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Ref: 100993/ERQ/MTL/001.

24 February 2022

Environment Agency
Permitting Services Centre
Quadrant 2
99 Parkway Avenue
Sheffield
S9 4WG

Dear Sirs

Mobile Treatment Licence EA/EPR/EB3636AK/A001 (EAWML105284) – PROVECTUS REMEDIATION LTD, Deployment Form – Edwin Richards Soil Treatment Facility, Portway Road, Rowley Regis, West Midlands, B65 9DS.

Please find included with this letter the deployment form for soil treatment works we wish to undertake at the above site commencing April 2022. We enclose the following:

- Completed Deployment form (including site plans).
- WAMITAB certification.
- Appendices with excerpts from the full environmental permit implemented at the site

The site is currently operated under a permit variation ref: EPR/HP3632RP/V003. The approach provided would be to temporarily consent the site to use a soil treatment method regularly implemented for land remediation work. This approach will achieve improved health and safety standards and emissions management compared to existing methods used at the site. All emissions and impacts will achieve the same standards already approved by the Environment Agency as a minimum. This method may then be implemented longer term under a permit variation.

The documents listed above contains the answers to the questions included in the form. We would like to pay by debit card over the phone; to process this deployment submission. Please contact Sarah Detheridge on 01902 810084, with email at: invoices@provectusgroup.com.

Registered Office: 9 Kingsdale Business Centre
Regina Road, Chelmsford, CM1 1PE
A Company registered in England & Wales
Company no. 4418196

Section A – Your Organisation

A1.3 – Contact Details

Provectus Remediation Ltd
Regent House,
Bath Avenue,
Wolverhampton
WV1 4EG

Contact name: Mr Jon Owens
Phone: 01902 810085
Mobile: 07932 910175
Email: jon.owens@provectusgroup.com

A1.4 – Preferred method of correspondence is by email.

A1.4 – The permit number is EA/EPR/EB3636AK/A001 (EAWML105284)

A2.2 – The address of the permit holder is detailed below;

Provectus Remediation Ltd
Regent House,
Bath Avenue,
Wolverhampton
WV1 4EG

Section B – Deployment Details

B1.1 Site Address

Edwin Richards Quarry Soil Treatment Facility, Portway Road, Rowley Regis, West Midlands, B65 9DS – currently operated under EPR ref: EPR/HP3632RP/V003

B1.2 - Site Plan

We attach a site plan (Appendix A) showing the location of the MTL operation on the site outlined in a red boundary. The plan in Appendix B shows the location of the immediate receptors and also the proposed location of the pollution control measures as described in the following sections. The Environmental risk assessment report is included in Appendix B and details of the site can be found in Section 2.

The site is a contained area that comprised a former aggregate ‘dust shed’ operated at the site which was adapted in 2018 to allow the physical treatment of soil to be undertaken. The purpose of the temporary soil treatment facility is to support the restoration of the site to meet the final levels for the site. Planning consent for both areas of the site used for soil treatment is included in Appendix F.

B1.3 – The operating site is covered by another Environmental Permit EPR ref: EPR/HP3632RP/V003.

B2 – Specific activities to be carried out at the site

B2.1 – The contaminants to be treated are;

- Removal of oversize debris from soils with sporadic bound ACM debris with asbestos fibre levels limited to: <0.1% for chrysotile and <0.01% for other forms of asbestos – this is known to be an effective threshold to prevent airborne emissions of asbestos in air

B2.2 – Authorised Activities

Provectus will be conducting the following activity within the soil treatment building at the site to improve operate safety and reduce emissions from mobile plant:

- Screening of soils to remove oversize hard materials (concrete/bricks) prior to hand picking of any residual ACM debris

Asbestos in Soil
Hand picking of soil has been undertaken on many remediation projects by Provectus using soil screening equipment and hand picking stations identical to the approach proposed for the Edwin Richards site. The soil screening approach is authorised for use under mobile treatment licences, and this is highlighted in the pan European publication in Appendix I.

It is proposed to implement the soil screening approach at the site within the soil treatment building. Asbestos has been monitored in air within the building on all occasions that soil treatment is undertaken since 2018 and this has never exceeded the permit threshold of <0.01f/ml or the operator proposed threshold of <0.0005f/ml. This correlates with the experience of soil remediation projects.

The only difference between the approach proposed here and soil remediation projects is that the acceptance criteria for asbestos fibres in soil are far stricter than on a remediation project. The soil screening approach proposed for this MTL deployment will remove oversize materials from soil and separate out soil fractions that can be handpicked more effectively.

The soil screening will therefore reduce damage to the picking station that has occurred historically from oversize inclusions. This will reduce the timescale for hand picking and result in reduced emissions from mobile plant. The soil screener will have daily asbestos monitoring to confirm that no emissions above 0.0005f/ml are occurring and ensure that the permit limit of 0.01f/ml is always respected.

B2.3 – The site does not form part of a cluster project.

B3 – Duration of this Deployment

B3.1 – The Duration of this deployment is up to 52 weeks, and we do not anticipate any periodic breaks. The deployment will cease once any formal permit variation is

approved for the screening process. In the event that the permit variation is approved prior to this MTL deployment then this deployment will not commence.

B4 – Management Supervision

B4.1 – Andy Clee is to be the technically competent manager overseeing this deployment. The award certificate for Andy is included in Appendix G.

4.2 – Provectus site staff will be present during working hours during the operation of the facility. Further technical support to Andy Clee will be provided by Jonathan Owens. The COTC certificate for Jonathan Owens is included in Appendix G.

B5 – Waste types and quantities

The specific waste types and maximum quantities that will be treated at the operating site are listed below;

Waste type	EWC Code	Quantity	Medium
Solid wastes	See list below	45,000m^3	Solid
Total		**45,000m^3**	

The list for treatable wastes is detailed below although the vast majority is anticipated to be 17 06 05* other construction materials containing asbestos, or 17 05 03* soil and stones containing hazardous substances. Hazardous wastes are limited to 89,999t/annum. No unbound asbestos or insulation material will be treated by this process.

Waste code	Description
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**
17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 03*	soil and stones containing hazardous substances (CONTAINS IDENTIFIABLE PIECES OF BONDED ASBESTOS (any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye))
17 05 04	soil and stones other than those mentioned in 17 05 03 (CONTAINS IDENTIFIABLE PIECES OF BONDED ASBESTOS (any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye))
17 06	**insulation materials and asbestos-containing construction materials**
17 06 05*	construction materials containing asbestos (DISCRETE PIECES OF BONDED ASBESTOS WITHIN THE SOIL MATRIX ONLY)

B6 – Acceptance Procedures

The procedure for processing soil is provided in Appendix C – this includes the thresholds for ACM fibres in soil that can be processed by soil screening.

B7 – Conceptual Site Model and Risk Assessment

Please refer to Appendix D – environmental risk assessment report.

The table is presented in Table 5 of the report for the entire site relating to dust emissions. Also included in Appendix C & D of this report (included in Appendix D) is the dust management plan for the site and emissions monitoring and management plan that is implemented at all times.

B8 – Pollution Control

The site is secure and is part of the larger waste management facility. Assessments of fugitive and point source emissions from the soil screening are included in the report in Appendix D. Dust is managed effectively with all asbestos monitoring and dust monitoring undertaken and submitted to the EA on a quarterly/annual basis as required.

Surface Water Management

Accumulations of surface water are unlikely to pose a significant problem due to the location of the operation inside a covered building, engineered pad and associated drainage. However, in the highlight unlikely event that accumulations of water, occur and potentially pose a risk to adjacent areas will be controlled on site to prevent run off. Control measures include an internal drainage system and pumping system to the on site water treatment system.

Groundwater Monitoring

No monitoring is proposed. The wider area has their own agreed monitoring regime for areas surrounding the soil treatment facility.

B9 – Emission Monitoring Plans

The emissions monitoring plans are contained within Appendix D of the Environmental Risk Assessment Report (Appendix D).

B10 – Commissioning, Operating and Maintenance

Operation and maintenance of all plant and equipment required for the treatment process will be conducted by suitably qualified engineers and operators. Checks of all screening plant and equipment will take place on a weekly basis and recorded, a copy of which will be stored on site during days of operation. Daily visual checks of the soil screens are undertaken and cleaned if there is a build up of cohesive soil.

Quantity Measurement Systems

The amount of soil treated by treatment methods will be measured when the loads are measured on the weighbridge. The total amount of hazardous soils will not exceed 89,999t/annum.

We trust the enclosed is acceptable to you, if you have any queries regarding the above, please do not hesitate to contact me on the numbers provided below. We look forward to hearing from you shortly.

Kind Regards,

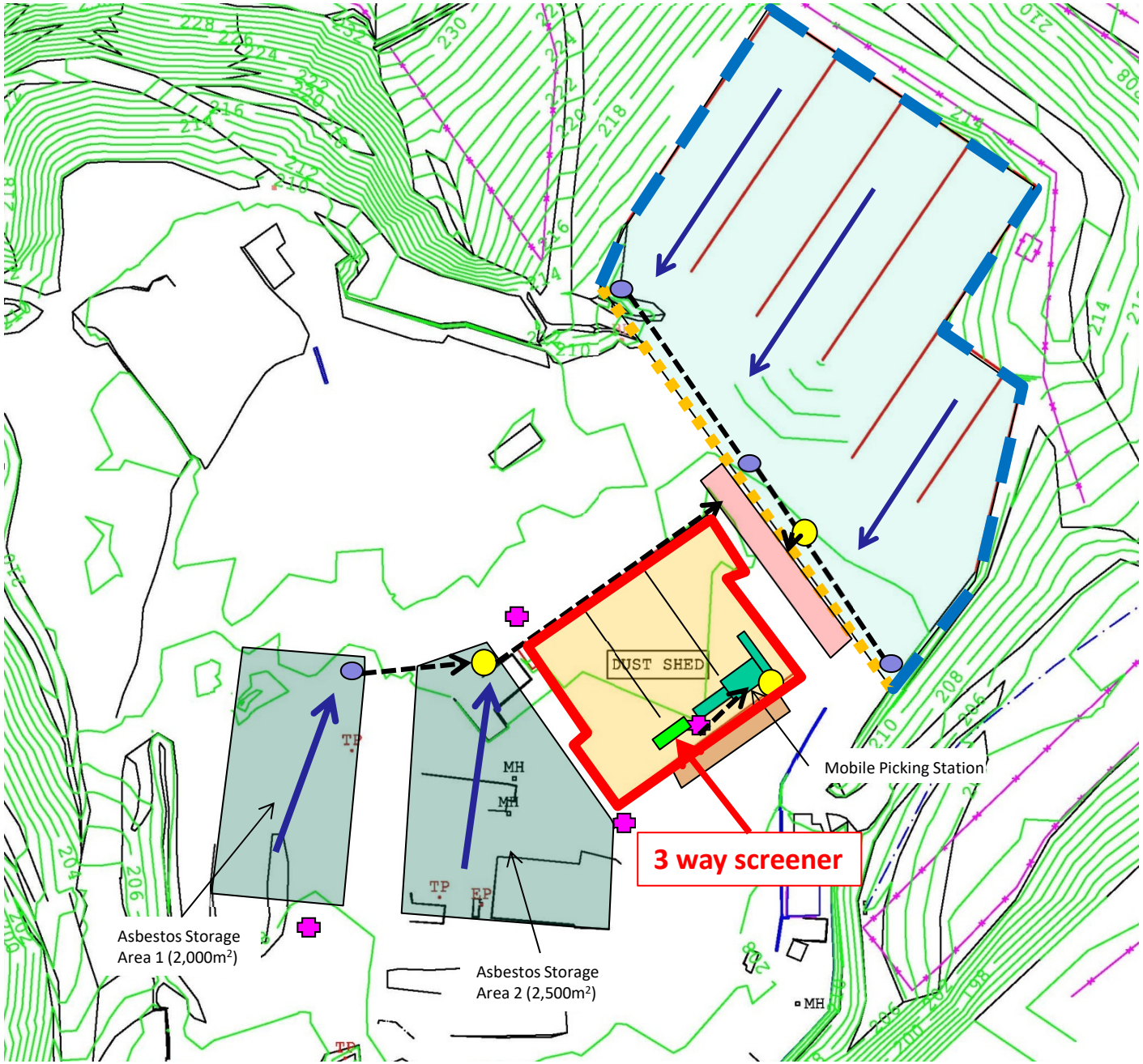
Jon Owens
Director, Soil Treatment

Direct Dial 01902 810084
Mobile 07932 910175
Direct Email jon.owens@provectusgroup.com

Enc.

- **Appendix A – Site Drawings**
- **Appendix B – Soil Reception Procedure**
- **Appendix C – Soil Processing Procedure**
- **Appendix D – Environmental Risk Assessment Report**
- **Appendix E – Planning Permission**
- **Appendix F – COTC Certificates**
- **Appendix G – Asbestos in Soil, Nicole 2021.**

APPENDIX A – Site Drawings



Fall of Pad Drainage

Underground drains

Pumping Chamber

Asbestos Treatment Area

Biological Treatment Area

Treatment Plant Location

External Asbestos Storage

Biofilter

Air sampling: asbestos

Extent of MTL boundary

PROVECTUS

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Client: FCC Environment

Project: ERQ MTL , Rowley Regis

Job No.: 100993/MTL

Title: Location of Soil Screener

Scale: NTS

Date Drawn: February 2022

Drawing No.: 100993/MTL – Asbestos DWG3/Rev1

APPENDIX B – Soil Reception Procedure

STF – FO02 - SOIL RECEPTION PROCEDURE

Document No:	STF - RR - FO02	**Issue No:**	2
Author:	Jon Owens	**Approved By:**	Steve Langford
Issue Date:	19/01/18	**Approval Date:**	19/01/18

Introduction

This procedure relates to the measures to be undertaken for the assessment of data and inspection of waste received at the soil treatment facility. It allows rejection of non-conforming waste to ensure no contaminated soils are accepted which cannot be treated by the treatment facility to a standard suitable for reuse, or which breach the list of permitted wastes as shown in the site's Environmental permit.

Principle of Operation

The inspection will allow the following to be assessed prior to acceptance:

1. Presence of untreatable and hazardous materials (e.g. tars, clinker, asbestos insulation etc.) in the contaminated soil.
2. Presence of excessive litter/debris in the contaminated soil.
3. Compliance with the previously supplied chemical/physical analysis information (supplied by waste producer).
4. Potential for the waste to behave as a liquid or have free water/oil in the waste

If the waste material is not compliant with the agreed conditions of the Environmental Permit and pre-acceptance assessment then the waste will be declined/rejected. As a note, the forms of untreatable asbestos described in point 1 are predominantly insulation products as follows in Table 1.

Table 1. Unacceptable Forms of Asbestos Insulation Products

Form of asbestos	Example
Asbestos pipe lagging	
Loose asbestos fill	
Asbestos insulation board (AIB)	

Procedure

Pre-Acceptance Assessment

This is undertaken by Provectus to confirm treatability to meet the reuse criteria. A set of Terms and Conditions for acceptance are sent to the Waste Producer including a clear statememt of any waste characterisation samples that are deemed untreatable. These are agreed in writing between the Waste Producer and Provectus prior to an authorisation number (contract line) being issued by FCC at the weighbridge for deposit at the Soil Treatment Facility.

Where data gaps exist or queries remain about the suitability of material for treatment, Provectus or FCC will offer to attend the site of origin to undertake pre-acceptance analysis and visually inspect the material and obtain further information about the waste description.

In the event that the moisture content of the waste being in the range of 25-30% then the potential for free water or oil will be further reviewed. Where moisture contents are at this level or even higher and the material does not behave as a liquid, have the potential for releasing water/oil etc and is suitable for the site infrastructure then it would be accepted on a case by case basis.

Should either Provectus, or after consultation, FCC determine that there is the high potential for material to contain untreatable inclusions or to behave as a liquid or contain free water or oil then the waste will be declined for acceptance.

Duty of Care Documentation

Duty of Care Documentation and other legal procedures (registration of hazardous waste site *etc*.) are completed between the Waste Producer and forwarded to FCC. No tipping on the STF will be permitted without relevant documentation from the waste producer. This must be checked on-site at the STF to ensure that the load is indeed destined for the STF, and that the documents are correctly completed. In the case of hazardous waste, the consignment note shall be filled in by a member of Provectus staff; and in the case of non-hazardous waste, the waste transfer note shall be inspected at the STF site office, and the load checked by a Provectus staff member at the STF.

Health and Safety

The site technician or PM is to provide guidance to the location for soil to be tipped, and any relevant safety information prior to tipping of soil.

Technicians and site personnel are to stand well away from the lorry when tipping so as to avoid any crush injuries/incidents as a result of being in close proximity to the tipping lorry. Any drivers must be informed of the requirement to wear a hard hat and high visibility vest when outside of the lorry cabin.

Lorries shall be informed to check that any waste/debris is removed from their lorry prior to leaving the STF.

Visual Inspection: Waste Input

The following locations will be used for accepting wastes:

- Hydrocarbons only: biopile treatment area
- Asbestos only, or asbestos and hydrocarbons: asbestos processing shed

The following plant and personnel are required as part of this procedure:

- Provectus STF Technician
- Excavator / loading shovel (if available)

Each load of soil for inspection will be tipped onto the nominated quarantine area by the tipper lorry. The technician will inform the tipper lorry driver to remain at the stockpiling area until the inspection has been completed.

In the event of the material containing free water or oil, the load will be immediately rejected.

In the event of untreatable forms of asbestos being present, the load will be immediately rejected

The excavator will be used to expose any unsuitable materials and allow a comprehensive visual assessment. The technician will determine the next action when this has been completed, this will comprise of the following:

- Waste is accepted and tipper lorry is permitted to leave the STF with the accompanying paperwork, or;
- Waste is not accepted and the unsuitable element of waste load, either partial or complete load is removed by excavator and placed back into the tipper lorry. A rejection form is filled in on-site and both Landfill Manager (LM) and Sales Manager (SM) are informed. It is the duty of FCC to inform the Environment Agency of any rejected loads.

At the end of the formal waste acceptance procedure the soil will be prepared for processing or biotreatment. Coordination of further treatment/processing events is to be decided by the Site Manager/Site Operator.

Chemical Analysis: Waste Input

Based on visual inspection, sampling frequency will be considered; this is in relation to the volume from each hazardous waste production site. Sampling will be undertaken on soils using composite sampling methods described in BS812.

The chemical analysis of soils generally takes 5-7 days to complete, therefrore limited storage times are required. Materials will be placed into treatment as soon as practicable from the receipt of chemical analysis and formal acceptance of the waste.

The range of contaminants for analysis will be based upon the original contaminating substances. A copy of the analysis shall be checked by the PM for verification against the original client data. In the event of non-conformity, the PM shall liaise with the LM and SM, and a decision on the next course of action will be taken.

For avoidance of doubt, the limits for asbestos from laboratory testing will be as follows:

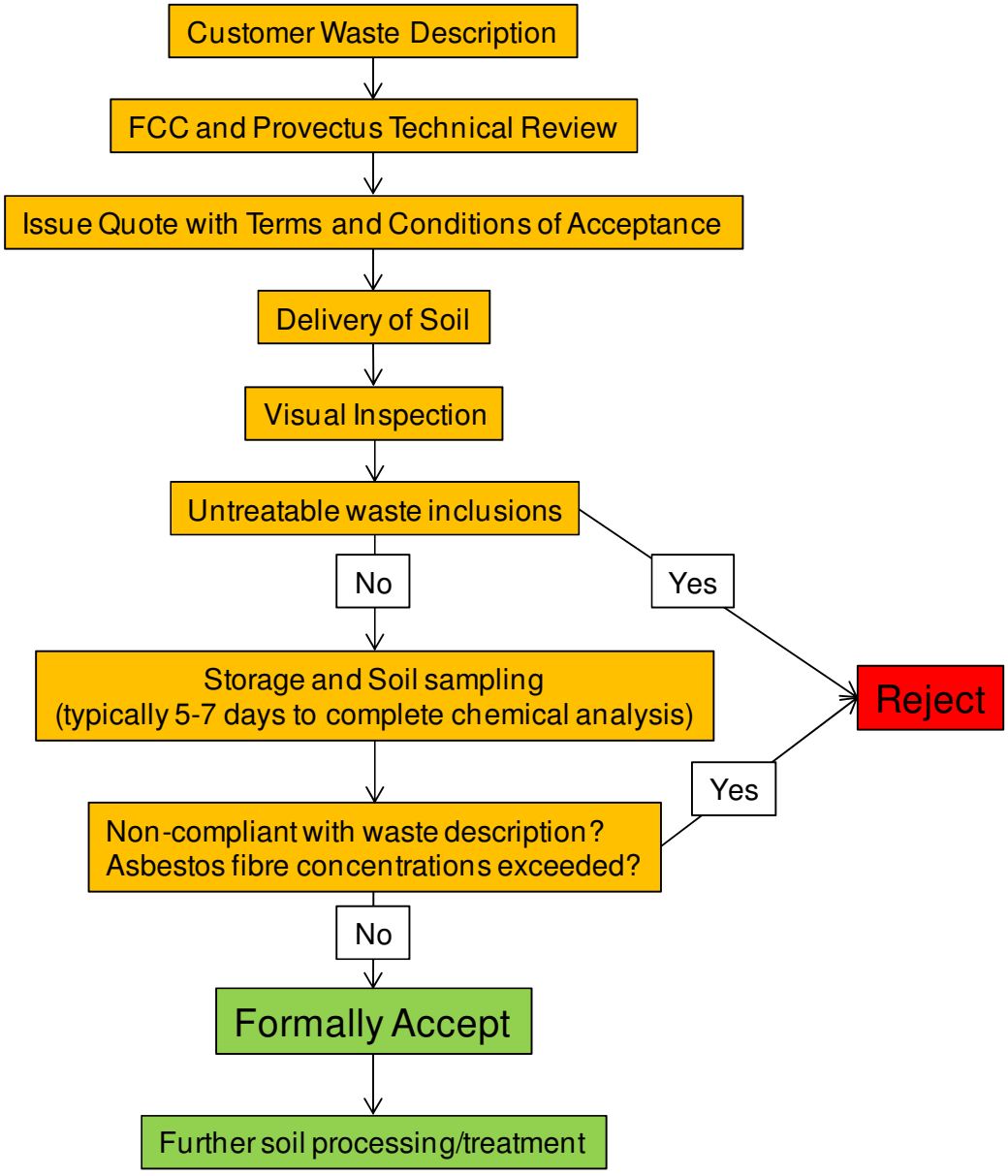
- Chrysotile only: 0.1%
- Other forms of asbestos (or chrysotile and others): 0.01%
- Asbestos debris limited to those which can be removed as Notifiable Non-Licensed Works (NNLW)

The waste will only be formally accepted once initial reception analyses is received in accordance with procedure STF PR02.

Summary of Waste Reception

Figure 1 is a flow diagram for the waste reception procedure. The procedure is implemented to ensure that the waste is only formally accepted once visual inspections and chemical analysis of received wastes has been successfully completed. This ensures that any soils that are formally accepted are suitable for further soil processing/treatment. All non-compliant wastes will be rejected.

Figure 1. Summary of Waste Acceptance Procedure



APPENDIX C – Soil Processing Procedure

STC – WI 011 – PROCESSING OF SOILS WITH VISIBLE ASBESTOS DEBRIS

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

Document Changes

Revision No:	Summary of Changes	Date
6	Changes for permit variation application to increase storage and screen soils prior to hand picking.	08.04.19

Definitions and Abbreviations

ACM – Asbestos Containing Materials
NNLW – Notifiable non-licensed works

Introduction

This procedure relates to the measures to be undertaken for the removal of visible ACM fragments from soil received at the site. The purpose of the removal of asbestos debris would be to allow further treatment of soils by biotreatment or to stockpile processed soils for disposal in the non-hazardous void.

Principle of Operation

The general principle of the operation is to receive and treat soils at the site with visible asbestos fragments that would be classified as hazardous waste under Environment Agency guidance WM3.

The aim of the processing works would be to remove visible fragments from the soil to facilitate direct reuse in the adjacent non-hazardous void or for further biotreatment to reduce hydrocarbons to concentrations suitable for reuse in the adjacent non-hazardous void.

Pre-acceptance checks and analysis of the received soil and processed soil will ensure that no unsuitable soil is received at the facility either for treatment, or disposal in the non-hazardous void. Air monitoring during the soil processing works will ensure the protection of site workers and surrounding receptors.

The works would be notified to the HSE as notifiable non-licensed works (NNLW) on the basis that ACMs are potentially broken/degraded and require effective management to ensure the protection of workers and surrounding receptors. No licensed works are proposed for treating soils at the site.

Procedure

Analysis for soils impacted with visible asbestos fragments would be reviewed prior to any offer to accept at the Edwin Richards Quarry. Waste acceptance limits for asbestos fibres in soils would be **0.1%** for serpentine asbestos (chrysotile) and **0.01%** for amphibole asbestos types. Site visits will be undertaken and any supplementary analysis undertaken to comply with STC-WI 002 and STC – WI 003 to ensure that soils are suitable for treatment using the available methodology at the site.

Should any non-compliant wastes be encountered the standard rejection procedure should be implemented. In the event that the works to reject waste would constitute licensed asbestos works in accordance with HSE guidance, the standard notification would be made and works would cease until the non-compliant waste is removed.

Soils would be received at the site and placed on to the external asbestos storage area. Soils will be visually inspected to ensure non-compliant materials (e.g. insulation products) are not present, sampled and covered with a tarpaulin to ensure control of any potential emissions during the reception analysis phase. The reception analysis will be reviewed and only soils that are deemed to have no potential to generate asbestos fibres above the detection limit of <0.01f/ml will be formally accepted. Soils that have the potential to generate airborne asbestos fibres, i.e. they exceed the asbestos fibre acceptance criteria or contain non-compliant products (e.g lagging, asbestos insulation board etc) will be rejected and removed from site.

Stockpiled soils will be transferred into the asbestos building by dumper and loaded onto a three way screen with a fines, mid range and oversize separation system. The mid range fraction will be loaded directly onto the picking station with asbestos operatives removing visible fragments and double bagging prior to storage in a locked skip. The fines and oversize will be visually inspected prior to storage in the internal storage bays for validation testing. If visually identifiable asbestos is present in the fines or overzsize fraction these will be loaded onto the picking station for picking prior to validation testing.

The locked asbestos skip will be removed from site when full and taken to a hazardous landfill for disposal.

All personnel will enter and leave the building via the designated decontamination facility.

Plant/Equipment to be Used:

- Tarpaulins
- Asbestos air monitoring equipment
- 360 excavator
- Front loading dumper
- 3 way screener
- Picking station
- Decontamination Unit

Plant/Operator Certification Required:

- CPCS/CSCS Cards
- Asbestos Awareness

Summary of Known or Suspected Hazards (either construction, physical or contamination hazards identified):

- The stored soil from a variety of sources will contain low levels of ACM debris and asbestos fibre concentrations lower than the waste acceptance limits previously described. The potential for airborne asbestos fibres being generated is considered extremely low.
- The potential routes of asbestos exposure are by inhalation of dust.
- Potential exposure to plant exhaust gases from undertaking the works inside a building are mitigated by having large entrance and exit openings that allow continuous ventilation of the building
- Construction hazards (slips, trips and falls on uneven ground, machinery)
- Physical hazards associated with moving equipment & machinery.

General Description of Work

- Soils received will be covered with tarpaulins whilst awaiting reception analysis
- Reception analysis to be reviewed and approved by the Operations Manager prior to any transfer of soil into the asbestos processing building
- All screening and hand picking works to be undertaken with background air monitoring to confirm if asbestos fibres are being generated
- Enter clean end of decontamination unit and pick up disposable overalls/overshoes (if used) and disposable RPE if used
- Don PPE and where required RPE (as specified) prior to entering designated area of site via dirty exit of decontamination unit
- Excavate stockpiled soils in a controlled manner with handpicking of debris into waste asbestos sack directly where possible. Where required, use the surfactant spray if any asbestiform materials appear dry/friable. Place double bagged ACM debris in the dedicated lockable skip at the end of each work period.
- Wipe all tools, etc. with a dampened cloth.
- Place used damp rags in a waste sack and seal.
- At the edge of the work area, clean the outside of all waste sacks and seal.
- Wipe off boots and face mask (if worn) with a cloth and bucket provided.
- Disposable overalls (turned inside out), gloves and where required, any used disposable respirators in asbestos waste bag. Seal the clear bag.
- Once soils have nil visible asbestos and are chemically approved as suitable for further treatment or reuse, remove from the building as required
- Ambient asbestos monitoring in air to be undertaken daily during screening/hand picking works. Works must cease to allow damping down measures to be implemented if fibre concentrations exceed **0.01f/cm3**.

Site Manager to conduct a visual inspection of work areas and transit routes. If a satisfactory level of cleanliness has been achieved they shall complete an interim sign off in the site diary.

Personal Protection

PPE:

- Hi-Visibility vest/jacket
- Hard Hat
- Protective boots (steel toecap/midsole)
- Disposable overalls: Type 5 (BS EN ISO 13982-1)
- Disposable overshoes where required
- Disposable gloves

RPE:

- disposable respirator to standards EN149 (type FFP3) or EN1827 (type
- FMP3);
- half or full mask respirator (to standard EN140) with P3 filter; or semi-disposable respirator (to EN405) with P3 filter. Masks would be positive or negative pressure depending on face fit requirements. Should negative

pressure masks be used then a break every hour of continuous use should be undertaken.

Also:

- Surfactant spay (e.g. Idenden Dampstrip Asbestos Penetrant 30-330 or similar)
- First Aid Kit
- Mobile Phone

Emergency Procedures

Personnel injury/overexposure:

Remove to fresh air and provide first aid procedures as required; Contact Emergency services if accident/injuries warrants; Decontaminate personnel if required (remove overalls and PPE, wash hands and forearms).

Fire or Explosion:

Evacuate the work area and summon local Fire Brigade. Do not attempt to fight fire. Remain upwind of smoke in safe area. Follow existing Site Procedures.

Decontamination Procedure

Personnel: 1) Remove disposable contaminated clothing and discard in the designated waste container.
2) Wash hands/face/forearms prior to leaving decontamination unit.

Site Rules

- **NO SMOKING**, No eating, drinking, or chewing of gum.
- Wear protective equipment specified above.
- Utilise good personal hygiene habits – wash hands and exposed skin with soap and water prior to leaving site.
- Remove and dispose of contaminated clothing as described above before leaving the working area.

The safe working procedures detailed in this method statement must be adhered to.

DECLARATION

I have read, understood and will comply with the requirements of this Safety Method Statement			
Name	Work Position	Signature	Date

APPENDIX D – Environmental Risk Assessment Report

TerraConsult

November 2020

4236/R/003/4

Edwin Richards Quarry - Soil Treatment Centre

Environmental Risk Assessment Report

Permit Variation Application

Prepared for:

Waste Recycling Group (Central) Limited

Edwin Richards Quarry - Soil Treatment Centre

Environmental Risk Assessment Report

Permit Variation Application

November 2020

Carried Out For:

Waste Recycling Group (Central) Limited

Ground Floor West
900 Pavilion Drive
Northampton Business Park
Northampton
NN4 7RG

Prepared By:

Bold Business Centre
Bold Lane
Sutton
St. Helens
WA9 4TX

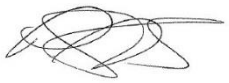
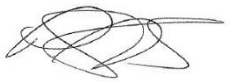
Telephone: 01925 291111

DOCUMENT INFORMATION AND CONTROL SHEET

Document Status and Approval Schedule

Report No.	Title
4236/R/003/4	**Edwin Richards Quarry - Soil Treatment Centre: Environmental Risk Assessment Report**

Issue History

Issue	Status	Date	Contributors	Signature	Date
4	Reissued to EA	**November 2020**	**Prepared By:** C. Finney		November 2020
			Checked By: P Roberts		November 2020
			Approved by: P. Roberts		November 2020

DISCLAIMER

This consultancy contract was completed by TerraConsult Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, the degree of manpower and resources allocated to the project as agreed.

TerraConsult Ltd cannot accept responsibility to any parties whatsoever, following the issue of this report, for any matters arising which may be considered outwith the agreed scope of works. This report is issued solely to the client and TerraConsult cannot accept any responsibility to any third parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents at their own risk.

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1.0 INTRODUCTION

1.1 Background

1.1.1 TerraConsult Limited (TerraConsult) was commissioned by Waste Recycling Group (Central) Limited (WRG) to prepare an application to vary the Environmental Permit reference EPR/HP3632RP/V002 for the following:

- Amend the split of hazardous / non-hazardous waste treated at the facility by increasing the annual throughput for hazardous waste by 29,999 tonnes per annum (tpa) to a total of 89,998 tpa and reducing non-hazardous waste from 120,001 tpa to 60,002 tpa related to the following activities:
  - S5.3A(1)(a)(ii) Physical treatment of hazardous waste;
  - S5.3A(1)(a)(ii) Asbestos removal from soils;
  - S5.4A(1)(a)(ii) Physical treatment of non-hazardous waste;
  - S5.3 A(1)(a)(i) Bioremediation of hazardous waste
  - S5.4A(1)(b)(i) Bioremediation of non-hazardous waste
- Permit acceptance of wastes classified as hazardous HP10 (toxic for reproduction) in Table S2.3;
- Addition of EWC codes 17 09 03* (other construction and demolition wastes (including mixed wastes) containing hazardous substances), 17 09 04 (mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03) to Table S2.6 of the Permit;
- Addition of EWC Codes 19 12 11* other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances and 19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 to Table S2.3;
- Addition of code R5 to Table S1.1 to enable equivalent treatment activities to S5.3 A(1)(a)(i) and S5.4 A(1)(b)(i) for recovery as well as disposal;
- Amendment to Table S1.1 Activity S5.6 A(1)(a) or addition of a new activity for the temporary external storage of up to 10,000 tonnes untreated hazardous soils containing asbestos pending further treatment or transfer off-site;
- Increase of non-hazardous waste storage limit from 100,000 tonnes to 150,000 tonnes (Table S2.5);
- Permission to pre-screen soils containing bound asbestos debris; and,
- Removal of the 150,000 tonne per annum waste dewatering and solidification activities as listed in Table S1.1 of the Permit and the list of waste types listed in Table S2.4 of the Permit.

1.1.2 This Environmental Risk Assessment (ERA) report has been prepared to support the Permit variation application. This risk assessment has been undertaken using current Environment Agency (the Agency) Guidance on risk assessments for your environmental permit issued as web based guidance. The guidance referenced identifies a four step process to risk assessments which can be summarised as:

- Risk identification;
- Risk assessment;
- Appropriate control; and
- Presentation of assessment.

1.1.3 The guidance indicates that the following parameters require assessing:

- Odour;
- Noise and vibration;
- Fugitive emissions including dust, mud and debris; and
- Accidents.

1.1.4 A comprehensive H1 ERA prepared by Amex Foster Wheeler Environment & Infrastructure UK Limited (Amec) 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. With the exception of the additional waste types all other aspects of the activity remained unchanged and therefore the ERA was limited to a review of the original H1 assessment for the handling of wastes and management of material that may contain asbestos containing material (ACMs).

1.1.5 Due to the nature of the proposed changes to the activity as part of this application a similar approach will be taken. It is not considered necessary to revise all aspects of the previous ERAs therefore only the activities with proposed changes will be further assessed. For clarity, Table 1 identifies each aspect of the previous ERAs and states whether further consideration is necessary. For the purposes of this ERA, despite the removal of the dewatering activity (150,000 tonne per annum) a reduction in tonnage has not been considered as the activity never commenced. Therefore overall throughput has not been increased.

Table 1: Review of ERAs

Original ERA Impact Assessment Criteria	Proposed changes which require further assessment	Further assessment required?
Odour	Increase the annual throughput for hazardous waste. Addition of EWC codes 17 09 03*, 17 09 04,19 12 11* and 19 12 12.	**Yes. Increase in quantities of hazardous waste could potentially increase odour due to presence of hydrocarbons and therefore will need to be assessed however treatment is limited by the capacity of the bioremediation area and the treatment capacity will not change.**
Noise	No proposed changes to how waste is delivered / exported. New pre-screening soils containing bound asbestos debris activity added to operations. No other changes to existing activities.	**Yes. Pre-screening activity for soils containing bound asbestos debris could increase noise from the facility.**
Release of Pollutants from Traffic	No proposed changes to how waste is delivered / exported, moved around the site, or overall tonnage	**No changes to this aspect.**
Fugitive Emissions from Vehicle Movements	No proposed changes to how waste is delivered / exported, moved around the site, or overall tonnage	**No changes to this aspect.**
Dust from non-hazardous soil storage	Increase to non-hazardous waste storage limit from 100,000 tonnes to 150,000 tonnes	**Yes. Potential increase in dust due to increased storage of non-hazardous soils.**

Original ERA Impact Assessment Criteria	Proposed changes which require further assessment	Further assessment required?
Dust from Waste Handling Operations	New pre-screening soils containing bound asbestos debris activity added to operations. Temporary external storage of up to 10,000 tonnes untreated hazardous soils containing asbestos pending further treatment or transfer off-site.	**Yes. Potential increase in dust being released from pre-screening operation and storage**.
Release of dust / bio-aerosols from screening, placement and turning of soil biopiles.	No changes to how waste is handled prior to, during and after biopile treatment, or total quantity of waste being treated at any one time	**No changes to this aspect**
Release of VOCs from contaminated soils	No changes to how waste is handled prior to, during and after biopile treatment. Variation will increase the quantities of hazardous waste. No changes proposed to existing abatement controls.	The contaminated soils to be accepted and biologically treated have the potential for the release of VOCs. Despite the addition of soils classified as HP10 the Operator does not propose to accept batches of waste soils with an average TPH concentration of >3%. The biopiles are subject to extraction ventilation when operational or meteorological conditions require it and the size of the biopiles will not change as a result of the increase in hazardous waste. The potential for VOC release during biopile remediation will remain low due to the active controls in place. **No changes to this aspect.**
Potential Contaminated run-off	Removal of the 150,000 tonne per annum waste dewatering activity.	Dewatering of dredging spoil likely to have produced significantly higher quantities of organic rich effluent than water running off the sheeted soil containing asbestos fragments which will be stored on a clay-lined, kerbed, hardcore reinforced pad with sealed drainage. **Diminished risk / no change in this respect.**
Birds, vermin and insects attracted to site	No proposed change to waste types which would attract pests to the site	**No changes to this aspect.**
Mud from vehicle movement and litter escape from site and/or delivery vehicles	No changes to site operations, vehicle transit routes or existing controls to reduce mud being tracked off site. No proposed changes to waste types that will include a source of wind-blown litter. Overall quantities of waste brought to site remain unchanged.	**No changes to this aspect.**
Leak or spillage of waste soils	No change proposed to how waste is brought to site, bunded areas or spillage containment measures.	**No changes to this aspect.**
Containment Failure	No changes proposed to how waste is brought to site. New containment area to be installed for external storage of asbestos soils. Same standards and measures applied to prevent and contain spillages applied.	The new containment area for asbestos soils will be a geotextile clay liner, kerbed, hardcore reinforced pad with sealed drainage. The running surface will drain to a pumping chamber which will send any water to an additional tank in the water treatment plant area. This will ensure there is sufficient capacity for containing drainage from the larger external area in the event of a storm.
Flooding	New containment area to be installed for external storage of asbestos soils. Same standards and measures applied to prevent and contain spillages applied. Flood risk classification has not changed.	
Accidental Fires	No proposed changes which result in more	Level of containment equivalent to

Original ERA Impact Assessment Criteria	Proposed changes which require further assessment	Further assessment required?
	flammable wastes being brought to site. No change to quantities of existing potentially flammable material (wood chip) stored on site. New containment area to be installed for external storage of asbestos soils. Same standards and measures applied to prevent and contain spillages applied.	original silt dewatering activity and over smaller surface area. **Diminished risk / no change in this respect.**
Incompatible substances	New waste types do not have higher risk of containing incompatible wastes	**No change to this aspect.**
Vandalism causing loss of containment/ fire	No changes to security measures	**No changes to this aspect.**

1.1.6 The conclusion of Table 1 is that potential odour, noise and dust emissions from handling operations require further assessment. In addition a review will be made of the previously identified pathways and receptors which may have changed since the previous ERA was submitted in 2017.

1.1.7 The Agency guidance requires information to be presented in the form of risk assessment tables, one table each for odour, noise and fugitive emissions. Identification of accidents scenarios and their prevention through operation management should also be detailed. Each table should identify the hazard, the potential receptors and the pathway from the hazard to those receptors. The tables should also include the preventative risk management practice to be employed along with an assessment of the mitigated risk.

1.1.8 The Site has the following standalone emission management plans in place for the Site which are appended to this ERA:

- Odour Management Plan (Appendix B)
- Dust Management Plan (Appendix C)
- Emissions Management and Monitoring Plan (Dust, PM10 & Asbestos Fibres) (Appendix D)

2.0 SCOPE OF THE ASSESSMENT

2.1 Current Operations

2.1.1 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 non-hazardous landfill site also operated by WRG. 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).

2.2 Proposed Additional Operations

2.2.1 The Operator proposes to increase the proportion of hazardous waste to be treated at STC from 29,999 tonnes per annum to 89,999 tonnes per annum. A commensurate reduction in non-hazardous waste throughout will be required. The increase in the hazardous soils will not result in an increase in treatmentas this is limited by the capacity of the treatment technologies employed at the Site. The bays in the asbestos building has a storage capacity of 3,750 m^3/6,000t. The bioremediation area has a treatment capacity of 26,640 m^3 based on the maximum biopiles height of 5 m (as dictated by planning restrictions). The asbestos building and the bioremediation area have adequate controls for dust and odour that are based on full occupation of the treatment areas.

2.2.2 The waste types to be accepted under 19 12 11* / 19 12 12 comprise soil like material that accumulates in skips and becomes washed off when the skips are emptied. The soil removed from scrap metal skips is normally classified as 19 12 11* (hazardous) due to the potential hydrocarbon content exceeding 0.1%. The STC only accepts soils with a biodegradable oil/organic content that can be treated through bioremediation, including treatable fractions from other sites. Therefore, the waste types are in keeping with the EWC codes already accepted at the STC.

2.2.3 The Operator proposes to pre-screen the soils contaminated with asbestos fragments prior to handpicking to remove oversize aggregate materials which would otherwise damage the handpicking station and prolong hand picking works whilst oversize is manually removed by site personnel. The limits applied to the asbestos content in the soil matrix will not change.

2.2.4 The Operator proposes to store soils containing discrete asbestos fragments pending pre-screening external to the building in a designated asbestos storage area. This will provide a safer environment for soil treatment staff and overall improvements in soil segregation and quarantining capacity as well as more efficient soil treatment operations and reduced emissions. Any asbestos waste will be sheeted prior to transfer into the building for pre-screening and handpicking. The soil will be stored on an impermeable surface with sealed drainage.

2.2.5 To broaden the operational capability of the STC, waste classified as HP10 (hazardous for reproduction) and additional EWC codes 17 09 03*, 17 09 04, 19 12 11*, and 19 12 12 are required to be added to the permit. The STC is currently permitted to accept wastes with waste hazardous properties HP4 to HP7 and HP14 for bioremediation.

2.2.6 The Operator does not propose to accept soil with an average TPH concentration > 3%. The addition of HP10 is primarily to account for data resulting from analysis of individual samples collected at site investigations prior to their import to the Soil Treatment Centre. Data reported from individual samples may report a TPH concentration of >3% TPH, which may for example have resulted from a surface spill of heating oil or diesel fuel. However this may be due to a hotspot area identified at a specific location before a stockpile was formed or from the stockpile itself. For the purposes of waste acceptance at this

installation, the overall average TPH concentration of a stockpile (or other defined batch of waste) will be below 3%. No operational changes at the STC are proposed as the technical measures assume there is no change in the composition of waste from that currently permitted.

2.3 Potential Hazards

2.3.1 Table 1 identified that odour, noise and dust emissions require further assessment due to the potential changes to impacts on human health or the environment resulting from the proposed changes to the permit. Operational practices to manage these activities are detailed in the accompanying Technical Standards report referenced 4236/02/01 and summarised below.

Odour / VOC emissions

2.3.2 A comprehensive Air Quality Assessment produced by Amec (Report Ref: rr533il) in support of the original permit application assessed the potential odour emissions from the STC. This identified that primary potential source of odour at the STC is from potential Volatile Organic Compounds (VOC) release from soils contaminated with solvents or other organic residues. The following sources / activities associated with the STC have the potential to produce odorous emissions:

- Delivery of waste to the STC and initial pre-acceptance assessment;
- Transfer of soils to appropriate storage area (biopiles, external and internal asbestos soils storage);
- Bioremediation of hydrocarbon contaminated soils including initial placement, aeration and turning;
- Pre-screening of soils containing asbestos fragments which may be contaminated with hydrocarbons;
- Handpicking of asbestos fragments of soil with potential hydrocarbon contamination and subsequent storage prior to further treatment in biopiles.
- Storage and transfer of residual material;
- Removal of contaminated residues from treatment process;

Hazardous Soils Increase

2.3.3 The application proposes to vary the ratio of hazardous and non-hazardous soils with the amount of hazardous soils increasing from 29,999 tonnes per annum (tpa) to a total of 89,999 tpa and reducing non-hazardous waste from 120,001 tpa to 60,001 tpa related to the following activities. The proposed increase of hazardous waste throughput will not increase the size or capacity of the biopiles or the amount of soil in treatment at any one timeas this is limited by the capacity of the treatment technologies employed at the Site. The bays in the asbestos building has a storage capacity of 3,750 m^3/6,000t. The bioremediation area has a treatment capacity of 26,640 m^3 based on the maximum biopiles height of 5 m (as dictated by planning restrictions). The asbestos building and the bioremediation area have adequate controls for dust and odour that are based on full occupation of the treatment areas. The rate and nature of any odour emission already assessed will therefore not change, just the frequency at which the biopiles are fully occupied. The potential for odour release during the bioremediation process are effectively controlled through the odour abatement unit for the biopiles comprising the air extraction system which has been installed and designed for full occupation of the bioremediation area. The network of perforated aeration pipes installed beneath the soil biopiles are linked to a high performance vacuum blower system. 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 blower is located within an insulated and secure shipping container. The exhaust to air extraction system is connected to the biofilter to capture and treat the degradation products and reduce particulate and odour emissions. The biofilter comprises a woodchip medium filter.

2.3.4 The addition of new EWC codes and ability to accept waste classified as hazardous under HP10 (toxic for reproduction) will not change the nature of the contaminants in the material being treated i.e. hydrocarbons. The Operator does not propose to accept soil with an average TPH of above 3% and this aspect will not change (see Section 2.2.5).

2.3.5 The Operator has advised that it is unlikely that soil accepted for treatment to remove asbestos fragments will also be contaminated with hazardous concentrations of hydrocarbons, as these waste streams are largely from different types of source site. Processing material heavily contaminated with hydrocarbons through the screen / handpicking line is not preferred as it presents significant operational difficulties such as contamination and protection of personnel and plant. For this reason the residual material removed from the screen is equally unlikely to be contaminated with levels of hydrocarbons that could cause an odour. Soil which has been subjected to screening and picking is unlikely to be contaminated with solvents or organic residues limiting the potential for VOC release if disturbed.

2.3.6 To date it has been confirmed by the Operator there has been no odour complaints at the STC.

2.3.7 The risk assessment for odour including mitigation controls is provided in Table 3. An Odour Management Plan (Report Ref: 4236/R/006/3) is provided at Appendix B.

Noise and Vibration

2.3.8 The current sources of noise and vibration associated with the STC result primarily from the movement and operation of site plant during operational hours and continual operation of biopile management plant. The most likely sources of noise and vibration would be fans, pumps and motors, along with general noise associated with vehicle movement.

2.3.9 Whilst physical treatment of soils using a screener is permitted at the site, it has not been implemented. The introduction of screening equipment into the asbestos building is the only change to the noise and vibration source term. This equipment will process soils potentially containing fragments of hardcore and stone which are too large to send through the handpicking station. Such items have caused damage to the station previously and posed risk to site personnel. The noise associated with any granular material passing through a screen can be significant but this will be operated inside an enclosed building to mitigate any elevated noise levels. The noise associated with running processed material through the picking line will be significantly less as the larger fragments have been removed along with the fines fraction resulting in materials that will be easier to pick. Therefore, after the initial screening the timescales for hand picking and supporting plant and therefore overall noise emissions are significantly reduced compared to the current operation.

2.3.10 The screen will be located inside the building and only run as required. There are already strict controls on the operation of this aspect of the installation i.e. handpicking can only take place when personnel are in appropriate PPE and air monitoring is being carried out. The same controls will apply to the screening activity. The building and surrounding topography both offer an acoustic barrier to noise emissions. A Noise Management Plan is already in place and includes measures to mitigate noise from plant equipment.

2.3.11 The risk assessment for noise and vibration is discussed further in Table 4.

Dust

2.3.12 The main changes to site operations which may result in the generation of additional dust emissions comprises: the increase in external storage of non-hazardous waste from 100,000 tonnes to 150,000 tonnes, the external storage of up to 10,000 tonnes of soils contaminated with discrete fragments of asbestos; and, the pre-screening in the building of the same material to remove large aggregate or other fractions. The proposed change in the ratio of hazardous to non-hazardous soils to be accepted at the facility will not result in an increase in dust as the overall treatment and handling procedures will not change. The Site has an Emissions Management and Monitoring Plan in place to for the prevention and control of dust, PM10 and asbestos fibres. This includes monitoring procedures and management controls to limit the potential for dust, PM10 and asbestos fibres to be released.

Non-hazardous Soil Storage

2.3.13 The location of the non-hazardous soil storage area is not proposed to change. The increase in the storage capacity by 50,000 tonnes is facilitated by the removal of the 150,000 tonne per annum solidification and dewatering activities. The soil storage area is bounded to the south by the Soil Treatment Building and bounded to the north by the tree lined perimeter bund. The Edwin Richards Quarry is located to the west of the soil storage area with the bioremediation area located to the east. During particularly dry weather the storage areas will be dampened down as necessary. Current additional dust management and suppression measures comprise a mobile 'Dust Cannon' atomiser that directs a fine mist at a specific point or activity over a wide space.

Asbestos Storage

2.3.14 A technical assessment of the waste is undertaken by the Operator to confirm whether the waste meets the acceptance criteria and can be treated to meet the reuse criteria. This is based on chemical analysis provided by a potential Waste Producer. If the waste meets the acceptance criteria and is confirmed as treatable, WRG will issue an authorisation number which allows the acceptance of the waste from the Waste Producer. On arrival at the STC all waste will be weighed at the weighbridge and all appropriate documentation is to be provided. The waste will be directed to a designated soil reception area. The pre-acceptance assessment at the soil reception area will be overseen by the STC Manager and comprise a visual inspection and sampling of the soil for analytical testing. The soil reception area is located within the asbestos storage areas.

2.3.15 The proposed asbestos storage areas will be located to the south west of the Soil Treatment Building. The asbestos soils will be stored on the impermeable kerbed concrete pad with sealed drainage. After deposit in the designated area, the waste will be sheeted to prevent potential mobilisation of dust. The waste will be subject to pre-assessment to confirm the soil matrix will not contain asbestos fibres at concentrations (based on current permit limits) which could be liberated to air. The sheeting of the stockpiles is therefore a precautionary measure. This material will be re-excavated and moved to the building as required for pre-screening prior to handpicking. The sheeting will be in place when the soils are not being excavated or deposited.

Pre-screening of asbestos soils

2.3.16 Once reception analysis is received to confirm that soils have no potential to generate airborne asbestos fibres they will be moved to the asbestos shed. Any soils received that have the potential to generate airborne asbestos fibres above the detection limit of 0.01f/ml will be rejected from site. Soils containing asbestos accepted on site will then be pre-

screened within the building to allow the removal of oversized and fine fractions which have the potential to damage the picking station along with the fines that can conceal smaller bound asbestos debris. The pre-screening will increase the efficiency of the soil processing and will not result in airborne asbestos fibres above existing approved levels. It will also significantly decrease the timescales for picking thereby significantly reducing exhaust emissions from mobile plant.

Hand-picking of asbestos soils

2.3.17 Screened soils containing visible asbestos debris will enter the picking station from the soil screener conveyor. Hand-picking of small asbestos fragments is undertaken by suitably trained operatives. The asbestos fragments are placed in individual polythene bags directly adjacent to each operative. When full the picking line conveyor is stopped and the sealed bag placed into a second bag. The double bagged asbestos is placed in a designated container which will not exceed 10 tonnes.

Ambient Air Monitoring

2.3.18 The STC is permitted to accept waste soils containing mixed forms of asbestos with soil fibre concentrations <0.01% w/w and chrysotile asbestos with soil fibre concentrations <0.1% w/w. The application of these soil asbestos fibre limits is to remove the potential for airborne emissions of asbestos fibres. Asbestos air monitoring is currently undertaken at 4 locations at the Site in accordance with Table S3.3 of the Permit and the data assessed against the method detection limit of 0.01 fibres/ml (HSE clearance limit). The sampling methodology follows HSG 248 Asbestos: *The analysts guide for sampling, analysis and clearance procedures*.

2.3.19 Data collected by the Operator from ambient air monitoring and personal monitoring confirms that the reception and handling of soil containing asbestos fibres that meet the Permit limits does not result in liberation of fibres at concentrations exceeding 0.01 fibres/ml. The monitoring data reported was below the limit of detection on all occasions and is attached as Appendix A. The pre-acceptance procedures and monitoring undertaken to date demonstrates that there are no point source emissions of airborne asbestos fibres. The changes to the asbestos processing will not increase the emissions of airborne asbestos fibres. The reason for this is that the site does not accept asbestos products or asbestos concentrations in soil that could give rise to airborne asbestos above the air monitoring method detection limit of 0.01f/ml. This statement is supported by the Operator's subcontractor experience and monitoring data on several sites over many years operating under a Mobile Treatment license (MTL).

2.3.20 Current additional dust management and suppression measures comprise a mobile 'Dust Cannon' atomiser that directs a fine mist at a specific point or activity over a wide space. Surfactant is added as a precautionary measure in the unlikely event of amphibole asbestos fibres being present (Amphibole fibres are hydrophobic (unlike chrysotile fibres) and this makes the fibres more difficult to remove from airborne suspension or likewise immobilise them on soil surfaces with water alone). Low levels of surfactant is added to water (1 part surfactant to 15 parts water) which is applied to the soil surface only. This mitigation measure is present for use but has not been shown to have been required within the building due to the strict acceptance criteria and the efficiency of pre-acceptance procedures employed at the STC.

2.3.21 Screening of material will only occur at designated times and when all personnel in the building are wearing the correct PPE, when dust monitoring apparatus is running, the necessary dust mitigation measures i.e. misting sprays are operational and with due regard to avoiding this activity during windy conditions.

2.3.22 The risk assessment for dust including mitigation controls is discussed further in Table 5. A Dust and Particulate Management Plan (Report Ref: 4236/R/005/2) is provided at Appendix C. The Site has an Emissions Management and Monitoring Plan in place to for the prevention and control of dust, PM10 and asbestos fibres. This includes monitoring procedures and management controls to limit the potential for dust, PM10 and asbestos fibres to be released.

2.4 Potential Pathways

2.4.1 The transit mechanism for potential odour, noise and fugitive emission reaching potentially sensitive receptors is through the air. This will be determined by:

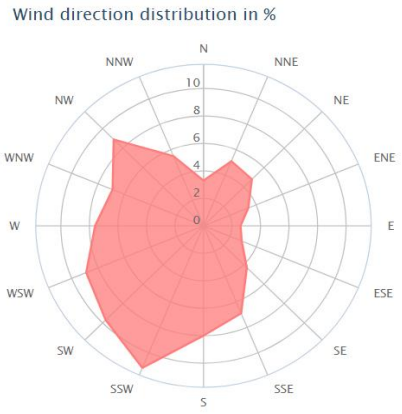
- The quantity of waste at source
- The ability of waste to leave the treatment building
- Wind direction and speed
- Intervening obstacles
- Exposure of receptor to waste

2.4.2 The windrose reproduced as Figure 1 is based on meteorological data from Birmingham Airport. The windrose indicates a prevailing south to south-westerly wind with a north-westerly and occasional north-easterly component. The risk associated with fugitive dust emissions are detailed in Table 2 below.

2.5 Potential Receptors

2.5.1 For consistency the receptors identified in Table 2 of the original ERA have been referenced. Receptors No 11 (Rowley Hall Primary School), No 12 (Grace Mary Primary School), 13 (Dudley Road) and 14 (Priority Habitats) have been added. The assessment will reference the distance from the STC permit boundary to the sensitive receptor.

Figure 1: Windrose, Birmingham Airport



2.5.2 The probability of exposure is determined by the distance of the receptor to the site and the likelihood of the hazard reaching a receptor (e.g. frequency of prevailing wind in the direction). This stage of the assessment assumes that exposure has resulted from an uncontrolled emission i.e. without mitigation. The distance of these receptors to the site boundary, their direction relative to the site and the frequency the wind blows in the direction of the receptor is detailed in Table 2. The locations of most concern are those regularly or permanently occupied by human receptors. Human receptors up to 500 m and sensitive habitats within 1 km of the STC have been identified and are shown on the Sensitive Receptors Plan (Drawing Ref: 4236/1/001).

Table 2: Potentially Sensitive Receptors

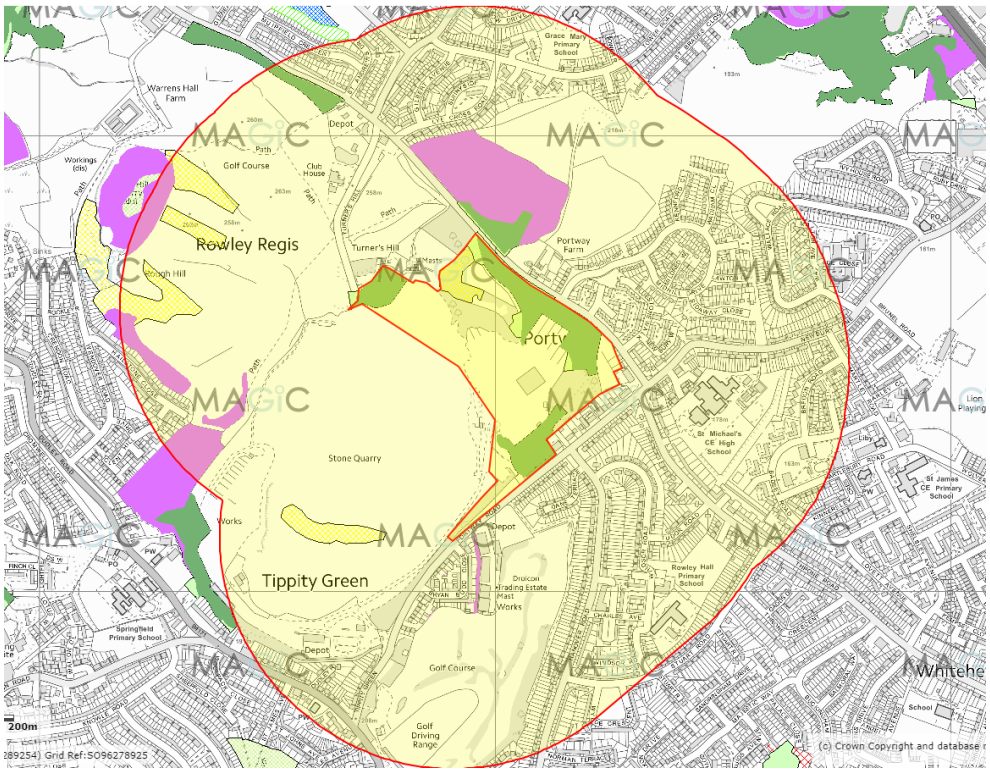
No.	Receptor Description	Receptor Type	Direction from Site	Distance to Building	Frequency downwind of site
1	Tower Road off Portway Hill	Residential properties	North-north-west	485 m	6.8 %
2	Dudley Golf Club House	Recreational facility	North-north-west	160 m	4.3 %
3	Portway Hill	Residential properties	North East	10 m	8.9 %
4	Old Portway House and Barn	Listed building	North	30 m	8%
5	Portway Road	Residential and Commercial Properties	East to South	10 m	7.6% to 3.4%
6	Warren Hall Country Park	Local Nature Reserve	West	635 m	2.5%
7	Bumble Hole	Local Nature Reserve	West	990m	2.5%
8	Rowley Hills	Local Wildlife Site	North East	225 m	9.8%
9	Dudley Golf Course	Recreational	West to North West	50 m	2.5% to 6.8%
10	Rowley Regis Golf Course	Recreational	South	120 m	3.4%
11	Rowley Hall Primary School	School	South-east	430 m	8.9%
12	Grace Mary Primary School	School	North-north-west	490 m	6.8 %
13	Dudley Road	Residential and Commercial Properties	South-west	475 m	4.7%
14	Deciduous woodland, woodland & good quality semi-improved grassland (nonpriority)	Priority Habitats	0-160m	NE to W	9.7% to 2.6%

2.6 Potentially Sensitive Habitats

2.6.1 The ‘Nature and Heritage Conservation Screen’ identified that the Fens Pools of Special Area of Conservation (SAC) is located 4.4 km west of the site. Local Nature Reserve’s Warren’s Hall Country Park and Bumble Hole are located 635m and 990m west of the Site. Numerous Local Wildlife Sites were also identified and the Screen is attached as Appendix D.

2.6.2 A review of Magic maps (https://magic.defra.gov.uk/magicmap.aspx, last accessed May 2019) showed there are three priority habitats located within 500 m the STC comprising deciduous woodland, good quality semi-improved grassland (non-priority) and woodland. The closest deciduous woodland is within the site boundary, the closest good quality semi-improved grassland is 50m north-east and the closest woodland is 160m west. Figure 2 shows the extent of priority habitats.

Figure 2: Extent of Habitats



2.6.3 Fens Pools SAC is located >1km from the site and will not be considered any further in this ERA.

2.6.4 Noise and vibration has the potential to disturb local wildlife and dissuade it from using the adjacent habitats. If emitted in high quantities and for sustained period of time, dust may settle on the adjacent land and smother flora. It is very unlikely that the site will be capable of producing sufficiently high levels of dust and for prolonged period of time.

3.0 Risk Assessment and Accident Management Plans

3.1 Risk Assessments

3.1.1 The specific risk assessments completed for Odour, Noise and Dust Fugitive Emissions are provided in Tables 3 to 5 below. In many cases there is an inter-relationship between these specific risk assessments and meteorological conditions and where relevant this has been identified. The pathway is determined by the location of the receptor relative to the site, the distance from the site boundary (m) and the frequency (likelihood) the prevailing wind will blow in the direction of the receptor (%) as determined by windrose data.

Mitigated Risk

3.1.2 The Mitigated Risk is the residual risk presented by the Hazard after control measures have been instigated.

Environmental Accidents

3.1.3 The Agency guidance requires the completion of an Accidents Risk Assessment and Management Plan. This should assess potential hazards associated with the proposed activity not described in the sections above.

Table 3: Odour Risk Assessment and Management Plan

Hazard / Pathway	Receptor				Probability of exposure	Unmitigated Consequence	Initial Risk / Reason	Risk Management	Mitigated Risk
	No.	Dist.	Direc.	Freq.					
Odour through the Air from: Waste storage. Bioremediation process.	1	485 m	NNW	6.8 %	Medium – distant from site, occasionally downwind	High - Odour nuisance to residents	High – odour nuisance	Strict waste acceptance procedures are in place to ensure that no non-conforming materials are accepted which may contain malodorous waste. Bioremediation management controls are in place including an air extraction system, biopiles only being turned during appropriate meteorological conditions. Air drawn from the biopiles passed through carefully managed biofilter and malodorous compounds removed. Within the Soil Treatment Building operational controls utilised for the control of asbestos soils also control the potential release of odour such as preventing unnecessary agitation of the material. Regular olfactory monitoring will be conducted and will take account of meteorological conditions and potential impacts of odour (however unlikely) on receptors. Further details are contained in the Odour Management Plan, attached as Appendix B	Low
	2	160 m	NNW	4.3 %	High - close to site, infrequently downwind	High - Odour nuisance to users of golf course	High – odour nuisance		
	3	10 m	NE	8.9 %	High – close to site , frequently downwind	High - Odour nuisance to residents	High – odour nuisance		
	4	30 m	N	8%	High – close to site, frequently downwind	High - Odour nuisance to residents	High – odour nuisance		
	5	10 m	E to S	7.6% to 3.4%	High close to site, infrequently to occasionally downwind	High - Odour nuisance to residents	High – odour nuisance		
	6	635 m	W	2.5%	Low - distant from site, infrequently downwind	Low – not a nuisance to habitats	Low – significant distance, infrequently downwind		
	7	990 m	W	2.5%	Low - distant from site, infrequently downwind	Low – not a nuisance to habitats	Low – significant distance, infrequently downwind		
	8	225 m	NE	9.8%	High - close to site, frequently downwind	Low – not a nuisance to habitats	Low – not a nuisance to habitats		
	9	50 m	W to NW	2.5% to 6.8%	High - close to site, infrequently to occasionally downwind	High - Odour nuisance to users of open space	High – odour nuisance		
	10	120 m	S	3.4%	High - close to site, infrequently downwind	High - Odour nuisance to users of open space	High – odour nuisance		
	11	430 m	SE	8.9%	Medium – distant from site, frequently downwind	High - Odour nuisance to students	High – odour nuisance		
	12	490 m	N to NW	6.8 %	Medium – distant from site, frequently downwind	High - Odour nuisance to students	High – odour nuisance		
	13	475 m	SW	4.7%	Medium – distant from site, occasionally downwind	High - Odour nuisance to residents	High – odour nuisance		
	14	0-160m	NE to W	9.7% to 2.6%	High – close to site and frequently downwind	Low – not a nuisance to habitats	Low – not a nuisance to habitats		

Table 4: Noise and Vibration Risk Assessment and Management Plan

Hazard and 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 on site. Site plant. Pre-screening activity.	1	485 m	NNW	6.8 %	Low – distant from site	High - noise nuisance to residents	Medium – potential noise nuisance	Noise Management Plan (Amec report Ref: 33012rr726i1) will be implemented. The NMP applies noise limit criteria derived from measure background sound levels. Noise monitoring is undertaken on site using an integrating-Averaging sound level meter or equivalent during construction operations, every 4 months during normal operations and in response to any complaint if received. On site speed limits will be enforced and internal site roads will be maintained to minimise noise / vibration. Appropriate maintenance of site vehicles in accordance with the manufacturer's or supplier's instructions. Where practicable, engines to be switched off when not in use. Silencers will be used on vehicles. Should it prove necessary alternatives to reversing bleepers on site vehicles will also be considered. Where possible pumps and mechanical plant shall be located behind existing screening mounds and be electrically powered. The air circulation plant will be enclosed in an acoustically treated shipping container, which would minimise noise	Low
	2	160 m	NNW	4.3 %	High – close to site	Medium – some nuisance to users of golf course	Medium – potential noise nuisance		
	3	10 m	NE	8.9 %	High – close to site	High - noise nuisance to residents	High – proximity of potential noise nuisance		
	4	30 m	N	8%	High – close to site	High - noise nuisance to residents	High – potential noise nuisance		
	5	10 m	E to S	7.6% to 3.4%	High – close to site	High - noise nuisance to residents	High – proximity of potential noise nuisance		
	6	635 m	W	2.5%	Low – distant from site	Medium – disturb local wildlife	Low – distance from site		
	7	990 m	W	2.5%	Low – distant from site	Medium – disturb local wildlife	Low – distance from site		
	8	225 m	NE	9.8%	High – close to site	Medium – disturb local wildlife	Medium – potential noise nuisance		
	9	50 m	W to NW	2.5% to 6.8%	High – close to site	Medium – some noise nuisance to users of open space	High – proximity of potential noise nuisance		
	10	120 m	S	3.4%	High – close to site	Medium – some nuisance to users of golf course	High – proximity of potential noise nuisance		
	11	430 m	SE	8.9%	Medium – proximity to site	High - noise nuisance to students	High – proximity of potential noise nuisance		
	12	490m	N to NW	6.8%	Medium – proximity to site	High - noise nuisance to students	High – proximity of potential noise nuisance		
	13	475 m	SW	4.7%	Low – distant from site	High - noise nuisance to residents	Medium – potential noise nuisance		
	14	0-160m	NE to W	9.7% to 2.6%	High – close to site	Medium – disturb local wildlife	Medium – potential noise nuisance		

Table 5: Dust and Fugitive Emission Risk Assessment and Management Plan

Hazard and Pathway	Receptor				Probability of exposure	Unmitigated Consequence	Initial Risk / Reason	Risk Management	Mitigated Risk
	No.	Dist.	Direc.	Freq.					
Dust through air from: Vehicle movements. Waste storage. Pre-screening activity. Bioremediation process.	1	485 m	NNW	6.8 %	Medium – distant from site, occasionally downwind	High - dust nuisance to residents	High –dust nuisance	On site vehicle speed limit enforced to ensure that vehicle movements do not generate excessive dust. Dust Cannon atomiser that directs a fine mist at a specific point for general dust suppression. Bioremediation management controls are in place including an air extraction system, biopiles only being turned during appropriate meteorological conditions. Weighbridge will conduct assessment of waste inputs and impose controls and restriction on potentially dusty waste (e.g. bagging, rapid cover following placement, refusal to tip). Daily visual inspection by appropriate site staff at suitable locations taking account of the prevailing wind direction. All vehicles will use wheel wash to prevent mud / dust being trailed onto adjacent roads and creating a hazard / nuisance. A street sweeper will regularly clean site roads of any mud trailed on from site vehicles. Dampening of site roads/surfaces as necessary using a tanker during dry periods. Further details are contained in the Dust Management Plan, attached at Appendix C and Emissions Management and Monitoring Plan attached at Appendix D.	Low
	2	160 m	NNW	4.3 %	High - close to site, infrequently downwind	High - dust nuisance to users of golf course	High – dust nuisance		
	3	10 m	NE	8.9 %	High – close to site , frequently downwind	High - dust nuisance to residents	High – dust nuisance		
	4	30 m	N	8%	High – close to site, frequently downwind	High - dust nuisance to residents	High – dust nuisance		
	5	10 m	E to S	7.6% to 3.4%	High close to site, infrequently to occasionally downwind	High - dust nuisance to residents	High – dust nuisance		
	6	635 m	W	2.5%	Low - distant from site, infrequently downwind	High – dust nuisance and potential to smother vegetation	Low – significant distance, infrequently downwind		
	7	990 m	W	2.5%	Low - distant from site, infrequently downwind	High – dust nuisance and potential to smother vegetation	Low – significant distance, infrequently downwind		
	8	225 m	NE	9.8%	High - close to site, frequently downwind	High – dust nuisance and potential to smother vegetation	High – dust nuisance		
	9	50 m	W to NW	2.5% to 6.8%	High - close to site, infrequently to occasionally downwind	High - dust nuisance to users of open space	High – dust nuisance		
	10	120 m	S	3.4%	High - close to site, infrequently downwind	High - dust nuisance to users of golf course	High – dust nuisance		
	11	430 m	SE	8.9%	Medium – distant from site, frequently downwind	High - dust nuisance to students	High – dust nuisance		
	12	490 m	N to NW	6.8 %	Medium – distant from site, frequently downwind	High - dust nuisance to students	High – dust nuisance		
	13	475 m	SW	4.7%	Medium – distant from site, occasionally downwind	High - dust nuisance to residents	High – dust nuisance		
	14	0-160m	NE to W	9.7% to 2.6%	High – close to site, frequently downwind	High – dust nuisance and potential to smother vegetation	High – dust nuisance		

Table 6: Accident Management Plan

Hazard	Receptor	Pathway	Probability	Consequence	Overall Risk	Risk Management	Mitigated Risk
Liquid Pollutant Leak or damage to portable fuel bowser, static fuel storage tank or site vehicles. Leak or damage to bioremediation equipment.	Groundwater	Through ground	Low	High - pollution of groundwater	Medium	Fuels, lubricants and process water tanks will be stored in bunded areas with 110% capacity. Site vehicles and plant will be subject to regular maintenance to ensure the risk of leaks of potentially harmful liquids are minimised; Waste management activities at the site will continue to be carried out on an impermeable surface with sealed drainage with discharge to on-site foul water drainage system; Spill kits are located within the Site Office. In the event of the spillage of polluting materials, immediate action will be taken to contain the spillage; The Site surface, covered buildings, roofed areas, fixed / temporary bays and containers are visually inspected at least weekly to ensure continuing integrity and fitness for purpose. The inspection and any necessary maintenance required will be recorded.	Low
	Surface Water	Lateral	Low	High - pollution of surface water	Medium		
Fire Uncontrolled burning of residual wastes or site vehicles.	Groundwater	Through ground	Low	High - pollution of groundwater through firewater run-off or leaks from damaged equipment	Medium	Wastes to be accepted at site will have a low organic content and inherently non-combustible in nature; Site vehicles and plant subject to regular preventative maintenance in line with site EMS procedures; Fire control equipment will be on hand, with major incidents to be dealt with by the Fire Brigade in accordance with site EMS Procedures.	Low
	Receptors listed in Table 1 above	Airborne	Low	Medium - smoke / odour annoyance	Medium		
Explosion Compressed gas cylinders, combustion of fuel storage tank	Site staff	Airborne	Low	High - danger of serious injury	Medium	Fuel is stored in separate installation with appropriate controls to prevent fire or explosion (i.e. no smoking on site); Compressed gases not required and therefore present for operation of installation. Site workshop located away from installation with appropriate controls in accordance with EMS procedures;	Low
	Groundwater	Through ground	Low	High - pollution of groundwater through leaks from damaged equipment	Medium		
Wastes storage Chemical reaction of incompatible wastes	Receptors listed in Table 1 above	Airborne	Low	Medium - odour annoyance or smoke from oxidising agents	Medium	Any potentially polluting substances will be appropriately stored.	Low
Vandalism Damage to site vehicles, fuel bowsers, air extraction system	Groundwater	Through ground	Low	High - pollution of groundwater through leaks from damaged equipment	Medium	Existing site security will prevent access by unauthorised persons. Vehicles will be kept overnight in a secure area with appropriate security measures.	Low
	Receptors listed in Table 1 above	Airborne	Low	Medium - odour annoyance	Medium		

4.0 Conclusions

4.1.1 The operational hazards associated with the proposed changes have been considered in the tables above. It has been concluded that with the use of appropriate mitigating controls where necessary, the installation will not present a significant risk to surrounding receptors.

DRAWINGS

4236/1/001 Sensitive Receptor Plan

42361/1/002 Site Layout Plan

Key

- Existing topography
- Soils treatment centre permit boundary
- Storage of soils containing asbestos

TerraConsult

Bold Business Centre, Bold Lane, Sutton, St Helens WA9 4TX

Client: waste recycling group

Site

Edwin Richards Quarry - Soil Treatment Centre

Title

Sensitive Receptors Plan

Scale	1:2,000	@ A1	
Drawing No.	4236/1/001		
Rev	Date	Description	
File	22313012sitelayout+Fill.dwg		
Date	06/19	Engineer	EG
Drawn	OS	Checked	FINAL

Key

- Soils Containing Asbestos Reception Area
- Biological Treatment Area
- Hydrocarbon Contaminated Soils Quarantine Area
- Treatment Plant Location
- Biofilter
- Air Sampling Monitoring Point

1) Site layout provided from Provectus Drawing No. 100993 - Asbestos DWG 2

TerraConsult

Bold Business Centre, Bold Lane, Sutton, St Helens WA9 4TX

Client: waste recycling group

Site: **Edwin Richards Quarry - Soil Treatment Centre**

Title: **Site Layout Plan**

Scale	1:1,000	@ A3
Drawing No.	4236/1/002	

Rev	Date	Description

File	4236.1.002 - Site Layout Plan		
Date	06/19	Engineer	XXX
Drawn	OS	Checked	FINAL

Z:\Jobs\4236 - FCC Provectus ERQ Substantial EP Variation\8 - Drawings\Drawings

APPENDIX A

ASBESTOS MONITORING DATA

Air Monitoring 2018

Date	Asbestos Analyst	Duration of test	Number of Fixed Monitoring Tests	Maximum Concentration	Detection Limit
08/05/2018	Envirochem	1hr 13mins	5	<0.01f/ml	0.001
16/05/2018	Envirochem	1hr 1min	4	<0.01f/ml	0.002
22/05/2018	Envirochem	1hr 1min	4	<0.01f/ml	0.001
13/06/2018	Envirochem	1hr 9mins	5	<0.01f/ml	0.002
11/07/2018	Envirochem	1hr	0	<0.01f/ml	0.001
19/07/2018	Envirochem	1hr 1min	4	<0.01f/ml	0.002
23/07/2018	Riverside	31mins	3	<0.01f/ml	0.01
24/07/2018	Riverside	1hr 10mins	4	<0.01f/ml	0.01
25/07/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
26/07/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
27/07/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
30/07/2018	Riverside	1hr 8mins	4	<0.01f/ml	0.01
31/07/2018	Riverside	1hr 8mins	4	<0.01f/ml	0.01
01/08/2018	Riverside	1hr 13mins	4	<0.01f/ml	0.01
02/08/2018	Riverside	1hr 6mins	4	<0.01f/ml	0.01
03/08/2018	Riverside	1hr 10mins	4	<0.01f/ml	0.01
06/08/2018	Riverside	1hr 15mins	4	<0.01f/ml	0.01
07/08/2018	Riverside	1hr 11mins	4	<0.01f/ml	0.01
08/08/2018	Riverside	1hr 9mins	4	<0.01f/ml	0.01
09/08/2018	Riverside	1hr 8mins	4	<0.01f/ml	0.01
10/08/2018	Riverside	1hr 10mins	4	<0.01f/ml	0.01
13/08/2018	Riverside	1hr 11mins	4	<0.01f/ml	0.01
14/08/2018	Riverside	1hr 6mins	4	<0.01f/ml	0.01
15/08/2018	Riverside	1hr 6mins	4	<0.01f/ml	0.01
16/08/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
17/08/2018	Riverside	1hr 9mins	4	<0.01f/ml	0.01
20/08/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
21/08/2018	Riverside	1hr 7mins	4	<0.01f/ml	0.01
22/08/2018	Riverside	59mins	4	<0.01f/ml	0.01
23/08/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
24/08/2018	Riverside	1hr 6mins	4	<0.01f/ml	0.01
28/08/2018	Riverside	1hr 4mins	4	<0.01f/ml	0.01
29/08/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
30/08/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
31/08/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
05/09/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
06/09/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
07/09/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
11/09/2018	Riverside	1hr 6mins	4	<0.01f/ml	0.01
12/09/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
13/09/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
14/09/2018	Riverside	1hr 28mins	4	<0.01f/ml	0.01
17/09/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
21/09/2018	Riverside	1hr 4mins	4	<0.01f/ml	0.01
28/09/2018	Riverside	1hr 4mins	4	<0.01f/ml	0.01
08/10/2018	Riverside	1hr 15mins	4	<0.01f/ml	0.01
09/10/2018	Riverside	1hr 12mins	4	<0.01f/ml	0.01
10/10/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01

Air Monitoring 2018

Date	Asbestos Analyst	Duration of test	Number of Fixed Monitoring Tests	Maximum Concentration	Detection Limit
11/10/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
12/10/2018	Riverside	1hr 3mins	4	<0.01f/ml	0.01
15/10/2018	Riverside	1hr	4	<0.01f/ml	0.01
16/10/2018	Riverside	1hr	4	<0.01f/ml	0.01
06/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
07/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
14/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
15/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
19/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
22/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
28/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
29/11/2018	Riverside	1hr	4	<0.01f/ml	0.01
04/12/2018	Riverside	1hr	4	<0.01f/ml	0.01
07/12/2018	Riverside	1hr	4	<0.01f/ml	0.01
12/12/2018	Riverside	1hr	4	<0.01f/ml	0.01
13/12/2018	Riverside	1hr	4	<0.01f/ml	0.01
14/12/2018	Riverside	1hr	4	<0.01f/ml	0.01
19/12/2018	Riverside	1hr	4	<0.01f/ml	0.01

Air Monitoring 2019

Date	Asbestos Analyst	Duration of test	Number of Fixed Monitoring Tests	Maximum Concentration	Detection Limit
03.01.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
11.01.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
17.01.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
23.01.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
30.01.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
13.02.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
20.02.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
25.02.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
07.03.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
14.03.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
20.03.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
26.03.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
28.03.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
02.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
04.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
10.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
11.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
12.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
15.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
16.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
17.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
18.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
23.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
26.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
29.04.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
03.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
07.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
09.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
16.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
21.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
23.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
28.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
30.05.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
04.06.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
06.06.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
10.06.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
11.06.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
12.06.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
13.06.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml
14.06.2019	Riverside	1 Hour	4	<0.01f/ml	0.01f/ml

APPENDIX B

ODOUR MANAGEMENT PLAN

TerraConsult

November 2020

4236/R/006/3

Edwin Richards Quarry - Soil Treatment Centre

Odour Management Plan

Permit Variation Application

Prepared for:

Waste Recycling Group (Central) Limited

Edwin Richards Quarry - Soil Treatment Centre

Odour Management Plan

Permit Variation Application

November 2020

Carried Out For:

Waste Recycling Group (Central) Limited

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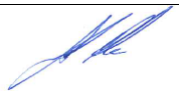
DOCUMENT INFORMATION AND CONTROL SHEET

Document Status and Approval Schedule

Report No.	Title
4236/R/006/3	**Edwin Richards Quarry - Soil Treatment Centre: Odour Management Plan**

Issue History

Issue	Status	Date	Contributors	Signature	Date
3	Reissued to EA	**November 2020**	**Prepared By:** E Greenhalgh		**November 2020**
			Checked By: P Roberts		**November 2020**
			Approved by: J Baxter		**November 2020**

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This consultancy contract was completed by TerraConsult Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, the degree of manpower and resources allocated to the project as agreed.

TerraConsult Ltd cannot accept responsibility to any parties whatsoever, following the issue of this report, for any matters arising which may be considered outwith the agreed scope of works. This report is issued solely to the client and TerraConsult cannot accept any responsibility to any third parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents at their own risk.

CONTENTS

DRAWINGS

TABLES

1.0 INTRODUCTION

1.1 Report Overview

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

- Increase the annual throughput for hazardous waste by 29,999 tonnes to a total of 89,999 tonnes with a commensurate reduction in non-hazardous soils from 120,001 to 60,001 tonnes;
- Permit acceptance of wastes classified as hazardous HP10 (toxic for reproduction);
- Addition of EWC codes 17 09 03* (other construction and demolition wastes (including mixed wastes) containing hazardous substances), 17 09 04 (mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03) to Table S2.6 of the Permit;
- Addition of EWC Codes 19 12 11* other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances and 19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 to Table S2.3;
- Addition of code R5 to Table S1.1 to enable equivalent treatment activities to S5.3 A(1)(a)(i) and S5.4 A(1)(b)(i) for recovery as well as disposal;
- Amendment to Table S1.1 Activity S5.6 A(1)(a) or addition of a new activity for the temporary external storage of up to 10,000 tonnes untreated hazardous soils containing asbestos pending further treatment or transfer off-site;
- Increase of non-hazardous waste storage limit from 100,000 tonnes to 150,000 tonnes;
- Permission to pre-screen soils containing bound asbestos debris; and,
- Removal of the 150,000 tonne per annum waste dewatering and solidification activities as listed in Table S1.1 of the Permit and the list of waste types listed in Table S2.4 of the Permit.

1.1.2 The Soil Treatment Centre (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 non-hazardous landfill site also operated by WRG. 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 that could give rise to unacceptable emissions).

1.1.3 An Air Quality Management Plan relating to both odour and dust (Report Ref: 33012rr722i2, November 2016) was submitted to discharge planning condition 14 of planning permission DC/14/57744. The purpose of this Odour Management Plan is to address the current and proposed activities at the STC which have the potential to cause emissions of odour and how these emissions will be minimised.

1.1.4 Reference has been made to the following guidance documents:

- H4 Odour Management: How to comply with your environmental permit (Environment Agency, March 2011);
- Sector Guidance Note IPPC S5.06: Guidance for the Recovery and disposal of hazardous and non-hazardous waste. Issue 5. May 2013.

1.1.5 A copy of this Odour Management Plan will be included in the Site Management System (or Working Plan) held at the Site Office and all members of staff will have access to this document.

2.0 ODOUR SOURCE TERM CHARACTERISATION

2.1 Odour Source

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

- Delivery of waste to site and initial pre-acceptance assessment;
- Transfer of soils to appropriate storage area (biopiles, external and internal asbestos soils storage);
- Bioremediation of hydrocarbon contaminated soils including initial placement, aeration and turning.
- Pre-screening of soils containing asbestos fragments which may be (albeit unlikely) contaminated with hydrocarbons;
- Storage and transfer of residual material removed from screen;
- Handpicking of asbestos fragments soil with potential hydrocarbon contamination and subsequent storage prior to further treatment in biopiles; and
- Removal of contaminated residues from treatment process.

2.1.2 The contaminated soils accepted on site may contain odorous organic substances due to the presence of hydrocarbons compounds. Odour may present a nuisance to surrounding human receptors or cause an adverse impact to the environment.

2.1.3 The wastes types to be accepted at Site are set out in Schedule 2 of the permit. The permit variation proposes the addition of waste classified as hazardous HP10 and EWC codes 17 09 03*, 17 09 0419 12 11* and 19 12 12. These wastes are very similar in nature to those already accepted at the Site and are unlikely to increase the odour potential of the waste source term on site.

2.1.4 The Operator proposes to increase the proportion of hazardous waste to be treated at site from 29,999 tonnes per annum to 89,999 tonnes per annum. A commensurate reduction in non-hazardous waste throughput will be required from 120,001 to 60,0001. This will not result in an increase in treatment capacity as this is limited by the capacity of the treatment technologies employed at the Site. The bays in the asbestos building has a storage capacity of 3,750 m^3/6,000t. The bioremediation area has a treatment capacity of 26,640 m^3 based on the maximum biopiles height of 5 m (as dictated by planning restrictions). The asbestos building and the bioremediation area have adequate controls for dust and odour that are based on full occupation of the treatment areas. The increase in hazardous soils to be accepted therefore does not pose an additional risk of odour emissions during bioremediation.

2.1.5 Soils accepted for biological treatment contain the following contaminants:

- range of petroleum hydrocarbons (petrol, heating fuel, diesel, used oils, crude oil etc.);
- polycyclic Aromatic Hydrocarbons (PAHs);
- creosote;
- phenols; and
- chlorinated Solvents and other Volatile Organic Compounds (VOCs).

2.1.6 Absence of oxygen during the bioremediation process may lead to anaerobic conditions developing in the soils and potential generation of odorous compounds. Optimum conditions are maintained to avoid anaerobic decomposition. The current bioremediation procedures maintains optimum aerobic conditions in waste by extracting air through the soil continuously with regular monitoring to ensure optimal oxygen levels are present at all

times. The Air Extraction System has been designed and installed to account for full occupation of the bioremediation area.

2.1.7 Extracted air is passed through a biofilter to remove odorous contaminants. The biofilter is maintained on a regular basis to ensure conditions for removal of odours/volatile organic compounds (VOCs) are optimal. The performance of the biofilter is monitored as previously agreed in the existing permit and remedial action can be implemented based on analysis of the monitoring information. Strict controls including maintaining ideal moisture and temperature conditions, nutrient concentrations, pH and matrix particle size for the biofilter are in place.

3.0 ODOUR MANAGEMENT AND CONTROL

Waste Acceptance

3.1.1 The Technical Standards Report (Document referenced: 4236/R/002/3) details the waste acceptance procedure for the Site. Strict waste acceptance procedures are in place to ensure that no non-conforming materials are accepted which may contain malodorous waste not suited for treatment at the facility. Any potentially odorous soils identified will be subject to pre-determined handling requirements arranged as a consequence of the pre-acceptance assessment.

Bioremediation Process

3.1.2 Bioremediation of soils refers to the biological treatment of contaminated soils by creating optimal conditions for the biodegradation of organic contaminants. To enable biodegradation to occur the following parameters are monitored and manipulated:

- pH
- temperature,
- moisture content,
- oxygen level
- nutrient concentrations

3.1.3 Decomposition of the organic contaminants is carried out by microorganisms in the soil. This can be enhanced by addition of inorganic nutrients such as ammonium nitrate and organic material such as woodchip. Moisture is also essential for microbial activity; low moisture content will inhibit microbial growth but excessive moisture restricts airflow. The perforated aeration pipes located beneath the waste are able to extract air from the biopile. This allows effective control of the waste oxygen levels and moisture content in the waste to maintain aerobic conditions. This reduces the potential for anaerobic conditions to develop which can cause odorous emissions.

3.1.4 Biodegradation is optimised by maintaining a temperature in the biopiles 30°C and 40°C to ensure predominantly mesophilic microflora are stimulated.

3.1.5 The stages of the bioremediation process is detailed below:

i. **Initial Placement**: The soil is placed on the treatment pad by a dump truck where an excavator will form the biopile.
ii. **Addition of Nutrients**: Based on the contaminants present within the soil, nutrients are added to facilitate the biological degradation of the hydrocarbon compounds.
iii. **Chemical Analysis** – Approximately every 4 weeks the soil is tested to analyse the contaminant concentrations to determine whether the biological treatment of the soil is adequately reducing the hazardous contaminants to non-hazardous concentrations. Additional nutrients and/or organic inputs may be added to expedite the process
iv. **Nutrients testing** – Every 2-4 weeks the soil is tested to analyse the levels of nutrients within the soil to ensure that there is sufficient inorganic and organic material to facilitate the biodegradation process. This is supported by the chemical analysis of the soil for contaminant concentrations. Soils are tested in accordance with Provectus procedure STC-F006-Soil Analysis.
v. **De-compaction of the soil** – Every 4-8 weeks the biopile will be turned to facilitate aeration of the soil.
vi. **Validation testing**: Once the soil meets the re-use criteria, the soil is removed from the treatment pad and transferred to the non-hazardous soils storage area or directly to the non-hazardous landfill void on site.

3.1.6 The biopile Air Extraction System comprises a network of perforated aeration pipes installed beneath the waste biopiles which are linked to a high performance vacuum blower system. 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 Air Extraction System has been designed and installed to account for full occupation of the bioremediation area. The blower is located within an insulated secure shipping container. An air/water separator is fitted within the collection system to remove liquid from the process air extracted from the biopile. The process water is pumped from the separators via an automated pump with automatic level detection system to a process water tank for primary settlement and carbon filtration prior to discharge to foul sewer.

3.1.7 The air extraction system is connected to a biofilter to capture and treat the degradation products and reduce particulate and odour emissions. The biofilter comprises a woodchip medium filter. The biofilter medium has exhaust holes to allow gaseous emissions to be released.

3.1.8 The air extraction system is regularly monitored and maintained. Table S3.1 of the Permit requires the biofilter to be monitored for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), and Polycyclic Aromatic Hydrocarbons (PAHs) on a monthly basis. Table S3.3 of the Permit also requires the biofilter to be regularly checked and maintained to ensure appropriate temperature and moisture content. Equipment must be calibrated on a 4 monthly basis or as agreed with the Environment Agency. These procedures ensure the air extraction system is effective at reducing odour emissions and any leaks or damage are detected and repaired. Compliance with this requirement is demonstrated by the monthly biofilter monitoring and regular VOCs monitoring results at the site.

3.1.9 Operational controls during the bioremediation process are in place to ensure no turning of the biopiles is undertaken during high winds. It is understood that there is no distinguishable odour at the site boundary from the biopiles under treatment.

Soil Treatment Building

3.1.10 Within the Soil Treatment Building operational controls utilised for the control of asbestos soils also control the potential release of odour such as preventing unnecessary agitation of the material.

Housekeeping Practices

3.1.11 All Site roads and surfaces will be inspected on a daily basis. A street sweeper will regularly clean site roads of any mud trailed on from site vehicles. Dampening of site roads/surfaces as necessary using a tanker during dry periods will minimise dust / odour.

3.1.12 On site vehicle speed limits are enforced to ensure that vehicle movements do not generate excessive dust. All loaded vehicles using the public highway will be sheeted or fully contained to prevent odour nuisance along the access route and beyond. All vehicles will use wheel wash to prevent mud / dust being trailed onto adjacent roads and creating a hazard / nuisance. Empty vehicles containing odorous residues should, whenever possible, be hosed out to prevent releases occurring whilst using the public highway.

3.1.13 Drop heights will be minimised as far as practicable during the loading and unloading of materials to reduce the likelihood of dispersion and minimise the potential for odour release as a consequence of agitation.

3.1.14 All treatment will take place in the existing concrete bays to reduce dispersion and control measures will be implemented to minimise odour release. Untreated soils will be stored in

existing bays, providing additional screening from subsequent handling and storage activities.

3.1.15 Regular housekeeping should be undertaken to minimise the spread of odorous residues and ensure effective containment and all site staff, including contractors, will receive appropriate training in order to ensure that employees are conversant with the odour control and management procedures.

Drainage

3.1.16 Water is reused on site where possible with any surplus disposed to foul sewer after treatment. All surfaces used to treat or store waste comprise impermeable concrete hardstanding. There are no direct releases off-site other than via the engineered surface water management system. All collected surface water drains to settlement tanks located to the south east of the Site. The water from the tanks is then pumped to a combined sewer outfall located to the east of the tanks. In the event the pump was unable to perform, water from the settlement tank can drain to the surface water sewer under a surface water discharge consent. Surface water volume and quality is monitored in accordance with the Environment Permit. The surface water drainage system has cut-off values that can be isolated in the event of a spill or contamination.

3.1.17 All drainage infrastructures will be inspected, maintained and repaired as necessary.

3.1.18 In the highly unlikely event that odour should become an issue as a result of the on-site drainage system, a full review of the infrastructure will be conducted and cleaning and inspection frequencies adjusted accordingly.

Accident Management Plan

3.1.19 The Technical Standards Report (Document referenced: 4236/R/002/3) details Accident Management Controls for the site.

4.0 ODOUR PATHWAY CHARACTERISATION

4.1 Overview

4.1.1 The principle mechanism for the transit of odorous emissions from site operations to adjacent sensitive receptors is via ambient air. The distance and direction that these emissions will be carried is determined by the following factors:

- Source Related Pathways
- Meteorological Conditions; and
- Topography

4.2 Meteorological Conditions

Wind Direction

4.2.1 The prevailing wind direction will determine which receptors will be affected and at what frequency. The main controlling factor in determining the pathway of odour is the ambient meteorological conditions. This is fundamental to the transportation of odour to sensitive receptors.

Wind Velocity

4.2.2 Wind velocity will affect the distance an odour emission will travel. Conversely, increased wind speed could also beneficially improve dispersal. Those receptors closest to the installation are still at the highest risk of a potential negative impact however.

Air Temperature

4.2.3 Warm air may carry odours upwards by convection for their dispersal away from the site. However, warm weather will encourage the onset of biodegradation of exposed or temporarily stored wastes and therefore increase odour potential.

Adverse Weather Conditions

4.2.4 Unusual weather conditions may increase the risk of odour emissions from the site. Site staff will be vigilant to unusual trends in the meteorological data or forecasts which may indicate strong winds or extremes of temperature which may cause a potential problem. The types of weather conditions that may impact on odour generation and emissions and appropriate contingency actions are detailed in section 6 below.

4.3 Receptor Locations

4.3.1 When choosing the receptors, the closest or the most sensitive (if different from the closest) have been considered in each direction from the STC. The most sensitive receptors are within 500 m radius of the STC making the assessment conservative for other potential receptors located further away. Receptors are considered sensitive where people have the potential to be adversely affected by the odour emissions. The nearest sensitive receptors to the Site are identified in drawing referenced 4236/1/001: Sensitive Receptor Plan

4.3.2 The probability of exposure is determined by the distance of the receptor to the Site and the likelihood of the hazard reaching the receptor (e.g. frequency of prevailing wind in that direction). This stage of the assessment assumes that exposure has resulted from an uncontrolled emission i.e. without mitigation.

4.3.3 The distance of these receptors to the Site boundary, their direction relative to the Site and the frequency the wind blows in the direction of the receptor is detailed in Table 1 below.

The sensitivity to odour of the individual receptor types identified in the third column of Table 2 is further detailed in Table 3.

Table 1: Potentially 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	North-north-west	485 m	6.8 %
2	Dudley Golf Club House	Recreational facility	North-north-west	160 m	4.3 %
3	Portway Hill	Residential properties	North East	10 m	8.9 %
4	Old Portway House and Barn	Listed building	North	30 m	8%
5	Portway Road	Residential and Commercial Properties	East to South	10 m	7.6% to 3.4%
6	Warren Hall Country Park	Local Nature Reserve	West	635 m	2.5%
7	Bumble Hole	Local Nature Reserve	West	990m	2.5%
8	Rowley Hills	Local Wildlife Site	North East	225 m	9.8%
9	Dudley Golf Course	Recreational	West to North West	50 m	2.5% to 6.8%
10	Rowley Regis Golf Course	Recreational	South	120 m	3.4%
11	Rowley Hall Primary School	School	South-east	430 m	8.9%
12	Grace Mary Primary School	School	North-north-west	490 m	6.8 %
13	Dudley Road	Residential and Commercial Properties	South-west	475 m	4.7%
14	Deciduous woodland, woodland & good quality semi-improved grassland (nonpriority)	Priority Habitats	0-160m	NE to W	9.7% to 2.6%

Table 2. Types of Receptors Sensitive to Odour

Receptor Type	Sensitivity to Odour
Residential	High
Recreational	High
Commercial	High
Highway	Low
Habitat	Low
School	High

4.4 Receptor Types

Residential, recreational, industrial and commercial premises

4.4.1 The potential emissions from the STC are likely to have a similar impact on persons occupying residential, recreations, industrial, commercial of educational premises. Exposure of emissions to persons in 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 activities may generate similar emissions to the Site and the employees may be desensitised as a result.

4.4.2 The closest residential areas to the STC are 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.

Highways and footpaths

4.4.3 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.

4.4.4 The highways and footpaths are close to the STC, and this places a more immediate need for the operational effectiveness of Site controls. The Operator has confirmed that no odour complaints have been received at the STC. The roads and footpaths to the north east are upwind of the Site for the majority of the time.

Public Amenity

4.4.5 Persons using the Golf Courses and Rowley Hills (Local Wildlife Site) may be exposed to potential odour emissions from the STC. The potential emissions and their effects are the same as human receptors at fixed locations or pedestrians on nearby highways and paths.

5.0 ODOUR RISK ASSESSMENT

5.1 Site Odour Emissions

5.1.1 The risk potential to each receptor as identified in Section 5 and shown on drawing referenced 4236/1/001 from odour generated at the STC is presented in Table 3 below. This table evaluates the nuisance to sensitive receptors from odour emissions and the control measures to be implemented at the STC in order to minimise this risk, producing a revised residual risk to receptors.

Table 3: Odour Risk Assessment

Hazard / Pathway	Receptor				Probability of exposure	Unmitigated Consequence	Initial Risk / Reason	Risk Management	Mitigated Risk
	No.	Dist.	Direc.	Freq.					
Odour through the Air from: Waste storage. Bioremediation process.	1	485 m	NNW	6.8 %	Medium – distant from site, occasionally downwind	High - Odour nuisance to residents	High – odour nuisance	Strict waste acceptance procedures are in place to ensure that no non-conforming materials are accepted which may contain malodorous waste. Bioremediation management controls are in place including an air extraction system, biopiles only being turned during appropriate meteorological conditions. Air drawn from the biopiles passed through carefully managed biofilter and malodorous compounds removed. Within the Soil Treatment Building operational controls utilised for the control of asbestos soils also control the potential release of odour such as preventing unnecessary agitation of the material. Regular olfactory monitoring will be conducted and will take account of meteorological conditions and potential impacts of odour (however unlikely) on receptors.	Low
	2	160 m	NNW	4.3 %	High - close to site, infrequently downwind	High - Odour nuisance to users of golf course	High – odour nuisance		
	3	10 m	NE	8.9 %	High – close to site , frequently downwind	High - Odour nuisance to residents	High – odour nuisance		
	4	30 m	N	8%	High – close to site, frequently downwind	High - Odour nuisance to residents	High – odour nuisance		
	5	10 m	E to S	7.6% to 3.4%	High close to site, infrequently to occasionally downwind	High - Odour nuisance to residents	High – odour nuisance		
	6	635 m	W	2.5%	Low - distant from site, infrequently downwind	Low – not a nuisance to habitats	Low – significant distance, infrequently downwind		
	7	990 m	W	2.5%	Low - distant from site, infrequently downwind	Low – not a nuisance to habitats	Low – significant distance, infrequently downwind		
	8	225 m	NE	9.8%	High - close to site, frequently downwind	Low – not a nuisance to habitats	Low – not a nuisance to habitats		
	9	50 m	W to NW	2.5% to 6.8%	High - close to site, infrequently to occasionally downwind	High - Odour nuisance to users of open space	High – odour nuisance		
	10	120 m	S	3.4%	High - close to site, infrequently downwind	High - Odour nuisance to users of open space	High – odour nuisance		
	11	430 m	SE	8.9%	Medium – distant from site, frequently downwind	High - Odour nuisance to students	High – odour nuisance		
	12	490 m	N to NW	6.8 %	Medium – distant from site, frequently downwind	High - Odour nuisance to students	High – odour nuisance		
	13	475 m	SW	4.7%	Medium – distant from site, occasionally downwind	High - Odour nuisance to residents	High – odour nuisance		
	14	0-160m	NE to W	9.7% to 2.6%	High – close to site and frequently downwind	Low – not a nuisance to habitats	Low – not a nuisance to habitats		

6.0 COMMUNITY ENGAGEMENT, REPORTING & CONTINGENCIES

6.1 Overview

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

6.1.2 The performance of an odour management system 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.

6.1.3 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 odour event (e.g. perimeter monitoring).

6.2 Monitoring

Off-Site Olfactory

6.2.1 The Site Manager will be responsible for ensuring that regular visual inspections are made of the Site and its perimeter in order to identify any sources of odour and to establish whether any odours are discernible. Due to the potential for de-sensitisation to odours, odour monitoring will only be carried out by personnel who do not regularly work at the site. These personnel will be the most suitable to detect any fugitive odour outside the STC.

6.2.2 Off-site olfactory monitoring will also be carried out with reference to the protocol in Appendix 1 of the Environment Agency H4 Odour Management Guidance. All site operatives will be responsible for reporting any odour problems as soon as practicable to the Site Manager or the next level of management if the manager is not available.

6.2.3 The following locations will be targeted for odour monitoring by the nominated site personnel:

- Weighbridge or waste reception area (continuous monitoring of vehicles);
- Point of waste deposition;
- Bioremediation area, particularly during initial placement, aeration and turning; and
- Subject to prevailing wind direction (i.e. up and down wind), appropriate areas of the site perimeter.

6.2.4 The following information will be recorded during each round of monitoring:

- Name and job position of assessor;
- Nature of any problem identified including location / source, date, time, duration, prevailing weather conditions and likely cause;
- On-site activities and operational condition at the time of the monitoring visit (this should include any abnormal events detailed in Section 6.6 below);
- Records of the likely source of any odour even if it is not from the Site;
- Details on the corrective action taken, realistic timeframes for remedial works and any subsequent changes to monitoring and operational procedures.

6.2.5 The Site Manager will be informed immediately of any findings of odour attributed to the Site and will authorise remedial measures to be taken.

6.3 Complaints Process

6.3.1 Any complaints received at the STC or via the Regulatory bodies including the Environment Agency and Local Authority, will be recorded using the Odour Compliant Report Form contained in the Site Management System. This will instigate further olfactory monitoring at the location of the complaint and on site to determine the extent of the odour and whether a mobile mister 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 odour e.g. differentiating between potential off-site odours.

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

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

6.3.4 Complaints regarding odour 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 odour;
- 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 odour even if it is clearly not from the Site;
- Details on the corrective action taken, and any subsequent changes to monitoring and operational procedures;

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

6.3.6 The operator 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. The operator will be in regular contact with the complainant and the Agency whilst the cause of the odour is being investigated and remediated.

6.3.7 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.

6.4 Means of Contact

6.4.1 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.

6.4.2 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 the Operator.

6.5 Complaints Investigation

6.5.1 As part of each odour 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 in this OMP, 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.

6.6 Abnormal Events and Contingency Procedures

Temperature Inversions

6.6.1 Temperature is one of the parameters that is monitored and manipulated in the bioremediation process. Biodegradation is optimised by maintaining a temperature of 30 and 40˚C in the biopiles to ensure the mesophilic microflora are predominately stimulated. These management controls help manage odour. The air extraction system effectively controls odour emissions by capturing and treating volatile compounds to reduce odour emissions.

Strong Winds

6.6.2 Daily visual inspection of the site infrastructure will be undertaken and recorded. Additional inspection for damage resulting from high wind events will also be undertaken and contingency actions identified below considered should high wind conditions result in escape of significant odours. A mobile mister may be employed to limit the potential for any odour emissions.

Snow / Ice

6.6.3 Severe cold weather may result in disruption to waste deliveries and removal of materials from site however due to the nature of the soils to be treated it is unlikely to cause an increase in odour.

Hot Conditions

6.6.4 The warmer the waste the greater the potential to generate odour therefore an increase in ambient air temperature may result in increased odour from the biopiles due to the promotion of the biodegradation process. However the biopiles are maintained at a temperature of 30 and 40°C therefore hot conditions will not impact this process. The air extraction system will enable control any potential odour by capturing and treating volatile compounds reducing odour emissions from the soils. . A mobile mister may be employed to limit the potential for any odour emissions.

Unscheduled unavailability

6.6.5 Unscheduled unavailability should only take place due to unscheduled maintenance, emergency situations and for Health and Safety reasons such as a fire at the site. In such cases the site operative will initially inform the manager who will in turn inform the Site manager, the Authority and the Environment Agency. The operator will implement measures to store or divert soils as required.

6.7 Records and Review

6.7.1 A daily record relating to the management and monitoring of odour will be maintained. It will include the following details:

- The results of inspections and olfactory 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.

6.7.2 The Odour Management Plan will be reviewed on an annual basis with the scheduled review of the site management system or with every major decrease, or alteration to the odour generated at site (i.e. a change to odour source term, pathways or receptors).

DRAWINGS

Key

- Existing topography
- Soils treatment centre permit boundary
- Storage of soils containing asbestos

TerraConsult

Bold Business Centre, Bold Lane, Sutton, St Helens WA9 4TX

Client: waste recycling group

Site

Edwin Richards Quarry - Soil Treatment Centre

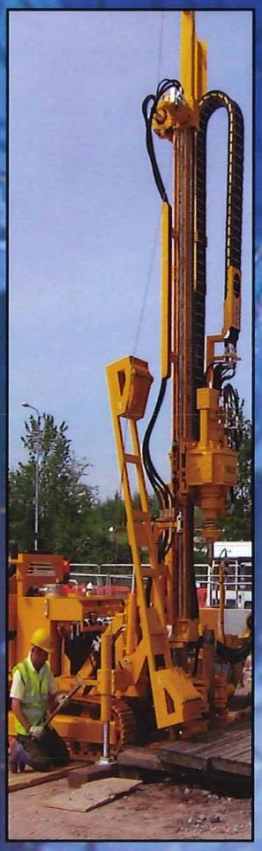
Title

Sensitive Receptors Plan

Scale	1:2,000	@ A1	
Drawing No.	4236/1/001		
Rev	Date	Description	
File	22313012sitelayout+Fill.dwg		
Date	06/19	Engineer	EG
Drawn	OS	Checked	FINAL

APPENDIX C

DUST MANAGEMENT PLAN


TerraConsult

November 2020

4236/R/005/3

Edwin Richards Quarry - Soil Treatment Centre

Dust & Particulate Management Plan

Permit Variation Application

Prepared for:

Waste Recycling Group (Central) Limited

Edwin Richards Quarry - Soil Treatment Centre

Dust & Particulate Management Plan

Permit Variation Application

November 2020

Carried Out For:

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DOCUMENT INFORMATION AND CONTROL SHEET

Document Status and Approval Schedule

Report No.	Title
4236/R/005/3	**Edwin Richards Quarry - Soil Treatment Centre: Dust & Particulate Management Plan**

Issue History

Issue	Status	Date	Contributors	Signature	Date
3	Reissued to EA	**November 2020**	**Prepared By:** E Greenhalgh		November 2020
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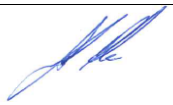
			Approved by: J Baxter		November 2020

DISCLAIMER

This consultancy contract was completed by TerraConsult Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, the degree of manpower and resources allocated to the project as agreed.

TerraConsult Ltd cannot accept responsibility to any parties whatsoever, following the issue of this report, for any matters arising which may be considered outwith the agreed scope of works. This report is issued solely to the client and TerraConsult cannot accept any responsibility to any third parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents at their own risk.

CONTENTS

DRAWINGS

TABLES

1.0 INTRODUCTION

1.1 Report Overview

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

- Amend the split of hazardous / non-hazardous waste treated at the facility by increasing the annual throughput for hazardous waste from 29,999 tonnes per annum (tpa) to 89,999 tpa and reducing the annual throughput for non-hazardous waste from 120,001 tpa to 60,001 tpa;
- Permit acceptance of wastes classified as hazardous HP10 (toxic for reproduction);
- Addition of EWC codes 17 09 03* (other construction and demolition wastes (including mixed wastes) containing hazardous substances), 17 09 04 (mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03) to Table S2.6 of the Permit;
- Addition of EWC Codes 19 12 11* other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances and 19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 to Table S2.3;
- Addition of code R5 to Table S1.1 to enable equivalent treatment activities to S5.3 A(1)(a)(i) and S5.4 A(1)(b)(i) for recovery as well as disposal;
- Amendment to Table S1.1 Activity S5.6 A(1)(a) or addition of a new activity for the temporary external storage of up to 10,000 tonnes untreated hazardous soils containing asbestos pending further treatment or transfer off-site;
- Permission to pre-screen soils containing bound asbestos debris;
- Increase of annual non-hazardous waste storage limit from 100,000 tonnes to 150,000 tonnes; and,
- Removal of the 150,000 tonne per annum waste solidification and dewatering activities as listed in Table S1.1 of the Permit and the list of waste types listed in Table S2.4 of the Permit.

1.1.2 The Soil Treatment Centre (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 non-hazardous landfill site also operated by WRG. 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). .

1.1.3 An Air Quality Management Plan relating to both odour and dust (Report Ref: 33012rr722i2, November 2016) was submitted to discharge planning condition 14 of planning permission DC/14/57744. The purpose of this Dust and Particulate Management Plan is to address the current and proposed activities at the STC likely to cause a potential emission of uncontrolled dust and particulates and how these emissions will be minimised. This was based on full occupation of the bioremediation area. Reference has been made to the Agency web based guidance on air emissions risk assessment for your environmental permit (DEFRA and Agency, 2016[1]).

[1] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

1.1.4 A copy of this Dust and Particulate Management Plan will be included in the Site Management System (or Working Plan) held at the Site Office and all members of staff will have access to this document. The Dust and Particulate Management Plan should be read in conjunction with the Emissions Management and Monitoring Plan.

2.0 SITE OPERATIONS

2.1 Current Site Activities

2.1.1 The STC currently accepts up to 29,999 tonnes per annum of hazardous waste and up to 150,000 tonnes per annum of non-hazardous waste for treatment. Waste arrives in vehicles.

2.1.2 The STC is currently accessed via the entrance on Portway Road. The hazardous waste is currently deposited within the enclosed Soil Treatment Building. Non-hazardous waste is stored externally on an impermeable pad.

2.1.3 The STC is permitted to accept waste soils containing mixed forms of asbestos with soil fibre concentrations <0.01% w/w and chrysotile asbestos with soil fibre concentrations <0.1% w/w. The application of these soil asbestos fibre limits is to remove the potential for airborne emissions of asbestos fibres.

2.1.4 Once reception analysis is received to confirm that soils have no potential to generate airborne asbestos fibres they will be moved to the asbestos shed. Any soils received that have the potential to generate airborne asbestos fibres above the detection limit of 0.01f/ml will be rejected from site. Hand-picking of small asbestos fragments is undertaken by suitably trained operatives. The asbestos fragments are placed in individual polythene bags directly adjacent to each operative. When full the picking line conveyor is stopped and the sealed bag placed into a second bag. The double bagged asbestos is placed in a designated container which will not exceed 10 tonnes.

2.1.5 On completion of hand-picking, the waste soils are deposited into a stockpile in designated bays within the building. Each of the bays provides storage of material post hand picking awaiting compliance testing prior to further onward treatment or disposal. The bays have a storage capacity of 3,750 m^3/6,000t. Validation testing will be carried out prior to disposal or further treatment. Any soils with elevated hydrocarbons will be transferred for bioremediation treatment at the installation. If the soil meets the re-use criteria then it will be retained on site for deposition in the landfill void or sent off-site.

Bioremediation Process

2.1.6 The biological treatment process typically is between 8 to 16 weeks dependent on the contaminants present in the soil.

2.1.7 Bioremediation of soils is undertaken on a kerbed treatment pad comprising concrete and tarmac hardstanding. The treatment pad has an appropriate fall to allow all process water to be collected in a precast concrete covered gully which ultimately drains to the southern corner of the pad to be pumped out and either recirculated back into the biopile or discharged to the on-site foul water drainage system. A system of perforated aeration pipes run horizontally along the base of the biopile treatment pad.

2.1.8 Soils accepted at the STC and post-treated asbestos soils which require further treatment are transferred to the biopile treatment area via dump truck and/or excavator. The soils are arranged into biopiles with the most recent soils placed to the north of the biopile area for treatment and the south representing soils at completion. The biopiles are managed using a system of lots which allows the waste to be trackable from the point of origin to its location on the treatment pad.

2.1.9 Bioremediation of soils refers to the biological treatment of contaminated soils by creating optimal conditions for biodegradation of contaminants. To enable biodegradation to occur the following parameters are monitored and manipulated:

- pH
- temperature,
- moisture content,
- oxygen level
- nutrient concentrations

2.1.10 Decomposition of the organic contaminants is carried out by microorganisms in the soil. This can be enhanced by addition of inorganic nutrients such as ammoniacal nitrate and organic material such as woodchip. Moisture is also essential for microbial activity; low moisture content will inhibit microbial growth but excessive moisture restricts airflow. The perforated aeration pipes located beneath the waste extract air from the biopile. This allows effective control of the waste oxygen levels and moisture content in the waste to maintain aerobic conditions.

2.1.11 Biodegradation is optimised by maintaining a temperature in the biopiles 30 and 40˚C to ensure the mesophilic microflora are predominately stimulated.

2.1.12 The stages of the bioremediation process is detailed below:

1. **Initial Placement:** The soil is placed on the treatment pad by a dump truck where an excavator will form the biopile.
2. **Addition of Nutrients**: Based on the contaminants present within the soil, nutrients are added to facilitate the biological degradation of the hydrocarbon compounds.
3. **Chemical Analysis** – Approximately every 4 weeks the soil is tested to analyse the contaminant concentrations to determine whether the biological treatment of the soil is adequately reducing the hazardous contaminants to non-hazardous concentrations. Additional nutrients and/or organic inputs may be added to expedite the process
4. **Nutrients testing** – Every 2-4 weeks the soil is tested to analyse the levels of nutrients within the soil to ensure that there is sufficient inorganic and organic material to facilitate the biodegradation process. This is supported by the chemical analysis of the soil for contaminant concentrations. Soils are tested in accordance with Provectus procedure STC-F006-Soil Analysis.
5. **De-compaction of the soil** – Every 4-8 weeks the biopile will be turned to facilitate aeration of the soil.
6. **Validation testing**: Once the soil meets the re-use criteria, the soil is removed from the treatment pad and transferred to the non-hazardous soils storage area or directly to the non-hazardous landfill void on site.

2.1.13 On receipt of validation testing that confirms the soil meets re-use criteria, it is transferred to the non-hazardous soils storage area, disposed in the adjacent landfill void or reused on site as restoration soils. The treated soils are stored externally as shown on 4236/1/001: *Sensitive Receptor Plan*, pending disposal or removal off-site.

2.1.14 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.

2.1.15 Water is reused on site where possible. All surfaces used to treat or store waste comprise impermeable concrete hardstanding. There are no direct releases off-site other than via the engineered surface water management system. All collected surface water drains to settlement tanks located to the south east of the Site. The water from the tanks is then pumped to a combined sewer outfall located to the east of the tanks. In the event the pump was unable to perform, water from the settlement tank can drain to the surface water sewer under a surface water discharge consent. Surface water volume and quality

is monitored in accordance with the Permit. The surface water drainage system has cut-off values that can be isolated in the event of a spill or contamination.

2.1.16 Process water from the biopiles passes into a drain at the lowest point of the treatment pad and is transferred to the integrated water tank for treatment through settlement. All areas within the STC where soil is stored or treated, including the Soil Treatment Building, have sealed drainage systems to collect the process water. Any accumulated water within the building is pumped from the drainage sump to the primary settlement tank via sand and carbon filters. The tank is fitted with high level alarms to ensure it does not overfill.

2.1.17 The STC lies within the larger Edwin Richard Quarry. The whole site is fully contained and bounded by a palisade security fence. The access has steel framed lockable double gates which will be kept locked at all times outside operational hours. Entry is via the weighbridge and Site Office where all visitors are required to stop and sign in.

2.2 Proposed Site Activities

2.2.1 The Operator proposes to increase the proportion of hazardous waste to be treated at site from 29,999 tonnes per annum to 89,999 tonnes per annum. This will not result in an increase in treatment capacity as this is limited to the treatment capacity of the bioremediation area. A commensurate reduction in non-hazardous waste throughput will be required. The Operator also wishes to screen the soils contaminated with asbestos fragments prior to handpicking. All soils containing asbestos accepted on site will be pre-screened within the building to allow the removal of oversized fractions which have the potential to damage the picking station and fines that can conceal smaller bound asbestos debris.

2.2.2 The limits applied to the asbestos content in the soil matrix will not change. To broaden the operational capability of the site waste classified as hazardous HP10 and EWC codes 17 09 03*, 17 09 04,19 12 11* and 19 12 12 are required to be added to the permit. These wastes are very similar in nature to those already accepted at the site.

2.2.3 The Operator proposes to remove the 100,000 tonne per annum waste dewatering activity. The areas previously designated as a storage area to dewater canal and river dredgings were never constructed or used. Instead the Operator proposes to increase the non-hazardous soil storage limit from 100,000 tonnes to 150,000 tonnes and to store 10,000 tonnes of soils containing bound asbestos debris in this area to create space for safer vehicle and plant operations. Any asbestos waste will be sheeted prior to transfer into the building for screening and handpicking. The soil will be stored on an impermeable surface with sealed drainage.

3.0 POTENTIAL DUST EMISSION SOURCES

3.1 On-Site Dust Emission Sources

3.1.1 Fugitive dust and particulate emissions can potentially arise from the following Site activities:

- Delivery of waste to site and initial pre-acceptance assessment;
- Transfer of soils to appropriate storage area (biopiles, external and internal asbestos soils storage);
- Bioremediation of hydrocarbon contaminated soils including initial placement, aeration and turning;
- Screening of soils containing asbestos fragments;
- Storage and transfer of residual material removed from screen; and
- Handpicking of asbestos fragments of soil with potential hydrocarbon contamination and subsequent storage prior to further treatment in biopiles.

3.1.2 Fugitive dust may present a dust nuisance to surrounding human receptors or cause an adverse environmental impact if excessive deposits settle on sensitive habitats. Particulates pose a nuisance to human receptors, particularly as an added health risk by inhalation and could have adverse effects on sensitive habitats by smothering vegetation.

3.2 Control Measures

Waste Acceptance Procedure

3.2.1 The Technical Standards Report (Document referenced: 4236/R/002/2) details the waste acceptance procedure for the STC. Weighbridge will conduct assessment of waste inputs and impose controls and restriction on potentially dusty waste (e.g. bagging, rapid cover following placement, refusal to tip). All soils received at the STC are appropriately sheeted.

Pre-screening and hand picking of asbestos soils

3.2.2 Pre-screening and handpicking of soils containing asbestos is carried out within the Soil Treatment Building. Any soils received that have the potential to generate airborne asbestos fibres above the detection limit of 0.01f/ml will be rejected from site.

3.2.3 All soils containing asbestos accepted on site will be pre-screened within the building to allow the removal of oversized fractions which have the potential to damage the picking station and fines that can conceal smaller bound asbestos debris.

3.2.4 The pre-screening will increase the efficiency of the soil processing and will not result in airborne asbestos fibres above existing approved levels. It will also significantly decrease the timescales for picking thereby significantly reducing exhaust emissions from mobile plant. Screened soils containing visible asbestos debris will enter the picking station from the soil screener conveyor.

3.2.5 The material is transferred on a conveyor in the picking station whilst operatives manually select and sort the required material. Hand-picking is undertaken by suitably trained operatives. The conveyor moves at a sufficiently slow velocity to allow the operative to safely sort through the material. This prevents unnecessary agitation and dust generation. The asbestos fragments are placed in individual polythene bags directly adjacent to each operative. When full the picking line conveyor is stopped and the sealed bag placed into a second bag. The double bagged asbestos is placed in a designated container which will not exceed 10 tonnes.

3.2.6 On completion of hand-picking, the waste soils are deposited into a stockpile in designated bays within the building. Care is taken not to drop the material from excessive height to reduce potential for dust emissions.

3.2.7 A permanently installed dust suppression system is present in the building and can be operated when required. This process of monitored in accordance with the procedures and monitoring regime detailed in the Emissions Management and Monitoring Plan.

Waste Storage

3.2.8 The location of the non-hazardous soil storage area is not proposed to change. The increase in the storage capacity by 50,000 tonnes is facilitated by the removal of the 100,000 tonne per annum dewatering activity. The soil storage area is bounded to the south by the Soil Treatment Building and bounded to the north by the tree lined perimeter bund. The Edwin Richards Quarry is located to the west of the soil storage area with the bioremediation area located to the east. During particularly dry weather the storage areas will be dampened down as necessary. Current additional dust management and suppression measures comprise a permanent water spray system within the building.

3.2.9 The proposed asbestos storage areas are to be located to the south west of the Soil Treatment Building. These areas were previously designated as a storage area to dewater canal and river dredgings but was never constructed or used. It will be repurposed and constructed as a temporary storage area for asbestos soils awaiting treatment. This area will replace the current soil reception area within the building where there is limited storage capacity and space for safe vehicle movement. By moving the temporary storage area external to the building it provides a safer environment for soil treatment staff and overall improvements in soil segregation and quarantining capacity as well as more efficient soil treatment operations and reduced emissions. The asbestos soils will be stored on the impermeable kerbed concrete pad with sealed drainage and sheeted until being moved to the building for screening / hand picking within the Soil Treatment Building.

Dust suppression

3.2.10 Dust management and suppression measures comprise a permanent dust suppression system within the asbestos building. Surfactant is added as a precautionary measure in the unlikely event of amphibole asbestos fibres being present (Amphibole fibres are hydrophobic (unlike chrysotile fibres) and this makes the fibres more difficult to remove from airborne suspension or likewise immobilise them on soil surfaces with water alone). Low levels of surfactant is added to water (1 part surfactant to 15 parts water) which is applied to the soil surface only. This mitigation measure is present for use but has not been shown to have been required within the asbestos shed due to the strict acceptance criteria and efficiency of pre-acceptance procedures employed at site.

Bioremediation Process

3.2.11 The moisture content of the biopiles is maintained at a constant level (~20%) to allow the bioremediation and subsequently minimise the dust potential. Operational controls during the bioremediation process are in place to ensure no turning of the biopiles is undertaken during high winds. The increase in hazardous soils will not result in an increased amount of soils being treated at any one time as the treatment capacity is limited by the size of bioremediation area and 5m height limits imposed by planning consent at the site

Site Vehicles

3.2.12 On site vehicle speed limit enforced to ensure that vehicle movements do not generate excessive dust.

3.2.13 Drop heights will be minimised during the loading and unloading of materials to reduce the likelihood of dispersion and minimise the potential for dust release as a consequence of agitation.

3.2.14 All vehicles will use wheel wash to prevent mud / dust being trailed onto adjacent roads and creating a hazard / nuisance.

3.2.15 A street sweeper will regularly clean site roads of any mud trailed on from site vehicles. Dampening of site roads/surfaces as necessary using a tanker during dry periods will minimise dust.

3.3 Off-site Dust Emission Sources

3.3.1 The directly adjacent Edwin Richards non-hazardous landfill site also operated by WRG is a potential source of wind-blown dust, most likely from accumulation on Site roads or during the depositing of waste. Dust management controls are in place for this site and are in with WRG Environmental Management System.

4.0 POTENTIAL PATHWAYS

4.1 Airborne Pathways

4.1.1 The potential pathways for dust and particulates to reach sensitive receptors are through the air. This will be determined by:

- The quantity of waste at source
- Wind direction and speed
- Intervening obstacles
- Exposure of receptor to waste

4.1.2 A wind rose generated at the meteorological station at Birmingham Airport has been used. The windrose indicates a prevailing south to south-westerly wind with a north-westerly and occasional north-easterly component. Locations to the northeast of the STC are therefore most likely to receive potential emissions should they arise. The frequency the wind blows toward potentially sensitive receptors is detailed in Table 1. Met office data for Birmingham International Airport[2] indicate average wind speed is 7.0 knots. The days where >1mm of rainfall occurring is 129.3 days out of 365 days (35% of the year).

4.1.3 The primary barrier to particulate emissions will be the mature line of trees abutting the western and southern boundary of the STC. These may serve to disperse the wind flow potentially reducing the distance dust emissions could travel downwind causing this material to accumulate in the vegetation. The STC may also act as a barrier trapping dust, however strong winds may still lift dust over the building.

[2] https://www.metoffice.gov.uk/public/weather/climate/gcqf2sb4e

5.0 POTENTIAL SENSITIVE RECEPTORS

5.1 Receptor Locations

5.1.1 When choosing the receptors, the closest or the most sensitive (if different from the closest) have been considered in each direction from the hazard. The Sensitive receptors within 500 m of the STC are summarised in Table 1 and Drawing Referenced 4236/1/001. The most sensitive receptors are within 500 m radius of the STC making the assessment conservative for other potential receptors located further away. Account has been taken of the mechanism of transport to the sensitive receptor e.g. wind direction or a physical connection to the Site. Receptors are considered sensitive where people and habitats have the potential to be adversely affected by the dust emissions.

5.1.2 The probability of exposure is determined by the distance of the receptor to the Site and the likelihood of the hazard reaching the receptor (e.g. frequency of prevailing wind in that direction). This stage of the assessment assumes that exposure has resulted from an uncontrolled emission i.e. without mitigation.

5.1.3 The distance of these receptors to the Site boundary, their direction relative to the Site and the frequency of the wind blows in the direction of the receptor is detailed below. The sensitivity to dust of the individual receptor types identified in the third column of Table 1 is further detailed in Table 2.

Table 1: Potentially 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	North-north-west	485 m	6.8 %
2	Dudley Golf Club House	Recreational facility	North-north-west	160 m	4.3 %
3	Portway Hill	Residential properties	North East	10 m	8.9 %
4	Old Portway House and Barn	Listed building	North	30 m	8%
5	Portway Road	Residential and Commercial Properties	East to South	10 m	7.6% to 3.4%
6	Warren Hall Country Park	Local Nature Reserve	West	635 m	2.5%
7	Bumble Hole	Local Nature Reserve	West	990m	2.5%
8	Rowley Hills	Local Wildlife Site	North East	225 m	9.8%
9	Dudley Golf Course	Recreational	West to North West	50 m	2.5% to 6.8%
10	Rowley Regis Golf Course	Recreational	South	120 m	3.4%
11	Rowley Hall Primary School	School	South-east	430 m	8.9%
12	Grace Mary Primary School	School	North-north-west	490 m	6.8 %
13	Dudley Road	Residential and Commercial Properties	South-west	475 m	4.7%
14	Deciduous woodland, woodland & good quality semi-improved grassland (nonpriority)	Priority Habitats	0-160m	NE to W	9.7% to 2.6%

Table 2: Types of Receptors Sensitive to Dust

Receptor Type	Sensitivity to Dust
Residential	High
Recreational	High
Commercial	High
Highway	Low
Habitat	High
School	High

5.2 Receptor Types

Habitats, watercourse and waterbodies

5.2.1 The deciduous woodland located from the northeast of the STC is classified as a protected habitat. The Agency describes these types of habitats as contained nutrient sensitive vegetation which if depleted, may affect sensitive species dependent on that type of flora.

5.2.2 There are no watercourses within the 500 m radius of the STC.

5.2.3 Uncontrolled fugitive dust and particulates are likely to affect adjacent habitats. The dense vegetation itself is expected to limit the transit of any such emissions far from the STC. In the unlikely event it were to occur, only the accumulation of significant quantities of dust in the vegetation may inhibit normal plant growth or animal behaviour.

Residential, recreational, industrial and commercial premises

5.2.4 The potential emissions from the STC are likely to have a similar impact on persons occupying residential, recreational, industrial or commercial premises. Exposure of emission 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.

5.2.5 Fine dust particles may be able to travel further than larger particles that may settle on surfaces nearby. Finer particulates may elicit an unpleasant or harmful respiratory effect from sensitive individuals whilst settlement of dust may be unsightly or damaging by smothering sensitive flora.

5.2.6 The closest residential areas to the Site are Portway Hill, Portway Road and Dudley Road. Two primary schools are also within the 500 m radius of the Site. For conservatism this management plan assumes the residents and schools are occupied during the operational hours of the Site by members of the public most sensitive to emissions from the Site. It is considered that the operational controls, physical barriers (building, treeline and fences), and distance to the receptor prevent any emissions from reaching receptors.

Highways and footpaths

5.2.7 The transitory nature of highways means receptors using those locations will be exposed to potential emissions from the STC 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.

5.2.8 Highways and a number of footpaths are close to the STC. The highways and footpaths to the north east are upwind of the Site for the majority of the time, but are protected by the boundary fence and dense vegetation.

Public Amenity

5.2.9 Persons using the Golf Courses and Rowley Hills (Local Wildlife Site) may be exposed to potential dust emissions from the Site. The potential emissions and their effects are considered the same as human receptors at fixed locations or pedestrians on nearby highways and paths.

6.0 DUST RISK ASSESSMENT

6.1 Risk Assessment

6.1.1 The risk potential to each receptor as identified in Section 5 and shown on drawing referenced 4236/1/001 from dust and particulates generated at the Site is presented in Table 3 below. This table evaluates the unmitigated risk to sensitive receptors from uncontrolled dust emissions and the control measures to be implemented at the Site in order to minimise this risk, producing a revised risk to receptors.

Table 3: Dust Risk Assessment

Hazard and Pathway	Receptor				Probability of exposure	Unmitigated Consequence	Initial Risk / Reason	Risk Management	Mitigated Risk
	No.	Dist.	Direc.	Freq.					
Dust through air from: Vehicle movements. Waste storage. Pre-screening activity. Bioremediation process.	1	485 m	NNW	6.8 %	Medium – distant from site, occasionally downwind	High - dust nuisance to residents	High –dust nuisance	On site vehicle speed limit enforced to ensure that vehicle movements do not generate excessive dust. Dust suppression system that directs a fine mist within the asbestos building and mobile units for general dust suppression. Bioremediation management controls are in place including an air extraction system, biopiles only being turned during appropriate meteorological conditions. Weighbridge will conduct assessment of waste inputs and impose controls and restriction on potentially dusty waste (e.g. bagging, rapid cover following placement, refusal to tip). Daily visual inspection by appropriate site staff at suitable locations taking account of the prevailing wind direction. All vehicles will use wheel wash to prevent mud / dust being trailed onto adjacent roads and creating a hazard / nuisance. A street sweeper will regularly clean site roads of any mud trailed on from site vehicles. Dampening of site roads/surfaces as necessary using a tanker during dry periods.	Low
	2	160 m	NNW	4.3 %	High - close to site, infrequently downwind	High - dust nuisance to users of golf course	High – dust nuisance		
	3	10 m	NE	8.9 %	High – close to site , frequently downwind	High - dust nuisance to residents	High – dust nuisance		
	4	30 m	N	8%	High – close to site, frequently downwind	High - dust nuisance to residents	High – dust nuisance		
	5	10 m	E to S	7.6% to 3.4%	High close to site, infrequently to occasionally downwind	High - dust nuisance to residents	High – dust nuisance		
	6	635 m	W	2.5%	Low - distant from site, infrequently downwind	High – dust nuisance and potential to smother vegetation	Low – significant distance, infrequently downwind		
	7	990 m	W	2.5%	Low - distant from site, infrequently downwind	High – dust nuisance and potential to smother vegetation	Low – significant distance, infrequently downwind		
	8	225 m	NE	9.8%	High - close to site, frequently downwind	High – dust nuisance and potential to smother vegetation	High – dust nuisance		
	9	50 m	W to NW	2.5% to 6.8%	High - close to site, infrequently to occasionally downwind	High - dust nuisance to users of open space	High – dust nuisance		
	10	120 m	S	3.4%	High - close to site, infrequently downwind	High - dust nuisance to users of golf course	High – dust nuisance		
	11	430 m	SE	8.9%	Medium – distant from site, frequently downwind	High - dust nuisance to students	High – dust nuisance		
	12	490 m	N to NW	6.8 %	Medium – distant from site, frequently downwind	High - dust nuisance to students	High – dust nuisance		
	13	475 m	SW	4.7%	Medium – distant from site, occasionally downwind	High - dust nuisance to residents	High – dust nuisance		
	14	0-160m	NE to W	9.7% to 2.6%	High – close to site, frequently downwind	High – dust nuisance and potential to smother vegetation	High – dust nuisance		

7.0 COMMUNITY ENGAGEMENT, REPORTING & CONTINGENCIES

7.1 Overview

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

7.1.2 The performance of a dust and particulate management system will ultimately be judged from the STC 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.

7.1.3 The controls for each source term 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 dust event (e.g. perimeter monitoring).

7.2 Monitoring

7.2.1 The Site has an Emissions Management and Monitoring Plan in place to for the prevention and control of dust, PM10 and asbestos fibres. This includes monitoring procedures and management controls to limit the potential for dust, PM10 and asbestos fibres to be released. The offsite and on-site monitoring proposed is summarised below in Table 4.

Table 4: Monitoring Regime

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 minutes*	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

Offsite Monitoring

7.2.2 Regular visual inspections of the STC and perimeter will be undertaken by the Site Manager to identify any sources of dust and particulates and to establish whether any dust has left the STC. This will include dust arising from vehicles arriving at the STC.

7.2.3 All Site Personnel will be responsible for reporting dust and particulate problems as soon as practicable to the Site Manager or the next level of management if the Site Manager is not available.

7.2.4 The following locations will be targeted for dust monitoring by the nominated Site staff:

- Weighbridge or waste reception area (continuous monitoring of vehicles);
- Point of waste deposition;
- Bioremediation area, particularly during initial placement, aeration and turning; and
- Subject to prevailing wind direction (i.e. up and down wind), appropriate areas of the site perimeter.

7.2.5 The following information will be recorded during each round of monitoring:

- Name of assessor and position at facility e.g. weighbridge clerk etc;
- Nature of any problem identified including location, source, date, time, duration, prevailing weather conditions and likely cause;
- On-site activities and operational condition at the time of the monitoring visit (this should include any of the abnormal events detailed in Section 7.8 below);
- Records of the likely source of any dust, even if it is not from the STC
- Details on the corrective action taken, realistic timeframes for remedial works and any subsequent changes to monitoring and operational procedures.

7.2.6 The Site Manager will be informed immediately of any findings of dust and particulates attributed to the site and will authorise remedial measures to be taken.

7.2.7 Dust will be monitored via frisbee gauges on monthly basis. A limit of 200mg/m2/day should be applied.

PM10 Monitoring

7.2.8 Consideration has been given to carrying out total deposited dust and / or PM10 monitoring at the site. It is understood there has been no historic compliance issues with dust from the STC (based on the available data and CAR reports). The main source of PM10 is considered to be releases from the treatment plant inside the asbestos building as a result of soil screener and 360 excavator.

7.2.9 PM10 is proposed to be monitored on a weekly basis as stated in Table 4 or as required if significant dust release is expected. This will be undertaken by handheld nephelometer to provide real time results for implementing immediate mitigation if results are within 25% of threshold. 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).

7.2.10 In the event that monitoring data shows that the emissions are within 25% of the threshold 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 5,000m^3/hr per unit and 2 units could be employed to allow for 10,000m^3/hr flow rate.

Current Permit Monitoring

7.2.11 Emissions Monitoring at the facility is undertaken in accordance with Schedule 3 of the Environmental Permit. This places monitoring requirements on point source emissions to air (biofilter), point source emissions to sewer and process monitoring (hand-picking of asbestos soils, biofilter and internal to the biopile during bioremediation).

7.2.12 Monitoring of the emissions from the biofilter will be undertaken on a monthly basis for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX) and Polycyclic Aromatic Hydrocarbons (PAHs) in accordance with Table S3.1 of the Permit. No limit has been set and the reference period is the hourly mean. In addition, the biofilter shall be regularly checked and maintained to ensure appropriate temperature and moisture content. Equipment shall be calibrated on a 4 monthly basis or as agreed with the Agency, in accordance with Table S3.3.

7.2.13 Asbestos air monitoring is currently undertaken at 4 locations at the Site in accordance with Table S3.3 of the Permit and the data assessed against a limit of 0.01 fibres/ml (HSE clearance limit). The sampling methodology follows HSG 248 Asbestos: *The analysist guide for sampling, analysis and clearance procedures*.

7.2.14 Data collected by the Operator from ambient air monitoring and personal monitoring confirms that handling of soil containing asbestos fibres that meet the Permit limits does not result in liberation of fibres at concentrations exceeding 0.01 fibres/ml. The monitoring data reported was below the limit of detection on all occasions.

7.2.15 The pre-acceptance procedures and monitoring undertaken to date demonstrates that there are no point source emissions of airborne asbestos fibres. The changes to the asbestos processing will not increase the emissions of airborne asbestos fibres. The reason for this is that the site does not accept asbestos products or asbestos concentrations in soil that could give rise to airborne asbestos above the air monitoring method detection limit of 0.01f/ml. This statement is supported by the Operator's subcontractor experience and monitoring data on several sites over many years operating under a Mobile Treatment license (MTL).

7.3 Complaints Process

7.3.1 Any complaints received at the STC or via the Regulatory Bodies including the Agency and Local Authority, will be recorded in the Dust Log contained in the Environmental Management System. On receipt of a compliant the Site Manager will be informed which will instigate further visual dust monitoring at the location of the complaint and on-site to determine the extent and location of the dust generating materials and/or process will be identified. This information will assist in the investigation and determining the source of the dust e.g. differentiating between potential dust from the Site or other off-site activities.

7.3.2 All complaints and queries will be logged in accordance within 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. All responses will be through trained and experienced staff.

7.3.3 In the event that a substantiated dust complaint is received arising from the STC, additional monitoring will be undertaken at the nearest sensitive receptors. The person conducting the survey shall make note of any dust at each monitoring point.

7.3.4 Complaints regarding dust from the facility 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 dust;
- Nature of problem including date, time, duration, prevailing weather conditions and cause of the problem;
- On-site activities and operational conditions at the time of the complaint;
- Records of the likely source of the dust, even if it is clearly not from the facility;
- Details on the corrective action taken and any subsequent changes to monitoring and operational procedures; and,
- The Agency will be proactively informed by the Operator of the complaint and the Operator will confirm to the best of its knowledge the information described above.

7.3.5 The Operator 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 Agency. The operator will be in regular contact with the complainant and the Agency whilst the cause of the dust is being investigated and remediated.

7.3.6 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

7.4.1 The facility 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 Agency. The company website also contains the necessary contact details for the Site.

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

7.5 Complaint Screening

7.5.1 As part of each dust 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. 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.

7.5.2 If patterns in complaints emerge, community groups or individuals (subject to their agreement) will be called upon to act as an additional dust monitoring resource.

7.6 Complaint Investigation

7.6.1 In the event that dust is found to be causing a problem from the STC, as determined and confirmed by investigation into off-site complaints, or during routine monitoring; the following measures will be undertaken:

- Additional dust monitoring as detailed above to identify the extent of the dust emission and potential cause for the dust i.e. waste material and/or activity;
- Examination of the operational activities at the time of the dust complaint;
- Examination of the meteorological conditions at the time of the complaint;
- Carry out a review of the operational procedure and controls and instigate any control measures immediately following identification of the problem; and,
- Further monitoring will be carried out to ensure the issue has been addressed and to monitor the effectiveness of any control measures undertaken.

7.7 Abnormal Events

7.7.1 The Dust & Particulate Management Plan assumes that the STC will be running under expected operational conditions. There are however circumstances that could result in a dust emission from the Site if not appropriately considered in advance.

Strong Winds

7.7.2 Daily visual inspection of the site infrastructure will be undertaken and recorded. Additional inspection for damage resulting from high wind events will also be undertaken and contingency actions identified below considered should high wind conditions result in escape of significant dust emissions.

Hot/Dry Conditions

7.7.3 The warmer the weather the greater the potential for wastes to become dry and dusty, particularly when stored outside and when agitated. Daily inspections will be undertaken to soils delivered to the site are appropriately sheeted and soils are wetted down if required to reduce dust emissions. During prolonged periods of hot weather inspection frequency will be increased, and dust mitigation measures will be more readily utilised. Additionally, dust suppression may be employed if deemed necessary. Contingency actions are identified in Table 4.

Implementation of the Contingency Plan and/or Emergency Plan

7.7.4 Unscheduled unavailability should only take place due to unscheduled maintenance, emergency situations and for Health and Safety reasons such as a fire at the site. In such cases the plant staff will initially inform the plant manager who will in turn inform service managers, the Authority and the Environment Agency. Site staff will implement measures to store or divert wastes as required.

Operator's Experience with contingency/emergency situations

7.7.5 The operator has Emergency / Incident Preparedness procedures which are implemented and continually reviewed to help improve procedures across the operator's operations.

Review and Update of Contingency and Emergency Plans

7.7.6 The Emergency / Incident Preparedness procedures will be reviewed following any incident where they have had to be followed. They will be updated as necessary with any lessons learned.

7.8 Records and Reviews

7.8.1 A daily record relating to the management and monitoring of dust will be maintained. It will include the following details:

i. The results of inspections and visual monitoring carried out by installation personnel;
ii. Weather conditions including atmospheric pressure, wind speed and wind direction;
iii. Problems including date, time, duration, prevailing weather conditions and cause of the problem;
iv. Complaints received including address of complainant; and
v. Details of the corrective action taken, and any subsequent changes to operational procedures.

7.8.2 The Dust Management Plan will be reviewed on an annual basis with the scheduled review of the site management system or with every major decrease, or alteration to the dust generated at site (i.e. a change to dust source term, pathways or receptors).

7.9 Communication tools

7.9.1 Stakeholders will typically include the Local Authority, the Environment Agency, Parish Councils and members of the local community. Other stakeholders may include local businesses should the facility be deemed to impact upon them.

7.9.2 In addition, and as covered within the complaints section, contact details will be made available so that any complaints can be directed to site and an investigation undertaken immediately.

DRAWINGS

Key

- Existing topography
- Soils treatment centre permit boundary
- Storage of soils containing asbestos

TerraConsult

Bold Business Centre, Bold Lane, Sutton, St Helens WA9 4TX

Client: waste recycling group

Site

Edwin Richards Quarry - Soil Treatment Centre

Title

Sensitive Receptors Plan

Scale	1:2,000	@ A1	
Drawing No.	4236/1/001		
Rev	Date	Description	
File	22313012sitelayout+Fill.dwg		
Date	06/19	Engineer	EG
Drawn	OS	Checked	FINAL

APPENDIX D

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.

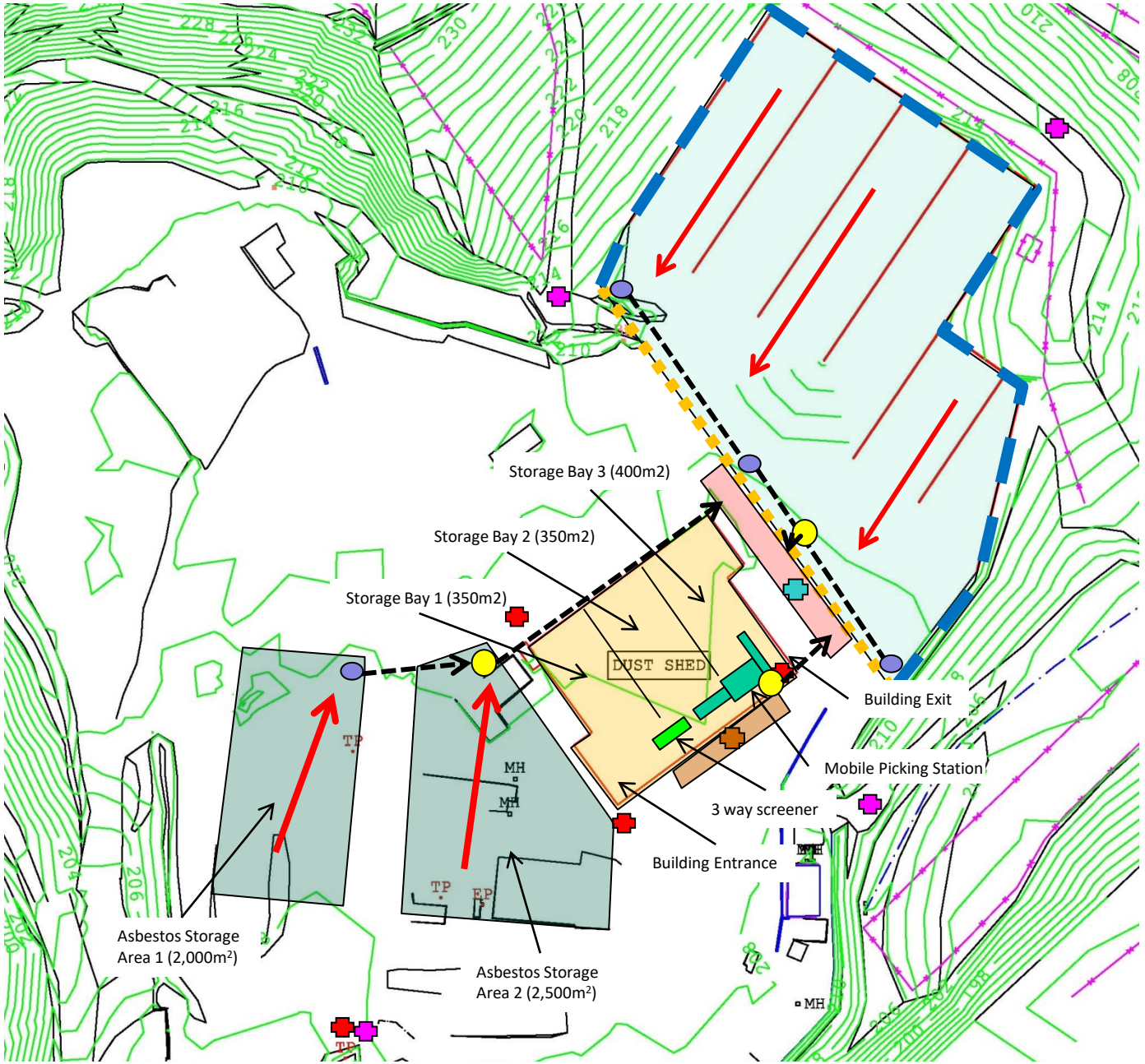
Table 3 provides detail of the existing monitoring undertaken on site for reporting as a permit condition, additional monitoring undertaken for internal management and control of emissions (but not required to be reported as a permit condition) with an update on locations in Appendix A to reflect the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



Fall of Pad Drainage

Underground drains

Asbestos Treatment Area

Biological Treatment Area

Water Treatment Plant

External Asbestos Storage (external bunding)

Biofilter

Air sampling: asbestos/PM_{10}

Air sampling: Dust/Noise/Odour

Air sampling: TPH/BTEX/PAHs

Water Sampling: Severn Trent

PROVECTUS

Provectus Remediation Ltd
Wyvols Court
Swallowfield
Reading
RG7 1WY

Tel. 0118 988 0218
www.provectusgroup.com

Client: FCC Environment

Project: ERQ, Rowley Regis

Job No.: 100993

Title: Revised Asbestos Treatment Layout and Monitoring

Scale: NTS

Date Drawn: October 2020

Drawing No.: 100993 – Asbestos DWG3/Rev1

APPENDIX E

NATURE AND HERITAGE CONSERVATION SCREEN

Nature and Heritage Conservation

Screening Report: Bespoke installations

Reference	**EPR/HP3632RP/V003**
NGR	**SO 96983 88526**
Buffer (m)	**420**
Date report produced	**7 May 2019**
Number of maps enclosed	**3**

The nature conservation sites identified in the table below must be considered in your application.

Nature and heritage conservation sites	Screening distance (km)	Further information
Special Areas of Conservation (cSAC or SAC) **Fens Pools (SAC)**	10	Joint Nature Conservation Committee
Local Nature Reserve (LNR) **Bumble Hole (LNR)** **Warren's Hall Country Park (LNR)**	2	Natural England
Local Wildlife Sites (LWS) **Dudley No.2 Canal** **Darby End Disused Railway Waterfall Lane** **Land at Victory Avenue** **Sheepfold Close/Brickhouse Road** **Alsopp's Hill** **Titford Pool** **Hailstone Quarry** **Titford Canal** **Warrens Hall Park** **Dudley Golf Course** **Warrens Hall Farm** **Portway Hill Open Space, Rowley Hills** **Rough Hill Quarry**	2	Appropriate Local Record Centre (LRC)

Warrens Hall Woodland, Tansley Hill
Mousesweet Brook Valley
Bumble Hole
Netherton Park
Gads Green, Bumble Hole
Sledmere
Gower Branch Canal
Warrens Hall Farm
Lister Road
Tansley Hill
Darby's Hill Road
Bury Hill Park, Rowley Hills
Darby's Hill, Rowley Hills
Barncroft Road, Tividale Hall Jasmine Road
Hollyhock Road

The relevant Local Records Centre must be contacted for information on the features within local wildlife sites. A small administration charge may also be incurred for this service.

Please note we have screened this application for protected and priority sites, habitats and species for which we have information. It is however your responsibility to comply with all environmental and planning legislation, this information does not imply that no other checks or permissions will be required.

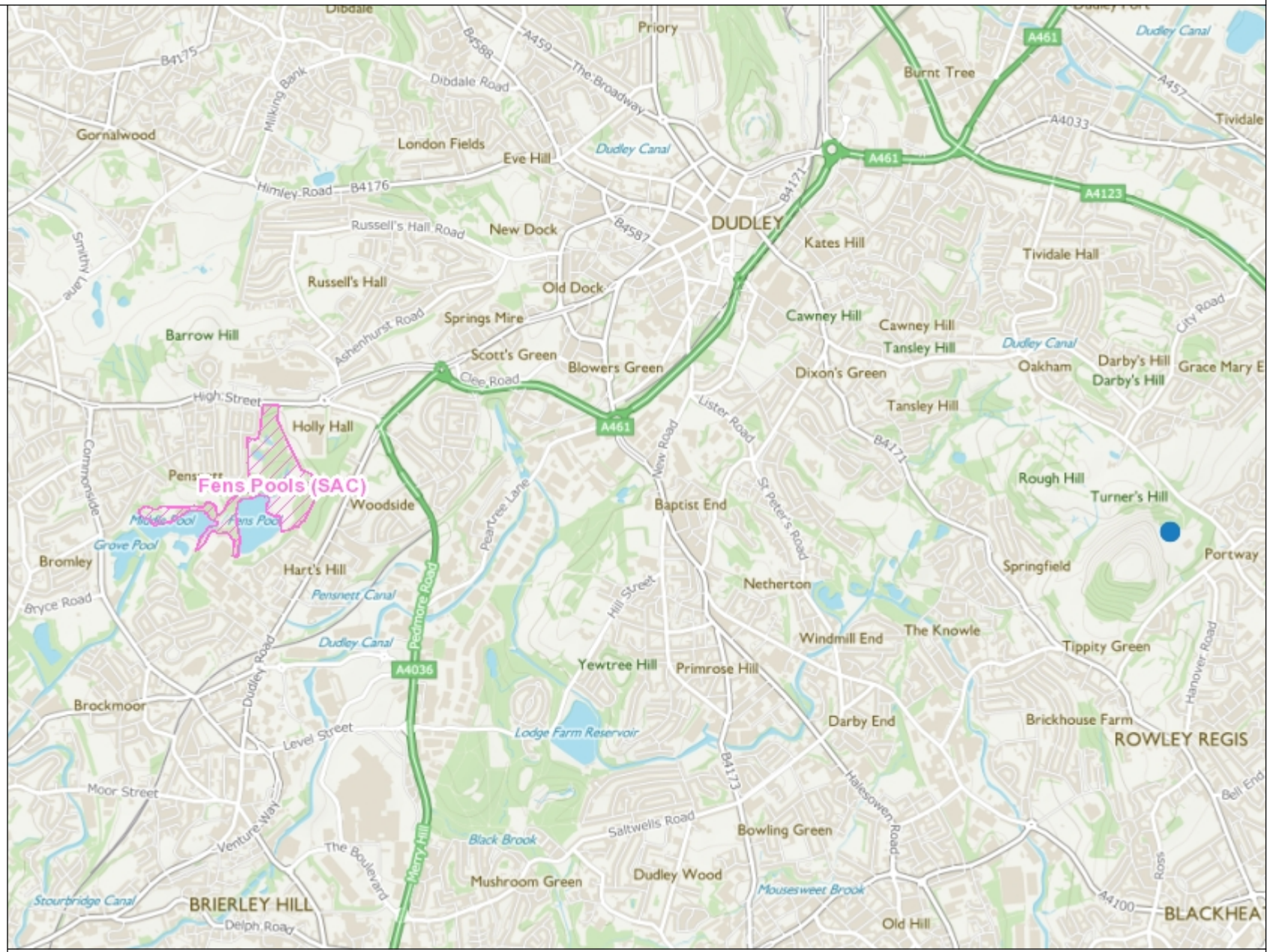
Please note, the enclosed pre-application map(s) is valid for a period of **6 months**. If you plan to submit your application more than 6 months after the map(s) was generated, you must request that the screen is re-run. This will ensure that you have used the most current information on heritage and nature conservation interests in your application.

SAC

Environment Agency

Legend

- SAC (England)
- SAC (Wales)



0 312 624 936

Metres

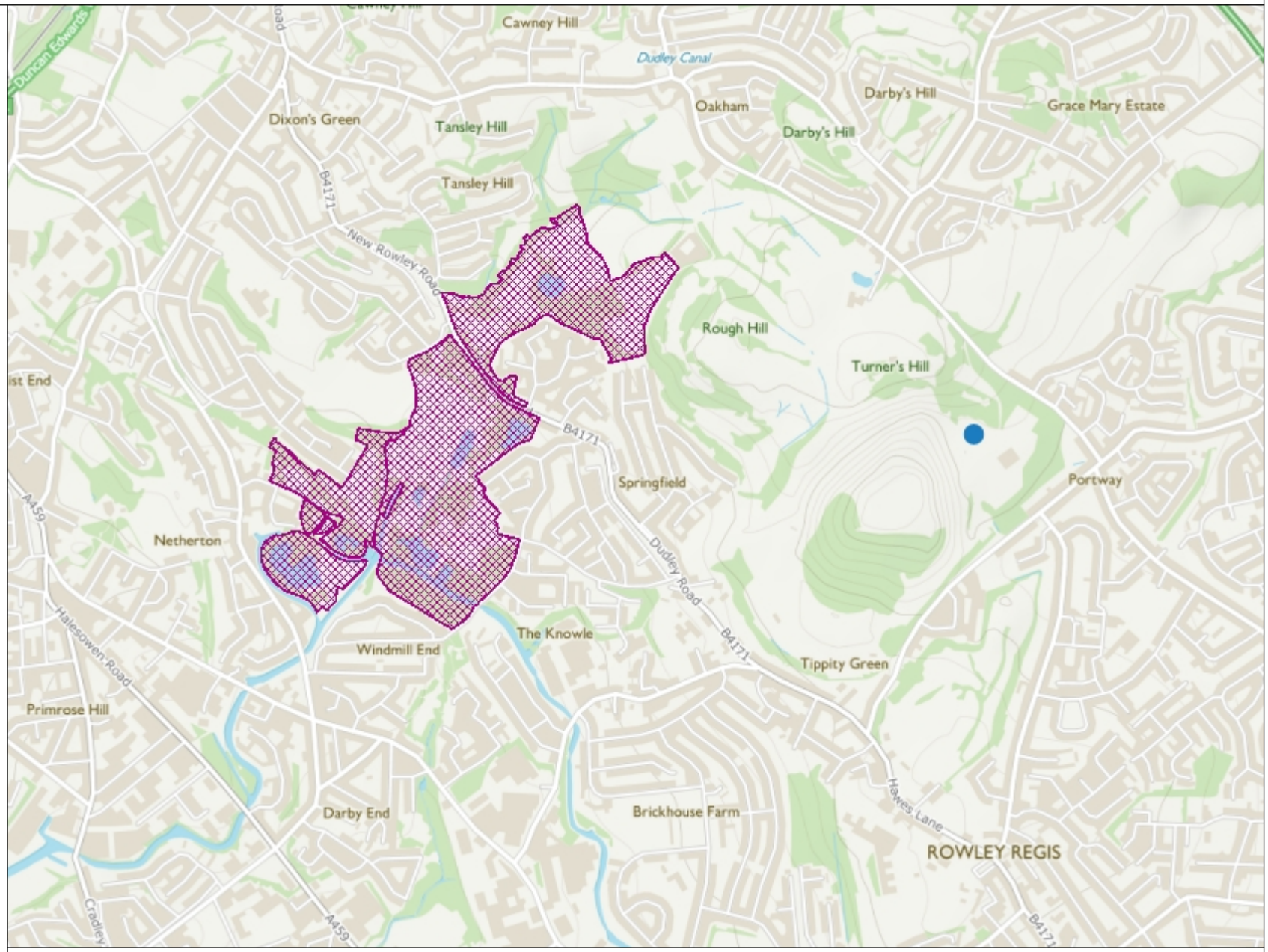
N
W E
S

LNR

Environment Agency

Legend

- LNR (England)
- LNR (Wales)



0 156 312 468

Metres

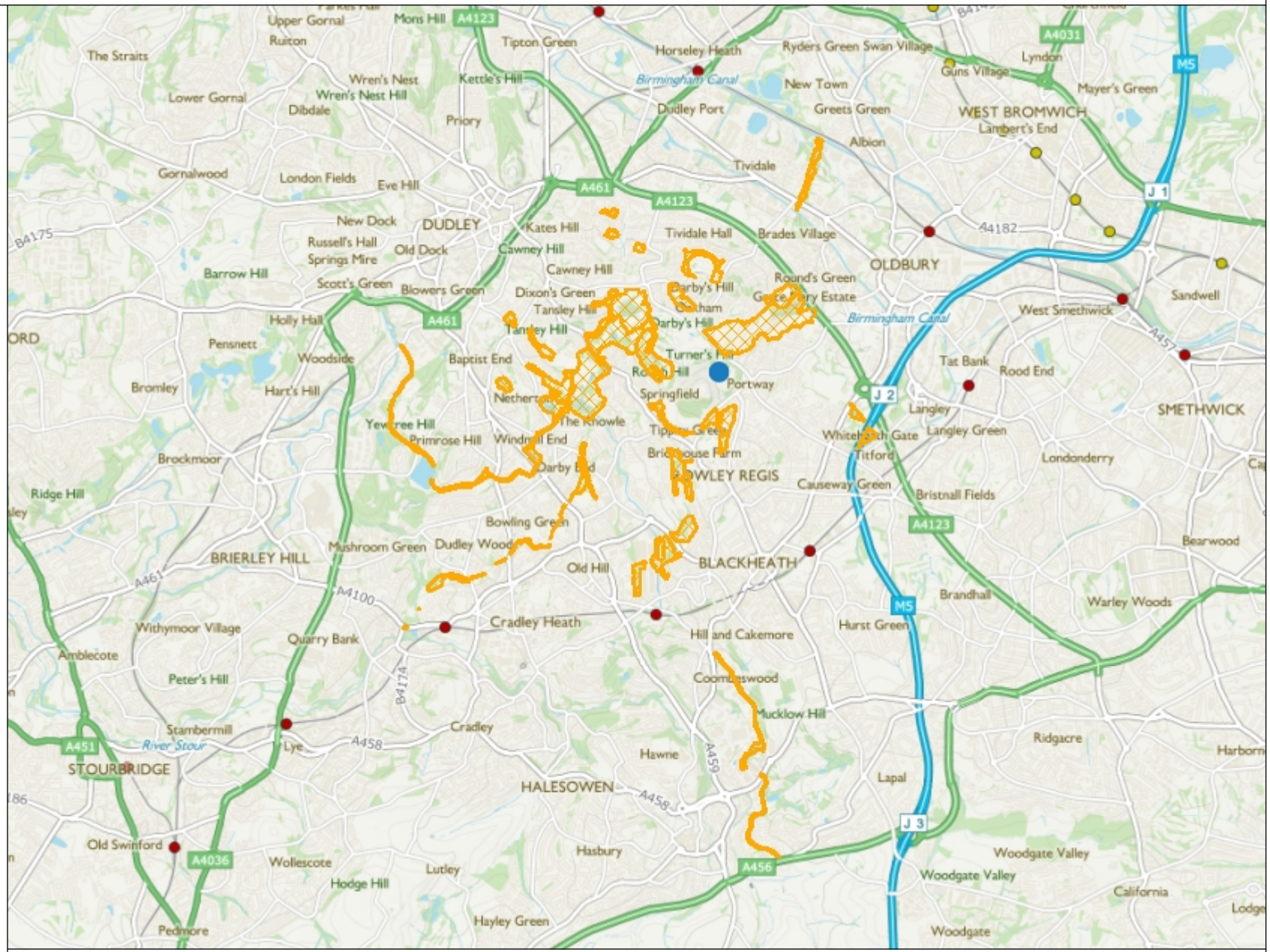
N
W E
S

LWS

Environment Agency

Legend

- Local Wildlife Sites



0 624 1,248 1,873

Metres

N
W E
S

APPENDIX E – Planning Permission

Sandwell Metropolitan Borough Council
Development Management Section
P.O. Box 2374
Council House
Freeth Street, Oldbury
West Midlands. B69 3DE

Application No. DC/14/57744

SANDWELL METROPOLITAN BOROUGH COUNCIL

PLANNING PERMISSION
TOWN AND COUNTRY PLANNING ACT 1990

THE TOWN AND COUNTRY PLANNING (APPLICATIONS) REGULATIONS 1988

Name and Address of Applicant	Name and Address of Agent
Mr Dave Molland FCC Environment UK Ltd Granville House St George's Road Donnington Wood Telford TF2 7RA	Mrs Claire Brown AMEC E&I UK Ltd Canon Court Abbey Lawn Abbey Foregate Shrewsbury SY2 5DE

Site: FCC Environment Edwin Richards Quarry Portway Road Rowley Regis

Particulars of Development: Development of a waste management facility comprising a 150,000 tonnes per annum soil treatment; a 150,000 tonnes per annum waste recycle facility; a repositioned landfill gas utilisation plant; a relocated leachate treatment plant; and a waste vehicle depot and associated workshop, office, parking and welfare facilities.

Valid application received on: 30th December 2014

The Borough Council of Sandwell as local planning authority considered the application as described above on 1st July 2015. **PLANNING PERMISSION IS GRANTED** for the above described development proposed in the application numbered as shown above and in the plans and drawings approved as listed overleaf, subject to the following condition(s):-

SEE OVERLEAF

Conditions

1. The development must conform with the terms of and the plans accompanying the application for permission and must remain in conformity with such terms and plans, save as may be otherwise required by (any of) the following condition(s), or approved amendment(s).

2. The development must be begun not later than the expiration of 3 years from the date of this permission.

3. There shall be no deliveries to the site outside the hours of 0630 to 1730, Monday to Saturday

4. No operations associated with the recycling facility shall take place outside the hours of 0600 to 2000 Mondays to Saturdays.

5. No operations associated with the soil treatment facility shall take place outside the hours of 0600 to 2000 Mondays to Saturdays.

6. No waste other than non-hazardous construction and demolition waste and commercial and industrial waste and hazardous soils shall be depoisted at or brought onto the site.

7. No stockpiles of waste or processed materials shall exceed 5m in height as measured from existing ground levels.

8. All vehicles transporting waste and/or recyclable materials to and from the site shall be securely contained or sheeted.

9. Prior to the re-opening of the northern access off Portway Road, a detailed design for the access, the weighbridge and the site offices and associated signage will be prepared and submitted to the local planning authority for approval.

10. Upon completion of the first residential dwelling (and prior to its occupation) relating to planning application reference DC/14/57745, all vehicles associated with waste operations at Edwin Richards Quarry must enter and leave the site by the northern access off Portway Road.

11. No infiltration of surface water drainage into the ground surface is permitted other than with the express written consent of the local planning authority, which may be given for those parts of the site where it has been demonstrated that there is no unacceptable risk to controlled waters. The development shall be carried out in accordance with those details.

Conditions continued

12. The development hereby permitted shall not be commenced until such time as a scheme for water pollution prevention has been submitted to and approved in writing by the local planning authority. The scheme shall include oil and petrol separators and be implemented as approved.

13. Prior to commencement of development a Noise Management Plan shall be submitted to and approved in writing by the local planning authority. All site operations shall be carried out in accordance with the agreed plan unless otherwise agreed in writing by the local planning authority.

14. Prior to commencement of development an Air Quality Plan (including both dust and odour) shall be submitted to and approved in writing by the local planning authority. All site operations shall be carried out in accordance with the agreed plan unless otherwise agreed in writing by the local planning authority.

15. Prior to commencement of development a Nature Conservation Plan (to include a Japanese knotweed eradication programme and the introduction of bat boxes) shall be submitted to and approved in writing by the local planning authority. All site operations shall be carried out in accordance with the agreed plan unless otherwise agreed in writing by the local planning authority.

16. Prior to commencement of development a scheme for all lighting on the site shall be submitted to and approved in writing by the local planning authority. The agreed scheme shall be implemented and retained unless otherwise agreed in writing by the local planning authority.

17. Prior to commencement of development a detailed Drainage Management Plan incorporating both foul and surface water shall be submitted to and approved in writing by the local planning authority. All site operations shall be carried out in accordance with the agreed plan unless otherwise agreed in writing by the local planning authority.

18. Prior to commencement of development a details of the height, type and position of all boundary treatment to be erected shall be submitted to and approved in writing by the local planning authority.

Conditions continued

19. Prior to commencement of development a scheme for the storage of all chemicals and reagents shall be submitted to and approved in writing by the local planning authority. The agreed scheme shall be implemented and retained unless otherwise agreed in writing by the local planning authority.

20. Prior to commencement of development a detailed scheme for the storage of all stockpiled materials be submitted to and approved in writing by the local planning authority. The agreed scheme shall be implemented and retained unless otherwise agreed in writing by the local planning authority.

21. Prior to commencement of development and following completion of the desktop study, a further detailed site investigation and remediation measures shall be submitted to and approved by the local planning authority. This shall establish the degree and nature of contamination present at the site and its potential to pollute the environment or cause harm to human health.

22. In the event that contamination is found at any time when carrying out the approved development, that was not previously identified, it must be reported in writing immediately to the local planning authority. An investigation and risk assessment must be undertaken and where remediation is necessary, a remediation scheme must be prepared, which is subject to the approval in writing by the local planning authority.

23. Where remediation works have been carried out in pursuance with the preceding conditions, a post remediation report shall be submitted to and approved by the local planning authority. This report should fully detail the remedial works undertaken and demonstrate their compliance.

Reasons

1. To ensure that any development undertaken under this permission shall not be otherwise than in accordance with the terms of the application, on the basis of which permission is being granted, except in so far as other conditions may so require.

2. Pursuant to section 91 of the Town and Country Planning Act 1990

Reasons continued

3. To safeguard nearby residential property from undue noise and nuisance.

4. To safeguard nearby residential property from undue noise and nuisance.

5. To safeguard nearby residential property from undue noise and nuisance.

6. To define the permission and to protect the amenities of nearby residents.

7. To ensure the satisfactory appearance of the site.

8. In the interests of environmental amenity and to prevent dust and mud on the highway.

9. To ensure the satisfactory appearance of the site

10. In the interests of highway safety and the free flow of traffic.

11. To protect and enhance the quality of the Controlled Water Receptors.

12. To prevent pollution and contamination to ground water.

13. To prevent undue noise and disturbance to nearby residential property.

14. To prevent undue dust and odour.

15. In the interests of Nature Conservation.

16. To prevent undue glare and noise pollution.

17. To ensure the adequate drainage of the site.

18. In the interests of safety and security and to ensure the adequate appearance of the site.

19. In the interests of public safety.

Reasons continued

20. In the interests of public safety.

21. & 22. & 23. In the interests of public safety.

Date - 3 AUG 2016 Signature .....

Area Director - Regeneration and Economy

N.B.

1. THIS IS A PLANNING PERMISSION ONLY. IT IS NOT AN APPROVAL:-

(A) UNDER THE BUILDING REGULATIONS (WORK WHICH REQUIRES SUCH APPROVAL MUST NOT START UNTIL IT HAS BEEN OBTAINED): OR

(B) UNDER ANY OTHER STATUTORY PROVISION

2. YOUR ATTENTION IS DRAWN TO THE NOTES OVERLEAF.

APPROVED PLANS AND DRAWINGS:-

Plan Description	Reference	Version
Location Plan	33012-SHR136	
Site/Block Plan	33012-SHR137	
General	33012-SHR124	

NOTE FOR APPLICANT

Applicant Engagement Statement

In dealing with this application the local planning authority has worked with the applicant in a positive and proactive manner in compliance with paragraphs 186 and 187 of the National Planning Policy Framework.

The following Policies And Proposals Contained Within Sandwell Council's Development Plan Are Relevant to the Determination of this Application:

EMP3 Local Quality Employment Areas

By 2026, we will provide 1,294 ha of local quality employment land.

Local quality employment areas are characterised by a critical mass of industrial, warehousing and service activity in fit for purpose accommodation with good access to local markets and employees. These areas will provide for the needs of locally based investment and will be safeguarded for the following uses:

- Industry and warehousing
- Motor trade, including car showrooms, garages and vehicle repair
- Haulage and transfer depots
- Trade wholesale retailing and builders merchants
- Scrap metal, timber, construction premises and yards
- Waste collection, transfer and recycling uses as set out in Policy WM4

Not all areas will be suitable for all uses and Local Development Documents may provide further detail to limit the scope of uses which are acceptable.

Targets for the quantity of Local Quality Employment Land for each Local Authority Area are set out in Table 12:

An indicative breakdown by regeneration corridor to illustrate how this target will be achieved is set out in Appendices 2 and 3.

The broad location of these local employment areas is shown on the Key Diagram and Regeneration Corridor Plans, and detailed boundaries will be confirmed in Area Action Plans, Allocations Development Plan Documents and Proposals Maps.

EMP4 Maintaining a Supply of Readily Available Land

We aim to have 185 ha (five years supply) of land readily available at any one time. This will comprise the following minimum provision of such land for each local authority to form part of the proposed employment land stock set out for 2016 and 2026 in Table 10:

- Dudley - 28ha
- Sandwell - 70ha
- Walsall - 46ha
- Wolverhampton - 41ha

SAD EOS 3 - Rowley Hills Strategic Open Space

The Policy Map defines the Strategic Open Space within which development will not be permitted that would prejudice the character of the area or its function in:

- providing a major area of continuous and wide open space;
- preventing the merging of urban areas;
- providing an open, natural skyline;
- providing for outdoor recreational opportunities for neighbouring urban areas;
- providing a range of wildlife habitats and a wildlife corridor;
- providing extensive views out over the surrounding areas.

WM4 Locational Considerations for New Waste Management Facilities

Key Locational Considerations for All Waste Management Proposals

Proposals should demonstrate how they will contribute towards Spatial Objective 9 and the strategic objectives of Policy WM1, such as the contribution they will make towards landfill diversion, delivery of new waste management capacity and diversification of the range of facilities currently available. All proposals should include details of the proposed operations and the technologies involved, the types of waste to be managed, the maximum throughput capacity, the source of the wastes,

and in the case of recycling, composting and recovery facilities, the recovery rate/ end products and whether the end products will be waste or usable raw materials, produced in accordance with agreed quality protocols.

Waste arising in the Black Country should be managed within the Black Country where feasible, and should be managed as close as possible to its source of origin. Proposals involving on-site management of waste will be supported where this would not have unacceptable impacts on neighbouring uses. To minimise impacts on the highway network, wherever possible, opportunities should be taken to transport waste by rail or inland waterway, particularly where freight opportunities have been identified (see TRAN3).

The development of "shared" municipal waste management facilities to be used by more than one waste planning authority/ waste disposal authority, and the co-location of municipal and commercial waste operations will be supported in principle, where this would generate benefits in terms of increased viability/ economies of scale, minimising the distance waste needs to travel, and improved access to facilities for local communities and businesses. The clustering of related or complementary waste treatment, transfer and disposal operations in a specific location will also be supported, where this would not have adverse cumulative impacts on neighbouring uses.

All proposals should minimise adverse visual impacts, potential detrimental effects on the environment and human health, and localised impacts on neighbouring uses from noise, emissions, odours, vermin and litter. To minimise such impacts, wherever possible, waste management operations should be contained within a building or other physical enclosure. The design of new buildings, other structures, boundaries and landscaping should also make a positive contribution to the area (see ENV3).

Preferred Locations for Enclosed Waste Management Facilities

The preferred locations for enclosed waste management facilities are the employment areas shown on the Waste Key Diagram, the Strategic Key Diagram and Regeneration Corridor Maps. Locations proposed for change to housing should be avoided (see DEL2). The following guidance defines the types of operation likely to be suitable on different types of employment land (see Policies EMP2 and EMP3).

Operations Likely to be Suitable on all Employment Land

- Any waste operations falling within Use Class B1 (b) or (c), B2 or B8;
- Household Waste Recycling Centres (HWRC);

- Material Recycling/ Recovery Facilities (MRF);
- Mechanical Biological Treatment (MBT);
- In Vessel Composting (IVC);
- Anaerobic Digestion (AD);
- Thermal Treatment/ Energy Recovery (Incineration without Recovery, Energy from Waste (EfW), Combined Heat and Power (CHP), Pyrolysis, Gasification);
- Ancillary facilities linked to an existing employment use.

Operations Likely to be Suitable on Local Quality Employment Areas only

- Transfer stations / skip hire;
- Small scrap yards and open storage facilities;
- Hazardous waste treatment / processing facilities;
- Urban quarries (enclosed CD&EW processing/ aggregate recycling);
- Storage/ screening/ other treatment of contaminated soils.

All proposals should demonstrate compatibility with the uses already present within / adjacent to the area and with future aspirations for the area, for example, if it is a Strategic High Quality Employment Area (see EMP2). New waste management facilities will only be allowed on employment land which is predominantly office (Use Class B1 (a)) where it would complement the uses in that area. Proposals involving the management of hazardous wastes should demonstrate that the proposed use would not cause harm to the environment, human health or neighbouring uses.

Other Potentially Suitable Locations for Enclosed Operations

The following types of operation may be suitable for location within/ on the edge of centres or near to residential areas, particularly where they are linked to or providing a service to a neighbouring use, the local community or local businesses:

- Household Waste Recycling Facilities (HWRCs);
- Storage/ warehouse facilities;
- "Clean" Material Recycling/ Recovery Facilities (MRFs);
- Biomass/ Combined Heat and Power (CHP);
- Other operations whose impacts can be easily controlled.

Proposals should be compatible with adjoining uses and provide justification for the location chosen, such as demonstrating that they complement or provide a service to adjacent uses.

Preferred Locations for Open Air Facilities

Where feasible, operations in the open air should ideally be accommodated on Local Employment Land. However, a peripheral location may be the only viable option for certain operations. The following types of waste management operation will normally require an open air or outdoor site:

- Landfill/ land-raising operations;
- Disposal of inert wastes to land as part of land remediation/ engineering;
- Open windrow composting facilities;
- Large scrap yards and other large open storage facilities;
- CD&EW processing/ aggregate recycling associated with quarries and landfill sites;
- Bioremediation of contaminated soils.

Open air operations should include mitigation for visual impacts and other potentially harmful effects on adjoining uses through appropriately-designed landscaping, appropriate proximity boundaries and screening. Proposals in the Green Belt and/ or on a green field site should clearly demonstrate that there are no alternative options on previously-developed land and that the need for the proposal outweighs any harm to the environment.

Proposals for landfilling, land-raising or disposal of waste to land for restoration should include a suitable method of infilling and landscaping using materials appropriate to the proposed after-use and the underlying geology/ hydrology. They should aim to achieve the earliest practicable restoration of the site to a beneficial after-use appropriate to the location, and provision for after-care (see also MIN5). Proposals for re-working of deposited wastes or pre-treatment of wastes at a landfill site will not be permitted if this would result in restoration being significantly delayed. Where proposals for landfilling or land-raising with non-hazardous wastes are likely to generate significant amounts of gas, they should include provision for the monitoring, control and venting of gases and the treatment of leachate, and where feasible, provision to capture landfill gas for energy.

Assessment Criteria for New Waste Management Facilities

When considering new proposals involving waste management operations or for new waste management facilities, the Black Country Authorities will assess them against the following criteria:

- Whether the proposal supports national and local waste strategies, objectives and targets for waste (for example, Spatial Objective 9 and local municipal waste management strategies);

- Whether the proposal is well-located in relation to the sources of waste it will be managing (for example, will it be managing waste arising from Black Country communities and businesses?);
- Whether the location is suitable for the type of facility and operations proposed and capable of adapting to changing circumstances (for example, is the site/ premises capable of accommodating more than one type of technology or of handling different types of waste?);
- Whether the proposal would provide opportunities for co-location of related uses and/ or generate other benefits (for example, would it manage a range of waste types or streams, produce high quality aggregates or other useful raw materials, or supply heat and power or other forms of energy to adjacent uses?);
- Whether the proposal would involve re-use of previously-developed land (and if not, is it fully justified in terms of operational requirements and lack of suitable alternatives?);
- Whether the proposal contributes towards the positive environmental transformation of the Black Country (for example, is it designed to complement/ contribute towards environmental infrastructure and does it identify and adequately address potential harmful effects on the environment?);
- Whether the proposal is compatible with neighbouring uses (taking into account the nature of the wastes being managed, the technologies used, the hours of operation and cumulative effects), and if so, whether it identifies and adequately addresses potential harmful effects on amenity;
- Whether the proposal supports economic and growth objectives for the Black Country (for example, would it create or retain local jobs, provide a service to local businesses, produce material resources for local industries, or aggregates to supply construction projects within the Growth Network?);
- Whether the proposal would address impacts on the highway/ transport network (for example, has the potential to move waste by rail or inland waterway been fully considered, and does it identify and adequately address impacts on the local/ strategic highway and drainage network?).

The same criteria will be used to identify and select sites for inclusion in other DPDs and municipal waste management strategies as well as for assessing planning applications.

NOTES

Unstable or Contaminated Land

Responsibility and subsequent liability for safe development and secure occupation rests with the developer and/or landowner. Although the local planning authority has used its best endeavours to determine the application on the basis of the information available to it, this does not mean that the land is free from instability or contamination.

In cases where the question of stability or contamination has been a material consideration, resolution of this issue does not necessarily imply that the requirements of any other controlling authority would be satisfied, and the **granting of planning permission does not give a warranty of support or stability or of freedom from contamination.**

Appeals to the Secretary of State

If you are aggrieved by the decision of your local planning authority to refuse permission for the proposed development or to grant it subject to conditions, then you can appeal to the Secretary of State under section 78 of the Town & Country Planning Act 1990.

If you want to appeal, then you must do so within 12 weeks of the date of this notice in the case of a householder application and within six months of the date of this notice in any other case, using a form which you can get from The Planning Inspectorate,3/17 Eagle Wing, Temple Quay House, 2 The Square, Temple Quay, Bristol. BS1 6PN. The Secretary of State can allow a longer period for giving notice of an appeal, but he will not normally be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal.

The Secretary of State need not determine an appeal if it seems to him that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions it imposed, having regard to the statutory requirements, to the provisions of the General Permitted Development Order 1995 or any of the relevant Development Order and to any Directions given under such Order(s). In practice, the Secretary of State is unlikely to refuse to consider appeals solely because the local planning authority based its decision on a Direction given by him.

Purchase Notices

If either the local planning authority or the Secretary of State for the Environment Transport and the Regions refuses permission to develop land or grants it subject to conditions, the owner may claim that he can neither put the land to a reasonably beneficial use in its existing state nor can he render the land capable of reasonably beneficial use by the carrying out of any development which has been or would be permitted.

In these circumstances, the owner may serve a purchase notice on the Council in whose area the land is situated. This notice will require the Council to purchase his interest in the land in accordance with the provisions of Part VI of the Town & Country Planning Act 1990.

Notes for applicants who intend to carry out work to which the Building Regulation apply:

Now that you have your Planning Permission, you will also need to consider applying for Building Regulation approval. This is basically a technical exercise to ensure that your project complies with current national building standards and that your health and safety (and that of members of your household) is not compromised.

Sandwell Council's Regeneration and Economy Directorate also provides a Building Control Service and if your scheme requires Building Regulation approval, I would ask you to contact my Building Control Section on 0121 569 4054/4055 if you require further information concerning the Building Regulations process or visit our website at www.sandwell.gov.uk for guidance and forms.

The Council's in-house Building Control Team can offer the following services:

- Assessment of plans and any structural calculations – plans and details will be checked by our Team of qualified surveyors to check for compliance with the Building Regulations.

- Next day site inspection service (providing you book your inspection prior to 5.30 pm)

- In order to ensure that your building work meets minimum safety standards our Surveyors will carry out a pre-scheduled number of site inspections dependent on your project. We understand the importance of you (and your contractor) having on-site advice available throughout the duration of your project.

Impartial and independent advice – as a team within the Council, Building Control does not have any contracts or links with architects or contractors and therefore, our primary concern is that your project meets current construction standards and that health and safety is given the highest priority.

thinkSandwell

Sandwell Metropolitan Borough Council's Employment & Skills

Sandwell is recognised as being within an area which has high levels of worklessness and low skills. As a key responsibility to counteract this, the Council's Regeneration and Economy's 'Think Sandwell' team endeavour to maximise enterprise and employment opportunities from all new investment identified in the borough.

As part of all planning decisions we require applicants to consider the Councils ethos of employment and skills creation opportunity wherever possible under the Community Benefits and Social Value Act 2012.

Working with Think Sandwell enables the endorsement of community benefits linked to targeted recruitment and employment, helping to sustain the boroughs economic, social and environmental considerations.

Contacts:

Further enquiries in regard to the community benefit initiative within Sandwell please contact Karen_richards@sandwell.gov.uk Community Benefit Coordinator – 0121 569 2104/M: 07929353338
and Paul_smith@sandwell.gov.uk Senior Manager - Sector Development - 0121 569 3309 / M: 07979591982.

Sandwell
Metropolitan Borough Council

Mr Alistair Hoyle
Axis
Well House Barns
Bretton
CH4 0DH

My Ref: DC/17/60597
Your Ref:
Please ask for: Mr Carl Mercer
Tel No.: 0121 569 4048
Date: 5 September 2019

Dear Sir or Madam,

Town and Country Planning Act 1990 (as amended)
Confirmation of Approval of Non Material Amendments attached to planning permission

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Proposed Development: Variation of condition 1 of planning permission DC/14/57744. Proposed restoration and re-location of landfill gas utilisation plant.

Location and Site: FCC Environment Edwin Richards Quarry Portway Road Rowley Regis

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I refer to your application received concerning the above.

I confirm that the amendments are hereby agreed and a further planning application will not be required in this instance. The amendments comprise of the following:-

i) To amend the split of hazardous / non-hazardous waste from 29,999tpa / 120,001tpa to 59,999tpa / 90,001tpa;

ii) Increase the amount of non-hazardous external storage from 100,000 tonnes to 150,000 tonnes;

iii) Remove the permitted 100,000tpa dewatering of dredged materials activity; and

iv) External storage of up to 10,000tpa of soils containing bound asbestos.

This letter of approval shall be read in conjunction with planning approval DC/14/57744 and DC/17/60597.

Yours faithfully,

Amy Harhoff
Director of Regeneration & Growth

Regeneration and Growth
Amy Harhoff, Director of Regeneration and Growth - Neighbourhoods
P.O. Box 2374, Council House, Freeth Street, Oldbury, West Midlands. B69 3DE
www.sandwell.gov.uk

APPENDIX F – COTC Certificates

Certificate No. OCC4246

Operator Competence Certificate

Qualification Title:

Managing Physical & Chemical Treatment - Hazardous Waste : Remediation of Contaminated Land - 4MPTHR

This Certificate is awarded to

Andrew Clee

Awarded: 22/10/2013

Authorised

WAMITAB Chief Executive Officer

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

This certificate is jointly awarded by WAMITAB and the Chartered Institution of Wastes Management (CIWM) and provides evidence to meet the Operator Competence requirements of the Environmental Permitting (EP) Regulations, which came into force on 6 April 2008.

00041135

wamitab

Certificate No: 13134

CERTIFICATE OF TECHNICAL COMPETENCE

This Certificate confirms that

Andrew Clee

Has demonstrated the standard of technical competence required for the management of a facility of the type set out below

Facility Type

Level 4 in Waste Management Operations - Managing

Treatment Hazardous Waste (Remediation 4TMHCL)

Authorising Signatures:

Chief Executive Officer

Director:

Date of issue: 22 October 2013

00020194

Continuing Competence Certificate

This certificate confirms that

Andrew Clee

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 25/11/2021

TMH	Treatment - Hazardous Waste
TMNH	Treatment - Non Hazardous Waste
CLR	Contaminated Land Remediation

Expiry Date: 25/11/2023

Verification date: 24/11/2021

Authorised:

Director of Qualifications and Standards

Learner ID: 19274

Certificate No.: 5189050

Date of Issue: 25/11/2021

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

00160255

Peterbridge House
3 The Lakes
Northampton
NN4 7HE

Tel: 01604 231950

Email: info.admin@wamitab.org.uk
www.wamitab.org.uk

Our Ref: LS/LEB/88/03/27219/4MPTHR
Waste Management Training Ltd

14 February 2017

Mr Charlie Gould
7 Hazel Croft
Northfield
Birmingham
B31 2LP

Dear Mr Gould

Award of Vocational Qualification (VQ)

May I take this opportunity to congratulate you on gaining your Vocational Qualification, which is enclosed. Your achievement is the result of a considerable amount of hard work and effort. The certificate formally recognises the competence you have achieved within the waste management sector.

As part of a process of continuous improvement I would be grateful if you would spend a few minutes to complete the attached feedback form. Your comments will be used in confidence to refine the existing WAMITAB framework to ensure it continues to deliver vocational qualifications in a cost effective way. Thank you for your co-operation in completing the feedback form.

We hope the certificate will provide the basis for the on-going development of your waste management skills in the industry, and would remind you of the need to maintain your competence over time. For further information contact WAMITAB or visit the 'Continuing Competence' section of our website.

Yours sincerely

Chris James
Chief Executive Officer

Enc:
- VQ & Unit Certificate ☑
- OCC Certificate ☑
- COTC Certificate ☑
- Feedback form ☑

wamitab

Qualification Title:

WAMITAB Level 4 Diploma in Waste Management Operations Managing Physical & Chemical Treatment - Hazardous Waste Remediation of Contaminated Land - 4MPTHR
Qualification Accreditation Number:

600/0331/5

This Certificate is awarded to

Charlie Gould

Awarded: 14/02/2017

Serial No:27219/4MPTHR/1

Authorised

Chris James
Chief Executive Officer, WAMITAB

Regulated by Ofqual

For more information see http://register.ofqual.gov.uk

Corff dyfarnu cydnabyddedig
Cymwysterau Cymru Qualifications Wales
Recognised awarding body

The qualifications regulators logos on this certificate indicate that the qualification is accredited only for England, Wales and Northern Ireland.

00094355

Credit certificate

This certificate determines credit awarded to:

Charlie Gould

Units gained:

		Credit Value	Credit Level
Y6015875	Monitor procedures to safely control work operations	4	3
K6009711	Manage physical resources	3	4
M6009712	Manage the environmental impact of work activities	5	4
Y6021501	Control work activities on a waste management facility	9	3
A6021670	Manage the movement, sorting and storage of waste	7	3
K6021423	Procedural compliance	6	4
M6021424	Manage and maintain effective systems for responding to emergencies	19	4
D6021435	Control maintenance and other engineering operations	13	4
K6021504	Manage improvements to waste management operations	7	4
M6021407	Manage site operations for the remediation of contaminated land	13	4
K6021406	Manage the transfer of outputs and disposal of residues from remediation of contaminated land	8	3
F6021606	Manage the reception of hazardous waste	15	4

Awarded: 14/02/2017

Serial No.: 27219/HSS3/1

Authorised

Chris James
Chief Executive Officer, WAMITAB

Regulated by Ofqual

For more information see http://register.ofqual.gov.uk

Corff dyfarnu cydnabyddedig
CYMWYSTERAU CYMRU QUALIFICATIONS WALES
Recognised awarding body

The qualifications regulators logos on this certificate indicate that the qualification is accredited only for England, Wales and Northern Ireland.

00094360

Certificate No. OCC7539

Operator Competence Certificate

Title:

Managing Physical & Chemical Treatment - Hazardous Waste : Remediation of Contaminated Land - 4MPTHR

This Certificate is awarded to

Charlie Gould

Awarded: 14/02/2017

Authorised

WAMITAB Chief Executive Officer

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

This certificate is jointly awarded by WAMITAB and the Chartered Institution of Wastes Management (CIWM) and provides evidence to meet the Operator Competence requirements of the Environmental Permitting (EP) Regulations, which came into force on 6 April 2008.

00094358

wamitab

Certificate No: 14240

CERTIFICATE OF TECHNICAL COMPETENCE

This Certificate confirms that

Charlie Gould

Has demonstrated the standard of technical competence required for the management of a facility of the type set out below

Facility Type

Level 4 in Waste Management Operations - Managing

Treatment Hazardous Waste (Remediation 4TMHCL)

Authorising Signatures:

Chief Executive Officer _____

Director: _____

Date of issue: 14 February 2017

00021371

Continuing Competence Certificate

This certificate confirms that

Charles Gould

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 03/11/2021

TMH	Treatment - Hazardous Waste
TMNH	Treatment - Non Hazardous Waste

Expiry Date: 03/11/2023

Verification date: 02/11/2021

Authorised:

Director of Qualifications and Standards

Learner ID: 106542

Certificate No.: 5187543

Date of Issue: 03/11/2021

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

00154819

WAMITAB

WASTE MANAGEMENT INDUSTRY TRAINING AND ADVISORY BOARD

CERTIFICATE No: 05700

CERTIFICATE OF TECHNICAL COMPETENCE

This Certificate confirms that

Jonathan Owens

has demonstrated the standard of technical competence required for the management of a facility of the type set out below

Facility Type:

Level 4 in Waste Management Operations -

Managing Treatment Hazardous Waste (4TMH)

Authorising Signatures:

Director General

Director

Date of issue: 26 January 2004

Continuing Competence Certificate

This certificate confirms that

Jonathan Owens

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 25/11/2020

TMH Treatment - Hazardous Waste

Expiry Date: 25/11/2022

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APPENDIX G – Asbestos in Soil, Nicole 2021

ASBESTOS IN SOIL

A pan european perspective

Demolition earthworks | AECOM

ASBESTOS IN SOIL

A pan european perspective

NICOLE

Network for Industrially Co-ordinated Sustainable Land Management in Europe

ASBESTOS IN SOIL - A PAN EUROPEAN PERSPECTIVE

Foreword

There are common themes and good practice running throughout Europe with respect to the management of asbestos in soil, although many variations in approach exist.

As with other contaminants, the assessment and management of asbestos risks should follow a risk based assessment approach (source-pathway-receptor analysis) with selection of appropriate remediation following a suitable remedial options appraisal.

However, many decisions regarding the remediation and management of asbestos in soils are based on stakeholder perception and a subjective or emotive response (i.e. hazard based rather than risk-based).

As demonstrated in this report there are few European countries with clear standards and detailed guidance. This document provides an overview of best practice in the industry with a pan European perspective and with some case studies to illustrate typical responses to asbestos in soils impacts.

Contents

Asbestos warning sign | AECOM

1 Introduction

Asbestos is a common and challenging contaminant in soil; a legacy of widespread historic use in buildings and poor historic control of construction waste, building demolition, and re-use of crushed demolition aggregate as made ground.

Hazard, risk perception and acceptance can vary widely amongst stakeholders and the management of asbestos in soil can vary widely as a result.

Differing stakeholder positions on risk acceptance or risk avoidance (zero tolerance) can have a significant impact on project designs, programmes, and costs, and there is little harmonisation in approach across Europe.

Asbestos in soils is increasingly recognised by those involved in the management of brownfield

Degraded asbestos debris in soil | AECOM

Visual detection of asbestos during remediation | NTP

land regeneration as a potentially high-cost, risk-driven issue, and this publication seeks to: provide a pan-European perspective; identifying opportunities for harmonisation; improve awareness and understanding; and promote greater consistency.

The content of this publication reflects the work of the NICOLE Asbestos Working Group from 2017 to 2021.

The aims of the NICOLE Working Group were to:
Compare and contrast current industry approaches, regulatory positions and quality and availability of existing guidance in European Countries as an initial "baselining" exercise to help identify significant differences and opportunities for harmonisation.

Improve awareness and understanding in managing the risks of asbestos in soil (considering its occurrence both on its own and as a co-contaminant with other pollutants) by advocating a pragmatic approach and promoting greater consistency where possible.

These aims were to be achieved by:

1. Collating information on, and benchmarking of, current methods, standards and guidance for the characterisation, risk assessment, remediation and regulation of asbestos in soils that are currently adopted by industry and regulators in European Countries;
2. Identifying how asbestos contaminated soils (including those also contaminated with other pollutants) are currently remediated in different countries, considering different treatment technologies and the availability (or otherwise) of appropriate disposal/ treatment facilities;
3. Identify existing research efforts into characterisation, risk assessment and remediation, and identify research opportunities that could support a sustainable pragmatic approach; and
4. Identifying case studies that support and improve confidence in risk management decisions and in developing best practice.

2 NICOLE Survey of Members

To establish a baseline of current legislation, guidance and practice in European countries, a detailed survey was issued to NICOLE and Common Forum members in 2018. Three years on and very little has changed. The survey comprised 70 questions covering 6 topic areas.

These were:

1. Legislative provision and regulatory position
2. Good practice industry guidance
3. Laboratory methods
4. Waste classification, handling and disposal
5. Remediation options
6. Research and innovation

12 responses were received for 6 countries.

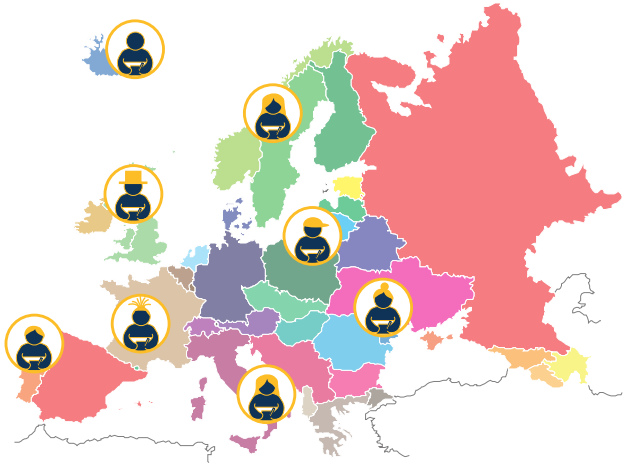


Figure 2.1 NICOLE Network Survey of members

3 Legislative and Regulatory Positions

One potential harmonising factor is EU Directive 2009/148/EC, on the protection of workers from the risks related to exposure to asbestos at work, that sets out occupational health and safety requirements for work involving asbestos. However, even with this in place, the control limits for asbestos in air vary considerably across Europe, ranging from the Directive Control Limit of 0.1f/ml in the UK to 0.002f/ml in The Netherlands (50x lower). No country has specific legal provision solely addressing exposure to asbestos in soil, although it is increasingly recognised that disturbance of asbestos containing soil is an activity that is captured by existing asbestos-specific occupational regulations relating to work in buildings (e.g. maintenance, refurbishment and demolition).

Asbestos cement fragments in soil | AECOM

Country	Occupational exposure limit (f/ml 8hr TWA)
EU limit value (2009/148/EC)	0.1 (100,000f/m^3)
UK	0.1
France	0.01
Italy	0.01
Germany	0.001
Netherlands	0.002 (with intention to reduce to 0.0003)

Table 3.1 Occupational exposure limit

Presence of AiS guidance. Detailed sampling and testing protocols. Air and soil guidelines. Regular testing

Absence of AiS guidance. Reliance on OSH and waste regulations. No regular testing

There is a stark divergence between those countries with detailed regulatory guidance on the risk management of asbestos in soil and those countries with no specific regulatory guidance for asbestos in soil. It was discussed at the NICOLE workshop in Warsaw in November 2019 that asbestos is considered to be an emerging soil contaminant in Germany, and in many Eastern European countries, even though in other countries it has been recognised as a contaminant of concern for decades. Where detailed gui-dance is in place, it is largely based on the research of RIVM and TNO published between 2003-2008.

The only European regulatory guidance levels for asbestos in soil are those published by the Dutch, Belgian and Italian authorities. The Dutch and Belgian authorities adopt a Tiered approach and use the same Tier 1 value, but importantly use different definitions for those values.

Dutch Tier 1 Intervention value = 100mg/kg (sum of chrysotile+10x amphibole as measured by NEN 5707)

Flanders Tier 1 Intervention value = 100mg/kg (sum of fixed + x10 loose fibres (all asbestos types) as measured by TEM)

4 Industry Good Practice

It is only common among a small number of European Countries to test made ground soil samples for asbestos as part of a normal site investigation. Sampling is either carried out using typical practice adopted for contaminated land or using detailed prescriptive practice specific to asbestos (such as for the Netherlands and Belgium). Guidance on sampling strategies, sample plans, laboratory test methods, and requirements for site staff competency/qualifications is mixed, with no common approach across the countries surveyed.

When suspected asbestos is observed in the soil there is a legal requirement under workplace regulations to put in place procedures to manage the associated risks. If suspected asbestos is found onsite during site investigation or remediation works, the general procedure is to stop work, make the work area safe and temporarily vacate the area until the risk assessment and method statements for the work can be revised. Actions can include the use of dust suppression, asbestos survey of the area, confirmatory laboratory testing of the identified material, and use of Licensed contractors to remove the asbestos. Work should only ever continue if safe methods of work can be put in place.

Signing of an asbestos impacted area | NTP

Guidance Questions	Belgium (Flanders)	Belgium (Wallonia)	France	Italy	Portugal	Spain	UK
Is the testing of brownfield sites for asbestos commonplace?	yes	yes	no	yes	yes	not	yes
Is guidance available for the risk management of asbestos in soil?	yes	yes	yes	no	no	no	yes
Does the guidance fill a gap in regulatory guidance?	yes	no	yes	no	no	no	yes
Is the guidance entirely country specific?	no	no	yes	yes	no	no	yes
Does the guidance advocate a tiered approach?	yes	no	no	no	no	no	yes
Does guidance include method on soil sampling if asbestos is present?	yes	yes	no	yes	no	no	yes
Does the guidance recommend air testing during site-based activities?	no	no	yes	yes	yes	no	yes
Does the guidance advocate health and safety precautions during sitebased activities?	yes	yes	yes	yes	yes	yes	yes
Does the guidance advocate a guideline for asbestos in soil?	yes	yes	no	no	no	no	no
Is there any guidance on how to assess risk from asbestos fibres being present in water?	no	no	no	no	no	no	no

Table 4.1 Summary of questionnaire responses on good practice guidance

5 Approaches to Ground Investigation

Some of the specific aspects of ground investigation identified in the survey included:

The importance of desk study and site walkover to establish the likelihood of asbestos being present.
Sampling strategies — can be targeted or random/ systematic.

Sampling approach — size and frequency. Dutch, Belgian, and SoBRA guidance require/advocate the use of much larger sample sizes that typically used for other soil contaminants. The Dutch and Belgian guidance also specify sample frequency, e.g. 1 sample per 50 m^3 or 1 per 1000 m^2.

Activity based sampling is occasionally used. This is in essence what the RIVM/TNO guidance was based on, what is described in US EPA guidance,

Asbestos sampling activities in Belgium | AECOM

and what is advocated in SoBRA guidance to better understand the likelihood of asbestos fibres becoming airborne as a result of soil disturbance.

Other ground condition factors are important to risk, including soil type, vegetation or other surface cover, and moisture content.

Asbestos sampling activities in Belgium | AECOM

Differing views exist as to whether ground investigation falls under occupational regulations for work with asbestos (as per in buildings).

Requirement for suitably trained/experienced staff. For example, Dutch guidance requires specific certification and accreditation for inspection and sampling of soils.

Asbestos was found to be present in up to 20% of made ground samples according to SoBRA research in the UK based on 150,000 soil samples submitted to UK laboratories between 2015 and 2018.

6 Detecting asbestos in soil

Asbestos sampling activity in UK | AECOM

The conceptual understanding of the spatial distribution of asbestos is fundamental to the design of an investigation and the interpretation of the results. Is it a delineable area subject to asbestos disposal? Is it dispersed fragments across a wide area? What is the likelihood of detecting the asbestos using your sampling strategy?

Grid Size	Probability of detecting one ACM fragment	Sample size as a proportion of grid square
100	1 in 100,000	0.01%
50	1 in 10,000	0.04%
10	1 in 1000	1%

Table 6.1 Probability of detecting asbestos based on a soil sample size of 1 litre

The reliability of the site investigation is a function of:

- Sample size
- Sample density

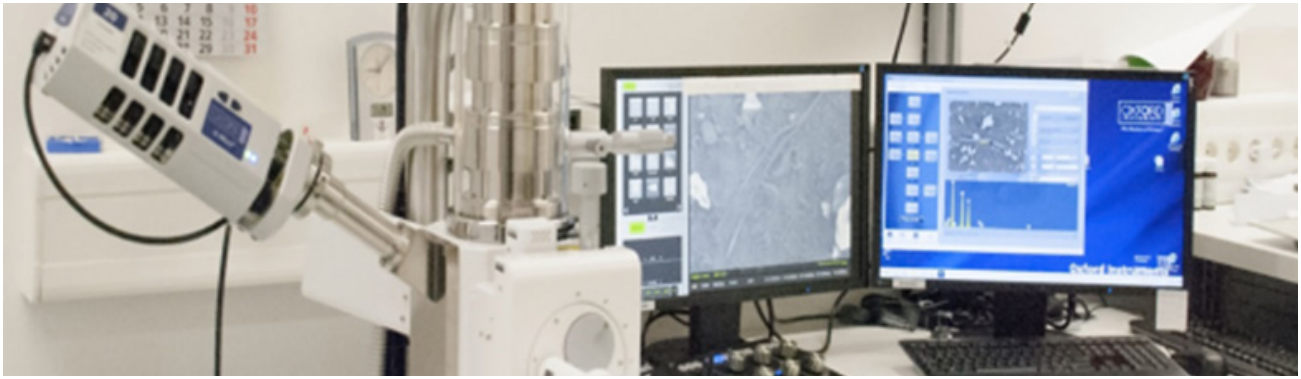
As noted previously the Dutch and Belgian authorities, and SoBRA in the UK, advocate taking larger samples for asbestos compared to typical size of soil samples taken for other contaminant testing because of the greater uncertainties involved in sampling for asbestos in soil.

The theoretical probability of detecting a small area of isolated asbestos fragments in soil can be extremely low. If random fragments are found in soil the probability of more unidentified fragments being present in the soil can be high.

Samples taken in The Netherlands | NTP

7 Laboratory Methods

Electron microscope



Laboratory methods vary widely across Europe. Some countries have very detailed analytical methods that are embedded in the regulatory guidance (for example the Netherlands and NEN Standard 5707). Other countries such as the UK have a mixture of methods published by regulatory bodies (HSE for HSG248) and industry bodies (SCA Blue Book Method*).

Current European Standards specifically for quantifying asbestos in soil include: NEN 5707 (The Netherlands) SCA Blue Book Method (UK)*

** Withdrawn in October 2020 due to concerns over validation triggered by AISS results*

The methods that are available vary depending on the regulatory context and purpose of the test.

The three most common purposes are:

1. Bulk analysis for the presence of asbestos (driven by occupational regulation)
2. Air monitoring (also driven by occupational regulation)
3. Gravimetric quantification for waste classification

The reliability of laboratory test methods can be better understood by studying the inter-laboratory proficiency schemes, such as those provided by the UK Health & Safety Laboratory schemes (including AISS) **[link]**

Detailed standards for quantification in soil are the least common and also tend to have the greatest variability. When a single standard method is not mandated by regulation, interlaboratory variability can be high. Each laboratory undertaking the often multi-stage analytical process slightly differently—be it in the sample preparation, the mass of sub-sample analysed, the magnification of the microscope used, the type of microscopic method (PLM, PCOM, SEM, TEM), the assumed composition of man-made asbestos products, or the fibre counting rules employed.

8 Waste Classification, Handling and Disposal

The classification, handling and disposal of asbestos and soil impacted asbestos waste is addressed by the EU Waste Framework Directive (2008/98/EC) and is potentially the most harmonised aspect of dealing with asbestos in soil across Europe as a result.

All European countries adopt the 0.1% hazardous waste threshold.

Soil that contains identifiable pieces of asbestos containing material (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then the soil is regarded as hazardous waste.

Collection of asbestos fragments should be done using double bagged, be labelled asbestos waste,

Double bagging of asbestos waste in UK | Ramboll

Double bagging of asbestos waste in UK | Ramboll

and shipped using the correct waste transfer documentation.

Large asbestos sheets can be wrapped in 1000 gauge polythene sheeting, labelled as above and placed in an enclosed and locked skip.

The transport of asbestos impacted soils can be either in enclosed containers or in sheeted lorries by a licensed waste carrier.
It is important to note that in accordance with the waste hierarchy, the volume of hazardous waste should be reduced by physical separation of visible asbestos from residual soils (if feasible).

9 Approaches to Risk Assessment

Motor-powered breathing system | NTP

The most established approaches to risk assessment for asbestos in soil in Europe are the frameworks developed by VROM (now IenW) and OVAM, and with the latter OVAM framework being highly influenced by the earlier VROM framework. Further steps to better understand the potential fibre release of asbestos from the affected land are introduced by the US EPA framework that advocates activity-based sampling, and UK good practice that advocates the better understanding of dust and asbestos fibre release from soil disturbance.

Published research on which the frameworks are based is limited, and dated—the research that

forms the basis of the VROM framework dates from the 1990s, and a core piece of research advocated in the UK guidance dates from the 1980s.

Whilst individual frameworks vary in the detail, and the data requirements for those frameworks vary (see section on Ground Investigation), there is a common theme to the frameworks that is illustrated in the diagram below.

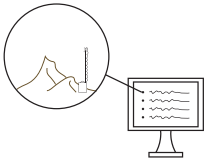
Tier	Tier 1	Tier 2	Tier 3	Tier 4
Data	Basic soil characterisation 	Differentiation in asbestos form and type 	Respirable fibre content in soil. Particle size fraction of interest 	Site-specific fibre-release data 
Criteria	Generic assessment criteria (not asbestos type specific)	Generic assessment criteria for asbestos types and/or forms	Generic assessment criteria for respirable fibre content	Site-specific assessment criteria

Figure 9.1 Common theme in frameworks

Hobmoor School – Birmingham, UK | Google Maps

Ramboll was commissioned by Balfour Beatty Construction Limited to develop and implement an asbestos remediation strategy to enable the construction of a new school.

Previously developed as industrial land, the historic review and site visit established significant volumes of demolition rubble from prefabricated buildings across the site. The proposed development included landscaping, sports areas and

Frequently occurring fragments of asbestos cement and AIB were discovered

Asbestos finds | Ramboll

earthworks reprofiling. This meant significant cut and fill works across the site with soil containing demolition rubble.

Asbestos Containing Material (ACM) was encountered during site clearance, so a specialist survey contractor was commissioned for soil sampling and perimeter air monitoring. The asbestos detected in this survey was asbestos cement (chrysotile), asbestos insulation board (amosite) and found in the topsoil till a depth of 1,00-1,50 meters. The pollutant linkages identified during construction and operation were potential exposure to free fibres from friable materials from the asbestos cement and insulation board.

The remedial options appraisal included:

- Dig contaminated soil and dump on site in vegetation strip; costs over £800 000,
- Hand pick asbestos material, capping with imported top soil (0,3 meters) and install a marker layer between clean top soil and contaminated soil underneath; costs approximately £500 000,
- Assess the risks of in situ reusing the top soil.

Pockets of asbestos covered much of the site at depths up to 5m.

Asbestos finds—hand picking | Ramboll

Processing plant | Ramboll

Based on the options appraisal a bespoke methodology was developed and a comprehensive worldwide review of asbestos legislation and guidelines was undertaken. The final remediation strategy designed comprised of:

1. Hand picking of asbestos cement and asbestos insulation board fragments,
2. Trommel sieving of soil on a 14 mm mesh,
3. Air monitoring for fibres across the perimeter of the site and in the "Control Zone",
4. Works carried out by a licensed contractor with a HSE approved asbestos methodology.

A dust and fibre release experiment was designed to estimate the potential fibre release during school operation, which could be released by soil derived indoor dust. This was done by simulating a realistic and real time situation. For this a 12 m^3 sealed enclosure was built into the school with an air lock entry. The soil in the sealed enclosure was vigorously disturbed to generate dust. The indoor air was monitored and sampled. The samples were tested with Phase Contrast Optical Microscopy (PCOM) analyses.

The remediation delivered a screened top soil which was suitable for re-use in the landscape area

Indoor air experiment | Ramboll

without requirement of a cover layer. The worst case activities were simulated and tested and concluded no residual fibres and low residual risks. All air monitoring results were below detection limit of the standard HSE method i.e. <0.01 f/ml during the earthworks. And the air testing experiment (samples repeatedly disturbed) did not generate airborne fibre concentrations above limit of detection of the standard HSE method (<0.01 f/ml).

The new school is in place and the landscaping offers a nice area around it.

Before and after construction | Ramboll

10 Risk-Based Soil Guidelines

There are few published guideline values for asbestos in soil in Europe. Those that are published are summarised below:

Country/ Region	Guideline Value	Additional Information
The Netherlands	Tier 1: 100mg/kg Tier 2: 1000mg/kg (non-friable) or 100mg/kg friable Tier 3: 10mg/kg respirable fibres	Soil Remediation Circular 2013 Annex 3. Concentrations defined as the sum of chrysotile + x10 amphibole and as the average dry weight concentration over a maximum spatial unit of 1000m2. Samples to be taken and analysed as per SIKB Protocol 2018 and NEN 5707.
Italy	1000mg/kg	D.Lgs 152/06. Analysis required to be either SEM for asbestos content <1% or DRX/FTIR for asbestos contents >1%.
Belgium/ Flanders	100mg/kg	Phase 1—minimum of two 10 litre sieved soil samples per 1000m2 of unpaved ground. If concentration < 100mg/kg or >70cm bgl, no action required. If >100mg/kg, further site-specific inspection (Phase 2) required. Concentrations defined as the sum of fixed fibres + x10 loose fibres.
Belgium/ Wallonia	100mg/kg	Concentrations defined as the sum of bonded fibres + x10 unbound fibres. If concentration is > 100mg/kg but <500mg/kg it is acceptable to use soil beneath 1m clean soil + geotextile.
Belgium/ Brussels	100mg/kg Intervention Value 80mg/kg Remediation Value	If the results obtained for a sample exceed the intervention standard for asbestos or if there is a question of pollution (in the sense of art. 3 25° of the Soil Ordinance), a detailed soil survey must be carried out.

Table 10.1 Published guidelines in Europe

11 Approaches to Risk Management

Risk perception and stakeholder acceptance of a risk-based approach to asbestos is potentially a far stronger driver of intervention than for many other soil contaminants. Zero tolerance or an abundance of caution towards asbestos can drive remediation towards "non-detect" solutions.

There are well established risk assessment decision frameworks available, for example the Australian, US EPA, Dutch, and Belgian approaches. What is not well understood is how often those frameworks are used past "Tier 1".

Is the challenge to prove the worth of the more detailed risk assessment Tiers? Is the scientific evidence sufficient to be able to persuade stakeholders that the risk is acceptable? Does the retention of asbestos-containing soils on-site leave constraints on land-use that is not cost-beneficial? Detailed risk assessment has its place and can be valuable in situations where it is not possible and not sustainable to remove the asbestos entirely. This is illustrated in the decision flowchart on the next page.

The difference in the prescriptive nature and detail of frameworks for individual countries and the sustainability of the output from those frameworks is worth further consideration.

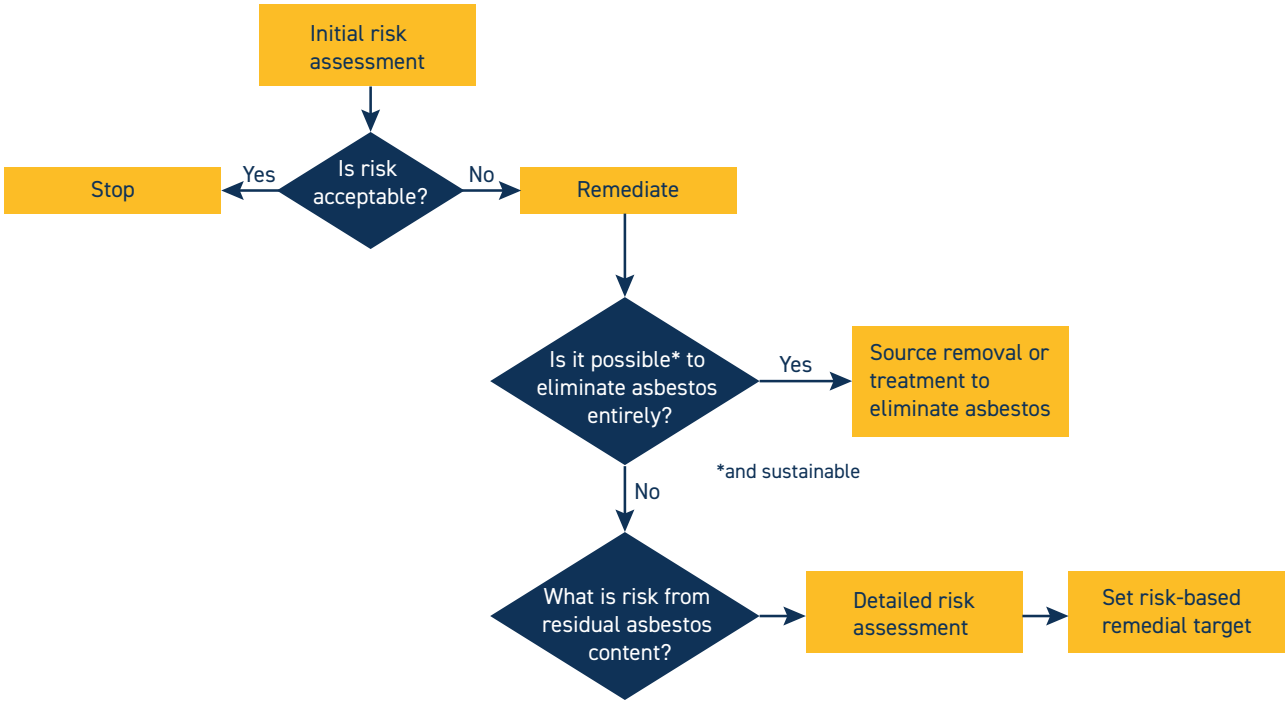


Figure 11.1 Approaches to Risk Management

12 Research and Innovation

Little innovation was specifically identified by the respondents to the questionnaire. A literature review of the most recent developments (within a 5 year time window) in the fields of analytical methodologies, remediation technologies and survey studies has been carried out for NICOLE through the analysis of scientific publications hosted at all the Web of Science databases [Link].

Asbestos investigations have historically focused on commercial asbestos fibers, which were commonly defined in regulations as chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite. Investigations now include other types of elongate mineral particles such as winchite and richterite (van Orden, 2018).

The most common analytical methods for asbestos analysis are polarised light microscopy (PLM), phase contract optical microscopy (PCOM) and electron microscopy (either scanning (SEM) or transmission (TEM).

Cossio et al (2018) improved the sensitivity and precision and enhanced the productivity of a Scanning Electron Microscopy with Energy Dispersive Spectrometry (SEMEDS) methodology for the analysis of asbestos in a natural confining matrix and also with a very low asbestos content.

Wroble et al (2017) compared different soil sampling and analytical methods for asbestos quantification in order develop a toolbox for better assessment in order to overcome the difficulties that exist in the detection of asbestos at low concentrations and its correspondent extrapolation from soil concentrations to air concentra-

tions. Sampling was performed using two distinct methods: traditional discrete ("grab") and incremental sampling methodology (ISM). Analysis was carried out using PLM, TEM and a combination of these two methods were used. Using a Fluidized Bed Asbestos Segregator (FBAS) followed by TEM analysis resulted in the detection of asbestos at locations that were not detected using other analytical methods.

Fibre counting by automated image analysis using fluorescence microscopy has been evaluated by Alexandrov et al (2015). There is the potential from this for faster analysis and less human error, but whilst good validation for medium to high fibre concentrations was achieved, for lower fibre concentrations it was less accurate.

In the last 5 years just a few articles mentioned innovative or upgraded technologies for the asbestos treatment in contaminated sites, mostly considering biological treatment.

Mohanty et al. (2018) examined whether environmentally relevant concentrations of siderophores (exudates from bacteria and fungi that facilitate iron mobilisation and uptake) could alter chrysotile toxicity. Iron removal by siderophores decreased the carcinogenicity of the fibres, the fungal exudates being more effective than those from the bacteria. However, the authors stated that this approach should be more deeply explored in order to develop a viable strategy to manage asbestos-contaminated sites. Native bacteria and fungi from asbestos mines in India (Aspergillus tubingenesis and Coemansia reverse) have

also reportedly been used to detoxify asbestos (Bhattacharya et al. 2015 & 2016).

Gonneau et al. (2017) evaluated the capacity of crop cultivar and grasses for the phytoremediation of soils containing asbestos from natural and anthropogenic causes. The presence of asbestos caused less or no impact on the plant growth when compared to other factors such as the presence of heavy metals or lack of nutrients.

Valouma et al. (2016) used a combined treatment of oxalic acid dihydrate with silicates (tetraethoxysilane and pure water glass (potassium silicate)) to achieve total destruction of chrysotile. Oxalic acid leaching followed by the tetraethoxysilane addition was more appropriate for cases of glushinskite recovery; while an Oxalic acid leaching followed by water glass managed to encapsulate the asbestos fibers, which might be a valid option for onsite asbestos detoxification.

A small number of commercial companies have developed innovative solutions to asbestos remediation:

- An Italian company offers an innovative remediation technology that uses microwave energy to convert asbestos waste to an inert material. The technology involves a movable reactor that can heat the asbestos and produce a reusable inert material [Link].
- A Japanese company Sagasiki offers 'ND Lock', a solidification solution based on calcium polysulphide (CaSx) formulation. The treatment involves a crystallization and decomposition process. Numerous applications relating to asbestos treatment are given on their website.

13 Remediation Options

The most common remediation approach in many countries is still to “dig and dump” (i.e. excavate and dispose to an off-site landfill). A question is whether this is a sustainable approach? The risk is removed by removing the hazard (i.e. the source) but does the context of site use permit a lower impact solution?

The trigger for remediation is also different between countries. For example, mandatory testing for microscopic fibres in soil whenever a construction activity takes place versus action only if visible asbestos waste is encountered. In France, all road asphalt has to be tested for the presence of asbestos as part of any road improvement scheme.

From the questionnaire responses it is clear that there is substantial variation in remediation

Typical remediation earthworks activities in UK | AECOM

Damping down of stockpiled material with water spray | AECOM

triggers, in what restrictions and requirements the identified presence of asbestos introduces, and in the remediation standards enforced. Even if the value of the remediation standard appears at face value to be the same (for example for The Netherlands and Belgium), the detailed definition of that value is different.

What is generally recognised in the questionnaire responses is that the presence of asbestos in the ground can have a significant effect on land use and costs for remediation (either in the cost for remediating the asbestos itself as a risk and remediation driver, or in the additional cost for remediating a different risk driving contaminant because of the co-presence of asbestos).

There are a number of remediation options to consider, some more established than others. From a risk management perspective these options can be grouped as follows:

Monitor
- Risk assessment
- Monitoring strategy

Institutional Controls
- Land-use management
- Signs
- Fencing
- Permit control
- Land-use restrictions

Traditional Remediation Methods
- Excavation and disposal offsite
- In-situ containment (cover system)
- Hand-picking (ground or belt)
- Tilling
- Mechanical screening

Emerging/Innovative/ Alternative Methods
- Mechanical screening (advanced)
- Soil washing
- Vitrification
- ABCOV (acid destruction)
- Microwave destruction
- Modified low temperature thermal desorption
- Soil fungi
- Fine grinding
- Physical stabilisation
- Phytoremediation

The following scheme (next page) presents the risk management based considerations for the remedial options.

What is the context for the decision?	What is the risk characterisation?	Remediation options	Considerations for remediation options
Management of current situation (land condition and use)	Negligible risk and no regulatory driver for further action/intervention	Monitor	Monitoring locations and monitoring frequency Type of monitoring (realtime/continuous or spot monitoring, time duration, dust and/or fibres) Limit of detection and sensitivity of method (e.g. differentiation of fibre types and fibre sizes)
Regulatory intervention	Low risk - potential to manage risk without extensive remedial action	Institutional control	Is control of use/access of area practicable and achievable? Does it require reassurance boundary monitoring? Fencing, signage, specific PPE/RPE requirements
Preparation for site divestment/acquisition	Higher risk - requires more detailed consideration of remediation options	Remove	Can it be treated and re-used on-site? Can it be treated to reduce volume requiring disposal? Can it be treated to reduce handling/ transportation risk?
Preparation for site for new use		Cover	What level/degree of soil disturbance does this need to protect against? Durability. What ground access constraints are present which may restrict/constrain installation of cover (type, extent)?
Construction activity requiring asbestos containing soil to be excavated and/or constructed on		Ex-situ treatment	Treatment type - physical separation, chemical destruction, stabilisation. What is the required post-treatment specification for the material? What is the treatment capable of achieving?
		In-situ treatment	Treatment type - physical separation, chemical destruction, stabilisation. What is the required post-treatment specification for the material? What is the treatment capable of achieving?

Figure 14.2 Example of a Risk Management Decision Flowchart

John F Hunt demolished and remediated this former 44-acre foundry / iron works site in Ipswich. The mixed-use site also held two historic landfills containing inert and 'difficult' waste.

Part of the works involved the management of 35,000 m^3 of previously unidentified fibrous asbestos in soil. This unforeseen event had not been budgeted for and could have potentially rendered the project unviable. John F Hunt worked quickly and pragmatically with the client's consultants and regulators to agree a solution to enable the re-use of materials on site, making the necessary adjustments to the remedial design and Materials Management Plan.

An innovative process engineered approach of complex sorting and cement stabilisation of the

Futura Business Park – Ipswich, UK | John F Hunt

All forms of asbestos were discovered including crocidolite lagging.

Pockets of asbestos covered much of the site at depths up to 5m.

Asbestos finds | John F Hunt

soil was agreed with the regulators to derive site won engineered fill that was suitable for use.

Due to the nature of the asbestos, the remediation works were undertaken as Licensed Asbestos Works managed by John F Hunt.

Contaminated soil was fed into a three-way screener. The oversize material off the screener was proven to be suitable for re-use. The mid-size component was passed to an 'asbestos picking station' where six operatives hand removed visible asbestos products; in some instance the material was passed though the picking station twice to ensure the re-use criteria of <0.1% asbestos (w/w) was achieved. Fine material coming off the screener was passed to a mill unit where

2% cement was added. The stabilised fines were fed onto a stacking conveyor with misting sprays that deposited the material directly into the excavation.

Throughout the works the air was monitored by an independent Asbestos Analyst to demonstrate that the control measures were suitable.

The processed soil was tested to show compliance with the Remediation Strategy, following which it was placed and compacted to form a development platform 1.5m below the finished site level.

John F Hunt were able to successfully treat 65,000 tonnes of asbestos contaminated soil using innovative techniques that ultimately saved the client over £10,000,000 in disposal costs.

Processing plant | John F Hunt

A number of innovations in remediation have either been proposed and/or implemented by remediation specialists, as exemplified in some of the case studies included in this document and the listing of potential options on page 37. Innovation does not have to be a completely new technology, and can include the innovative use of an existing technology.

Examples of this include the use of:

- Cement impregnated geotextiles for cover systems (see photographs to the right)
- Low temperature driers or thermal desorption units to extract loose fibres by drying + extraction of airborne fibres
- Mechanical screening (dry and/or wet)

Installation of surface barrier geotextile | Curtis Barrier Intl

A comprehensive review of remediation technologies is provided in a report by Bureau KLB for the Dutch Ministry for Infrastructure and Water Management published in 2018. This was driven by the need to reduce the unsustainable volume of asbestos contaminated soils being disposed to landfill in the Netherlands.

Mechanical screening of excavated soil | AECOM

Remedial objectives can shape option choices. For example:

Remove ACM fragments and re-use remaining soil at depth on-site	Physical separation of ACMs using hand picking or mechanical screening?
Remove asbestos fibres and re-use remaining soil at surface on-site	Physical separation of fibres by soil washing or drying + vacuum extraction?
Treat soil + asbestos so that material is suitable for re-use	Stabilisation or fibre destruction technology?
Re-use on-site is not possible/ acceptable	Off-site disposal—can pre-treatment reduce cost by minimising hazardous waste volume?

Figure 13.1 Examples of choices for different Remedial objectives

Factors to consider in remedial selection can include:

- Types of asbestos present
- Levels of asbestos present
- Area / volume of impacted soil
- Timescales
- Client risk perception / avoid land blight
- Sustainability
- Presence of other contamination
- Current and/or proposed land-use
- Site location (and proximity to receptors)
- Occupational health constraints
- Remediation standard required
- Other requirements for soil (e.g. geotechnical)

Removing asbestos contaminated soil | NTP

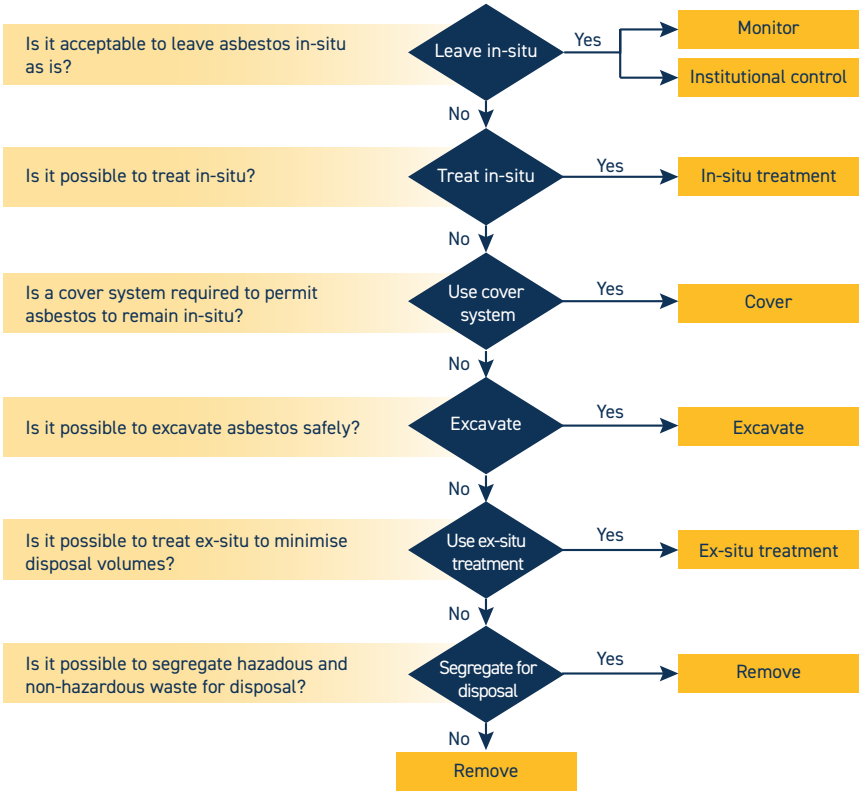


Figure 13.2 Example of a Remediation Decision Flowchart

14 Sustainable Remediation

Trommel screening of excavated soil | McAuliffe

Asbestos in soil remediation options should be considered in accordance with sustainable remediation frameworks (e.g. SuRF). Does the remediation approach represent the best solution when considering environmental, economic and social factors as agreed with stakeholders? How can successful remediation best be achieved with minimal environmental impact? What remedial solution delivers the greatest cost-benefit? Does the selected approach transfer impacts to future generations?

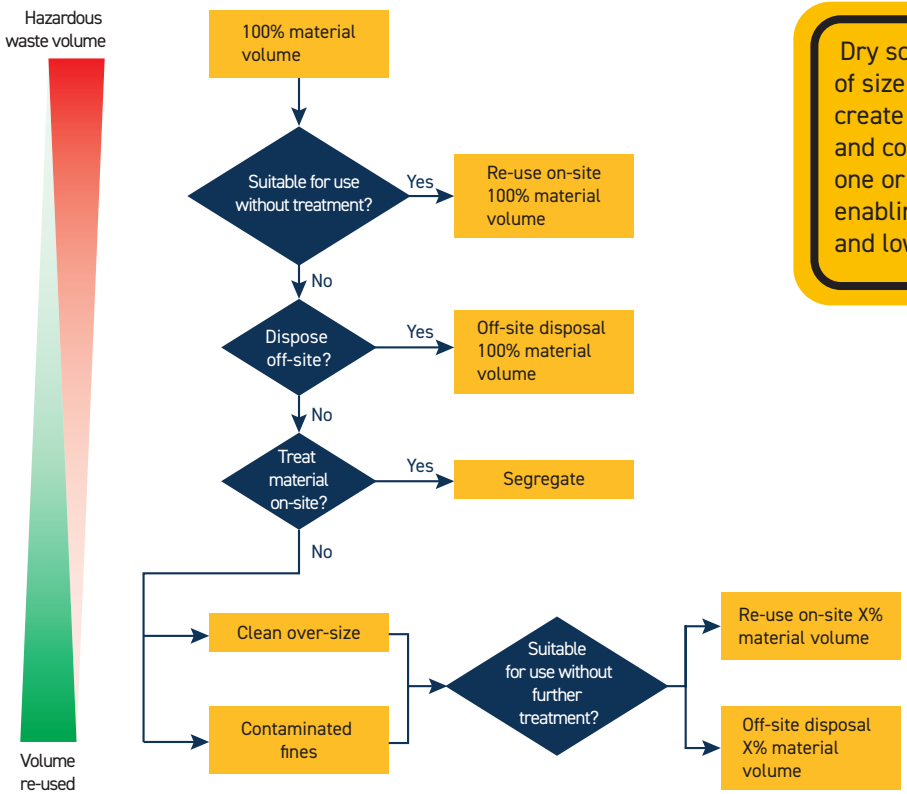
A simple example is the consideration of on-site physical separation to maximise the re-use of

Belt-picking station | McAuliffe


Hand picking of asbestos fragments on a belt | McAuliffe

material on-site and minimise off-site waste disposal. One way of viewing this is via a decision flowchart such as the examples on the following pages which illustrate the decision process and disposal volume reduction created by the adoption of mechanical separation treatment techniques. The use and sequencing of the material screening techniques will be influenced by a number of factors including:

- Cost of treatment versus cost of disposal
- Particle size distribution of material
- Remediation standard



Dry screening and separation of size fractions could create clean size-fractions and concentrate asbestos in one or more size fractions, enabling re-use of some material and lowering disposal volumes

Figure 14.1 An example of a treatment decision process for dry screening as a sustainable option

AECOM developed a remediation and excavated materials management strategy for the redevelopment of a former car part manufacturing facility located in the UK.

The presence of soil contaminants necessitated a remediation and earthworks strategy that had sustainability at its core: maximising reuse of site-won material, and minimising off-site disposal whist at the same time providing a safe development platform. The remediation strategy sought to first treat organic-based contamination through ex-situ bioremediation. Alongside the remediation works, an excavated materials management plan (MMP) was developed under the CL:AIRE Definition of Waste: Development Industry Code of Practice (Code of Practice) to support the earthworks design. Demolition of the former buildings and hard standing occurred alongside the soil remediation under separate contract by a third party. Four stockpiles of screened demolition materials (approx. 26,500 m^3) were prepared for re-use. However, these materials were subsequently found to contain a proportion of asbestos containing materials (ACM) which had in places also contaminated the ground as the stockpiles had been moved around by the contractor.

Asbestos finds | AECOM

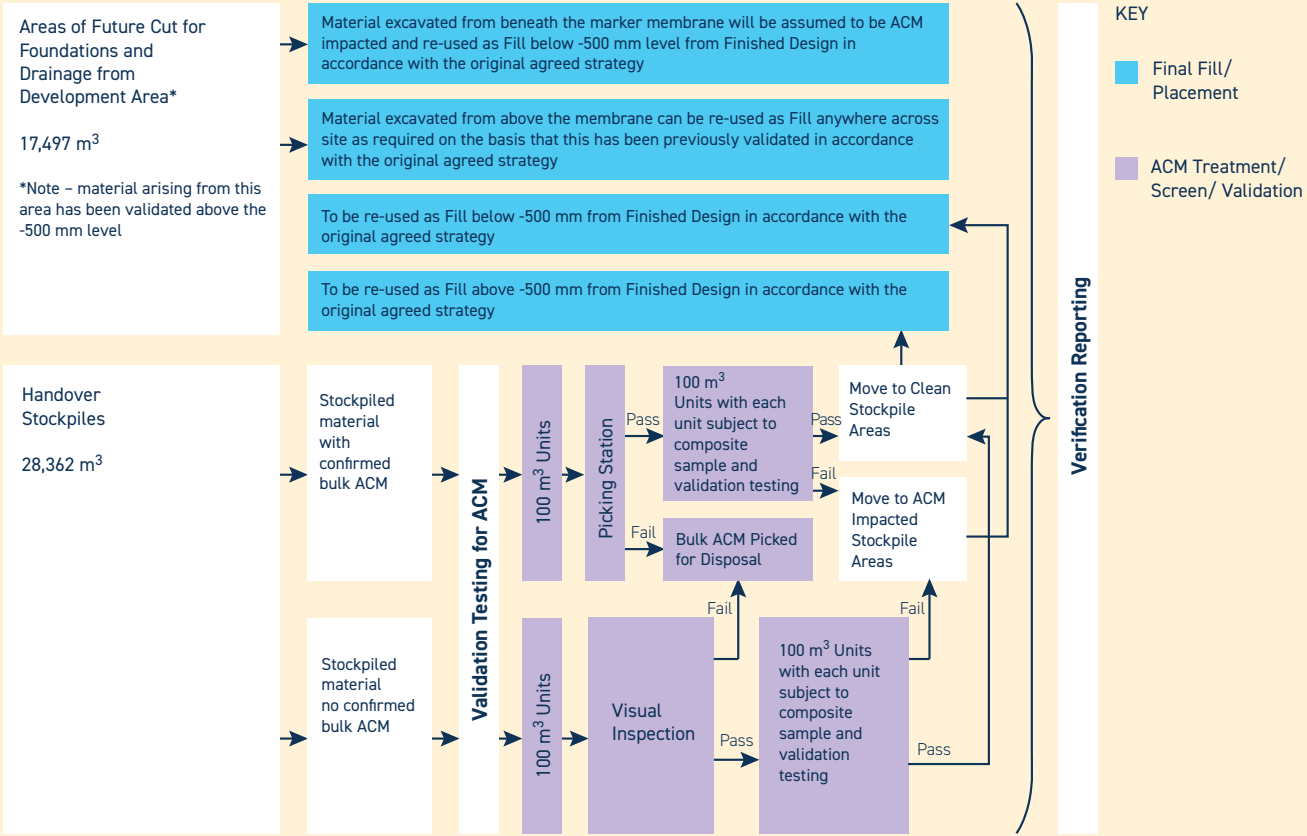


Figure C2.1 Material Management Flowchart

In order for the stockpiled materials to be re-used as part of the consented design a revised strategy was required to ensure the appropriate and safe re-use of these materials. AECOM prepared a detailed assessment on the levels of ACM and asbestos free fibres recorded in the materials and also quantified the level of risk posed by the materials. The soil re-use strategy was developed in accordance with the Control of Asbestos Regulations (2012) and the HSE Approved Code of Practice for managing and working with asbestos (ACoP L143) and gained regulatory agreement.

The strategy developed for the areas of impacted ground centred on a minimum of 500mm validated clean cover being placed below finished design level with the installation of a geotextile marker membrane at the interface of the clean cover and existing ground level. The strategy also made provision for selected 6F2 (UK highway's grade of aggregate) stockpiles impacted with asbestos to be

Installation of the cover system | AECOM

treated through mechanical screening, sorting and hand picking to generate screened material that met agreed validation criteria (<0.001% asbestos). The mechanical screening successfully separating the larger size fractions that were free of asbestos from the smaller size fractions where the asbestos tended to be. The treated larger size fractions could then be recrushed to produce graded material suitable for use in the development without restriction. Stockpiles that were not treated were tracked and used in dedicated areas of the development under 500mm of clean cover with geotextile marker membrane. In areas where soils containing ACM were placed beneath cover, the strategy set out the principles and expectations for a future site management strategy that would need to be adopted upon completion.

The approach taken at this site ensured that the excavated and site-won materials were managed sustainably on site, minimising potential off-site disposal and material import consistent with the original design aspirations and expectations attached to the planning consent.

15 Opportunities for Harmonisation

There are opportunities for and benefits of harmonisation:

- The advocacy of sustainable approaches to risk management
- Greater recognition of the cost-benefit of waste minimisation using ex-situ or in-situ techniques
- A common understanding of risk and a risk-based, proportionate, response to asbestos in soil

There are also barriers to harmonisation that ultimately will limit the degree of harmonisation that is possible. For example:

- Different national legislation and regulatory guidance
- Differing risk perception and/or prioritisation
- Differing scale of issue
- Differing scientific opinion

Figure 15.1 Harmonised approach

16 Concluding Remarks

The problem of asbestos contaminated soil is a common one across Europe, albeit to varying degrees and largely linked to the historic use and management of asbestos in construction and demolition of buildings. It is a recognised challenge for the risk management of existing land use and the re-purposing of brownfield land in some but not all European countries. As result there are well established guidance and procedures in place in some countries and an absence in others. The variability in approaches is marked, with highly detailed and prescriptive regulator-driven guidance in countries such as The Netherlands and Belgium, and less prescriptive industry-led guidance in the UK.

The opportunities for harmonisation across countries are few—certainly in the short-term, and this is driven by the different legislature and regulatory guidance in each country and the large differences in investigation approaches across European countries that have guidance in place. It is also evident that the approaches in countries are not all entirely risk-based. For example, the requirement to remove all visible fragments of asbestos in soil in Italy irrespective of the soil standard in Italy of 1000 mg/kg (which is the EU hazardous waste limit for asbestos). For many countries it is still the case that no risk-based guidance exists for asbestos in soil, and in those countries (unless gross asbestos contamination is identified) the consideration of low or trace levels of asbestos in soil is not a default consideration in site investigation design and land management.

There is therefore a place for advocating good practice in investigation, in risk assessment, and in

remediation, employing the best science and utilising the most sustainable remediation options. This is relevant both for European countries where regulation and guidance is currently absent, and for European countries where guidance is in place.

The pace of change in asbestos regulation and guidance is slow and there are opportunities to learn from countries outside of Europe, for example the work of the US EPA in the USA and the work of the Australasian Land and Groundwater Association (ALGA) and BRANZ Ltd in Australia and New Zealand.

CONTENT DISCLAIMER:
This publication does not necessarily represent the opinions of all NICOLE members.

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Acronyms and Abbreviations

ACM Asbestos containing material

AIB Asbestos insulation board

AISS UK Health and Safety Laboratory (HSL) Proficiency Testing for Asbestos in https://www.hsl.gov.uk/proficiency-testing-schemes/aiss

DRX X-ray diffraction

f/ml a unit of measurement for air (asbestos fibres per millilitre of air sampled)

f/m^3 a unit of measurement for air (asbestos fibres per cubic metre of air sampled)

FTIR Fourier transform infrared spectrometry

HSE UK Health and Safety Executive https://www.hse.gov.uk/

OVAM Public waste agency of Flanders https://www.ovam.be/

PCOM Phase-contrast optical microscopy (alternative acronym used is PCM)

PLM Polarised light microscopy

RIVM Netherlands National Institute for Public Health and the Environment https://www.rivm.nl/en

SCA UK Standing Committee of Analysts
http://standingcommitteeofanalysts.co.uk/

SEM Scanning electron microscopy

SoBRA UK Society of Brownfield Risk Assessment https://sobra.org.uk/

SuRF Sustainable Remediation Forum https://www.sustainableremediation.org/
and https://www.claire.co.uk/projects-and-initiatives/surf-uk

TEM Transmission electron microscopy

TNO Netherlands Organisation for Applied Scientific Research
https://www.tno.nl/en/

VROM Former Netherlands Ministry of Housing, Spatial Planning and the Environment (since 2010 with the Ministry of Infrastructure and the Environment)

US EPA United States Environmental Protection Agency https://www.epa.gov/

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