAINAGE PLAN

STATUS

FINAL

Date: 20.06.23	Scale: 1:1500	Drawn: JM	Chk: JW	App: JW

Project No:	Drg. No:	Rev:
K0182	K0182.2.004	01

Appendix B – Noise Impact Assessment

NVC
Noise &
Vibration
Consultants Ltd.

56a Leabrooks Road
Somercotes
Derbyshire
DE55 4HB
Tel No: 01773 607483
Fax No: 01773 603331
E-mail: drk.nvc@btopenworld.com
Web site: www.noiseandvibration.co.uk

Noise Assessment
Compliance with Planning Condition 5a
For
Soil Treatment Facility (STF)

At
Edwin Richards Quarry
Portway Road
Rowley Regis

Prepared on behalf of
Provectus Remediation Ltd

Undertaken by:
Consultant: D.R. Kettlewell MSc MIOA MAE I.Eng

Report No.: R22.0905/DRK
Date: 29th September 2022

Noise & Vibration Consultants Ltd

Member of Institute of Acoustic
Member of Association of Noise Consultant
Member of Academy of Experts

Report prepared by:
D R Kettlewell MSc MIOA MAE I.Eng – Principal Consultant:

Date: 29th September 2022

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1.0 INTRODUCTION

1.1 At the request of Byrne Looby acting on behalf of Provectus Soil Treatment Ltd, Noise & Vibration Consultants Limited ("NVC") was commissioned to carry out a BS4142 noise assessment for the Soil Treatment Facility ("STF") Site at Edwin Richards Quarry. This is being provided to comply with planning condition 5a of the Planning Permission and for an environmental permit variation application for the new treatment pad. The assessment survey was undertaken with the STF Site operating under normal operating conditions, which is located at the Edwin Richards Quarry at Portway Road, Rowley Regis.

1.2 The site has planning consent and Environmental Permit ("EP") to operate the STF. The planning condition 5a (ref. Planning Permission DC/21/66058 dated 17th September 2021. The condition states:

"*5a) Before the development is brought into use a noise assessment shall be carried out in accordance with BS4141: 2014+A1:2019 to identify and quantify the noise impacts associated with the soil treatment plant. The assessment shall identify appropriate mitigation measures to limit noise to nearby residents and may include an acoustic barrier and enclosures for external plant and equipment. The assessment shall be submitted to and approved in writing by the local planning authority."*

1.3 Subsequent to the planning permission, the soil treatment facility has been constructed, commissioned and is now operational. The soil washing plant would be utilised on a temporary basis and treatment of stockpiled soils would occur typically for approximately 6-8 weeks for each batch of soil, which is likely to occur once a year. The washing plant would only be brought onto site when the temporary activity is required.

1.4 This survey provides information on typical site operational noise from the permanent STF activity at near field and far field positions relative to nearest sensitive receptors (NSRs) and compares the results with background sound measurements recorded during plant break periods. Where noise contribution levels at NSRs cannot be determined due to residual sound levels, the near field data will be used to produce a noise model of activity at Site and predict noise contribution levels at the NSRs in accordance with BS4142:2014+A1:2019 (section 7.3.5 to 7.3.6).

Sources of Information

1.5 Information used in this assessment has been obtained from the following sources:

- Ordnance Survey maps of the local area;
- information relating to the general layout of the site was provided by Provectus Remediaton Ltd;
- Environmental Statement, Chapter 11 `Noise and Vibration' May 2014;
- Planning Consent Conditions (Ref: Application (DC/14/57744, dated 3 August 2016;
- British Standard BS4142: 2014+A1:2019,`Method for rating and assessing industrial and commercial sound'';
- ISO 9613-2:1996 `Acoustics – Attenuation of sound during propagation outdoors - Part 2 General method of calculation; and

- Amee Foster Wheeler Environment & Infrastructure UK Ltd Noise Management Plan: October 2016 (report 33012rr726i1).

Assessment Aim

1.6 The aim of the survey and assessment was to provide information on site operational noise levels at the nearest receptors to the site during normal operating conditions to provide a comparison of site attributable noise against background sound levels in accordance with BS4142:2014+A1:2019.

1.7 Appendix 1 provides details of technical terms within the chapter, for ease of reference. There is also a chart showing typical everyday noise levels to assist in understanding the subjective level of noise in terms of decibels.

2.0 SITE DESCRIPTION

Site Location

2.1 Edwin Richards Quarry Soil Treatment Facility is located to the east / northeast of Edwin Richards Quarry Landfill Site.

2.2 The wider Edwin Richards Quarry Site is situated in a predominantly residential area of Rowley Regis to the northwest of the town centre. The site is bordered to the north by Portway Hill/Oakham Road and the local landmark of Turner's Hill, which at 271 m AOD, this being the highest peak in the West Midlands.

2.3 To the east and south is predominately residential properties and commercial premises on Portway Hill and Portway Road with the industrial premises of Droicon Trading Estate off Portway Hill to the southwest. Directly to the west is the Edwin Richards Quarry Landfill and a municipal golf course to the northwest.

Site Plant & Associated Buildings

2.4 The Plant and Buildings associated with the operation of STF facility relative to the EP site boundary include the following:

- Soil Treatment Building including the soil screening plant & excavator
- Biotreatment Area
- External Excavator at Biotreatment Area
- Dump Trucks (Volvo A30G) x 2
- HGVs
- Biofilter System
- Soil Washing Plant (occasional use on-site during soil batch processing)
- Storage Pad Pumping Chamber
- Storage Pad Treatment Plant

Noise Monitoring Locations

2.5 The noise monitoring positions are deemed to be representative of noise levels at the receptor locations (i.e. adjacent to receptors or at positions which were equidistant to nearest road traffic noise sources etc.). These positions were chosen as being suitable in the 2016 Noise Management Plan provided by Amee Foster Wheeler Environment & Infrastructure UK Ltd Noise Management Plan ("NMP") (report 33012rr726i1).

2.6 Baseline noise levels were monitored at the following fixed locations (shown on Figure 1):

M1. Southeast of the STF site on intervening land between the site and the nearest property off Portway Road (i.e. approximate proxy position as defined in the NMP).

M2. Northeast of the STF site on land opposite the nearest property off Portway Hill (i.e. approximate proxy position as defined in the NMP).

M3. West of the Landfill Site on land to the east of the nearest property off Hailstone Close (i.e. approximate proxy position as defined in the NMP).

Operating Hours

2.7 As per Condition 3 of the extant planning consent (DC/14/57744, dated 3 August 2016) there will be no deliveries to site outside the hours of 06:30 - 17:30 hrs, Monday–Friday.

2.8 As per Condition 5 of the extant planning consent (DC/14/57744, dated 3 August 2016) no operations associated with the soil treatment facility shall take place outside the hours of 06:00-20:00 hrs, Monday-Saturdays.

2.9 The STF plant is typically and currently operating between 0730 to 1630 hours and deliveries of soil between 0800 to 1600 hours.

3.0 NOISE SURVEY DETAILS

3.1 Noise Monitoring

3.1.1 Fixed noise monitoring at positions M1 to M3 was undertaken on Tuesday 2nd August 2022 between 0815 to 1600 hours.

3.1.2 Spot roaming position noise monitoring on site of soil treatment activities was undertaken on Tuesday 2nd August 2022 as detailed below in Table 3.1 and Appendix 2. The STF was operating normally and at normal capacity during the survey.

3.1.3 Refer to Figure 1 attached for the fixed noise monitoring locations.

3.2 Noise Monitoring Equipment and Survey Positions

3.2.1 Noise monitoring was undertaken based on the following methodology:

(i) Fixed noise monitoring at 3 positions (M1 to M3) at proxy positions at locations identified in the NMP for the purpose of establishing baseline sound levels during site operations and during `break-times' when all site plant was switched off. These positions are deemed to be representative of noise levels at the most sensitive receptors to the Site (i.e. Portway Road & Portway Hill).

(ii) Spot roaming noise measurements at near and far field locations relative to the site operational areas of the Site were carried out to enable typical noise `break-out' and operational noise levels to be determined. This included broadband and one-third octave band frequency spectra noise levels for analysis. Monitoring was undertaken at circa 1.5m and 5m above ground by a hand-held noise meter or meter mounted on a tripod.

(iii) Subjective observations of noise levels at the nearest sensitive receptors to determine the existence of any distinguishable noise character from site.

3.2.2 Noise measurements were undertaken with Type 1 integrating sound level meters and within acceptable calibration limits. According to BS4142: 2014+A1:2019 the calibration of instruments should be:

Section 5.2: "NOTE 1 It is recommended that sound calibrators are calibrated at intervals not exceeding 1 year, conformity of the measuring systems with BS EN 61672-1 is verified at intervals not exceeding 2 years, and the conformity of filters with BS EN 61260 is verified at intervals not exceeding 2 years."

3.2.3 An effective windshield was used to minimise turbulence at the microphone. Monitoring at fixed noise monitoring positions was undertaken at a height of 1.5m above ground level and at least 3.5 metres from the nearest reflecting surface.

3.2.4 An acoustic calibrator was applied to the microphone before and after measurements to check the sensitivity of the measuring equipment. Calibration certificates for the noise meters and calibrator are available on request.

3.2.5 Monitoring of site noise was recorded during the daytime operating periods in terms of LAeq, LA10, LA90 and LAmax measurement indices. The noise monitoring exercise was carried out during appropriate weather conditions as defined by BS4142: 2014+A1:2019 (sections 6.3 and 6.4 of the Standard). A Davis weather station was utilised to determine weather conditions on site.

3.2.6 The following set-up parameters were used on the sound level meters during noise measurement:

Time Weighting: Fast
Frequency Weighting: `A'
Measurement Period: Fixed monitoring 15 minutes and spot roaming measurements typically over 1-minute periods

3.3 Meteorological Conditions

3.3.1 Weather conditions were recorded during the period of the survey and are detailed below:

Tuesday 19th December 2018

3.3.2 During the daytime it remained dry, variable cloud cover with light north-north-east winds (2-3m/s) and temperature ranging between 20deg to 23deg C.

3.3.3 The above climatic conditions were suitable for monitoring environmental noise levels in accordance with advice provided in BS4142:2014+A1:2019.

3.3.4 Mr D. R. Kettlewell of Noise & Vibration Consultants Ltd set up the noise monitoring equipment and undertook measurements at near field and far field positions on site.

3.4 Site Operations

3.4.1 The site was generally operating normally during the daytime monitoring period and all plant was working generally under typical conditions.

3.4.2 Between the hours of 1000-1030 hours and 1300-1330 hours the site was on break-time and therefore all plant was shut-down and background sound levels recorded at M1 to M3.

3.5 Instrumentation

3.5.1 Noise meters used for the survey are detailed below.

Manufacturer	*Description*	*Type*	*Calibration Due Date*	*Serial No.*
Cirrus	Real Time Sound Analyser	1710	April 2023	G066350
Cirrus	Real Time Sound Analyser	171A	June 2023	G061253
Norsonic	Real Time Sound Analyser	140	February 2023	1405418
Cirrus	Real Time Sound Analyser	171B	April 2023	G056142
Cirrus	Electronic Calibrator	CR: 513A	April 2023	031523

4.0 NOISE ASSESSMENT METHODOLOGY & RESULTS

4.1 Noise Assessment Methodology

Baseline Sound Levels

4.1.1 The results of noise measurements recorded for the purpose of establishing typical ambient and background sound levels at nearest sensitive receptor positions have been determined from proxy positions during break periods when the STF plant was shut-down. Further detail of the baseline results and graphs are presented below and in Appendix 2.

Table 4.1: Baseline Results During Daytime Operation Break Periods

Position	Time	LAeq dB	LA90 dB	Observations
M1: Southeast	1000-1030 & 1300-1330	**51**	**48**	Road traffic noise
M2: Northeast	1000-1030 & 1300-1330	**59**	**48**	Road traffic noise
M3: West	1000-1030 & 1300-1330	**52**	**47**	Distant road traffic noise

4.1.2 The background sound levels for the assessment have been established as 48dB LA90 at the sensitive receptor locations (M1 and M2) for properties off Portway Hill and Portway Road. The reported background levels for the ES provided in 2014 at Portway Hill between 0700-1900 hours were 48dB LA90 and for Portway Hill (i.e. Table 11.2 of the ES) a level of 49dB LA90. This is comparable to those recently measured at similar locations.

4.1.3 Due to the influence of residual noise (i.e. non-site noise levels in terms of LAeq) the determination of site attributable noise would be difficult to determine by way of logarithmic subtraction from operational noise measurements at NSRs. We have therefore used the near field noise measurements to create a noise model that reflects the results of the survey to determine the likely noise contribution from site. Refer to Appendix 4 for details of the noise mapping results.

4.1.4 In terms of assessing the impact of the Site `rating level' in relation to BS4142: 2014+A1:2019 (which is the relevant standard) we have used frequency analysis and site subjective observations to determine whether any noise character is appropriate (i.e. any significant tonal or impulse noise or noise that would attract attention). According to the 2019 standard penalty to the site attributable noise level would be applied where the acoustic feature is deemed to be appropriate. Table 4.2 provides the corrections for perceptible noise character.

Table 4.2: BS4142:2014+A1:2019 Character Corrections

Level of Perceptibility	Correction for Tonal Character dB	Correction for Impulsivity dB	Correction for Intermittency dB	Correction for other character dB
Not Perceptible	0	0	0	0
Just perceptible	+2	+3	0	0
Clearly perceptible	+4	+6	+3*	+3*
Highly perceptible	+6	+9	+3*	+3*

*Standard defines this should be readily distinctive against the residual acoustic environment, it is interpreted therefore to be either clearly or highly perceptible as a character. If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others, then it might be appropriate to apply a reduced or even zero correction for the minor characteristics.

4.2 Results

Subjective Observations

M1 Monitoring Position (south easterly direction - Refer to Figure 1)
Rear of Houses off Portway Road

4.2.1 This receptor is the one of the closest to the STF site in a south easterly direction off Portway Road with a relatively high earth embankment between the receptors and the Site. General ambient noise was associated with local and distant road traffic and occasional noise from commercial premises.

4.2.2 Noise from the STF was not perceptible above the general ambient noise at the proxy monitoring position during the daytime apart from occasional low-level noise from mobile plant movement. Observations at slightly closer positions to the receptors further down the embankment indicated no perceptible noise character due to masking from local non-site noise sources (i.e. regular road traffic movements). The application of noise character from a subjective perspective was therefore not deemed to be appropriate based on normal and typical site operations.

M2 Monitoring Position (north easterly direction – Refer to Figure 1)
15m south of Portway Hill (similar distance from main road as receptors)

4.2.3 This receptor is also one of the closest to the STF site boundary with a large earth embankment leading up to the site boundary wall of the Biotreatment area.

4.2.4 General ambient noise at this monitoring position is associated with regular local noise from traffic movements along Portway Hill. Noise from the STF was not audible at this location due to masking from local traffic and the screening effect from the embankment.

4.2.5 There was no perceptible or distinctive noise character from Site in proximity to this receptor and therefore no noise character penalty required.

M3 Monitoring Position (westerly direction – Refer to Figure 1)
40m East of Nearest Dwellings off Hailstone Close

4.2.6 The nearest receptors west of the landfill site are located off Hailstone Close. Noise at this location was dominated by distant road traffic noise.

4.2.7 Due to the separation distance, topography and dominance of distant road traffic, noise from the STF facility was not audible and no perceptible noise character was observed.

Objective Results

Comparison of Noise Levels with and without the Site in Operation

4.2.8 In order to provide some comparison of noise levels at monitoring positions M1 to M3, we have provided Table 4.3 which shows the average LAeq, LA90 and LAmax levels during site operation and site `break' times when plant was not in operation.

Table 4.3: Noise Levels at Positions M1 to M3 with and without the STF Site

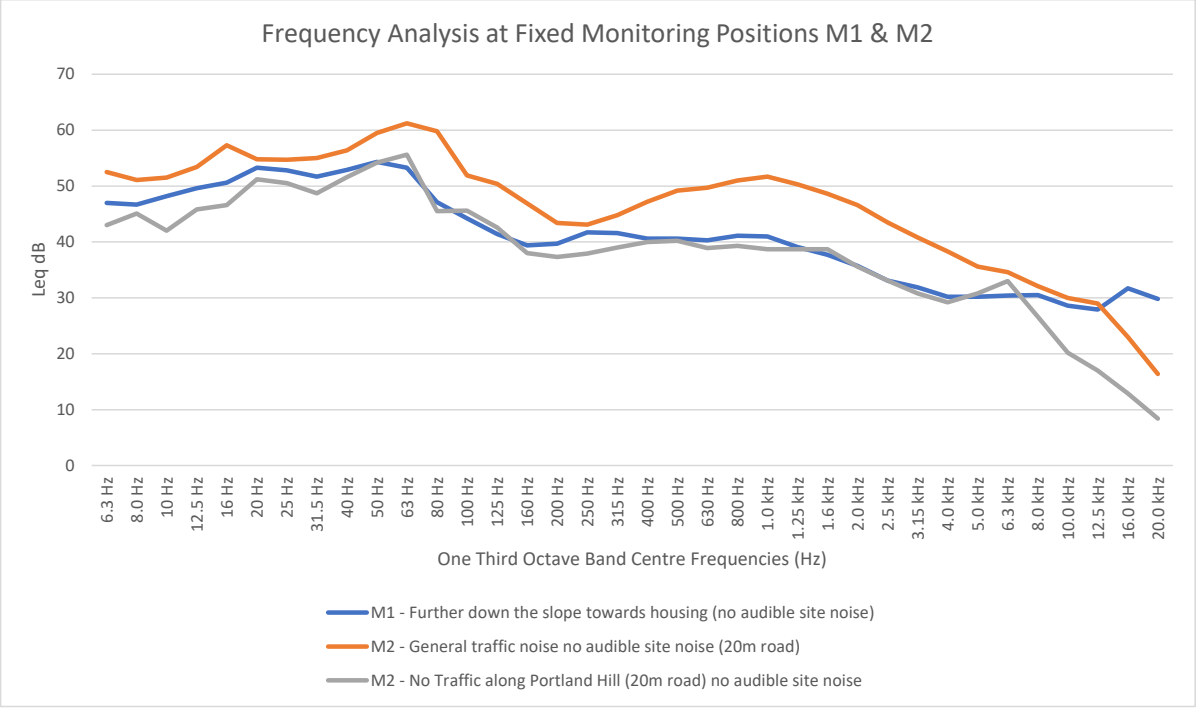
Location (Refer to Figure 1)	Grid Reference X Y	Time Period	LAeq dB	LA90 dB	LAmax dB	Level Difference LAeq dB
M1. Southeast	397149 288389	0815-1600	51.4	47.6	56-79	-
M1. Southeast	397149 288389	1000-1030 & 1300-1330	51.1	47.6	64-69	-0.3
M2. Northeast	397209 288578	0845-1600	59.7	48.0	68-84	-
M2. Northeast	397209 288578	1000-1030 & 1300-1330	59.3	48.0	68-74	-0.4
M3. West	396372 288346	0945-1600	52.2	46.6	54-70	-
M3. West	396372 288346	1000-1030 & 1300-1330	51.8	47.1	53-65	-0.4

4.2.9 The above table shows that noise levels have not increased as a result of the site STF operations. This supports the subjective observations of noise at these positions that site noise was not generally audible.

Frequency Analysis at Fixed Monitoring Positions

4.2.10 The results of one-third octave band centre frequency analysis of site noise at nearest sensitive receptors are presented below in Graph 4.1.

Graph 4.1: Frequency Analysis at Positions M1 & M2



4.2.11 The above graph shows no significant peak frequencies or tonal issues at the monitoring positions and the spectral shape is typical of road traffic noise due to vehicle engine noise at the 50Hz-63Hz third octave bands and at the mid frequency range between 800Hz to 1.25kHz due to vehicle tyre noise.

4.3 Near Field Monitoring Results

4.3.1 The results of on-site monitoring is provided below and in Appendix 2.

4.3.2 Monitoring was undertaken around the STF site in proximity to fixed and mobile plant, processing building, biofilter blower and the results are shown in Table 4.4.

Table 4.4: Monitoring in near field – STF Plant

Position & Activity	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmax (dB)
10m Door Opening into Soil Treatment Building	67.8	69.6	66.1	74.3
HGV Pass-by at 10m	73.3	75.4	70.2	76.8
30m HGV Offload & HGV Movement	70.9	72.3	69.1	76.1
10m Door Opening into Soil Treatment Building	67.6	68.8	66.4	72.3
30m Excavator working on Soil Storage Mound	66.3	67.1	65.5	72.0
10m Dump Truck (Volvo A30G) movement	70.7	74.0	67.5	75.0
30m Dump Truck being loaded by Doosan DX225LG Excavator	67.2	70.6	64.3	79.1
30m Dump Truck being loaded by Doosan DX225LG Excavator	64.2	65.4	63.0	70.8
20m Dump Truck on haul road	64.2	66.2	60.7	67.0
10m Dump Truck (Volvo A30G) movement on haul road	69.0	70.8	65.2	73.9
Tipper HGV offloading at 30m	71.2	75.3	66.7	79.1
20m Excavator loading Dump Truck	68.7	69.6	67.0	82.7
1m Fan Blower mounted in acoustic enclosure	77.7	78.3	77.0	79.6
Doorway to Soil Treatment Building	81.4	82.3	80.3	88.3
Boundary Wall - 30m Doorway of STB , 50m Excavator loading DT	62.8	64.0	60.9	74.5
Boundary Wall - 50m Doorway of STB , opposite Excavator loading DT	61.3	64.1	56.7	74.9
Rear doorway to STB opening	68.1	68.7	67.3	69.3

4.3.3 Noise levels from the soil washing plant are as detailed below:

Table 4.5: Typical Noise Levels from Soil Washing Plant, Biofilter & Pumping Chamber

Plant	Measurement Position	Measured Noise Level LAeq dB
Soil Washing Plant	10m from side of plant	81
Soil Washing Plant	25m from end of plant	70
Biofilter in container	1m from container	70-77
Treatment Plant	1m from plant	64-65
Pumping Chamber	1m from chamber	70

4.4 Noise Prediction Model

4.4.1 For site operational noise we have used ISO9613-2 prediction modelling and CadnaA software for producing noise maps of the highest likely generated noise.

4.4.2 The noise model uses the empirical near field data and appropriate settings to give an accurate prediction of noise from site working under typical operational conditions. The Input settings for the noise model include:

Ground factor (G) = 0.5 (mixed ground absorption)
Temperature = 10degC
Relative humidity = 70%
Maximum order of reflection = 1
Receptor height = Assumed to be 1.5m above ground.

4.4.3 The results of the noise model output are provided in Appendix 4. The predicted noise contribution from Site is provided below in Table 4.6.

Table 4.6: Predicted noise contribution from STF Site including mobile plant and HGVs (excluding temporary Soil Washing)

Receptor Location	Background sound level LA90 dB [LAeq dB]	Predicted rating noise contribution $LAeq_{1hr}$ dB	Level Difference LAeq dB	Impact According to BS4142: 2014+A1:2019
R1: Southeast (Portway Road)	48 [51]	33-40	-15 to -8	**Low**
R2: Northeast (Portway Hill)	48 [59]	38-44	-10 to -4	**Low**
R3: West (Hailstone Close)	47 [52]	20-21	-27 to -26	**Low**

4.4.4 The above noise prediction results show that the rating noise levels at the nearest receptors are shown to be below background sound levels and therefore a **low impact** is predicted in accordance with BS4142:2014+A1:2019.

4.4.5 The Soil Washing Plant which would only operate for a few weeks per year when the soil storage mound has reached a sufficient level to be cleaned. We have assessed the noise from this temporary plant operation together with the Biofilter and Pumping Chamber and general STF plant to determine the cumulative effect with both processes in operation. Table 4.7 provides the results of the CadnaA noise modelling predictions (refer to Appendix 4 for noise mapping results).

Table 4.7: Predicted Noise from STF Plant & Soil Washing Plant Operations (with mitigation measures)

Receptor Position (Refer to Figure 1)	Background sound level LA90 dB [LAeq dB]	Predicted rating noise contribution $LAeq_{1hr}$ dB	Level Difference LAeq dB	Impact According to BS4142: 2014+A1:2019
R1: Southeast (Portway Road)	48 [51]	45-47	-3 to -1	**Low**
R2: Northeast (Portway Hill)	48 [59]	41-48	-7 to 0	**Low**
R3: West (Hailstone Close)	47 [52]	28-33	-19 to -14	**Low**

4.4.6 The above noise prediction results show that noise levels at the NSRs during the highest likely noise generation during the temporary use of the Soil Washing Plant show that the rating noise levels do not exceed the representative background sound levels and therefore a **low impact** is concluded in accordance with BS4142:2014+A1:2019.

4.4.7 Table 4.8 provides details of the BS4142 assessment based on the highest predicted impact at the NSRs.

Table 4.8: BS4142 Assessment of mitigated noise at Position M2 (all STF, Soil Washing plant & Mobile Plant running i.e. highest impact)

Results		**Relevant**	**Commentary**
Calculated Specific sound level	$L_{Aeq(1hour)}$ = 48dB	7.3.6	Specific sound source calculated using ISO9613-2
Background sound level	L_{A90} = 48dB	8.1.3 8.2	Measured over daytime periods when STF plant was switched off and therefore deemed to be representative of the background sound level.
Assessment during daytime, reference time interval is 60mins		7.2	
Acoustic feature correction	0dB	9.2	No acoustic feature expected due to site noise contribution and much higher residual sound levels.
Rating level	(48 + 0) dB = 48dB	9.2	No perceptible noise character predicted
Background sound level	L_{A90} = 48dB	8	Value determined using measured background level during operational periods when site not in operation providing a robust assessment of baseline.
Excess of rating over background sound level	(48 – 48) dB = 0dB	11	
Assessment indicates a Low Impact.			
Uncertainty	Not significant	10	The residual levels are much higher (i.e. 59dB LAeq) and the uncertainty of the measurement does not have any significance to the outcome of the assessment. Appropriate standards used for the calculation. All instruments used Type 1, calibrated and in calibration limits for baseline.

5.0 CONCLUSIONS

5.1 The results of the survey and analysis have shown the following:

(i) Subjective observations of the background noise climate during daytime operating periods at the NSRs show that non-site noise sources are generally formed by local and distant road traffic noise.

(ii) Background sound levels at the north-eastern to south-eastern NSRs are 48dB LA90 and at greater distance to the west 47dB LA90. Corresponding residual levels at NSRs vary between 51dB to 59dB LAeq.

(iii) Subjective observations at NSR monitoring positions when the STF plant was operating normally, showed no significant perceptible noise or no perceptible or distinctive noise character from Site and therefore no noise character penalty was deemed to be required.

(iv) Due to the ambient noise levels at NSRs being too high to be able to measure the noise contribution from the STF site, it has been necessary to undertake noise prediction modelling using computer-based modelling software with appropriate settings in accordance with ISO9613-2 and industry.

(v) On-site noise monitoring has been undertaken of fixed and mobile plant noise sources to inform the noise prediction modelling.

(vi) The results of noise predictions of the STF site determined by the construction of a noise model using the empirical noise measurements recorded on site has shown the following:

a) The predicted noise levels vary between 20dB to 44dB $LAeq_{1hr}$ at NSRs.

b) The noise prediction results show that the rating noise levels at the NSRs are shown to be between 4dB and 27dB below representative background sound levels and therefore a **low impact** would occur in accordance with BS4142:2014+A1:2019.

c) The predicted noise levels are between 11dB and 32dB below the residual LAeq levels at NSRs.

(vii) The soil washing plant would be utilised on a temporary basis and treatment of stockpiled soils would occur approximately 6-8 weeks for each batch of soil, which is likely to occur once a year. The washing plant would only be brought onto site when the temporary activity is required.

(viii) The cumulative effect of the temporary soil washing activity and the day-to-day operation of the STF plant has been assessed (with mitigation measures proposed) and a noise prediction model generated to calculate the noise impact and the results show the following:

a) The cumulative noise levels at the NSRs during the highest likely site noise generation during the temporary use of the Soil Washing Plant show rating noise levels are between 28dB and 48dB $LAeq_{1hr}$.

b) The rating levels do not exceed the representative background sound levels and therefore a **low impact** would occur in accordance with BS4142:2014+A1:2019.

c) The predicted noise levels are between 4dB and 24dB below the residual LAeq levels at NSRs.

5.2 The proposed noise mitigation strategy is provided in section 6.0.

6.0 NOISE MITIGATION MEASURES

6.1 Soil Treatment Facility

6.1.1 The STF plant noise control measures include:

(i) All mobile plant fitted with non-tonal reversing alarms when operating on site (i.e. broadband, SMART or `white noise' type reversing alarms).

(ii) The soil screening plant to be retained within the existing portal frame building during processing of soils, which is located towards the centre of the Site.

(iii) The site boundary retaining wall and embankment to be retained that exists around the Biotreatment area.

(iv) Wherever practicable maintain the one-way system for dump trucks to move around the Site and minimise reversing for HGVs offloading soils in the Biotreatment area.

6.2 Soil Washing Facility (occasional use)

6.2.1 To reduce noise levels from the Soil Washing plant and other plant relocated in this area (i.e. biofilter, pumping chamber and treatment plant) the southern boundary and the southeast and southwest boundary of the Treatment Pad would be fitted with an acoustic screen. The screen height would be 5m in height and the location shown in Figure 3. The screen can be formed from a solid material having a minimum mass of 15kg/m2 (e.g. concrete, brickwork, close-boarded fencing etc.).

6.2.2 The location area assumed for the Soil Washing plant is shown on Figure 3.

6.3 Noise Management Plan (NMP) Mitigation Measures

6.3.1 The existing noise control measures detailed in the existing NMP include the following:

"The main control measures that will be implemented as part of the scheme area summarised below:

Appointment of a site contact to whom complaints or queries about construction activities can be directed. Any complaints to be investigated and action taken where appropriate (see Section 3.7 of this NMP); and

All construction activities to be undertaken in accordance with good practice described in BS5228-1:2009+A1:2014.

The Waste Recycling and Soil Treatment Facilities will be located on the existing footprint of the ERQ Quarry Site;

The plant complement would consist of modern machinery fitted with efficient silencers/insulation designed to minimise noise levels that are generated during operations. Mobile plant would have noise emission levels that comply with the limit levels as defined by the EC Directive 86/662/EEC and subsequent amendments;

The plant would be properly serviced, maintained and operated in accordance with the manufacturers' instructions to ensure that the occurrence of malfunctions, which can give rise to elevated noise levels, is reduced and any malfunctions that do occur are swiftly repaired;

The effectiveness of acoustic insulation and silencers fitted to plant will be qualitatively assessed and recorded as part of the Facility Manager's Weekly Report. Any items of plant with defective insulation or silencers will be identified for immediate investigation and remediation;

All reasonable steps should be taken to limit the amount of HGVs queuing or waiting to enter/exit the site; this will be achieved through the provision of a new weighbridge at the site;

Internal haul roads shall, where possible, be routed to allow maximum acoustic screening and separation distances to noise sensitive receptors. Haul roads shall be kept clean and maintained in a good state of repair and subject to a 10mph speed limit so as to avoid unwanted rattle and "body slap" from vehicles;

The use of SMART, broadband or "white noise" reversing alarms to reduce the effect of reversing bleepers on site vehicles;

Local communities to be kept informed of general site activities, including working hours via the Edwin Richards Quarry liaison committee;

Any pumps used on site will be powered by electricity wherever practicable, and all pumps and generators will be placed at locations to minimise noise emissions to sensitive receptors;

With the exception of acoustically enclosed generators, pumps and electric plant, all static plant should be shut down when not in use;

Avoid unnecessary revving of engines and switch off mobile plant and equipment when not required;

Minimise drop height of materials;

Start-up plant and vehicles sequentially rather than simultaneously;

Appointment of a site contact to whom complaints or queries about operational activities can be directed. Any complaints to be investigated and action taken where appropriate (see Section 3.7 of this ***NMP);***

Where possible, use equipment with lowest sound power level and without any dominant tonal or impulsive characteristics available for the required purpose; and

If necessary and practicable, emissions from sources of significant noise can be controlled using acoustic enclosures."

6.3.2 The above NMP mitigation strategy would be updated to include any additional measures detailed in section 6.1 and 6.2.

References:

Environmental Statement, Chapter 11 `Noise and Vibration' May 2014

Planning Consent Conditions (Ref: Application (DC/14/57744, dated 3 August 2016

British Standard BS4142: 2014+A1:2019 `Method for rating and assessing industrial and commercial sound''

ISO 9613-2:1996 `Acoustics – Attenuation of sound during propagation outdoors - Part 2 General method of calculation; and

Amee Foster Wheeler Environment & Infrastructure UK Ltd Noise Management Plan: October 2016 (report 33012rr726i1).

BS7445: 2003 `Description and measurement of environmental noise'

FIGURES

Figure 1: Fixed Noise Monitoring Positions & Receptor Locations

Figure 2 : Site Layout

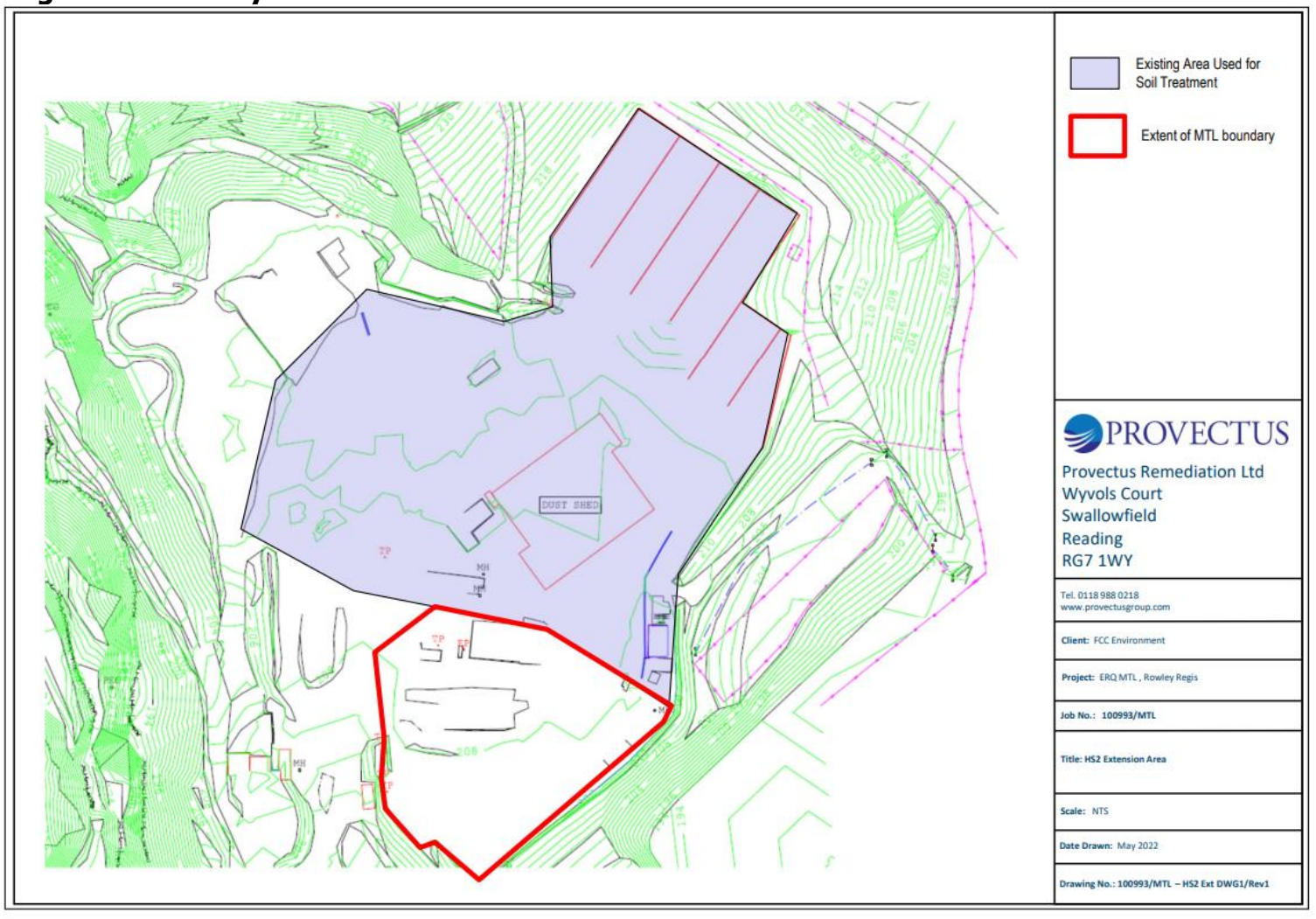
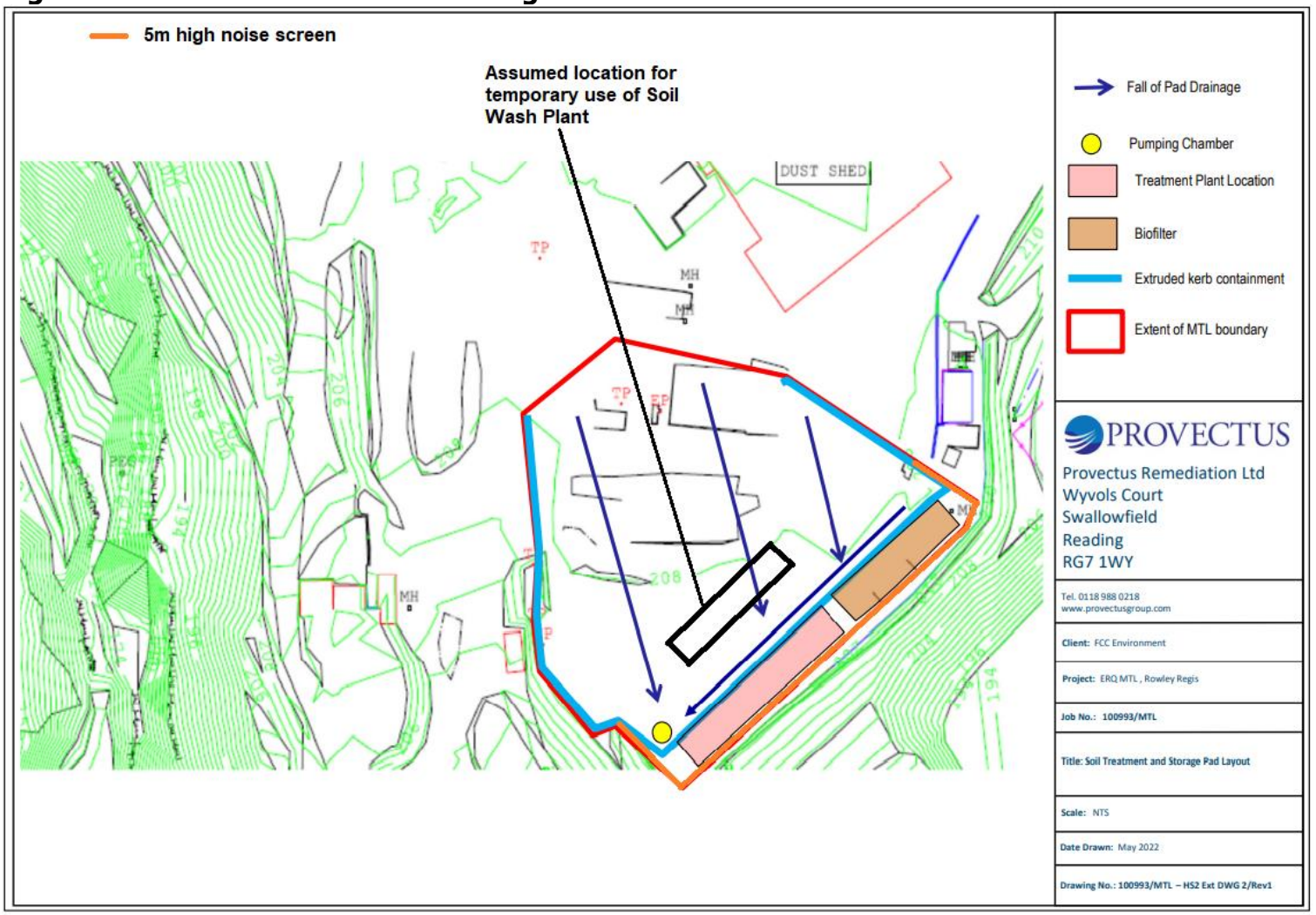


Figure 3 : Soil Wash Plant & Screening



APPENDIX 1

BASIC ACOUSTIC TERMINOLOGY

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air.

Sound Pressure Level is a measurement of the size of these pressure fluctuations. It is expressed in decibels (dB) on a logarithmic scale. Each 3 dB increase in sound pressure level represents a doubling of the sound energy. The threshold of hearing is approximately 0 dB.

The rate at which the pressure fluctuations occur determines the pitch or frequency of the sound. The frequency is expressed in Hertz (Hz), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hz to 20,000 Hz. Although sound can be of one discrete frequency - a 'pure tone' - most noises are made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same 'subjective' way. This is the basis of the A-weighted sound level dB(A), normally used to assess the effect of noise on people. The dB(A) weighting emphasises or reduces the importance of certain frequencies within the audible range.

Noise Measurement

The measurement of sound pressure level is only really meaningful where the level of noise is constant. In the typical industrial environment noise levels can vary widely and sometimes short duration high levels of noise are interspersed with periods of relative quiet. The most widely used means of 'averaging' the noise over a period of time is the Equivalent Continuous Sound Level. Normally written as L_{Aeq} this value takes into account both the level of noise and the length of time over which it occurs. There are many meters available which are capable of measuring L_{Aeq} by electronic integration over the measurement period.

The L_{Aeq} or A-weighted equivalent continuous noise level is a measure of the total noise energy over a stated time period and includes all the varying noise levels and re-expresses as an 'average', allowing for the length of time for which each noise level was presented.

The L_{An} parameters are defined as the noise levels which are exceeded for n% of the monitoring period, thus, for example, the L_{A90} parameter is the noise level exceeded for 90% of the 15 minute period, ie. 13.5 minutes. The L_{A50} parameter is the noise level exceeded for 50% of the hourly period, i.e. 30 minutes, etc. The L_{max} parameter is the maximum RMS A-weighted noise level occurring during the measurement period.

The definition in layman's terms is given below for terminology used in the measurement and results obtained during the survey work.

A-weighting: Normal hearing covers the frequency (pitch) range from about 20Hz to 20,000 Hz but sensitivity of the ear is greatest between about 500Hz and 5000Hz. The "A-weighting" is an electrical circuit built into noise meters to mimic this characteristic of the human ear.

Ambient noise: The totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.

Attenuation: Noise reduction

Background noise: The general quiet periods of ambient noise when the noise source under investigation is not there.

Decibel (dB): The unit of measurement for sound based on a logarithmic scale. 0dB is the threshold of normal hearing; 140dB is the threshold of pain. A change of 1dB is only detectable under controlled laboratory conditions.

dB(A) [decibel A weighted]: Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) serves to distinguish sounds of different frequency (or pitch) in a similar way to how the human ear responds. Measurements in dB(A) broadly agrees with an individual's assessment of loudness. A change of 3dB(A) is the minimum perceptible under normal everyday conditions, and a change of 10dB(A) corresponds roughly to doubling or halving the loudness of sound.

dB(C): [decibel C weighted]: Frequency weighting which does not alter low frequency octave band levels by very much compared to `A' weighting. Similar to linear reading (i.e. linear does not alter frequency spectra at all)

Frequency (Hz): The number of sound waves to pass a point in one second.

L_{Aeq}: This is a noise index used to describe the "average" level of a noise that varies with time (T). It allows for the different sensitivities of the human ear to different frequencies (pitch), and averages fluctuating noise levels in a manner, which correlates well with human perceptions of loudness.

$L_{A10,T}$: This noise index gives an indication of the upper limit or peak levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 10 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A10} reading was say 60dB, then this means that for 1 hour out of 10 the level went above 60dB.

$L_{A90,T}$: This noise index gives an indication of the lower limit or levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A90} reading was say 50dB, then this means that for 9 hours out of 10 the level went above 50dB.

L_{Amax}: This is the highest A weighted noise level recorded during a noise measurement period.

Residual noise: The ambient noise remaining at a given position in a given situation when the noise source under investigation is not there.

Specific noise: The noise source under investigation for assessing the likelihood of complaints

Examples of typical noise levels

Source/Activity	Indicative noise level [dB(A)]
Threshold of hearing	0
Rural night-time background	20-40
Quiet bedroom	35
Wind farm at 350m	35-45
Busy road at 5km	35-45
Car at 65km/h at 100m	55
Busy general office	60
Conversation	60
Truck at 50km/h at 100m	65
City Traffic at 5m	75-85
Pneumatic drill at 7m	95
Jet aircraft at 250m	105
Threshold of pain	140

APPENDIX 2

NOISE SURVEY RESULTS

FIXED POSITION NOISE MONITORING

Noise Survey Results

Date: Tuesday 2nd August 2022

Location: Edwin Richards Landfill, Portway Road, Rowley Regis **TABLE 1**

Client: Provectus Soil Management Ltd

Project: Soil Treatment Facility - Planning Condition 5a

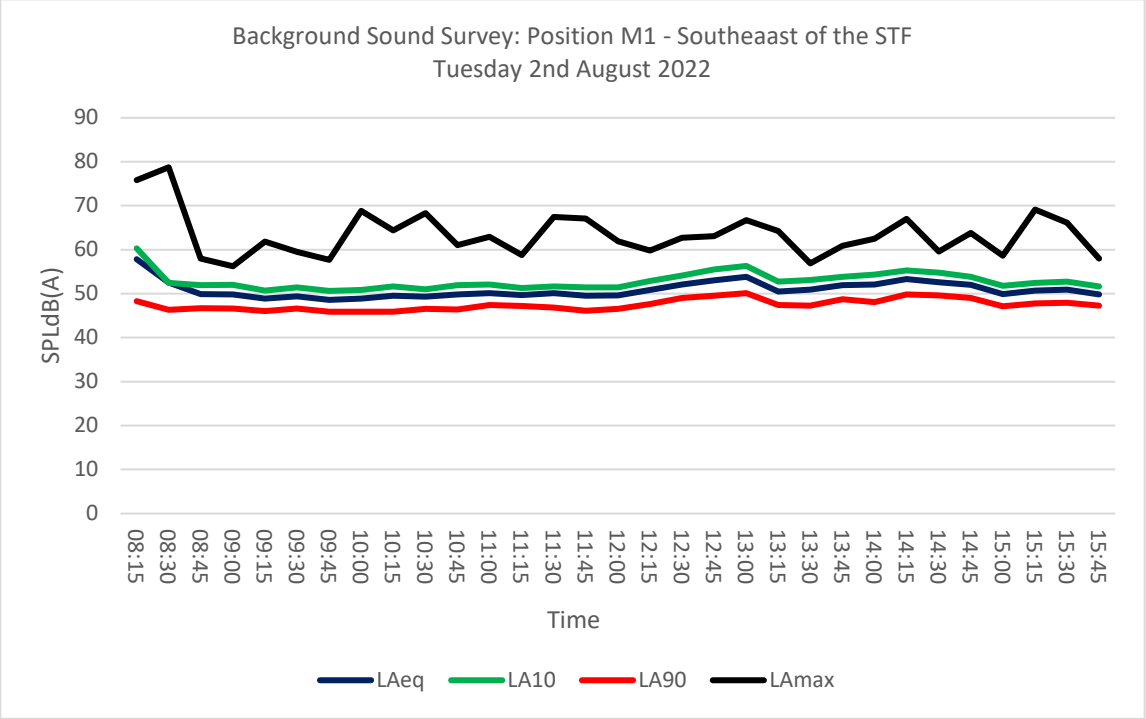
Data: **Baseline Sound Survey: Position M1 - Southeast of the STF**

Instrumentation: Cirrus 171A Real Time Analyser (G066350)

Calibration: 94dB

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmax (dB)	Observations
08:15	15:00	57.8	60.3	48.3	75.8	Road traffic noise
08:30	15:00	52.5	52.4	46.3	78.7	Noise from Site not audible
08:45	15:00	49.9	51.9	46.7	58.0	
09:00	15:00	49.8	52.0	46.6	56.2	
09:15	15:00	48.9	50.7	46.0	61.8	
09:30	15:00	49.4	51.4	46.6	59.5	
09:45	15:00	48.6	50.6	45.9	57.7	
10:00	15:00	48.9	50.8	45.9	68.8	
10:15	15:00	49.5	51.6	45.9	64.4	
10:30	15:00	49.3	51.0	46.5	68.3	
10:45	15:00	49.8	51.9	46.4	61.0	
11:00	15:00	50.1	52.1	47.4	62.9	
11:15	15:00	49.7	51.3	47.2	58.8	
11:30	15:00	50.1	51.6	46.8	67.4	
11:45	15:00	49.5	51.4	46.1	67.1	
12:00	15:00	49.6	51.4	46.5	61.9	
12:15	15:00	50.8	52.9	47.6	59.8	
12:30	15:00	52.1	54.1	49.0	62.7	
12:45	15:00	53.0	55.5	49.5	63.1	
13:00	15:00	53.8	56.3	50.1	66.7	
13:15	15:00	50.5	52.7	47.4	64.2	
13:30	15:00	50.9	53.1	47.3	56.9	
13:45	15:00	51.9	53.8	48.7	60.9	
14:00	15:00	52.1	54.3	48.1	62.5	
14:15	15:00	53.3	55.3	49.8	67.0	
14:30	15:00	52.6	54.8	49.6	59.6	
14:45	15:00	52.0	53.8	49.0	63.8	
15:00	15:00	49.9	51.8	47.1	58.6	
15:15	15:00	50.7	52.4	47.8	69.1	
15:30	15:00	50.9	52.7	47.9	66.1	
15:45	15:00	49.8	51.6	47.3	58.0	
Average 0815-1600		51.4	53.4	47.6	56-79	

Average	51.1	53.4	47.6	64-69	


Background Sound Survey: Position M1 - Southeaast of the STF
Tuesday 2nd August 2022
SPLdB(A)
90
80
70
60
50
40
30
20
10
0
08:15
08:30
08:45
09:00
09:15
09:30
09:45
10:00
10:15
10:30
10:45
11:00
11:15
11:30
11:45
12:00
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12:45
13:00
13:15
13:30
13:45
14:00
14:15
14:30
14:45
15:00
15:15
15:30
15:45
Time
LAeq
LA10
LA90
LAmax

Noise Survey Results

Date: Tuesday 2nd August 2022

Location: Edwin Richards Landfill, Portway Road, Rowley Regis **TABLE 2**

Client: Provectus Soil Management Ltd

Project: Soil Treatment Facility - Planning Condition 5a

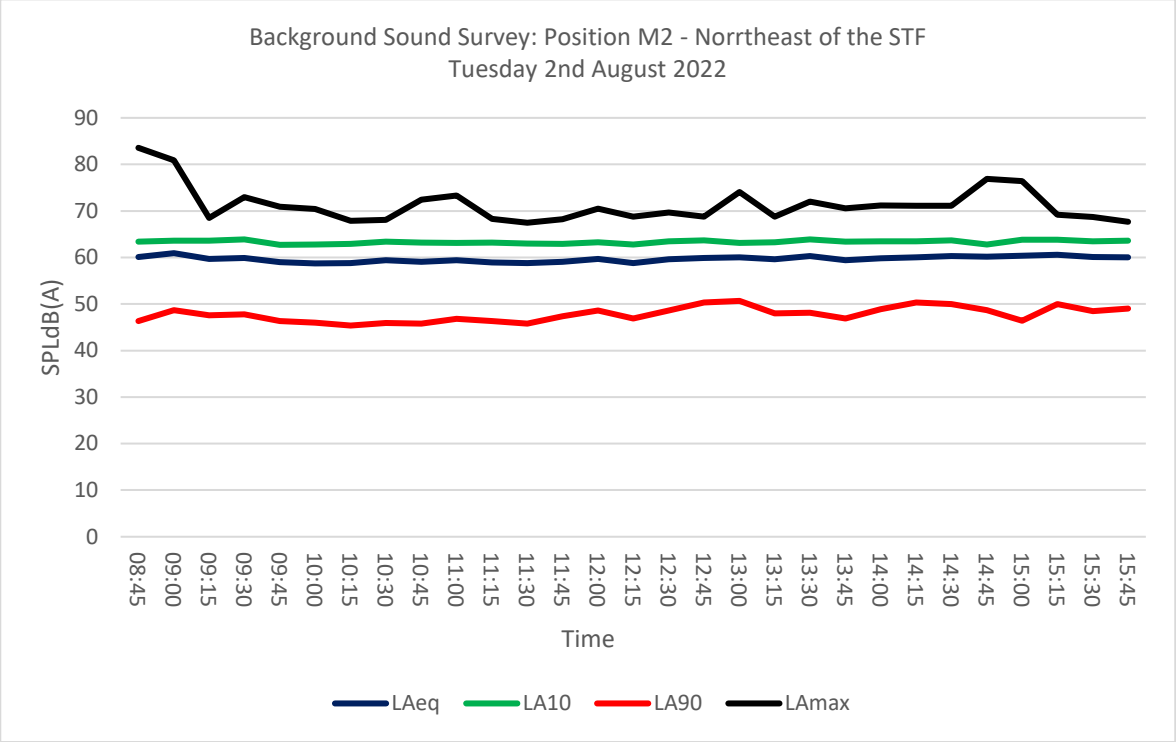
Data: **Baseline Sound Survey: Position M2 - North East of the STF**

Instrumentation: Cirrus 171A Real Time Analyser (G061253)

Calibration: 94dB

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmax (dB)	Observations
08:45	15:00	60.1	63.4	46.3	83.6	Road traffic noise
09:00	15:00	60.9	63.6	48.7	80.9	Noise from Site not audible
09:15	15:00	59.7	63.6	47.6	68.5	
09:30	15:00	59.9	63.9	47.8	73.0	
09:45	15:00	59.0	62.7	46.3	70.9	
10:00	15:00	58.7	62.8	46.0	70.4	
10:15	15:00	58.8	62.9	45.4	67.9	
10:30	15:00	59.4	63.4	45.9	68.1	
10:45	15:00	59.1	63.2	45.8	72.4	
11:00	15:00	59.4	63.1	46.8	73.3	
11:15	15:00	58.9	63.2	46.3	68.3	
11:30	15:00	58.8	63.0	45.8	67.5	
11:45	15:00	59.1	62.9	47.4	68.2	
12:00	15:00	59.7	63.3	48.6	70.5	
12:15	15:00	58.8	62.8	46.9	68.8	
12:30	15:00	59.6	63.5	48.6	69.7	
12:45	15:00	59.9	63.7	50.3	68.8	
13:00	15:00	60.0	63.1	50.7	74.1	
13:15	15:00	59.6	63.3	48.0	68.8	
13:30	15:00	60.3	63.9	48.1	72.0	
13:45	15:00	59.4	63.4	46.9	70.6	
14:00	15:00	59.8	63.5	48.9	71.2	
14:15	15:00	60.0	63.5	50.3	71.1	
14:30	15:00	60.3	63.7	50.0	71.1	
14:45	15:00	60.2	62.8	48.7	76.9	
15:00	15:00	60.4	63.8	46.4	76.4	
15:15	15:00	60.6	63.8	50.0	69.2	
15:30	15:00	60.1	63.5	48.5	68.7	
15:45	15:00	60.0	63.6	49.0	67.7	
Average 0845-1600		59.7	63.4	48.0	68-84	

Average	59.3	63.0	48.0	68-74	


Background Sound Survey: Position M2 - Norrtheast of the STF
Tuesday 2nd August 2022
SPLdB(A)
90
80
70
60
50
40
30
20
10
0
08:45
09:00
09:15
09:30
09:45
10:00
10:15
10:30
10:45
11:00
11:15
11:30
11:45
12:00
12:15
12:30
12:45
13:00
13:15
13:30
13:45
14:00
14:15
14:30
14:45
15:00
15:15
15:30
15:45
Time
LAeq
LA10
LA90
LAmax

Noise Survey Results

Date: Tuesday 2nd August 2022

Location: Edwin Richards Landfill, Portway Road, Rowley Regis **TABLE 3**

Client: Provectus Soil Management Ltd

Project: Soil Treatment Facility - Planning Condition 5a

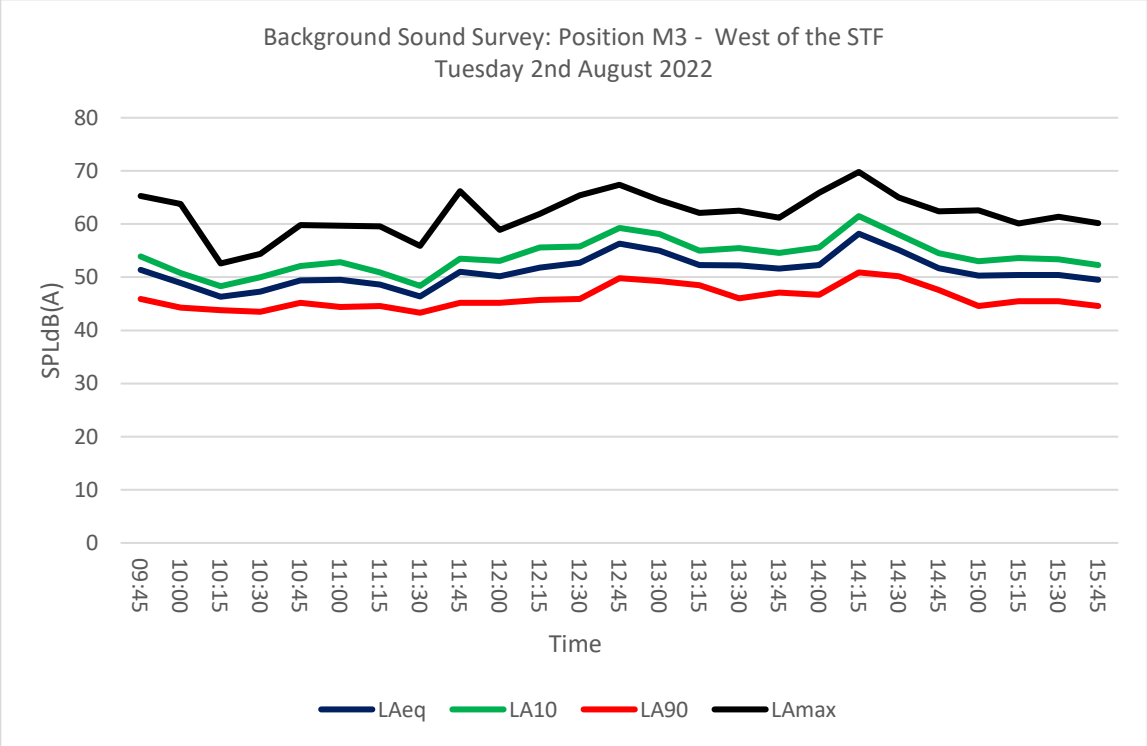
Data: **Baseline Sound Survey: Position M3 - West of the STF**

Instrumentation: Cirrus 171B Real Time Analyser (G056142)

Calibration: 94dB

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmax (dB)	Observations
09:45	15:00	51.4	53.9	45.9	65.3	Distant road traffic noise
10:00	15:00	48.9	50.8	44.3	63.8	
10:15	15:00	46.3	48.3	43.8	52.6	
10:30	15:00	47.3	50.0	43.5	54.4	
10:45	15:00	49.4	52.1	45.2	59.8	
11:00	15:00	49.5	52.8	44.4	59.7	
11:15	15:00	48.6	50.9	44.6	59.6	
11:30	15:00	46.4	48.4	43.3	55.9	
11:45	15:00	51.0	53.5	45.2	66.2	
12:00	15:00	50.2	53.1	45.2	58.9	
12:15	15:00	51.8	55.6	45.7	61.9	
12:30	15:00	52.7	55.8	45.9	65.4	
12:45	15:00	56.3	59.3	49.8	67.4	
13:00	15:00	55.0	58.1	49.3	64.5	
13:15	15:00	52.3	55.0	48.5	62.1	
13:30	15:00	52.2	55.5	46.0	62.5	
13:45	15:00	51.6	54.6	47.1	61.2	
14:00	15:00	52.3	55.6	46.7	65.9	
14:15	15:00	58.2	61.5	50.9	69.8	
14:30	15:00	55.1	58.0	50.2	65.0	
14:45	15:00	51.7	54.5	47.6	62.4	
15:00	15:00	50.3	53.0	44.6	62.6	
15:15	15:00	50.4	53.6	45.5	60.1	
15:30	15:00	50.4	53.4	45.5	61.4	
15:45	15:00	49.5	52.3	44.6	60.2	
Average 0945-1600		52.2	55.2	46.6	54-70	

Average	51.8	54.5	47.1	53-65	


Background Sound Survey: Position M3 - West of the STF
Tuesday 2nd August 2022
SPLdB(A)
80
70
60
50
40
30
20
10
0
09:45
10:00
10:15
10:30
10:45
11:00
11:15
11:30
11:45
12:00
12:15
12:30
12:45
13:00
13:15
13:30
13:45
14:00
14:15
14:30
14:45
15:00
15:15
15:30
15:45
Time
LAeq
LA10
LA90
LAmax

NEAR FIELD NOISE RESULTS

Noise Survey Results

Date: Tuesday 2nd August 2022
Location: Edwin Richards Landfill, Portway Road, Rowley Regis **TABLE 4**
Client: Provectus Soil Management Ltd
Project: Soil Treatment Facility - Planning Condition 5a
Data: **Baseline Sound Survey: Roaming measurements**
Instrumentation: Norsonic 140 Real Time Analyser (1405418)
Calibration: 94dB

Start Time	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmax (dB)	Position & Activity
10:52	67.8	69.6	66.1	74.3	10m Door Opening into Soil Treatment Building
10:52	73.3	75.4	70.2	76.8	HGV Pass-by at 10m
10:53	70.9	72.3	69.1	76.1	30m HGV Offload & HGV Movement
10:54	67.6	68.8	66.4	72.3	10m Door Opening into Soil Treatment Building
10:57	66.3	67.1	65.5	72.0	30m Excavator working on Soil Storage Mound
10:58	70.7	74.0	67.5	75.0	10m Dump Truck (Volvo A30G) movement
10:59	67.2	70.6	64.3	79.1	30m Dump Truck being loaded by Doosan DX225LG Excavator
11:00	64.2	65.4	63.0	70.8	30m Dump Truck being loaded by Doosan DX225LG Excavator
11:02	64.2	66.2	60.7	67.0	20m Dump Truck on haul road
11:03	69.0	70.8	65.2	73.9	10m Dump Truck (Volvo A30G) movement on haul road
11:04	71.2	75.3	66.7	79.1	Tipper HGV offloading at 30m
11:04	68.7	69.6	67.0	82.7	20m Excavator loading Dump Truck
11:06	77.7	78.3	77.0	79.6	1m Fan Blower mounted in acoustic enclosure
11:08	81.4	82.3	80.3	88.3	Doorway to Soil Treatment Building
11:11	62.8	64.0	60.9	74.5	Boundary Wall - 30m Doorway of STB , 50m Excavator loading DT
11:18	61.3	64.1	56.7	74.9	Boundary Wall - 50m Doorway of STB , opposite Excavator loading DT
11:56	68.1	68.7	67.3	69.3	Rear doorway to STB opening

Weather Station Davis Vantage Vue - Mounted on high ground

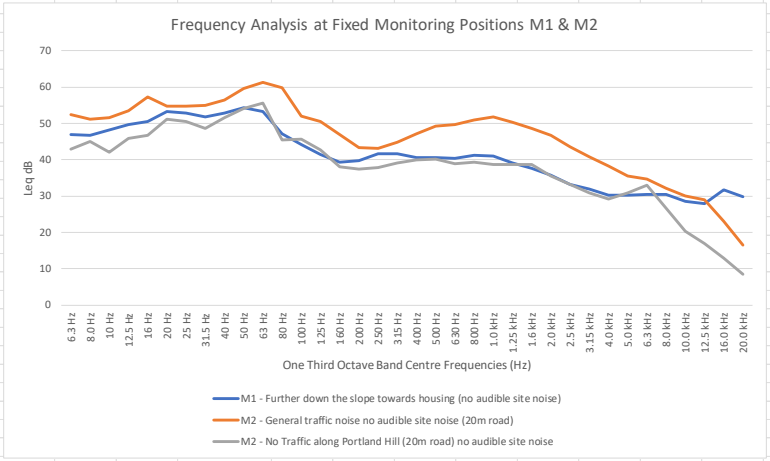
Time	Temp Out	Wind Speed	Wind Dir	Rain	Sample Wind Speed at M1 to M3 (hand-held anemometer)	Level Difference
07:30	19.5	3.7	ENE	0		
07:45	20.1	4.2	ENE	0		
08:00	20.4	4.2	ENE	0		
08:15	20.4	4.2	ENE	0	2.1m/s (M1)	-2.1
08:30	20.7	4.2	ENE	0		
08:45	20.9	4.2	ENE	0	1.8m/s (M2)	-2.4
09:00	21.2	4.2	ENE	0		
09:15	21.3	3.7	NE	0		
09:30	21.7	3.3	NE	0		
09:45	22.2	4.2	ENE	0		
10:00	21.9	4.6	NE	0		
10:15	21.8	4.6	NE	0		
10:30	21.6	4.6	NE	0		
10:45	22.2	4.2	ENE	0		
11:00	22.5	4.2	ENE	0		
11:15	23.1	4.6	NE	0		
11:30	23.4	4.4	NE	0		
11:45	23	4.1	ENE	0		
12:00	23	4.3	ENE	0		
12:15	23.9	4.5	ENE	0	1.9m/s (M2)	-2.6
12:30	24	4.5	ENE	0		
12:45	24	4.2	NE	0		
13:00	24.1	4.2	ENE	0		
13:15	24.8	4.4	ENE	0	2.2m/s (M1)	-2.2
13:30	24.1	4.4	ENE	0		
13:45	24	4.3	ENE	0		
14:00	23.6	4.6	NE	0		
14:15	23.5	4.2	ENE	0		
14:30	22.6	4.6	NE	0		
14:45	22.8	4.6	ENE	0		
15:00	22.9	4.1	ENE	0	2.1m/s (M3)	-2
15:15	23.2	4.1	ENE	0		
15:30	22.7	4	ENE	0		
15:45	22.4	4.1	ENE	0		
16:00	22.6	4.6	NE	0		

APPENDIX 3

FREQUENCY ANALYSIS RESULTS

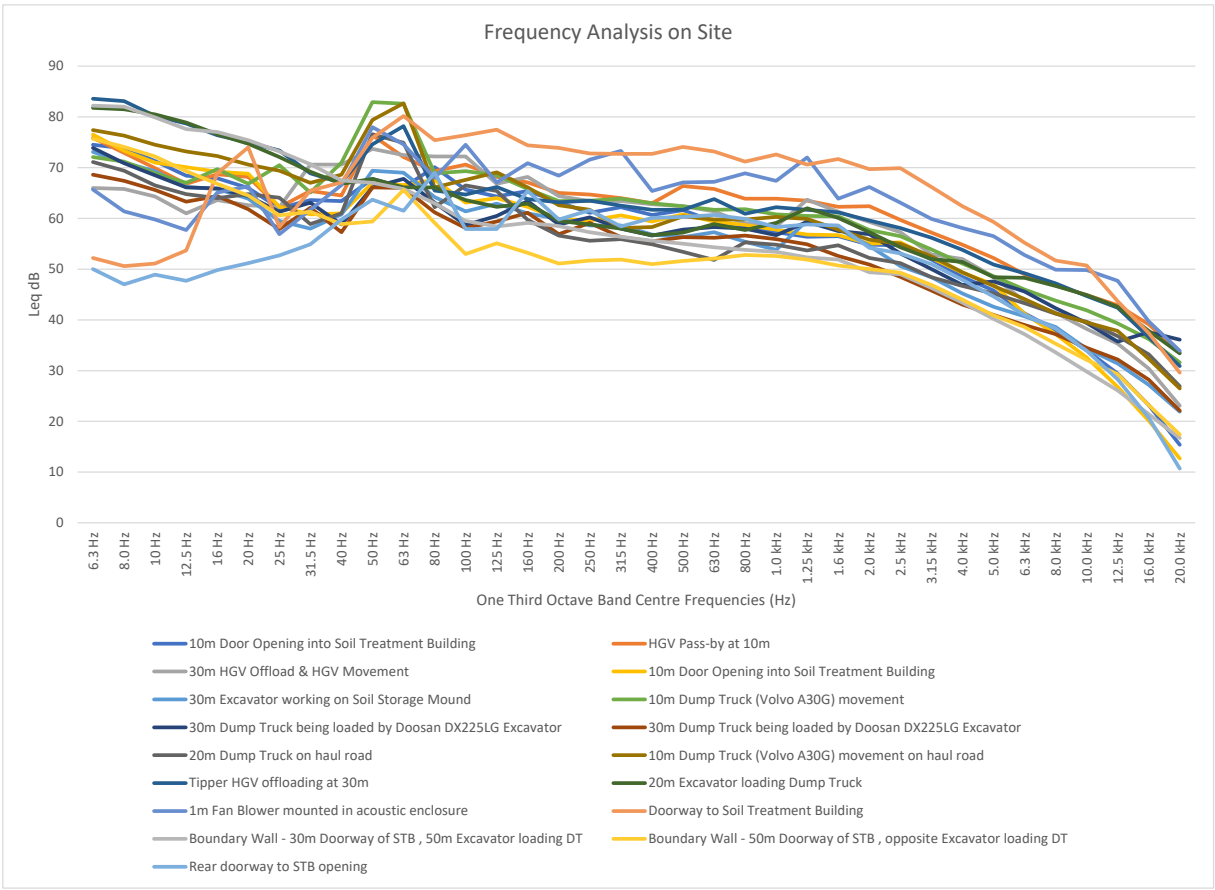
Frequency Analysis at Far Field Noise Monitoring Positions

LAeq	49	58.7	48.1
LA10	50.5	62.5	49.5
LA90	45	46.4	46.6
LAmax	69.3	67.1	50.4
Freq (Hz)			
6.3 Hz	47	52.5	43
8.0 Hz	46.7	51.1	45.1
10 Hz	48.2	51.5	42
12.5 Hz	49.6	53.4	45.8
16 Hz	50.6	57.3	46.6
20 Hz	53.3	54.8	51.2
25 Hz	52.8	54.7	50.5
31.5 Hz	51.7	55	48.7
40 Hz	52.9	56.4	51.6
50 Hz	54.3	59.5	54.2
63 Hz	53.3	61.2	55.6
80 Hz	47.1	59.8	45.5
100 Hz	44.2	51.9	45.6
125 Hz	41.4	50.4	42.6
160 Hz	39.4	46.9	38
200 Hz	39.7	43.4	37.3
250 Hz	41.7	43.1	37.9
315 Hz	41.6	44.8	39
400 Hz	40.6	47.2	40
500 Hz	40.6	49.2	40.2
630 Hz	40.3	49.7	38.9
800 Hz	41.1	51	39.3
1.0 kHz	41	51.7	38.7
1.25 kHz	39.1	50.3	38.7
1.6 kHz	37.7	48.6	38.7
2.0 kHz	35.7	46.6	35.6
2.5 kHz	33.1	43.5	33.1
3.15 kHz	31.9	40.8	30.8
4.0 kHz	30.2	38.3	29.2
5.0 kHz	30.2	35.6	30.8
6.3 kHz	30.4	34.6	33
8.0 kHz	30.5	32.1	26.6
10.0 kHz	28.6	30	20.2
12.5 kHz	27.9	29	17
16.0 kHz	31.7	23	12.9
20.0 kHz	29.8	16.4	8.4



Near Field Frequency Spectra

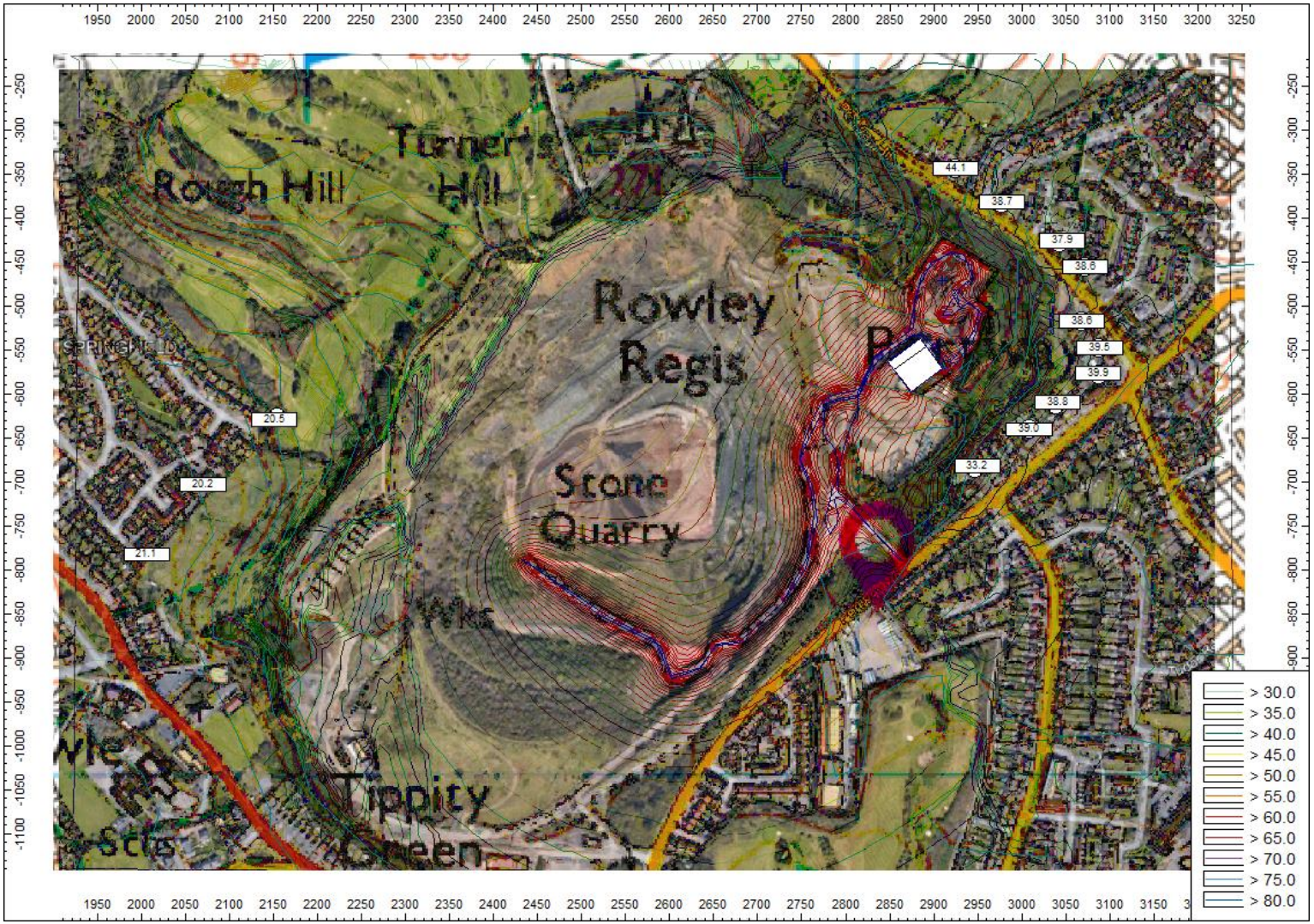
LAeq	67.8	73.3	70.9	67.6	66.3	70.7	67.2	64.2	64.2	69	71.2	68.7	77.7	81.4	62.8	61.3	68.1
LA10	69.6	75.4	72.3	68.8	67.1	74	70.6	65.4	66.2	70.8	75.3	69.6	78.3	82.3	64	64.1	68.7
LA90	66.1	70.2	69.1	66.4	65.5	67.5	64.3	63	60.7	65.2	66.7	67	77	80.3	60.9	56.7	67.3
LAmax	74.3	76.8	76.1	72.3	72	75	79.1	70.8	67	73.9	79.1	82.7	79.6	88.3	74.5	74.9	69.3
Position																	
6.3 Hz	74.5	75.9	66	76.5	73.1	72.1	73.9	68.6	71.1	77.4	83.6	81.8	65.7	52.2	82.2	75.7	50
8.0 Hz	73.8	72.9	65.8	73.3	71	71.2	70.9	67.4	69.4	76.3	83.1	81.5	61.4	50.6	82	74.1	47
10 Hz	71.3	69.9	64.3	71	69.3	68.9	68.5	65.6	66.5	74.5	80.2	80.5	59.8	51.1	79.9	72.2	48.9
12.5 Hz	68.4	66.8	61	70.1	66.2	67	66.1	63.3	64.8	73.2	78.7	78.9	57.7	53.7	77.6	69.3	47.7
16 Hz	67.9	68.7	63.6	69.2	65.8	69.7	65.9	64.4	64	72.3	76.4	76.6	65.1	68.9	77	66.8	49.8
20 Hz	66	68.2	62.6	68.8	63.9	66.8	64.4	61.8	64.8	70.6	75	74.7	66.3	74	75.4	64.5	51.2
25 Hz	62	62.2	62.2	62.3	59.5	70.5	61.3	57.9	64.1	69.4	73.4	72.1	56.9	58.3	73.2	60.6	52.7
31.5 Hz	63.6	65.4	70.6	60.8	58	65.1	63.1	62.1	58.9	67	68.9	69.2	61.7	65.5	70.7	61.3	54.9
40 Hz	63.4	64.5	70.6	61	60.8	71	58.8	57.3	61	68.6	67	66.8	66.6	67.1	67.5	58.9	59.8
50 Hz	67.8	76.4	73.7	67	69.4	82.9	66.1	66.1	76.6	79.4	74.6	67.8	78	75.9	67	59.4	63.7
63 Hz	66.1	72.1	72.5	66.6	69	82.6	67.8	66	74.9	82.7	78.2	66.1	74.6	80.2	65.8	65.6	61.5
80 Hz	70.1	69.3	72.2	67.6	64.2	68.9	63.1	61.2	62.2	66.1	65.5	66.1	68	75.4	63	59.1	69
100 Hz	65.7	70.6	72.2	63.1	61.4	69.3	58.7	58.1	66.5	67.6	64.7	63.6	74.5	76.4	59.5	53	57.9
125 Hz	64.3	68.2	66.8	64	62.9	68.5	60.5	59.4	65.4	69.1	66.2	62.3	67.1	77.5	58.4	55.1	57.9
160 Hz	65.4	67.1	68.2	62.3	61	65.8	63.4	61.1	59.7	66.1	63.8	62.9	70.9	74.4	59.1	53.2	65.4
200 Hz	63.2	65	64.4	59.9	59.9	63.4	58.8	56.9	56.6	62.6	63.2	59.5	68.4	73.9	58.5	51.1	59.8
250 Hz	61.1	64.7	63.4	59.6	58.6	63.5	60.2	59.1	55.6	61.7	63.5	58.8	71.6	72.8	57.3	51.7	61.6
315 Hz	62.2	64	63.4	60.6	58.6	63.9	58	56.3	55.9	58.1	62.5	58	73.3	72.7	56.4	51.9	58.4
400 Hz	60.7	63	62.8	59.4	56.8	63	56.6	55.5	54.9	58.3	61.7	56.7	65.4	72.7	55.6	51	60.1
500 Hz	61.6	66.4	62.4	60.8	56.3	62.4	57.8	56.3	53.4	60.4	61.7	57.2	67.1	74.1	55	51.6	60.3
630 Hz	59.4	65.8	61.4	59.4	57.3	61.7	58.3	56.2	51.8	59.8	63.8	58.9	67.2	73.2	54.3	52.1	60.7
800 Hz	58	63.9	59	58.7	55.4	61.8	58	56.6	55.3	59.8	60.9	57.7	68.9	71.2	53.8	52.8	59.9
1.0 kHz	57.3	63.9	58.4	57.8	53.8	60.8	56.7	55.9	54.8	60.3	62.2	59.1	67.4	72.6	53.4	52.6	58.3
1.25 kHz	56.4	63.5	63.7	56.8	59.6	60.5	59.3	54.9	53.7	59.9	61.7	62	72	70.6	52.3	51.9	58.8
1.6 kHz	56.5	62.3	61.3	56.7	58	60.4	57.5	52.6	54.7	57.8	61.2	60.1	63.9	71.7	51.9	50.7	58.6
2.0 kHz	54.8	62.4	59.3	55	54.6	57.7	56.9	50.9	52.2	55.8	59.6	57.3	66.2	69.7	49.4	50	54.2
2.5 kHz	54.7	59.7	57.3	55.3	50.6	56.5	53.1	48.5	51.2	55	58.1	54.3	63.1	69.9	49	49.3	53.1
3.15 kHz	51.9	57.2	52.9	52.2	48.4	53.9	50	45.8	48.4	52.5	56.2	52	59.9	66.2	46.3	46.9	51
4.0 kHz	48.5	54.8	52	49.3	45.2	51.1	46.9	43	46.7	49.4	53.8	51.4	58.1	62.4	43.4	44	47.9
5.0 kHz	45.8	52.2	48.5	47	42.6	48.6	47.6	41	45.2	46.7	50.9	48.4	56.5	59.3	40.2	40.9	44.6
6.3 kHz	41.3	49	43.7	41.2	40.7	46	45.6	39	43.3	44.1	49.2	48.3	52.8	55.2	37.2	38.6	41
8.0 kHz	38	46.8	41.4	37.2	38.6	43.8	42.3	37.2	41.2	41.3	47.2	46.7	49.9	51.7	33.6	35.3	38.3
10.0 kHz	34	44.9	38.2	32.6	34.3	41.9	39.4	34.5	39.6	39.5	44.7	44.9	49.8	50.7	29.8	32.1	33.9
12.5 kHz	29.4	42.9	35.3	26.8	31.4	39.3	35.7	32.2	36.8	37.8	42.4	42.6	47.7	43.7	26.1	29.3	28.3
16.0 kHz	23.2	39.1	30.4	20.1	27.2	36.2	37.6	28.2	33.2	32.3	36.6	37.8	39.7	37.4	21.4	23.2	20.7
20.0 kHz	15.4	33.6	23.1	12.7	21.9	31.6	36.1	22.1	26.9	26.5	30.9	33.4	33.9	29.6	16.7	17.4	10.7



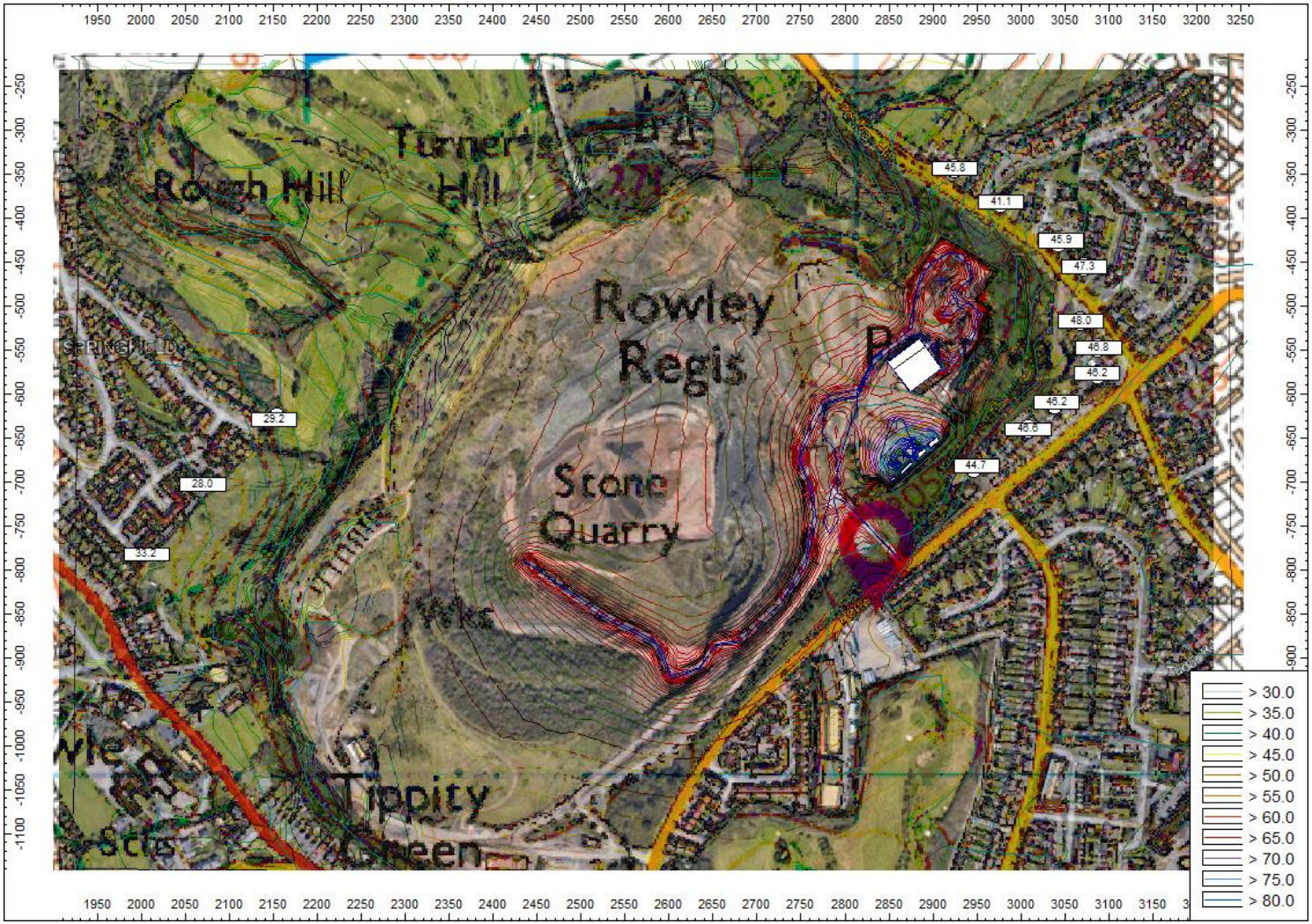
APPENDIX 4

NOISE PREDICTION MAPPING RESULTS

NOISE MAP 1: SOIL TREATMENT FACILITY NOISE CONTOURS



NOISE MAP 2: SOIL TREATMENT WITH SOIL WASHING FACILITY NOIISE CONTOURS



APPENDIX 5

CONSULTANT'S EXPERIENCE & QUALIFICATIONS

Consultant: Dean Robert Kettlewell - MSc MIOA MAE I.Eng (Director - Principal Acoustic Consultant)

Précis

As Director and Principal Acoustic Consultant with Noise & Vibration Consultants Ltd, Dean has over 35 years background experience in a wide range of issues relating to environmental, industrial and commercial noise and vibration assessment. He currently manages corporate and unit specific contracts for:

- Assessment of Environmental & Industrial Noise
- Environmental Noise Impact Assessments
- Specialist knowledge in the Design of Noise Control Systems
- Expert Witness representation for Planning Appeals
- Integrated Pollution Prevention and Control (IPPC) Applications
- Industrial Noise Assessment and Control
- Planning Issues for Residential and Commercial Development
- Noise at Work Regulations Assessments
- Building Acoustics and Sound Insulation Tests
- Wind Farm Noise Impact Assessments
- Entertainment Noise Assessment and Control
- Ground borne vibration measurement and assessment
- Project Management of Noise Control Systems

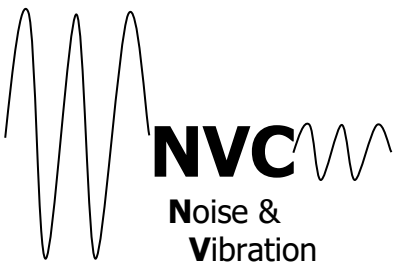
Relevant Work Experience

Director & Principal Consultant - Noise & Vibration Consultants Ltd	2001- to date
Senior Acoustic Consultant - Vibrock Limited	1998 - 2001
Associate & Principal Acoustic Consultant - John Savidge & Associates	1994 - 1998
Technical Manager – LBJ Limited (Noise Control Division)	1990 - 1994
Technical Engineer/Technical Manager (1988) - Vibac (Noise Control) Ltd	1982 - 1990

Qualifications and Education

M.Sc. Applied Acoustics (Derby University – Distinction)
HNC Electrical & Electronic Engineering
IOA Diploma in Acoustics & Noise Control
IOA Certificate in Law and Administration
Certificate of Competence in Workplace Noise Assessment
Certificate of Competence in Ground Vibration Monitoring

Affiliations: Member of Institute of Acoustics (MIOA)
Member of Academy of Experts (MAE)
Member of Association of Noise Consultants (ANC)
Incorporated Engineer (I.Eng)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Noise &
Vibration
Consultants Ltd

Appendix C – Emissions Management and Monitoring Plan

Emissions Management and Monitoring Plan

This document has been prepared in response to the Schedule 5 notice dated 28/09/20 for the variation to permit reference EPR/HP3632RP/V003.

The document details the existing monitoring undertaken at site both for reporting against the permit conditions and the other monitoring undertaken as routine by the applicant to support effective emissions management at the site. This report includes some minor changes to sampling locations due to the change in layout of the site under the proposed permit variation. In preparing this document the following EA guidance documents has been reviewed:

- Technical Guidance Note (Monitoring) M8 – Ambient Air. Environment Agency, Version 2 (May 2011)
- Technical Guidance Note (Monitoring) M17 - Monitoring Particulate Matter in Ambient Air around Waste Facilities. Environment Agency, Version 2 (July 2013)

Potential Emissions at Edwin Richards Quarry Soil Treatment Facility

The following provides a list of potential emissions at the soil treatment facility

1. Dust
2. Volatile Organic Compounds
3. Odours
4. Surface Run Off
5. Noise and vibration
6. Drag out of mud/debris

Items 2-6 were addressed by the original H1 ERA prepared by Amex Foster Wheeler Environment & Infrastructure UK Limited (Amec) that was submitted and approved as part of the original permit application for the facility. The Amec H1 ERA considered which aspects of the operation were likely to cause a potentially harmful emission in terms of odour, noise and vibration, fugitive emissions (including dust and pests) and accidents. This also referenced the Best Available Techniques and Operating Techniques including details on the types and quantities of waste accepted, operating controls and pollution mitigation controls. An ERA prepared by TerraConsult (Report Ref: 3483/R/002/02) was submitted in November 2017 in support of an application to vary permit EPR/HP3632RP to allow the acceptance of soils containing asbestos and untreated woodchip. The ERA was updated with the permit variation application issued to the EA on 20 June 2019.

The Schedule 5 received on 28/09/20 requires a revised Emissions Management and Monitoring Plan for the whole site. It requests that we will need to include the following aspects:

1. You must use appropriate measures to prevent emissions of dust, PM10 and asbestos fibres.

2. You must design, operate and maintain all internal and external storage areas and treatment processes, including all associated equipment and infrastructure, in a way that prevents fugitive emissions to air, including dust, PM10 and asbestos fibres. Where that is not possible, you must minimise these emissions.

3. All internal and external storage areas and treatment processes must collect, extract and direct all process emissions to an appropriate abatement system for treatment before release. Where that is not possible, you must minimise these emissions.

4. To reduce point source emissions to air (dust, PM10 and asbestos fibres) from the internal and external storage areas, treatment processes and handling of waste, you must use an appropriate combination of abatement techniques, including one or more of the following systems: adsorption (for example, activated carbon), biofiltration, wet scrubbing, fabric filters, high efficiency particulate (HEPA) filtration, condensation and cryogenic condensation, cyclonic separation, electrostatic precipitation and thermal oxidation.

5. You must identify the main chemical constituents of the site's point source emissions as part of the site's inventory of emissions to air.

6. You must make an assessment of the impact of the substances emitted to air, following the Environment Agency's guidance; Control and monitor emissions for your environmental permit https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit#dust-mud-and-litter

7. You must design, operate and maintain an appropriate monitoring system on site to ensure dust, PM10 and asbestos fibres releases are prevented, if not minimised, from leaving the site boundary.

The above seven points are now addressed.

You must use appropriate measures to prevent emissions of dust, PM10 and asbestos fibres:

Table 1. Sources of Emissions and Mitigation

Parameter	Source	Mitigation
Dust	Soil Inputs	Reception of soils with moisture content >15%. Generally soil moisture content is ~20% on received soils
	Dragout of mud onto road	Frequent road sweeping/damping down, daily visual inspections, speed limits on roads and designated traffic routes on hardstanding
	Soil Stockpiles/Biopiles	Limiting stockpile height within approved areas, sealing stockpile surfaces or covering, elevated soil moisture content >15% with reintroduction of treated water if required
PM10	Heavy duty vehicles	Traffic limits and routes, addition of soil screening to permit to enable tenfold increase in soil processing rates and reduction in plant time
	Soils	Unlikely with moisture content >15% and elevated clay content
Asbestos Fibres	Asbestos contaminated soils	Conservative waste acceptance criteria to prevent the acceptance of soils that can generate airborne asbestos fibres above the detection limit
		Moisture content in soils >15%. Dust suppression system on site
	Asbestos removed from soil	Double bagged and stored in locked skip

You must design, operate and maintain all internal and external storage areas and treatment processes, including all associated equipment and infrastructure, in a way that prevents fugitive emissions to air, including dust, PM10 and asbestos fibres. Where that is not possible, you must minimise these emissions.

Internal and external storage areas and treatment equipment are constructed on impermeable hardstanding with sealed perimeter kerbs and underground drainage and pumping chambers. Water treatment equipment is located within bunded areas with a minimum of 110% storage capacity. This ensures that there is no cross contamination to land or surface water from mobile contaminants or impacted surface water.

Biotreatment Area

The biopiles are operated using vacuum technology that means that >99% of volatile contaminants within soil pore spaces are collected and treated at the adjacent biofilter. The conversion of hydrocarbons to carbon dioxide and water vapour means that the soil moisture concentration in soils is elevated during treatment and is rarely, if ever below 15-20%. Soil in treatment does not give rise to visible dust or elevated dust concentrations during treatment.

Access Roads (biotreatment and asbestos treatment area)

Access roads and exposed areas of the treatment pads are potential sources of dust due to drag out of soil from vehicle movements which can dry out to a level which could post a dust nuisance. All traffic routes are regularly swept and damped down to prevent mud accumulation on internal roads or the public highway or be a source of dust during dry conditions.

Asbestos Treatment Area

The control of asbestos emissions is predominantly based upon only receiving soils that are proven to pose no potential for airborne emissions of asbestos fibres above the detection limit. The approach to achieving this has been stated in the previous permit variation approved in February 2018.

Soils with asbestos will be quarantined prior to formal acceptance even where in the majority of cases, soils have already been visually inspected and sampled prior to a formal offer for accepting the soils has been issued to the waste producer. The reception testing also includes for moisture content which will provide information on the dust potential in addition to the asbestos fibre quantification.

Reception testing will be undertaken at the receipt of soils and any soils that contain >0.1% chrysotile fibres, >0.01% other forms of asbestos fibres, or any form of unbound asbestos will be rejected from site. As an extra level of mitigation all externally stored asbestos contaminated soils will be covered prior to transfer to the internal building for screening and hand picking.

Within the asbestos soils storage and treatment areas, a dust suppression system is available to reduce dust and any particulate emissions. However, even without this operating and treatment activities operational there has never been an incidence of airborne asbestos being measured above the detection limit using Phase Contrast Microscopy (PCM) or if required to achieve a lower detection limit: Scanning Electron Microscopy (SEM) or Transmission Electron Microscopy (TEM).

PM10 emissions from vehicles

The main sources of PM10 emissions on site are from:

- Excavators

- Dump trucks
- Tipper/articulated lorries
- Hopper and Picking station

At present the use of the hand picking inside the building allows for the processing of approximately 50t/day. The picking station is regularly damaged as no removal of oversize inclusions is permitted and so there is significant amount of down time for asbestos processing plant. Also, the presence of soil fines in the matrix has the potential to conceal smaller asbestos debris meaning that the soils are generally handpicked twice to ensure compliance with the requirements to achieve a non-hazardous soil status. The existing approved method requires a significant amount of plant time for each tonne of asbestos contaminated soil and therefore is a source of elevated PM10.

On projects with a mobile plant license deployment a soil screener is added to the above list of equipment. This increases the throughput to approximately 500t/day, results in less downtime and due to the separation of the different soil fractions makes the hand picking significantly more effective with little or no double handling.

Therefore by adding the soil screening option, the efficiency is increased tenfold, so whilst there is a slight increase in PM10 levels as there is more plant present, it is for 10% of the existing timescales.

We have recently hired an electric hopper and picking station to review suitability which will offset PM10 emissions from the previous set of equipment. It is proposed to make this a permanent acquisition if the pre-screening is approved as it is only suitable for soils without large inclusions.

There will be no increase in asbestos fibres due to the strict waste acceptance criteria and we would anticipate a decrease in dust as the soil screener will be fitted with a spray rail for dust suppression. There would be a tenfold decrease in PM10 emissions from the soil processing due to the reduced plant timescales.

The additional storage areas will allow a one way traffic system to be employed and avoid the vehicle restrictions and delays during delivery into the asbestos building. This will significantly decrease the time the lorry is present on site and result in a reduction in PM10 emissions.

All internal and external storage areas and treatment processes must collect, extract and direct all process emissions to an appropriate abatement system for treatment before release. Where that is not possible, you must minimise these emissions.

The emissions from the biotreatment pad are collected by the undersoil pipework with liquids treated in the water treatment system and air treated by the biofilter. This approach is well established.

Asbestos fibres are not generated on site above the detection limit so no abatement system is required.

Dust generation is largely on haul roads and road sweeping/dust suppression is undertaken at source to prevent or minimise dust emissions occurring.

PM10 emissions are largely from heavy plant and vehicle traffic. Emissions from vehicles delivering soils to site are to be reduced by having external reception areas rather than the existing system of delivering inside a building which often leads to queuing vehicles.

The use of a soil screener in the asbestos processing will result in a tenfold reduction in PM10 emissions compared to the existing emissions.

To reduce point source emissions to air (dust, PM10 and asbestos fibres) from the internal and external storage areas, treatment processes and handling of waste, you must use an appropriate combination of abatement techniques, including one or more of the following systems: adsorption (for example, activated carbon), biofiltration, wet scrubbing, fabric filters, high efficiency particulate (HEPA) filtration, condensation and cryogenic condensation, cyclonic separation, electrostatic precipitation and thermal oxidation.

The majority of emissions described previously are prevented from occurring and do not require further mitigation after the initial suppression. Monitoring will provide verification to the effectiveness of the suppression works.

A water treatment plant is present on site to continuously treat water as it is collected from treatment areas.

A biofilter is used to treat continuous emissions from the biotreatment area and is deemed a point source emission and is currently monitored as per Table S3.1 of the permit.

Only the presence of PM10 that could accumulate inside the asbestos building is deemed to potentially require mitigation as a point source. This is released by the treatment plant from inside the asbestos building as a result of soil screener and 360 excavator. In the event that monitoring data shows that the emissions are within 25% of the thresholds in Table 3 then the building will have HEPA filters installed to mitigate point source emissions.

Mitigation of PM10 in a situation where concentrations are at 250µg/m3 or above, would comprise of using HEPA filters located near to the exhaust of the soil screener and on the ground close to the 360 excavator loading the screener. The type of HEPA filter utilised would allow 5,000m3/hr per unit and 2 units would be employed to allow for 10,000m3/hr flow rate. A typical HEPA filter employed on construction sites is shown below on the attached link.

https://www.dustarrest.com/product/dustblocker-5000-air-filtration-cleaner

You must identify the main chemical constituents of the site's point source emissions as part of the site's inventory of emissions to air.

Table 2. Chemical Constituents of Emissions

Source	Chemical Constituents
Biotreatment area	TPH, PAHs, BTEX, total VOCs
Asbestos building	PM10 from indoor soil screener and excavator unless electric or hybrid plant is used

All other sources are suppressed and therefore prevented from occurring. PM10 emissions from vehicles/plant outside of the asbestos building are not deemed to be point source emissions.

You must make an assessment of the impact of the substances emitted to air, following the Environment Agency's guidance; Control and monitor emissions for your environmental permit https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit#dust-mud-and-litter

A historical assessment of the impact of substances to air was completed in 2016 by Amec in the Air Quality Assessment document for the treatment of 150,000t of soils at the treatment facility. This assessment has not changed despite the inclusion of asbestos contaminated soils to the permit. There are no additional emissions from this activity above those permitted in 2016 as the restrictions placed on waste acceptance prevents airborne asbestos emissions from occurring. The same standards will be maintained if the permit variation is approved with an improvement in air quality as a result of reduced plant use. There is a change however in areas of the site being used for soil treatment with the extension in use of the building and adjacent soil storage area. However, the measures detailed in Table 1 of this response are utilised to mitigate any emissions to the limits provided in Table 3.

You must design, operate and maintain an appropriate monitoring system on site to ensure dust, PM10 and asbestos fibres releases are prevented, if not minimised, from leaving the site boundary.

Table 3 provides detail of the existing monitoring undertaken on site for reporting as a permit condition, additional monitoring undertaken for internal management and control of emissions (but not required to be reported as a permit condition) with an update on locations in Appendix A to reflect the change in layout proposed for the site.

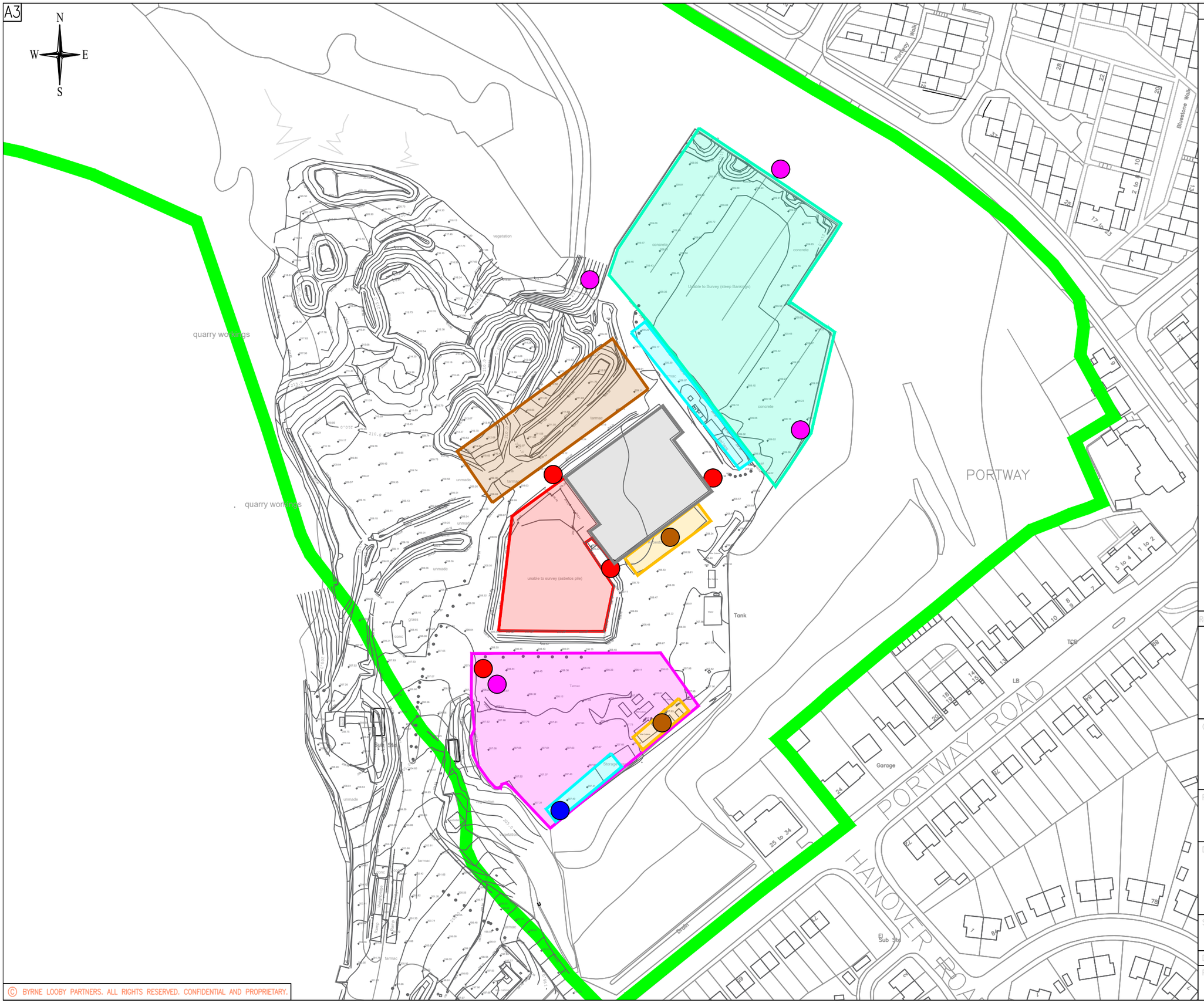
All equipment is calibrated at a frequency dictated by the manufacturer rather than a 4 monthly interval.

Table 3. Emissions Monitoring

Parameter	Frequency	Thresholds	Comments
Asbestos (TCM)	Daily during initial soil screening	<0.01f/ml	Proposed for permit variation to replace monitoring during hand picking. Method as described in M17 guidance and Table S3.3. This frequency is far in excess of other similarly permitted facilities.
Asbestos (SEM)	Quarterly		Added reassurance to ensure baseline of asbestos emissions is not changing. Method is as described in M17 guidance. Detection limit anticipated to be <0.0005f/ml. This monitoring is far in excess of other similarly permitted facilities.
Dust	Monthly	200mg/m2/day	Frisbee dust gauge method as described in M17 guidance.
Soil moisture content	Reception testing of soils as per	15% moisture content	To ensure soils received have low potential for dust release
Asbestos content in soils	Reception testing of soils	<0.1% chrysotile, <0.01% other types of asbestos fibres. No visible unbound asbestos or insulation	To ensure soils received cannot generate airborne emissions of asbestos above the method detection limit
PM_{10}	Weekly or as required if dust is suspected	250µg/m3/15 minute TWA*	Use of hand held nephelometer – not used for compliance against EU Directive Limit for PM_{10} as stated in EA Guidance M8, but provides real time results for implementing immediate mitigation if results are within 25% of threshold. A hand held mobile device for discrete monitoring around working areas. This method is preferred to support operational control of emissions rather than a fixed monitoring system for general air quality analysis at fixed locations (e.g. Filter Dynamics Measurement System/Beta Attenuation Monitor)
TPH/BTEX/PAHs	Monthly	None stated in permit	Biofilter Monitoring as described in Table S3.1
VOCs	Weekly or as required	1mg/m3 benzene	Use of calibrated PID around working areas on biotreatment pad. For ensuring RPE requirements are respected and biofilter is not overloaded with VOCs from incoming soils.
Odour	Daily	Absent	To ensure site activities do not cause nuisance
Noise	Monthly	85dBA	Occupational exposure monitoring in close proximity to working plant.
Treated water	Monthly	As required by trade effluent consent	Reported to Severn Trent to ensure compliance with trade effluent consent

*Mitigation implemented if within 25% of threshold due to accuracy of nephelometer method
Grey shading means the analysis results are already reported as required by the permit

A3



GENERAL NOTES

1. SURVEY INFORMATION SUPPLIED BY THE WASTE RECYCLING GROUP .
2. DO NOT SCALE
3. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM
4. ANY ANOMALIES ON THIS DRAWING ARE TO BE BROUGHT TO THE ATTENTION OF BYRNE LOOBY

KEY

- PERMIT BOUNDARY
- NON–HAZARDOUS SOIL STORAGE AND SCREENING AREA
- BIOLOGICAL TREATMENT AREA
- BIOFILTERS
- HAZARDOUS SOILS STORAGE AREA
- BIOLOGICAL TREATMENT AREA/SOIL WASHING AREA
- WATER TREATMENT PLANTS
- SOIL TREATMENT BUILDING
- AIR SAMPLING: ASBESTOS/PM10
- AIR SAMPLING: TPH/BTEX/PAH'S
- AIR SAMPLING: DUST/NOISE/ODOUR
- WATER SAMPLING: SEVERN TRENT

Rev	Date	Description	By	Chk	App

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CLIENT

waste recycling group

PROJECT

EDWIN RICHARDS QUARRY
SOIL TREATMENT CENTRE

DRAWING TITLE

EMMISIONS MONITORING PLAN

STATUS

FINAL

Date: 20.06.23	Scale: 1:1500	Drawn: JM	Chk: JW	App: JW

Project No:	Drg. No:	Rev:
K0182	K0182.2.003	01

STC – WI 014 – EMISSIONS CONTROL AND MONITORING

Author:	Jon Owens - STCM	**Approved By:**	Steve Langford - MD
Distribution:	Z/QMS/Work Instructions - STC		

Document Changes

Revision No:	Summary of Changes	Date
1	N/A	05/03/18
2	Addition of SEM testing detection limit	30/09/20
3	Inclusion of new treatment areas	06/06/22

Introduction

This Work Instruction (WI) sets out the measures taken to manage and control emissions of dust, PM10, asbestos fibres and VOCs/odours as part of permit requirements for Edwin Richards Soil Treatment Centre – EPR/HP3632RP/V003. This procedure is in addition to existing monitoring and measures undertaken by Provectus and FCC on site.

Principle of Operations

The main objective of the operation is to monitor, manage and minimise dust, PM10 and asbestos fibres from potentially being released at the soil treatment facility.
WI 007 – Environmental Monitoring outlines the sites current monitoring regime which includes dust and PM10 monitoring around the site. While *WI 011 – Processing of Asbestos Contaminated Soils* describes the measures in place with regards to ambient asbestos fibre monitoring in the air.

Procedure

All soils entering the Soil Treatment Centre (STC) undergo pre-assessment where the suitability is checked to ensure it meets the acceptance criteria such as asbestos type and fibre content.

Once on site soils are sampled for compliance and moisture content. Where soils are found to be too dry, they can be acted upon by damping down. For soils stored externally it is highly unlikely that they become dry enough to generate dust due to the UK climate.

Any soils that fail the compliance criteria shall be segregated and rejected from site and sent to an appropriately licensed facility.

Soils containing asbestos for picking are to either be placed directly in the asbestos shed or in the external storage areas shown on the attached drawing. Current monitoring undertaken within the asbestos shed has shown that fibres are not detected >0.01f/ml or >0.0005f/ml at any point (depending on what method is used for monitoring). When in use, the asbestos shed access road is to be routinely sprayed down with a propriety surfactant mixture. Dust levels on the roads in and around site are controlled through regular damping down and sweeping.

Externally, asbestos containing soils are to be covered with a tarpaulin or equivalent once formed into a static batch. If the soils are being moved to the asbestos shed, or being added to, then the tarpaulin can be temporarily removed.

Soil moisture content for exposed soils within the shed and also in the external storage area is to be checked to ensure moisture levels are above 15%. Soils with moisture content below 15% shall be dampened down using the irrigation system on site

Monitoring

Monitoring locations will be placed around the perimeter of site. These locations are to be monitored on a weekly basis for PM10 using a *Dustmate* – which will be calibrated as per the manufacturer's guidance. Action will be taken if dust results record levels greater than 250µg/m^3 over a 15 minute TWA, such as additional dust suppression on the roads via a water bowser, road sweeper or damping down soils with a pressure washer.

Additionally, frisbee dust gauges shall also be placed at these monitoring locations. This shall be sent to an accredited laboratory monthly for testing of deposited dust. Should levels of deposited dust exceed 200mg/m^2/day then actions as previously described, shall be taken.

Ambient asbestos fibre monitoring shall continue in the shed whilst activities are occurring to ensure compliance with the permit level of <0.01f/ml or the WHO levels of <0.0005f/ml. Additional monitoring shall take place externally around the storage area to confirm that fibres are not being released though site activities. This will be done via an accredited asbestos monitoring contractor. All of this monitoring is to confirm that no emissions are being generated on site.

Noise

The noise thresholds are contained within the noise assessment and are monitored on a weekly basis. It is not anticipated that the addition of the biotreatment pad will increase the noise levels at the site due to the acoustic insulation used on all equipment and previous monitoring that has shown that noise levels are not exceeding 5dB above background at the site boundary.

Odour

There is a low potential for odour at the site. Odour monitoring is undertaken on a daily basis with the target of no odour detected at the site boundary.

Biofilter Emissions

The point emissions from the STC biotreatment process to air are controlled through the site biofilter that is present on two separate biotreatment areas. On a monthly basis, sampling of the gases directly exhausted from the biofilter will be undertaken by an independent laboratory. The parameters to be tested are described in the site specific Environmental permit, typically this includes VOC's, TPH, BTEX and PAH. The biofilter is periodically changed or refreshed to ensure that it remains effective.

All results of monitoring shall be stored on the company server and/or site files.

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www.byrnelooby.com
www.ayesa.com/en/

Email: info@byrnelooby.com