# Best Available Techniques Assessment Variation to Bespoke Installation Permit

**Site name:** Parley Waste Management Facility

**Site address:** Chapel Lane, Parley, Christchurch, Dorset, BH23 6BG

**Operator name:** Eco Sustainable Solutions Limited

Written by Emily Shann Pitts, Shann Pitts Consulting, 21 March 2025

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# Table of Contents

# 1. Introduction

A Best Available Techniques (BAT) Assessment has been prepared by Shann Pitts Consulting (SPC) on behalf of Eco Sustainable Solutions Limited (Eco) to support an application for a variation permit application to vary the existing bespoke installation permit for the Parley Waste Management Facility at Chapel Lane, Parley, Christchurch, Dorset, BH23 6BG herein termed 'the Site'. The application has been prepared by SPC in conjunction with and on behalf of the Operator Eco.

The proposed changes to the permit are detailed within Section 2.2 of the Non-technical Summary[1] however the significant changes can be summarised as follows:

- Add new listed activity for the Solid Recovered Fuel Plant (currently a waste operation within the permit)
- Increase proposed tonnages for the permitted AD plant from 33,000 tpa to 70,000 tpa of prepared feedstock or 50,000 tpa of food waste.
- Change AD permitted waste types to reflect current standards
- Add, remove and change the location of emission points associated with the permitted AD plant, in particular:
    - Add a 1,013kWel combined heat and power engine (CHP)
    - Add an 870kWtho natural gas boiler
    - Add an emission point for a carbon filter abatement plant serving the pre-storage tanks

The scope of this BAT Assessment covers the proposed changes to the site operations. Section 2 of the report comprises a review of the operation, activities, infrastructure, management systems, etc. for the site, in comparison to the requirements of indicative BAT as stated in the BREF document 'Best Available Techniques Reference Document for Waste Treatment'[2] to ensure that all relevant areas are included.

The BAT Assessment has been cross referenced against relevant Appropriate Measures in the following Environment Agency Technical Guidance:

- Biological waste treatment: appropriate measures for permitted facilities (AMfBT)[3]; and
- Non-hazardous and inert waste: appropriate measures for permitted facilities (AMfNH).[4]

Compliance with the Medium Combustion Plant Directive (MCPD) and the Specified generator regulations as summarised in the gov.uk online guidance page Medium combustion plant and specified generators: environmental permits[5] has been considered separately in Section 3 of this report.

[1] Non-technical Summary, Shann Pitts Consulting, March 2025 (SPC0051/V019/NTS/V2/EcoPar/Mar25)
[2] Best Available Techniques (BAT) Reference Document for Waste Treatment, European IPPC Bureau, 2018
[3] https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities
[4] https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities/2-general-management-appropriate-measures
5 https://www.gov.uk/guidance/medium-combustion-plant-and-specified-generators-environmental-permits

The aims of this report are:

- to provide confidence to the Environment Agency that Eco has both considered the requirements of BAT and operates the site in compliance with the requirements of indicative BAT; and
- to guide future management system and site improvements works.

The report is structured in table format in the same order as set out in 2018 Best Available Techniques (BAT) Reference Document for Waste Treatment to ensure a logical review of the requirements of indicative BAT. Next to each relevant requirement there is a summary of the proposals and a comparison against indicative BAT.

The final section comprises conclusions and recommendations including any areas where the standards within BAT and / or Appropriate Measures are not currently met.

## 2. BAT Assessment for Parley Waste Management Facility

**Environmental Management System**

| **BAT 1** | **BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features** | |
|---|---|---|
| I | Commitment of the management, including senior management; | Senior management of Eco have committed to the establishment and maintenance of an environmental management system (EMS) which is certified under ISO14001. This forms part of Eco's Integrated Health, Safety, Quality, and Environmental Management System (HSQEMS). Environmental Objectives have been set in the form of Objectives and Key Results (OKRs) which are similar to Key Performance Indicators (KPIs) and are reviewed by management on a quarterly basis.<br>Ref: Environmental Policy Statement **(ECO-OD-03)** / Operations OKR document |
| II | Definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; | The Environmental Policy includes a commitment to measure, record and monitor environmental performance of Eco key significant environmental aspects in order to continually improve the Environmental Management System.<br>Ref: Environmental Policy Statement **(ECO-OD-03)** |
| III | Planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment by the management; | The EMS documents (as part of the HSQEMS) are detailed within the Document Master List (DML) **(ECO-OD-01)** and includes Standard Operating Procedures and Environmental Objectives.<br>The HSQEMS has been developed and approved by senior management who are also responsible for financial planning and investment decisions. |
| IV | Implementation of procedures paying particular attention to:<br>• structure and responsibility,<br>• recruitment, training, awareness and competence,<br>• communication,<br>• employee involvement,<br>• documentation,<br>• effective process control,<br>• maintenance programmes, | There are management system documents and procedures covering all of these elements as detailed in the Document Management List **(ECO-OD-01).**<br>• Roles and responsibilities are detailed within the HSQEMS Manual **(ECO-OD-17)** and the Management Procedure Organisational roles, responsibilities & authorities **(ECO-MP-04).**<br>• The management of Competence and Awareness are detailed in Sections 9.1 and 9.2 of the HSQEMS Manual **(ECO-OD-17)** respectively and training is documented on Training Matrix. |

| | | |
|---|---|---|
| **BAT 1** | **BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features** | |
| | • emergency preparedness and response,<br>• safeguarding compliance with environmental legislation; | • There is a Management Procedure for Communication **(ECO-MP-02)** which sets out what aspects of the Integrated Management System (IMS) will be communicated internally and externally. It also defines who will be communicated with and what format the communication will be in. In accordance with the HSQEMS Manual **(ECO-OD-17)**, the Environmental Policy Statement **(ECO-OD-03)** is communicated to all Eco staff and interested parties via induction, emails, meetings and presentations.<br>• Document control is in place and all documents benefit from version control which is managed through the Document Control Procedure **(ECO-MP-01)** and recorded in the Document Master List **(ECO-OD-01)**.<br>• The process is monitored and controlled in accordance with Quality Management System **(ECO-OP-59)** which is in accordance with the PAS110 standard.<br>• All plant and equipment are subject to a planned preventative maintenance programme in accordance with the maintenance planner for the site and as detailed under BAT 14;<br>• There is a site-specific Emergency Response Plan **(ECO-EP-02).**<br>• The HSQEMS includes a Compliance Obligations Register **(ECO-OD-07**) which is regularly reviewed and updated to ensure that management procedures take account of legal and guidance obligations. Section 8.2 of the HSQEMS Manual **(ECO-OD-17)** describes how Compliance Obligations are integrated into the management system. |
| V | Checking performance and taking corrective action, paying particular attention to:<br><br>• monitoring and measurement,<br>• corrective and preventive action,<br>• maintenance of records,<br>• independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained. | The management system incorporates:<br>• Checking performance through a planned audit and inspection schedule (the site has 3 or 4 inspections / audits per year).<br>• A Non- Conformance Reporting Management Procedure **(ECO-MP-07)**<br>• Records of audits, inspections and non-conformances are held electronically on a shared drive which is backed up onto the cloud.<br>• The EMS is certified under ISO 14001 and is therefore subject to internal and external auditing. |

| BAT 1 | **BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features** | |
|---|---|---|
| VI | Review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness; | ISO 14001 Management Review Meetings are carried out quarterly in accordance with Section 15 of the HSQEMS Manual **(ECO-OD-17).** There is a Management Review matrix in place to ensure that all items are covered at least annually. |
| VII | Following the development of cleaner technologies; | Eco are active members of the Renewable Energy Association (REA) (trade body) and have a network of contacts within the industry to keep well informed of industry developments. Eco will take the opportunity to adopt cleaner technologies where possible. In accordance with the Environmental Policy Statement **(ECO-OD-03):** *'The introduction of new recycling and renewable energy technologies will be effectively planned and managed to ensure adverse environmental impacts are designed out and the maximum environmental opportunities are obtained'.* |
| VIII | Consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life; | The EMS includes a Decommissioning Plan **(ECO-SM-22)** which meets the requirements of BAT. |
| IX | Application of sectoral benchmarking on a regular basis; | The Environmental Policy **(ECO-OD-03)** includes an objective to *'protect the local environment where Eco operates by adhering to all compliance obligations set by interested parties.'*<br>Through industry connections and networking including as Renewable Energy Association members, Eco compare environmental performance with other operators and strive to improve their performance through environmental objectives. |
| X | Waste stream management (see BAT 2); | See BAT 2 |
| XI | An inventory of waste water and waste gas streams (see BAT 3) | See BAT 3 |
| XII | Residues management plan - A residues management plan is part of the EMS and is a set of measures aiming to:<br>• minimise the generation of residues arising from the treatment of waste,<br>• optimise the reuse, regeneration, recycling and/or recovery of energy of the residues, and<br>• ensure the proper disposal of residues. | The EMS includes a Residues Management Plan **(ECO-SM-23)** which meets the requirements of BAT. |
| XIV | Odour management plan | See BAT 12. |

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| **BAT 1** | **BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features** | |
| XV | Noise and vibration management plan | See BAT 17. |
| AMfBT 5.1 Management System point 10 | You consider the risks a changing climate presents to your operations and have appropriate contingency plans in place to assess and manage future risks. | Climate change impacts and mitigation controls are considered in a Climate Change Risk Assessment **(ECO-RA-25)** which forms part of the EMS. |
| AMfBT 5.1 Management System point 13 | You have and maintain a site condition report for installations. For waste facilities the Environment Agency recommends that you carry out a site condition assessment during the life of the site. You would need to carry out this assessment on surrender. Please read the guidance Environmental permitting: H5 site condition report. | An updated Site Condition Report has been included in the current permit variation application. Once finalised this document will form part of the EMS for the site and will have a management system document reference. [6] |

[6] Site Condition Report, Shann Pitts Consulting Limited, February 2025 (SPC0051/V019/SCR/V1.0/EcoPar/Feb25)

**Other general management appropriate measures**

| Appropriate Measures | AMfNH Section 2.2 Staff Competence & AMfBT Section 5.3 Staff Competence | |
|---|---|---|
| 1 | Your facility must be operated at all times by an adequate number of staff with appropriate training, qualifications and competence. You must keep records of training, qualifications and relevant experience. | Training and Staff Development are carried out in accordance with Sections 14 and 15 of the Parley Environmental Management System Manual **(ECO-SM-13).** |
| 2 | If you operate a 24-hour process, you must have:<br>• remote or telemetric systems to make sure an alarm would be raised in the event of an incident during unmanned hours<br>• appropriate personnel on call to deal with these incidents<br>You must explain these procedures in your management system. | *AD Plant:*<br>The AD plant is a 24 hour operation and as such the Technically Competent Manager or other nominated competent person will be on call to manage any alarms arising through the SCADA system which will be communicated through telemetry during unmanned hours.<br>*SRF Plant:*<br>The SRF will run during usual the current operational hours (0700-1700). |
| 3 | The design, installation and maintenance of infrastructure, plant and equipment must be carried out by competent people, including Construction Quality Assurance where appropriate. | *AD Plant:*<br>The AD plant is being constructed and commissioned by German company Weltec Biopower (Weltec) and there will be other auxiliary plant and equipment installed by third parties including Prodeval for the gas upgrading plant. In all cases, Eco are committed to ensure that commissioning is carried out correctly and evidence will be retained. Primary and secondary containment will be signed off by Chartered Engineers prior to operation of the AD plant.<br>Maintenance contracts with third party suppliers will be maintained where appropriate and maintenance in-house will adhere to the manufacturers recommendations.<br>*SRF Plant:*<br>These principles will be adhered to within respect to the design, installation and maintenance of the proposed SRF plant. |

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| 4 | You must have appropriately qualified managers for your waste activity who are members of a government approved technical competence scheme and who attend the facility as set out in our attendance guidance. | There are 4 No. Technically Competent Managers qualified under the WAMITAB scheme on site. This is detailed in a supporting document to the permit variation application.[7] |
| 5 | Staff carrying out waste acceptance checks, including sampling and analysis of waste, must be appropriately trained and competent to:<br>• classify and characterise waste properly<br>• identify whether it is suitable for your facility<br>• manage any loads that do not conform to waste acceptance criteria<br>• determine end of waste products | Relevant staff are trained on the measures in the following EMS documents:<br>• Parley Waste Acceptance and Rejection Procedure **(ECO-OP-04);**<br>• Waste Pre-Acceptance Procedure **(ECO-OP-27)**; and<br>• Parley EMS **(ECO-SM-13)**, Section 8.6.1 |
| **Appropriate Measures (AMfBT & AMfNH)** | **Contingency plan and procedures - AMfBT Section 5.10 & AMfNH Section 2.4** | Contingency response procedures that cover the below points are documented within the Parley Emergency Response Procedure **(ECO-EP-02).**<br>In addition there are measures to stop accepting waste under certain circumstances in the Parley Odour Management Plan **(ECO-SM-01)**. |

[7] SPC0051/V019/TCM/V1/EcoPar/Feb25

**Waste Management Measures**

| **BAT 2** | **In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.** | |
|---|---|---|
| **Waste pre-acceptance** | | |
| a | Set up and implement waste characterisation and pre-acceptance procedures. | In accordance with the Waste Pre-Acceptance Procedure **(ECO-OP-27)** and Section 8.6.1 of the Parley EMS **(ECO-SM-13)**:<br><br>For each new proposed waste stream, the Sales Director is responsible for requesting the appropriate information so that the waste quality and any potential variations in quality can be assessed.<br><br>If sample data has not been provided by the potential waste supplier or if the chemical composition or variability of the waste is unclear from the data provided, then the Sales Director must liaise with the appropriate Site Manager and arrange for a representative sample of the waste to be obtained and analysed at a laboratory having robust quality assurance procedures and working with recognised test methods (EN ISO 17025 accreditation represents best practice). The analysis required will vary depending upon the nature of the waste and the process to be used.<br><br>For liquid wastes it may be appropriate to arrange for further laboratory tests to predict the performance of the treatment, of the waste e.g., biodegradability.<br><br>With this data, a technical assessment of the suitability of the waste for treatment should be conducted to ensure permit conditions are met. From here, if the waste passes pre-acceptance checks and fulfils the criteria set out in the Waste Pre-Acceptance Procedure **(ECO-OP-27),** paperwork will be saved onto the shared drive. If it does not pass, Eco will not accept the waste and inform the supplier, the waste cannot be accepted. A copy of any communication with respect to rejected wastes will be saved on the shared drive.<br><br>Information required at pre-acceptance will be reassessed if:<br><br>• The waste changes in characteristics.<br>• The process giving rise to the waste changes.<br>• The waste as received is found to no longer conform to the pre-acceptance information.<br>• In any case, on an annual basis.<br><br>In addition with respect to new feedstocks for the AD plant: |

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|---|---|---|
| **BAT 2** | **In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.** | |
| | | • Wastes are only accepted from approved suppliers which have been completed an 'agreement to supply waste' prior to acceptance at site.<br>• Liquid waste will be sampled and analysed as per waste supply agreement or when deemed appropriate by the AD Manager. Any unsuitable material will not be accepted at the facility. Any new waste supplied will be analysed prior to acceptance.<br><br>Feedstocks are tested for the following parameters; pH, dry matter, chlorides, biochemical methane potential (BMP); periodic bullet analyses and annual biological BMP. The frequency of feedstock testing depends on feedstock type. If it is a variable feedstock or there is e.g. potential for chloride issues then testing will be more frequent. |
| **Waste acceptance** | | |
| b | Set up and implement waste acceptance procedures | Quality requirements and waste acceptance criteria are clearly set out within the Parley Waste Acceptance and Rejection Procedure **(ECO-OP-04).** |
| **Waste tracking** | | |
| c | Set up and implement a waste tracking system and inventory. A waste tracking system and inventory aims to track the location and quantity of waste in the plant. It holds all the information generated during waste pre-acceptance procedures (e.g., date of arrival at the plant and unique reference number of the waste, information on the previous waste holder(s), pre-acceptance and acceptance analysis results, intended treatment route, nature and quantity of the waste held on site including all identified hazards), acceptance, storage, treatment and/or transfer off site. | Waste is only delivered to site if there is an 'agreement to supply waste' in place. All received materials are brought across the weighbridge and accounted for. Consistent blends of feedstock are achieved by monitoring the dry matter at the 2 No. Pre-storage tanks every week and adjusting the amount of liquid added to the feedstock mix.<br><br>Waste coming into site is measured on the automated weighbridge. Pre-treated waste entering the AD process is measured through SCADA (daily feed program to the digesters) and verified through monitoring of levels within the 2 No. 469$m^3$ Pre-storage tanks.<br><br>The weighbridge computer ensures that the following data is recorded:<br>1. For each load:<br>o Type of material (description)<br>o European Waste Catalogue (EWC) code<br>o Source<br>o Waste Transfer note reference<br>o Net weight of waste<br>o Date and time accepted |

| BAT 2 | In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below. | |
|---|---|---|
| | | ○ Haulier<br>○ Haulier's licence number<br>○ Origin of waste<br>○ Time and date<br>○ Record declaration of previous load acceptable and wash out certificate provided if required (e.g., Animal By-Product waste)<br>○ Vehicle registration number<br>2. For each load rejected at the weighbridge:<br>○ Type of material<br>○ EWC code<br>○ Source<br>○ Waste Transfer note reference<br>○ Tonnage<br>○ Date & time rejected<br>○ Reason for rejection / potential hazard as appropriate<br>○ Rejected by (name of staff member)<br>○ Destination of rejected material<br><br>For each load rejected the relevant **Site Manager** is responsible for recording the following for each load / part load rejected upon visual inspection on the Waste Rejection Record **(ECO-FT-34**):<br><br>○ Type of material<br>○ EWC code<br>○ Source<br>○ Waste Transfer note reference<br>○ Tonnage<br>○ Date & time rejected<br>○ Reason for rejection / potential hazard as appropriate<br>○ Rejected by (name of staff member)<br>○ Destination of rejected material<br><br>The relevant **Site Manager** is responsible for checking the following data is recorded into the waste correctly: |

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| **BAT 2** | **In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.** | |
| | | • Waste that has been received<br>• Waste that is rejected |
| **Output quality** | | |
| d | Set up and implement an output quality management system | <u>Digestate quality</u><br><br>Eco will apply for Parley AD site to be a registered digestate producer under the Biofertiliser Certification Scheme (BCS)[8] for PAS110[9] certified digestate as a 'Quality Output' achieving end of waste status under the Anaerobic Digestate Quality Protocol (ADQP)[10] or the Anaerobic digestate: Resource Framework (unpublished at the time of writing.<br><br>The digestate will be classified as digestate liquor in accordance with PAS110 as the dry matter will be approximately 4-6% dry matter.<br><br><u>Biogas quality</u><br><br>Gas quality will be continuously monitored via 7 No. inline analysers located at:<br><br>• Digester 1 (BF01)<br>• Digester 2 (BF02)<br>• End Store (BE01)<br>• Before the flare<br>• Desulphurisation unit inlet<br>• Desulphurisation unit outlet<br>• Biogas upgrading unit<br><br>The inline analysers will record the following parameters within the ranges of detection specified below:<br><br>• Methane ($CH_4$)- 0-100% vol.<br>• Hydrogen Sulphide ($H_2S$)- 0-3,000ppm |

[8] Biofertiliser Certification Scheme, https://www.biofertiliser.org.uk/

[9] PAS110:2014 Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials, British Standards Institution, 2014

[10] Anaerobic Digestate Quality Protocol, WRAP & Environment Agency, January 2014

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| **BAT 2** | **In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.** | |
| | | • Oxygen ($O_2$)- 0-25% vol.<br><br>Inline gas readings will be verified through weekly checks with a handheld gas monitor. The hand-held gas monitor is calibrated annually or sooner if there is a significant difference between the in-line and handheld device readings.<br><br>Results are compared to acceptable limits for use within the combined heat and power (CHP) engine and biogas upgrade unit (BUU).<br><br><u>Biomethane quality</u><br><br>Biomethane is produced in accordance with the Biomethane from Waste Quality Protocol[11]l . The quality of the biomethane is controlled within the biogas upgrading plant which monitors and controls gas quality and which will reject any biomethane of insufficient quality, which will be diverted to the flare. In addition a Time of Flight (ToF) Skid will be in place. This additional pipework loop allows additional time for the gas to be confirmed as being of appropriate quality before entering the network/sending to the reject line. |
| **Waste segregation** | | |
| e | Ensure waste segregation. Waste is kept separated depending on its properties in order to enable easier and environmentally safer storage and treatment. Waste segregation relies on the physical separation of waste and on procedures that identify when and where wastes are stored. | *AD Plant:*<br><br>Liquid food waste, delivered in tankers, is dispatched into the 3 No. liquid waste tanks ($30m^3$ each).<br><br>Solid food waste is tipped inside the Waste Reception Building in the waste hopper or one of the 2 No. storage bays. Most material is deposited directly by tipper vehicle into the feed hopper. However, if temporary storage of waste is required then it will be tipped into one of the 2 storage bays and be moved into the hopper when required.<br><br>*SRF Plant:*<br><br>The SRF will accept Municipal Solid Waste and Dry Mixed Recyclables waste streams which will be kept separate within the storage areas as will require different treatment processes. Incoming waste streams will be segregated through the SRF process. |

[11] Biomethane from waste Quality Protocol, March 2014, Environment Agency https://www.gov.uk/government/publications/quality-protocol-biomethane-from-waste

| **BAT 2** | **In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.** | |
|---|---|---|
| f | Ensure waste compatibility prior to mixing or blending of waste | Due to the nature of the feedstocks and waste pre-acceptance checks there is no potential for issues with waste compatibility. |
| g | Sort incoming solid waste | Sorting of incoming solid wastes is carried out as described above (e). |
| AMfBT 6 Waste pre-acceptance, acceptance and tracking point 9 | You cannot accept waste containing animal by-products unless your facility has been validated following the regulations and approved by the Animal and Plant Health Agency (APHA). You must monitor your process in line with animal by-products regulations where required to do so. | *AD Plant:*<br>Eco are in the process of applying for the relevant approval for treatment of animal by products in a biogas plant from the Animal and Plant Health Agency (APHA). |
| AMfBT 6.3 Waste acceptance and rejection point 21 | If you are permitted to accept animal by-products you must:<br>• segregate these from other waste<br>• keep liquors and leachate separate and provide wheel-wash facilities for disinfecting delivery vehicles on exit from the reception building<br>You may need additional cleaning methods, for example steam cleaning. You must carry this out in an enclosed area. | *AD Plant:*<br>Category 3 ABP catering waste will be tipped, stored and processed inside the Waste Reception Building. Any wash waters or liquor are collected within the sealed drainage system and treated within the AD process. |
| AMfBT 6.3 Waste acceptance and rejection point 22 | You must characterise wash-down water containing cleaning chemicals, for example disinfectants, and dispose of them appropriately. | *AD Plant:*<br>Water without any chemicals will be used to wash down the vehicles subject to approval by the APHA. |

**Inventory of Waste Water and Waste Gas**

<table>
<tr><td>BAT 3</td><td colspan="2">In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:</td></tr>
<tr><td>i</td><td>Information about the characteristics of the waste to be treated and the waste treatment processes, including:<br><br>• simplified process flow sheets that show the origin of the emissions;<br>• descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;</td><td>Origin of Emissions / Emission Points<br><br>AD Plant:<br><br>The AD Process Flow Diagram (Appendix A) shows inputs and outputs including the origin of any emissions. Proposed emissions to air with respect to the AD plant are shown in Table 1 below:<br><br>Table 1: AD Plant Emission Points
<table>
<tr><th>Emission point reference</th><th>Source</th><th>Emission parameters</th></tr>
<tr><td colspan="3">Emissions to air</td></tr>
<tr><td>A2</td><td>Biofilter for new Waste Reception Building (AD) and Pasteurisation building – permitted but location changed</td><td>Odour</td></tr>
<tr><td>A3</td><td>Carbon filter for 2. No Pre-storage tanks (new / replacing biofilter)</td><td>Odour</td></tr>
<tr><td>A4</td><td>Combined heat and power engine (CHP) stack (new / replacing biofilter)</td><td>Combustion emissions</td></tr>
<tr><td>A5</td><td>Auxiliary / emergency flare stack (moved)</td><td>Combustion emissions (emergency use only)</td></tr>
<tr><td>A6</td><td>Biogas upgrading plant vent stack (moved)</td><td>Carbon dioxide</td></tr>
<tr><td>A7</td><td>Boiler stack (new)</td><td>Combustion emissions</td></tr>
<tr><td>A8</td><td>Emissions from diesel back- up generator (new)</td><td>Combustion emissions (emergency use only)</td></tr>
<tr><td>A9</td><td>Pressure and vacuum relief valves (PVRVs) on Digester 1 (BF01)</td><td>Raw biogas (emergency use only)</td></tr>
<tr><td>A10</td><td>PVRVs on Digester 2 (BF02)</td><td>Raw biogas (emergency use only)</td></tr>
<tr><td>A11</td><td>PVRVs on End store (BE01)</td><td>Raw biogas (emergency use only)</td></tr>
<tr><td>A12</td><td>PRV on BUU (new)</td><td>Carbon dioxide / methane (emergency use only)</td></tr>
<tr><td colspan="3">Emissions to sewer</td></tr>
</table></td></tr>
</table>

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| **BAT 3** | **In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:** | |

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| **S1** | Dirty water excess that is not utilised in the AD process (existing permission) | Flow rate and volume |

*SRF Plant:*

The SRF Process Flow Diagram (Appendix B) shows inputs and outputs including the origin of any emissions. The Municipal Solid Waste input to the SRF plant may contain between 30-50% organic wastes. As such emissions from the waste treatment process may contain volatile organic compounds (VOCs) arising from decomposition of the waste.

Emissions to air with respect to the SRF plant are shown in Table 2 below:

*Table 2: SRF Plant Emission Points*

| Emission point reference | Source | Emission parameters |
|---|---|---|
| **Emissions to air** | | |
| **A18** | Abatement system for SRF building | TVOCs & Dust |
| **Emissions to sewer** | | |
| **S1** | Dirty water (leachate) including wash water from drainage within building (existing permission) | Flow rate and volume |

<u>Treatment Techniques</u>

There is no waste water treatment.

Waste gas treatment is described below:

*Biogas treatment*

Once out of storage the biogas passes through a gas cooling system to reduce moisture and then to the desulphurisation unit which will be capable of treating up to 1,279 $Nm^3/hr$ of gas with max 1,000ppm of hydrogen sulphide ($H_2S$) input concentration. The desulphurisation system is an aerobic biological treatment system with water.

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|---|---|---|
| **BAT 3** | **In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:** | |
| | | If additional treatment to reduce $H_2S$ is required, then iron hydroxide (powder in bags) will be added to the AD feed.<br><br>*Biogas upgrading*<br><br>The process of membrane upgrading of the biogas is based on the use of high-performance membranes that achieve a purification efficiency greater than 99% i.e., less than 1% loss of methane.<br><br>After pretreatment including the use of 2 No. activated carbon filters, the dried and desulphurised biogas is compressed to the working pressure of 8-14 bar before being introduced into the membrane filtration modules. The difference in size of the biogas constituents gives them different diffusion rates through the walls of the membranes thus making it possible to separate the methane (low diffusion rate) from the other compounds (carbon dioxide, water, nitrogen, oxygen, etc.). To control the purification performances and ensure the adjustments comply with the Gas Grid specifications, the unit is equipped with an analysis cabinet for $CH_4$, $CO_2$, $H_2S$ with 5 sampling points. The 6th point will ensure manual and punctual controls during operation.<br><br>The current specification is designed to a nominal biogas flow of 906$Nm^3$ (input) / 543$Nm^3$ (output) with a max biogas flow of 1,030$Nm^3$ (input) / 617$Nm^3$ (output).<br><br>It is Eco's intention to upgrade this plant in the future by adding further membranes in order to achieve a nominal biogas flow of 1,200$Nm^3$/hr (input) / 719$Nm^3$ (output) with a max biogas flow of 1,380 $Nm^3$/hr (input) / 826$Nm^3$ (output).<br><br>*Biofilters*<br><br>There is one existing woodchip biofilter (Emission point A1) which serves the food waste transfer building which may also house the SRF process (at current permitted levels only) until the new SRF Building is commissioned.<br><br>There is another biofilter proposed for the combined extracted air from the AD Waste Reception Building and Pasteurisation Building (A2) which is already permitted but the location has moved. The biofilters will be of the same design and utilise woodchip media material and aerobic conditions for naturally occurring microorganisms growing |

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| **BAT 3** | **In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:** | |
| | | on the media to breakdown organic compounds. Air flow and moisture are optimised by the operator to maximise efficacy of the biofilters.<br>*Carbon filters*<br>There will be a carbon filter abatement system in place for treatment of emissions to air from the combined flow of displaced air from 2 No. Pre-storage tanks. The abatement system will use a deep bed of activated carbon with correct prefiltration to maximise carbon life, where required.<br>*SRF Plant:*<br>The design of the new SRF plant is not finalised and as such any abatement technologies have not been determined. We propose that this information is provided for assessment by the Environment Agency through an Improvement Condition. |
| ii | Information about the characteristics of the wastewater streams | *AD Plant:*<br>All waste water arising with the AD Waste Reception Building will be utilised in the AD process. Any waste water arising within the secondary containment area will either be pumped to the Pre-storage tanks for reuse or be discharged to sewer (S1) under the existing Trade Effluent Consent Agreement.<br>*SRF Plant:*<br>Under normal operations there is no waste water from the SRF process and it is a dry process carried out in a building. There is an impermeable surface and sealed drainage within the building and any leachate will be pumped directly to the sewer for treatment at the Waste Water Treatment Works in accordance with the existing Trade Effluent Consent Agreement.<br>Wessex Water sample the effluent quality at inlet pipe to the waste water treatment works. The trade effluent consent limits the discharge to sewer to:<br>• A rate of discharge of 20 litres per second; and |

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| **BAT 3** | **In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:** | |
| | | • A limit on the total volume in one day or 24 hours of 1,700 cubic metres. |
| iii | Information about the characteristics of the waste gas streams, such as:<br><br>• average values and variability of flow and temperature;<br>• average concentration and load values of relevant substances and their variability (e.g., organic compounds, POPs such as PCBs);<br>• flammability, lower and higher explosive limits, reactivity;<br>• presence of other substances that may affect the waste gas treatment system or plant safety (e.g., oxygen, nitrogen, water vapour, dust). | *AD Plant:*<br><br>Up to 1,279 $Nm^3$/hr of biogas to be produced with max 1,000ppm of $H_2S$ input. The biogas will be stored above the 3 No. digesters.<br><br>Biogas has a lower explosive limit of approximately 6% by volume and a higher explosive limit of approximately 12% by volume.<br><br>Waste gas may arise in the form of biogas during periods of extended breakdown and maintenance. Waste gas will be burnt in the flare which will ignite automatically and complies with relevant standards.<br><br>*SRF Plant:*<br><br>The design of the new SRF plant is not finalised and as such any abatement technologies have not been determined. We propose that this information is provided for assessment by the Environment Agency through an Improvement Condition. |

**Waste Storage**

| **BAT 4** | **In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.** | |
|---|---|---|
| a | Optimised storage location. This includes techniques such as:<br><br>• the storage is located as far as technically and economically possible from sensitive receptors, watercourses, etc.;<br>• the storage is located in such a way so as to eliminate or minimise the unnecessary handling of wastes within the plant (e.g., the same wastes are handled twice or more or the transport distances on site are unnecessarily long). | *AD Plant:*<br><br>Solid waste feedstock will be stored in the dedicated Waste Reception Building benefiting from 3 No. automatic speed doors for HGVs and an odour abatement system (biofilter). Solid food waste is tipped in a waste hopper inside the Waste Reception Building, which minimises handling of the waste. Most material is deposited directly by tipper vehicle into the waste hopper. However, solid food waste may be deposited into the one of the two storage bay for later transfer to the hopper.<br><br>Liquid waste in tankers is transferred via a dispatch point within the Waste Reception Building to the 3. No Liquid Waste storage tanks (30$m^3$) for storage prior to pumping to the feed system.<br><br>*SRF Plant:*<br><br>The majority of waste storage will be within the new purpose built building. However, certain lower risk waste types namely, glass, refuse derived fuel bales and metal may be stored outside the building on an impermeable surface with sealed drainage. The processes and layout within the building will be designed to minimise any unnecessary handling of waste. All waste treatment will be carried out in the building which will benefit from an appropriate emissions abatement system as required. |
| b | Adequate storage capacity. Measures are taken to avoid accumulation of waste, such as:<br><br>• the maximum waste storage capacity is clearly established and not exceeded taking into account the characteristics of the wastes (e.g., regarding the risk of fire) and the treatment capacity;<br>• the quantity of waste stored is regularly monitored against the maximum allowed storage capacity;<br>• the maximum residence time of waste is clearly established. | *AD Plant:*<br><br>The proposed maximum annual tonnage of waste is 70,000 tonnes per annum (tpa) which is an increase from 33,000 tpa in current permit. This reflects the plant capacity to process up to 70,000 tpa of substrate (prepared feedstock) or 50,000 tpa of food waste.<br><br>See below the treatment capacity calculations based on proposed 70,000 tpa:<br><br>*The two digester tanks with a maximum working capacity of 5,039 $m^3$ each operate in parallel. The Pre-storage tanks have not been included in the treatment capacity calculation as there is no gas collection from these tanks.* |

<table>
<tr><td>BAT 4</td><td colspan="2">In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.</td></tr>
<tr><td></td><td></td><td>
Conversion factor for digesting material in tanks: 1 m$^3$ is equivalent to 1 tonne<br><br>
The minimum hydraulic retention time provided by Weltec is 53 days.<br><br>
Treatment capacity of 1 digester = 5,039 / 53 = 95 tonnes per day<br><br>
As there are 2 digesters - Total treatment capacity = 2 x 95 = 190 tonnes per day<br><br>
A dry dosing feed system suitable for feeding energy crops with a flow rate of 40m$^3$/hr, has also been specified. The dry dosing feeder will have the capacity to store 80m$^3$ of feed at any given time.<br><br>
The 2 No. Pre-storage tanks provide 4 days' worth of buffer capacity. The Wackerbauer feed system is capable of processing 15 tonnes of food waste per hour which provides sufficient processing capacity with contingency.<br><br>
The maximum storage capacities and residence times for the AD plant are detailed in Table 3 below.<br><br>
Table 3: AD Waste Storage Tonnages & Residence Times
<table>
<tr><th>Type of waste</th><th>Storage location</th><th>Maximum tonnage at any one time (tonnes)</th><th>Maximum residence time</th></tr>
<tr><td>Solid food waste</td><td>Waste hopper in Waste Reception Building</td><td>35</td><td>48 hours</td></tr>
<tr><td>Solid food waste</td><td>2 No waste storage bays in Waste Reception Building</td><td>164</td><td>48 hours</td></tr>
<tr><td>Food waste soup</td><td>Pre-storage tanks (2 No. 469m$^3$ tanks)</td><td>938</td><td>1 week</td></tr>
<tr><td>Plastic rejects</td><td>Waste Reception Building</td><td>20</td><td>1 week</td></tr>
<tr><td>Liquid waste</td><td>3 No. liquid waste tanks (30m$^3$ each)</td><td>90</td><td>1 week</td></tr>
<tr><td>Quarantine skip</td><td>Waste Reception Building</td><td>5</td><td>5 working days</td></tr>
<tr><td colspan="2">Total storage capacity</td><td>1,252</td><td></td></tr>
</table>
</td></tr>
</table>

| BAT 4 | In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below. | |
|---|---|---|

If the plant is accepting 50,000 tpa or 137 tonnes per day of solid food waste there is sufficient storage capacity (1.5 days worth).

If the plant were to accept purely prepared feedstock up to 70,000 tpa or 192 tonnes per day then the 2 No. Pre-storage tanks with combined volume of 938m$^3$ would have between 4-5 days buffering capacity.

*SRF Plant*

The activity is currently permitted as a waste activity (AR22) with a maximum tonnage limit of 9,798 tonnes per annum. The current permit variation application is to reflect a proposed maximum annual tonnages of up to 150,000 tonnes per annum and a treatment capacity of over 75 tonnes per day, thus the SRF process becoming a Listed Activity. The maximum storage capacities and residence times for the SRF plant are detailed in Table 4 below.

*Table 4: SRF Waste Storage Tonnages & Residence Times*

| Type of waste | Storage location | Maximum pile size as per Fire Prevention Plan guidance[12] (m$^3$) | Max m$^3$ of waste type | Maximum tonnage at any one time (tonnes) | Maximum residence time |
|---|---|---|---|---|---|
| **Municipal Solid Waste (untreated) and / or Dry Mix Recyclables (untreated)** | Dedicated tipping bay(s) in building | 450 | 2,700 (6 bays) | 1,512 | 5 days |
| **Oversize or non-recyclable items** | Dedicated tipping bay(s) in building | 450 | 450 (1 bay) | 81 | 5 days |

[12] Fire prevention plans: environmental permits Accessed 27 January 2025

<table>
<tr><td>BAT 4</td><td colspan="2">In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.</td></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Quarantine bay</td><td>Quarantine bay in building</td><td>375 (half largest pile)</td><td>375 (1 bay)</td><td>210</td><td>5 days</td></tr>
<tr><td>Fines (<50mm)</td><td>Dedicated bay in building</td><td>450</td><td>450 (1 bay)</td><td>387</td><td>5 days</td></tr>
<tr><td>Paper</td><td>Dedicated bay in building</td><td>750</td><td>1,500 (2 bays)</td><td>315</td><td>5 days</td></tr>
<tr><td>Cardboard</td><td>Dedicated bay in building</td><td>750</td><td>750 (1 bay)</td><td>157.5</td><td>5 days</td></tr>
<tr><td>Plastics</td><td>Dedicated bay in building</td><td>750</td><td>1,500 (2 bays)</td><td>210</td><td>5 days</td></tr>
<tr><td>Colour separated glass</td><td>Dedicated bay outside building</td><td>Not applicable</td><td>NA</td><td>150</td><td>5 days</td></tr>
<tr><td>Mixed glass</td><td>Dedicated bay outside building</td><td>Not applicable</td><td>NA</td><td>150</td><td>5 days</td></tr>
<tr><td>Ferrous metals</td><td>Dedicated bay outside building</td><td>750</td><td>750</td><td>225</td><td>5 days</td></tr>
<tr><td>Non-ferrous metals</td><td>Dedicated bay outside building</td><td>750</td><td>750</td><td>675</td><td>5 days</td></tr>
<tr><td>Refuse Derived Fuel</td><td>Dedicated area outside building</td><td>450</td><td>5 No. 450m$^3$ stacks with 6m separation distance</td><td>588</td><td>5 days</td></tr>
<tr><td colspan="3">Total storage capacity</td><td></td><td>4,600.5</td><td></td></tr>
</table>
</td></tr>
<tr><td>c</td><td>Safe storage operation. This includes measures such as:</td><td>Within the AD Plant there will be a dedicated telescopic handler for solid food waste. Crop materials will be handled using mobile plant not used for food waste.</td></tr>
</table>

| | | |
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| **BAT 4** | **In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.** | |
| | • equipment used for loading, unloading and storing waste is clearly documented and labelled;<br>• wastes known to be sensitive to heat, light, air, water, etc. are protected from such ambient conditions;<br>• containers and drums are fit for purpose and stored securely. | Waste movements within the SRF building will also be carried out by mobile plant not used in the wider site.<br>The wastes streams accepted for processing are not sensitive to heat, light, air, water etc. and therefore do not need to be protected from ambient conditions.<br>It is not proposed to accept any waste in containers into either the AD or SRF process. |
| d | Separate area for storage and handling of packaged hazardous waste. When relevant, a dedicated area is used for storage and handling of packaged hazardous waste. | Hazardous waste will not be accepted in accordance with Parley Waste Acceptance and Rejection Procedure **(ECO-OP-04).** |

**Waste Handling & Transfer**

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| **BAT 5** | **In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.** | |
| | Handling and transfer of waste are carried out by competent staff. | All waste handling and transfer activities are carried out by trained staff in accordance with the Quality Management System **(ECO-OP-59)** which is in accordance with the PAS110 standard. |
| | Handling and transfer of waste are duly documented, validated prior to execution and verified after execution; | Waste is only accepted in line with a supplier agreement.<br>All feedstocks coming into site are recorded on the weighbridge and the data stored on the weighbridge computer. This includes feedstock type, tonnage, date, and time.<br>Pre-treated waste entering the AD process is measured through SCADA (daily feed program to the digesters (BF01 and BF02) and verified through monitoring of levels within the 2 No. Pre-storage tanks BV01 and BV02. |
| | Measures are taken to prevent, detect and mitigate spills; | The Parley Waste Acceptance and Rejection Procedure **(ECO-OP-04)** includes measures for spillage prevention including a procedure for liquid waste dispatch. Spillages are managed in accordance with the Parley Emergency Preparedness Plan **(ECO-EP-02)**. All new employees are trained on the plan and refresher training is provided as required and includes spill response scenarios. |
| | Operation and design precautions are taken when mixing or blending wastes (e.g., vacuuming dusty/powdery wastes). | *AD Plant:*<br>Waste is only mixed within the enclosed waste treatment infrastructure within the Waste Reception Building and within the sealed tank infrastructure.<br>*SRF Plant:*<br>Waste will not be mixed or blended; the processes are designed to separate waste as far as possible. |

**Monitoring**

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| **BAT 6** | **For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g., waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g., at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).** |
| | *AD Plant:*<br><br>Dirty water from the Waste Reception Building is reused in the process. Water falling within the secondary containment is pumped to sewer in accordance with the Trade Effluent Agreement. Clean surface water from areas of the site not used for waste storage or treatment e.g. rainwater from rooves may be discharged to the ditch to the north.<br><br>*SRF Plant:*<br><br>No emissions to water. |

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| **BAT 7** | **BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.** |
| | *AD Plant:*<br><br>Not applicable no emissions to water.<br><br>*SRF Plant:*<br><br>Not applicable. No emissions to water. |

**Monitoring of Point Source Emissions to Air**

| **BAT 8** | **BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.** | | | |
|---|---|---|---|---|
| **Waste treatment process** | **Parameter** | **Standard** | **Frequency** | |
| Biological treatment (AD) | $H_2S$ | No EN standard available. | Once every six months. See BAT 34 | Odour monitoring of the AD biofilter and the carbon filters will be carried out every 6 months in lieu of $H_2S$ and $NH_3$ monitoring as per BAT 34. |
| Biological treatment (AD) | $NH_3$ | No EN standard available. | Once every six months. See BAT 34 | Odour monitoring of the AD biofilter and the carbon filters will be carried out every 6 months in lieu of $H_2S$ and $NH_3$ monitoring as per BAT 34. |
| Biological treatment (AD) | Odour concentration | EN 13725 | Once every six months.<br><br>The monitoring of $NH_3$ and $H_2S$ may be used as an alternative to the monitoring of the odour concentration. See BAT 34 | Odour monitoring will be carried out every 6 months as per BAT 34. |
| Mechanical treatment of waste | Dust | EN 13284-1 | Once every 6 months. See BAT 25 | Dust monitoring will be carried out once every 6 months as per BAT 25. |
| Mechanical treatment of waste with calorific value | Total Volatile Organic Compounds (TVOCs)* | EN 12619 | Once every six months. See BAT 31 | TVOC monitoring will be carried out once every 6 months as per BAT 25. |

* The monitoring only applies when the substance concerned is identified as relevant in the waste gas stream based on the inventory mentioned in BAT 3.

BAT 9 Not Applicable

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| **BAT 10** | **BAT is to periodically monitor odour emissions.** | |
| | Odour emissions can be monitored using:<br><br>• EN standards (e.g., dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure);<br>• when applying alternative methods for which no EN standards are available (e.g., estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.<br><br>The monitoring frequency is determined in the odour management plan (see BAT 12). | Monitoring will be carried out in accordance with EN standards (e.g., dynamic olfactometry according to EN 13725 in order to determine the odour concentration) in accordance with BAT 8 and BAT 34. The Parley Odour Management Plan **(ECO-SM-01)** will incorporate monitoring of odour emissions including the frequency as specified in any issued permit variation notice. |

**Material Efficiency**

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| **BAT 11** | **BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year.** | |
| | Monitoring includes direct measurements, calculation or recording, e.g., using suitable meters or invoices. The monitoring is broken down at the most appropriate level (e.g., at process or plant/installation level) and considers any significant changes in the plant/installation | Eco will maintain a log of:<br>• Wastes accepted for treatment (the record will specify which process) via weighbridge computer and Waste Transfer Notes<br>• Any residual waste removed off site (Waste Transfer Notes / Quarterly Waste Returns). Recorded on Parley site dashboard for internal review.<br>• Waste water released to sewer.<br>• Water usage is measured via a flow meter.<br>• Energy used is measured via a meter which measures mains electricity imports. This is recorded weekly from the meter.<br>• Raw materials used: oil, carbon, iron hydroxide<br><br>Waste production is recorded and audited in accordance with the Residues Management Plan **(ECO-SM-23).**<br><br>Eco will report the following to the Environment Agency on an annual basis, or as stipulated in the Environmental Permit.<br>• Waste in and out (waste returns) on a quarterly basis<br>• Electricity generated<br>• Biomethane generated<br>• Whole digestate<br>• Recovered outputs<br>• Water usage<br>• Energy usage<br>• Raw material usage<br>• Emergency flare operation; and<br>• Biomethane exported |

**Fugitive Emissions to Air**

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| **BAT 12** | **In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:** | |
| | A protocol containing actions and timelines; | A Parley Odour Management Plan (OMP) **(ECO-SM-01)** has been developed as part of the Environmental Management System and includes a protocol containing actions and timelines. |
| | A protocol for conducting odour monitoring as set out in BAT 10; | The OMP contains a section on odour monitoring as described in BAT 10. Point source emission monitoring from the odour abatement plant stack will be carried out periodically and in accordance with EN standards (e.g., dynamic olfactometry according to EN 13725 in order to determine the odour concentration). |
| | A protocol for response to identified odour incidents, e.g., complaints; | The OMP contains a section detailing the protocol for responding to odour incidents including complaints. |
| | An odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures. | The OMP includes an odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures. |

| **BAT 13** | **In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below.** | |
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| a | Minimising residence times | See BAT 4 b – Table 1 which includes waste storage residence times. |
| b | Using chemical treatment | This technique is not used. |
| c | Optimising aerobic treatment | The biofilters uses aerobic treatment to break down odorous compounds within the air stream. The potential for aerobic treatment is maximised by providing a large surface area onto which microbes to adhere within the woodchip media and the provision of ducting to enable air movement.<br><br>The AD desulpurisation plant utilises aerobic treatment of the hydrogen sulphide in the biogas via fillers that are coated with sulphur-oxidising microorganisms. |

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| **BAT 14** | **In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.** | |
| a | Minimising the number of potential diffuse emission sources. This includes techniques such as:<br><br>• appropriate design of piping layout (e.g., minimising pipe run length, reducing the number of flanges and valves, using welded fittings and pipes);<br>• favouring the use of gravity transfer rather than using pumps;<br>• limiting the drop height of material;<br>• limiting traffic speed; and<br>• using wind barriers. | *Whole Site:*<br><br>Vehicles are restricted to 10 miles per hour (mph) on site as a health and safety measure; this also reduces potential noise and dust emissions.<br><br>Site access and haul roads and operational areas will be maintained and repaired to minimise emissions of dust due to uneven and poor surfacing.<br><br>All roads and operational areas will be swept where necessary to reduce dust emissions.<br><br>Daily, visual inspection at all areas of the site and site boundary are carried out by site personnel. In the event that significant visual dust is observed at the boundaries of the operational areas, action will be taken to suppress the dust.<br><br>The Site Managers are responsible for implementing the management, monitoring, and action plans with respect to fugitive emissions. Fugitive emissions of odour are monitored daily in accordance with the Parley Odour Management Plan **(ECO-SM-01)** and recorded in the Parley AD Site Daily Record Sheet. The site is managed as per the Dust & Bioaerosol Management Plan **(ECO-SM-03)** which is focussed on the composting activities which have a higher potential to create dust emissions.<br><br>*AD Plant:*<br><br>The plant design is optimised to reduce pipe run lengths, flanges and valves.<br><br>*SRF Plant:*<br><br>The entire waste treatment process will be undertaken within a building. Drop height between process elements will be minimised where possible. Any potentially dusty treatment activities including shredding and screening will benefit from dust suppression where required. |

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| **BAT 14** | **In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.** | |
| b | Selection and use of high- integrity equipment. This includes techniques such as:<br><br>• valves with double packing seals or equally efficient equipment;<br>• high-integrity gaskets (such as spiral wound, ring joints) for critical applications;<br>• pumps/compressors/agitators fitted with mechanical seals instead of packing;<br>• magnetically driven pumps/ compressors/agitators; | All equipment and systems on site are supplied as per vendors original specification and are maintained to that standard thereafter when replacing. There are examples within the site infrastructure of all of the techniques listed. |
| c | Corrosion prevention | Materials are selected for suitability and longevity. |
| d | Containment, collection and treatment of diffuse emissions | *AD Plant:*<br><br>Odour emissions from the Waste Reception Building and the Pasteurisation building are minimised by the building being under negative pressure and the air being treated in the odour abatement system (biofilter).<br><br>There is a carbon filter to treat displaced air from the pre-storage tanks as they are filled.<br><br>*SRF Plant:*<br><br>All waste will be treated within a purpose built building. The design of the SRF plant is not finalised and as such any abatement technologies have not been determined. We propose that this information is provided for assessment by the Environment Agency through an Improvement Condition. |
| e | Dampening | If there were any emissions of dust observed as part of daily site inspections then dampening would be carried out. A water bowser is on permanent standby to dampen |

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| **BAT 14** | **In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.** | |
| | | down any surfaces; water can be extracted from the lagoon at the eastern end of the site or, as a backup system, access to a fill point connected to the mains water supply. These reserves will ensure that the site has a continuous reserve of water to ensure dust suppression requirements are met. |
| f | Maintenance | All plant and equipment are subject to a planned preventative maintenance programme in accordance with:<br>• Parley AD Site Daily Record Sheet<br>• Daily Checks for mobile plant<br>• Eco Daily Maintenance Schedule<br>Maintenance for each process area is the responsibility of the manager for that area of the site. |
| g | Cleaning of waste treatment and storage areas | *AD Plant:*<br>Cleaning of the Waste Reception Building is carried out in accordance with the Parley Waste Acceptance and Rejection Procedure **(ECO-OP-04):**<br>• *Once unloaded, wash off the back and wheels of the vehicle using the jet washer.*<br>• *Only when vehicle is clean and ready to go the exit door can be opened. It should be ensured that exit door is open for the minimum amount of time.*<br>*SRF Plant:*<br>The SRF building will be subject to an appropriate cleaning schedule which will form part of the site management systems. |
| h | Leak detection and repair (LDAR) programme | *AD Plant:*<br>There will be a Leak Detection and Repair (LDAR) Programme in place for the operational site which will be used to measure levels of volatile organic compounds, including methane from a number of monitoring points around the site as identified through a |

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| **BAT 14** | **In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.** | |
| | | Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) risk assessment and LDAR programme.<br><br>LDAR inspections will be carried out by a third party annually, as a minimum. The methodology and frequency will be in accordance with that stipulated within any issued variation notice.<br><br>*SRF Plant:*<br><br>Not applicable. |

**Emissions from Flaring**

| **BAT 15** | **BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.** | |
|---|---|---|
| a | Correct plant design. This includes the provision of a gas recovery system with sufficient capacity and the use of high-integrity relief valves. | There is 1,550m$^3$ of biogas storage in each of the two digesters and the end store, therefore providing a total of 4,650m$^3$ of biogas storage. The theoretical maximum production of biogas across the plant 1,279m$^3$ per hour. Therefore the gas storage capacity allows for approximately 3-4 hours of biogas production. However maintenance will be planned and feed rates reduced to reduce gas production and minimise flaring.<br><br>Biogas will not be routinely flared to atmosphere. The flare will only used during periods of extended maintenance and during abnormal operating conditions should the biogas storage become full. Flaring is a more favourable environmental outcome than release of raw biogas through pressure and vacuum relief valves.<br><br>The gas pressure within the double diaphragm roof is kept constant at 2.5 mbar. The gas pressure only rises once the maximum gas level (100%) has been reached. The tank sensors are connected to the flare via the control cabinet. When a defined gas level (<100%) is reached, the flare receives a release signal and starts. Thus venting via the PVRVs is used only in extreme circumstances as a precautionary approach to prevent catastrophic pressure build up within the system. Both are minimised as much as possible by monitoring and efficient operation of the site.<br><br>Furthermore, in order to minimise flaring of biomethane a Time of Flight (ToF) Skid will be in place. This additional pipework loop allows additional time for the gas to be confirmed as being of appropriate quality before entering the network/sending to the reject line. |
| b | Plant management. This includes balancing the gas system and using advanced process control. | Gas volume is monitored and regulated through process monitoring. The process is monitored and controlled in accordance with Quality Management System **(ECO-OP-59)** and resulting process management which include regulation of feed rates and monitoring of dry matter content and biochemical methane potential of feedstocks. |

<table>
<tr><td>BAT 16</td><td colspan="2">In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use (both of) the techniques given below.</td></tr>
<tr><td>a</td><td>Correct design of flaring devices. Optimisation of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases.</td><td>The flare is an HTC 13.7 high temperature combustion flare manufactured by C-Deg environmental engineering. It comprises 2 No. burners of different capacities which can be operated separately or together as shown in Table 5 below:<br>Table 5: Flare Capacity<br><table><tr><th>Burner number</th><th>Min flow rate ($m^3$/h)</th><th>Maximum flow rate ($m^3$/h)</th></tr><tr><td>1</td><td>202</td><td>700</td></tr><tr><td>2</td><td>404</td><td>1,400</td></tr><tr><td>1 & 2 combined</td><td>606</td><td>2,100</td></tr></table><br>The theoretical maximum biogas production is 1,279$m^3$ per hour and the theoretical maximum biomethane production is 759$m^3$ per hour, thus demonstrating that the flare is appropriately sized to cover abnormal operating conditions.</td></tr>
<tr><td>b</td><td>Monitoring and recording as part of flare management. This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g., composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g., $NO_X$, CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events.</td><td>The number of operating hours for the flare will be recorded on the SCADA system and this information will be submitted to the Environment Agency annually in accordance with the varied Environmental Permit.<br><br>It is in economic interests of Eco to minimise the amount of biogas lost to flaring and to conduct a root cause analysis to reduce the potential for future flaring events.</td></tr>
<tr><td>AMfBT 8.12 Biogas treatment and storage –</td><td>You should use enclosed (ground) design flares on all new plants. They should be capable of achieving a minimum of 1,000°C with 0.3 seconds retention time at this temperature.</td><td>The technology provider has confirmed that the flare will burn at >1,000°C for in excess of 0.3 seconds and is a ground enclosed flare.</td></tr>
</table>

| | | |
|---|---|---|
| AD plants point 12 | | |

**Noise & Vibration**

| | | |
|---|---|---|
| **BAT 17** | **In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:** | |
| | A protocol containing appropriate actions and timelines; | The applicability of BAT 17 is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated. The Operator has confirmed that no noise complaints have been received and noise nuisance has not been detected. A Noise and Vibration Management Plan will be developed if noise and / or vibration become a nuisance. |
| | A protocol for conducting noise and vibration monitoring; | As above. |
| | A protocol for response to identified noise and vibration events, e.g., complaints; | As above. |
| | A noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures. | As above. |

| **BAT 18** | **In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.** | |
|---|---|---|
| a | Appropriate location of equipment and buildings. Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating building exits or entrances. | The closest residential receptor to the site is Whitemere House which is 60m north of the site boundary. This property however is owned by the operator and rented out for holiday lets. It is not deemed to be a sensitive receptor for amenity impacts but has been considered with respect to human health impacts.<br><br>The next closest residential receptor are properties to the west on Barrack Road which at the closest point are 430m from the site boundary and are unlikely to be impacted by noise from the current or proposed operations due to the distance. In terms of the proposed AD Plant, due to a site layout redesign it is now an additional 190m further away from these residential receptors on Barrack Road then originally proposed and permitted under variation notice EPR/GP3793FY/V010<br><br>There are workplace receptors closer to the site including the Fencing Centre 10m to the west of the permitted boundary and businesses within Bournemouth Airport Aviation Park; the closest of which is Express Gases 115m to the south east of the permitted boundary. As workplaces with other noise sources in the vicinity they are unlikely to be impacted by noise emissions. |
| b | Operational measures. This includes techniques such as:<br><br>• inspection and maintenance of equipment;<br>• closing of doors and windows of enclosed areas, if possible;<br>• equipment operation by experienced staff;<br>• avoidance of noisy activities at night, if possible;<br>• provisions for noise control during maintenance, traffic, handling and treatment activities. | The hours of operation for the reception of waste are as follows:<br>o Monday – Friday: 07:00 – 17:00<br>o Saturdays & Public Holidays: 07:00 – 13:00<br>The hours of operation for the processing of material are as follows:<br>o Monday – Friday: 07:00 – 19:00<br>o Saturdays: 07:00 – 15:00<br><br>Operational measures to reduce noise emissions are detailed with Section 7.4 of the Parley Environmental Management System **(ECO-SM-13)** and include:<br><br>• Planned preventative maintenance of plant and equipment which will include all new plant and equipment including the flare and the CHP once installed.<br>• Only trained staff are able to operate equipment.<br><br>There is a 10 mph speed limit on site. |

| **BAT 18** | **In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.** | |
|---|---|---|
| c | Low-noise equipment. This may include direct drive motors, compressors, pumps and flares | This technique is not used. |
| d | Noise and vibration control equipment. This includes techniques such as:<br><br>• noise reducers;<br>• acoustic and vibrational insulation of equipment;<br>• enclosure of noisy equipment;<br>• soundproofing of buildings. | The CHP will be housed in a sound proofed container and will have a noise rating of 65dB at 10m<br><br>The SRF processes will be carried in a building with appropriate noise abatement for the selected plant and equipment to ensure the health and safety of workers. |
| e | Noise attenuation. Noise propagation can be reduced by inserting obstacles between emitters and receivers (e.g., protection walls, embankments and buildings). | See BAT 18a above |

**Emissions to Water**

| **BAT 19** | **In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.** | |
|---|---|---|
| a | Water management. Water consumption is optimised by using measures which may include:<br><br>• water-saving plans (e.g., establishment of water efficiency objectives, flow diagrams and water mass balances);<br>• optimising the use of washing water (e.g., dry cleaning instead of hosing down, using trigger control on all washing equipment); | Water may be collected off building roofs, abstracted from an on-site borehole or taken from the mains water connection on site.<br><br>*AD Plant:*<br><br>Due to the low dry matter content of the feedstock mix and the recirculation of process water, additional water will generally not be required for the AD process.<br><br>Rainwater will be collected off the roof of the Waste Reception Building and used in preference to mains or borehole water.<br><br>Water will be used to wash down vehicles which have dispatched solid waste inside the Waste Reception Building. This water use will be minimised via the use of trigger control hoses. All of the water collecting within the sump in the Waste Reception Building is pumped to the 2 No. Pre-storage tanks for use in the AD process.<br><br>*SRF Plant:*<br><br>Water will be required for dust suppression and for any shredding activities. This will be sourced primarily from rainwater collected off the building roof with main and borehole water in place for contingency. |
| b | Water recirculation | As described above. |

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| **BAT 19** | **In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.** | |
| c | Impermeable surface. Depending on the risks posed by the waste in terms of soil and/or water contamination, the surface of the whole waste treatment area (e.g., waste reception, handling, storage, treatment and dispatch areas) is made impermeable to the liquids concerned. | The waste storage and treatment areas of the AD Plant and the SRF Process building will be benefit from an impermeable concrete surface with sealed drainage as previously described. |
| d | Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels. Depending on the risks posed by the liquids contained in tanks and vessels in terms of soil and/or water contamination, this includes techniques such as:<br><br>• overflow detectors;<br>• overflow pipes that are directed to a contained drainage system (i.e., the relevant secondary containment or another vessel);<br>• tanks for liquids that are located in a suitable secondary containment; the volume is normally sized to accommodate the loss of containment of the largest tank within the secondary containment;<br>• isolation of tanks, vessels and secondary containment (e.g., closing of valves). | *AD Plant:*<br><br>The AD tanks are constructed of stainless steel upon poured specialist waterproof concrete bases with a bentonite liner beneath. The stainless steel plates which are bolted together to make up the rings of the tank are sealed to the concrete slab and to each other by means of specified durable sealants. A separate Construction Quality Assurance (CQA) document will be provided for these post construction. All the AD tanks will benefit from high level sensors and alarms connected to SCADA.<br><br>Aardvark EM Limited were commissioned by Eco to review the proposed containment design for the Parley AD site against CIRIA C736 and the ADBA secondary containment tool.[13] Their report forms Appendix C of this document. On completion of the works Construction Quality Assurance checks will be carried out by a chartered Engineer and any snagging carried out in line with the engineers report.<br><br>The process of management of water collecting within the secondary containment sump is such that daily checks are carried out on the level in the drainage sump and if there is liquid in the sump then the manually operated pump is used to pump the liquid to the Pre-tanks if liquid is required for the process or under normal operations to the sewer in accordance with the Trace Effluent Consent.<br><br>*SRF Plant:*<br><br>There will be no liquid waste storage. Any dirty water collecting within the SRF building will be captured and pumped to sewer although leachate production is unlikely. |

[13] Containment Design Compliance Review, 2391-R001, Aardvark EM, November 2024

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|---|---|---|
| **BAT 19** | **In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.** | |
| e | Roofing of waste storage and treatment areas | *AD Plant:*<br><br>All waste storage and treatment are carried out in the Waste Reception Building or within the enclosed AD plant infrastructure thus reducing production of dirty water.<br><br>*SRF Plant:*<br><br>All waste treatment and the majority of waste storage will be carried out in a building. The only waste that it is proposed to store outside is glass, metal and RDF bales; the waste storage area will benefit from an impermeable surface with sealed drainage to sewer. |
| f | Segregation of water streams | *AD Plant:*<br><br>Clean roof water will be segregated, used if required and any excess discharged to the ditch. The Reception Building is always designated as dirty and water collecting in the building will always be treated within the AD process. All other areas are also dirty (including the secondary containment area); water from these areas may be used in the process is required but normally released to sewer.<br><br>*SRF Plant:*<br><br>Clean roof water will be segregated and reused where possible. All waste storage and treatment areas will be designated as dirty. |
| g | Adequate drainage infrastructure. The waste treatment area is connected to drainage infrastructure. Rainwater falling on the treatment and storage areas is collected in the drainage infrastructure along with washing water, occasional spillages, | As above. |

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|---|---|---|
| **BAT 19** | **In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.** | |
| | etc. and, depending on the pollutant content, recirculated or sent for further treatment. | |
| h | Design and maintenance provisions to allow detection and repair of leaks. Regular monitoring for potential leaks is risk-based, and, when necessary, equipment is repaired. The use of underground components is minimised. When underground components are used, and depending on the risks posed by the waste contained in those components in terms of soil and/or water contamination, secondary containment of underground components is put in place. | Weltec have confirmed that all tanks and pipes are installed above ground and raised to a height of 4.5m where necessary to allow for access and egress. |
| i | Appropriate buffer storage capacity is provided for waste water generated during other than normal operating conditions using a risk-based approach (e.g. taking into account the nature of the pollutants, the effects of downstream waste water treatment, and the receiving environment). The discharge of waste water from this buffer storage is only possible after appropriate measures are taken (e.g., monitor, treat, reuse). | Waste water generated during abnormal operating conditions would be stored within the secondary containment systems, the sizing and suitability of which is described in the Containment Design Compliance Review (Appendix C). |

BAT 20 – not applicable (waste water treatment)

**Emissions from Accidents and Incidents**

| **BAT 21** | **In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1)** | |
|---|---|---|
| a | Protection measures. These include measures such as:<br><br>• protection of the plant against malevolent acts; fire and explosion protection system, containing equipment for prevention, detection, and extinction; and<br>• accessibility and operability of relevant control equipment in emergency situations. | The site benefits from CCTV monitoring and recording which will be extended into new operational areas. The CCTV footage will be available remotely by site personnel. There is secure fencing around the site. Diesel tanks and chemical stored are locked.<br><br>Only authorised persons are allowed on site. Maintenance workers or contractors are not permitted on site without a suitable qualification and they must have permission to do the work.<br><br>Competent personnel will be able to operate the AD Plant remotely via a secure remote login in system which ensures a direct link to the SCADA system.<br><br>Prior to the plant commissioning phase a risk assessment in accordance with the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) will be carried out and recommendations for remedial action completed.<br><br>There is a Fire Risk Assessment is in place. There are fire extinguishers strategically placed around the site which are maintained under contract with a specialist company. Each item of mobile plant is fitted with a fire extinguisher. All staff have received basic firefighting training including the use of the fire extinguishers. An updated Fire Risk Assessment will be carried out and recommended actions are undertaken. |
| b | Management of incidental/accidental emissions. Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves | The Parley Emergency Preparedness Plan **(ECO-EP-02)** will be updated to reflect the new operations and will contain Standard Operating Procedures for emergency situations:<br>• Fire/Explosion.<br>• Gas Leak – CHP Engines.<br>• Gas Leak – Inside the Building.<br>• Tank Failure.<br>• Electrical Failure.<br>• Mechanical Failure.<br>• Oil/Fuel/Chemical Spillage.<br>• External flood.<br>• Serious Injury. |

| | | |
|---|---|---|
| | | • Lightning Strike. |
| c | Incident/accident registration and assessment system. This includes techniques such as:<br><br>• a log/diary to record all accidents, incidents, changes to procedures and the findings of inspections; and<br>• procedures to identify, respond to and learn from such incidents and accidents. | In accordance with the Accident and Incident Reporting and Investigation Management Procedure **(ECO- MP-19)** it is the responsibility of all staff to report incidents, including near misses to their line of report or the Tech EHS Manager as soon as possible. Team Leaders and Line Managers are responsible (with support from the Tech EHS Manager) for undertaking investigations following incidents. The level of investigation will be determined by the severity or potential of the incident, in accordance with the details in the Accident and Incident Reporting and Investigation Management Procedure **(ECO-MP-19).**<br><br>Any changes to procedures are made in accordance with Document Control Procedure **(ECO-MP-01)**. |

**Material Efficiency**

| **BAT 22** | **In order to use materials efficiently, BAT is to substitute materials with waste.** | |
|---|---|---|
| a | Waste is used instead of other materials for the treatment of wastes (e.g., waste alkalis or waste acids are used for pH adjustment, fly ashes are used as binders). | The AD process makes good use of recycled dirty water and liquid waste to create a prepared feedstock in the correct dry matter range for anaerobic digestion. There is limited use of raw materials. The AD process uses primarily waste materials in order to recover biogas and digestate.<br><br>Raw material use is minimised where possible and use will be reported annually to the Environment Agency in line with permit conditions as required.<br><br>Opportunities will be sought to use waste materials in place of raw materials. |

**Energy Efficiency**

| **BAT 23** | **In order to use energy efficiently, BAT is to use both of the techniques given below.** | |
|---|---|---|
| a | Energy efficiency plan. An energy efficiency plan entails defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (for example, specific energy consumption expressed in kWh/tonne of waste processed) and planning periodic improvement targets and related actions.<br><br>The plan is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc. | Energy usage is monitored and reviewed annually. Currently the on-site energy demand is met by the Biomass combined heat and power engine (CHP). Any new energy demands for operation of the SRF and AD processes will be met by the new AD CHP or imported power prior to CHP commissioning.<br><br>There is currently an Objective and Key Result (OKR) which is similar to a Key Performance Indicator (KPI) in place for a 5% reduction in energy usage over the year. This forms part of the site EMS.<br><br>Records of primary energy used, energy generated, and energy exported are maintained and an annual return will be made to the EA in accordance with permit requirements. |
| b | Energy balance record. An energy balance record provides a breakdown of the energy consumption and generation (including exportation) by the type of source (i.e., electricity, gas, conventional liquid fuels, conventional solid fuels, and waste). This includes:<br><br>• information on energy consumption in terms of delivered energy;<br>• information on energy exported from the installation;<br>• energy flow information (e.g., Sankey diagrams or energy balances) showing how the energy is used throughout the process.<br>The energy balance record is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc. | *AD Plant Energy Production & Use:*<br><br>The function of the AD plant is to produce energy in the form of biomethane for export to the gas grid. The projected production of biomethane is in the region of 6,789,000 $Nm^3$/year.<br><br>In addition, the boiler has been sized alone to produce sufficient heat year round for the pre-storage tanks, digesters, pasteurisers and the desulphurisation unit.<br><br>When the CHP is installed in time, it will also have the capacity to provide all of the heat demands for the AD plant, such that the boiler can be in place for contingency heat production if the CHP is down. Electricity from the CHP will be sufficient to provide a parasitic load to the plant.<br><br>There is already on-site energy generation in place in the form of a biomass CHP (permitted by the Local Authority). |

| | | |
|---|---|---|
| **BAT 23** | **In order to use energy efficiently, BAT is to use both of the techniques given below.** | |
| | | The site as a whole will be a net energy producer with as many energy demands as possible met by on-site sources. Should additional electricity be required then mains grid will be drawn upon.<br><br>*SRF Plant:*<br><br>The SRF plant will be a consumer of energy which will be powered where possible by on-site electricity generation (Biomass CHP). The waste treatment processes will result in a recovered fuel product. |

**Waste Reduction**

| | | |
|---|---|---|
| **BAT 24** | **In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1).** | |
| | Packaging (drums, containers, IBCs, pallets, etc.) is reused for containing waste, when it is in good condition and sufficiently clean, depending on a compatibility check between the substances contained (in consecutive uses). If necessary, packaging is sent for appropriate treatment prior to reuse (e.g., reconditioning, cleaning). | Packaging removed from packaged waste feedstocks is washed in the process to ensure maximum removal of organic materials. The resulting packaging material is compacted and sent off site to be used in an energy from waste plant which is currently the best option for this waste stream in line with the waste hierarchy.<br><br>Ref: Residue Management Plan **(ECO-SM-23).** |

**General BAT conclusions for the mechanical treatment of waste when it is not combined with biological treatment – relevant to SRF Process**

| **BAT 25** | **In order to reduce emissions to air of dust, and of particulate-bound metals, PCDD/F and dioxin-like PCBs, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.** | |
|---|---|---|
| a | Cyclone used as preliminary separators for coarse dust | The design of the SRF plant is not finalised and as such any abatement technologies have not been determined. We propose that this information is provided for assessment by the Environment Agency through an Improvement Condition. |
| b | Fabric filter. May not be applicable to exhaust air ducts directly connected to the shredder when the effects of deflagration on the fabric filter cannot be mitigated (e.g. by using pressure relief valves). | As above. |
| c | Wet scrubbing | As above. |
| d | Water injection into the shredder. The waste to be shredded is damped by injecting water into the shredder. The amount of water injected is regulated in relation to the amount of waste being shredded (which may be monitored via the energy consumed by the shredder motor).<br><br>The waste gas that contains residual dust is directed to cyclone(s) and/or a wet scrubber | As above. |

**BAT – associated emission level (BAT-AEL) for channelled dust emissions to air from the mechanical treatment of waste– relevant to SRF Process**

| **Parameter** | **Unit** | **BAT-AEL (Average over sampling period)** | |
|---|---|---|---|
| Dust | $mg/Nm^3$ | 2-5* | If the final design incorporates channelled dust emissions to air 6- monthly stack monitoring will be carried out to assess emissions in relation to this BAT-AEL |

* When a fabric filter is not applicable, the upper end of the range is $10mg/Nm^3$

**BAT conclusions for the mechanical treatment in shredders of metal waste– relevant to SRF Process only**

| **BAT 26** | **In order to improve the overall environmental performance, and to prevent emissions due to accidents and incidents, BAT is to use BAT 14g and all of the techniques given below:** | |
|---|---|---|
| a | Implementation of a detailed inspection procedure for baled waste before shredding. | Not applicable – baled waste will not be shred. |
| b | Removal of dangerous items from the waste input stream and their safe disposal (e.g. gas cylinders, non-depolluted end of life vehicles (ELVs), non-depolluted Waste Electrical and Electronic Equipment (WEEE), items contaminated with (Polychlorinated biphenyl) PCB. | Waste will be inspected and pre-sorted after tipping and before shredding. Operatives will be trained to identify and remove dangerous items from the waste input streams and place in the quarantine area for safe recovery or disposal off-site. Due to the nature of the waste inputs ELVs would not be present. |
| c | Treatment of containers only when accompanied by a declaration of cleanliness. | Any large metal containers (not drinks / food cans etc.) that may be in the waste stream will be removed manually prior to shredding as per b above. |

| **BAT 27** | **In order to prevent deflagrations and to reduce emissions when deflagrations occur, BAT is to use technique a. and one or both of the techniques b. and c. given below.** | |
|---|---|---|
| a | Deflagration management plan, includes:<br><br>• a deflagration reduction programme designed to identify the source(s), and to implement measures to prevent deflagration occurrences, e.g. inspection of waste input as described in BAT 26a, removal of dangerous items as described in BAT 26b;<br>• a review of historical deflagration incidents and remedies and the dissemination of deflagration knowledge;<br>• a protocol for response to deflagration incidents. | It is recognised that shredding equipment can spark an explosion that ignites the dust created by shredding. As such as far as is feasibly possible incompatible waste such as lead acid batteries and nickel metal hydride batteries will be removed manually prior to shredding. In addition, any shredder will have the following features to prevent deflagrations:<br><br>• Spark detection system<br>• An automatic suppression systems |
| b | Pressure relief dampers are installed to relieve pressure waves coming from deflagrations that would otherwise cause major damage and subsequent emissions. | Technique not proposed. |
| c | Pre-shredding - Use of a low-speed shredder installed upstream of the main shredder. | Technique not proposed. |

| **BAT 28** | **In order to use energy efficiently, BAT is to keep the shredder feed stable.** | |
|---|---|---|
| a | The shredder feed is equalised by avoiding disruption or overload of the waste feed which would lead to unwanted shutdowns and start-ups of the shredder. | The flow into any shredder will be controlled and regulated. |

**BAT 29 & BAT 30 not applicable as relate to the treatment of WEEE containing VFCs and/or VHCs**

**BAT conclusions for the mechanical treatment of waste with calorific value – Relevant to SRF Process only.**

This section is relevant to the proposed Listed Activity (AR4) Schedule 1 of the EPR under S5.4 A(1)(a)(ii):

*Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving pre-treatment of waste for incineration or co-incineration*

| **BAT 31** | **In order to reduce emissions to air of organic compounds, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.** | |
|---|---|---|
| a | Adsorption | The design of the SRF plant is not finalised and as such any abatement technologies have not been determined. We propose that this information is provided for assessment by the Environment Agency through an Improvement Condition. |
| b | Biofilter | As above. |
| c | Thermal oxidation | As above. |
| d | Wet scrubbing | As above. |
| **BAT-associated emission levels (BAT-AELs) for channelled TVOC emissions to air from the mechanical treatment of waste with calorific value** | | |
| **Parameter** | **Unit** | **BAT-AEL (Average over the sampling period)** |
| TVOC | $mg/Nm^3$ | 10-30* |
| *The BAT-AEL only applies when organic compounds are identified as relevant in the waste gas stream, based on the inventory mentioned in BAT 3. | | |

**General BAT conclusions for the biological treatment of waste – AD Plant Only**

| | | |
|---|---|---|
| **BAT 33** | **In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.** | |
| | The technique consists of carrying out the pre-acceptance, acceptance and sorting of the waste input (see BAT 2) so as to ensure the suitability of the waste input for the waste treatment, e.g., in terms of nutrient balance, moisture or toxic compounds which may reduce the biological activity. | The EMS procedures for waste pre-acceptance and acceptance (see BAT 2) ensure that waste is only accepted at the facility if it is suitable for treatment within an anaerobic digester. |

| | | | |
|---|---|---|---|
| **BAT 34** | **In order to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including $H_2S$ and $NH_3$, BAT is to use one or a combination of the techniques given below.** | | |
| a | Adsorption | There will be carbon filters used to treat displaced air from the 2 No. Pre-storage tanks. There will be 2 No. activated carbon filters within the biogas upgrade unit. | |
| b | Biofilter | A woodchip biofilter system will be used to provide odour abatement for channelled emission from the AD Waste Reception Building and the Pasteurisation Building. | |
| c | Fabric filter | Not applicable. | |
| d | Thermal oxidation | Not applicable. | |
| e | Wet scrubbing | In the biogas desulphurisation unit, the microorganisms are immobilised on packed beds in a bioreactor. The scrubbing liquid is water with the necessary nutrients and flows through the bioreactor in the opposite direction to the biogas. This takes place with the addition of oxygen. | |
| **BAT-associated emission levels (BAT-AELs) for channelled $NH_3$, odour, dust and TVOC emissions to air from the biological treatment of waste** | | | |
| **Ref** | **Parameter** | **BAT-AEL (Average over the sampling period)** | |
| Table 6.7 | $NH_3$ - mg/$Nm^3$ * | 0.3 - 20 | Either the BAT-AEL for $NH_3$ or the BAT-AEL for the odour concentration applies. It is proposed that odour monitoring will be carried out. |
| | Odour concentration - $ou_E/Nm^3$ * | 200 - 1,000 | Odour monitoring against this BAT-AEL will be carried out every 6 months in accordance with BAT 8 |

* Either the BAT-AEL for $NH_3$ or the BAT-AEL for the odour concentration applies.

| **BAT 35** | **In order to reduce the generation of waste water and to reduce water usage, BAT is to use all of the techniques given below.** | |
|---|---|---|
| a | Segregation of water streams | This is detailed within the response to BAT 19. |
| b | Water recirculation | This is detailed within the response to BAT 19. |
| c | Minimisation of the generation of leachate | Leachate may be produced from stored food waste stored in the AD Waste Reception Building, but this is minimised through the short storage times; maximum of 48 hours. All leachate and dirty water are used in the AD process as a feedstock.<br><br>Waste water generation from the SRF processes is considered to be minimal due to the nature of the waste, short holding times and the storage of any wastes with high leaching potential within the building with sealed drainage. |

BAT 36-37 Not Applicable

**BAT conclusions for the anaerobic treatment of waste**

**Process Monitoring**

| **BAT 38** | **In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.** | |
|---|---|---|
| | Implementation of a manual and/or automatic monitoring system to:<br><br>• ensure stable digester operation,<br>• minimise operational difficulties, such as foaming, which may lead to odour emissions,<br>• provide sufficient early warning of system failures which may lead to a loss of containment and explosions.<br><br>This includes monitoring and/or control of key waste and process parameters, e.g.:<br><br>• pH and alkalinity of the digester feed;<br>• digester operating temperature;<br>• hydraulic and organic loading rates of the digester feed;<br>• concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate;<br>• biogas quantity, composition (e.g., $H_2S$) and pressure;<br>• liquid and foam levels in the digester. | The following process monitoring takes place:<br>***Continuous monitoring (recorded on SCADA):***<br>1. Gas production<br>2. Gas pressure<br>3. Gas volume<br>4. Temperature<br>***Daily Process Monitoring:***<br>5. Odour at site boundary and main potential odour sources<br>6. Continuous gas readings ($CH_4$, and $O_2$). Periodic gas readings $H_2S$. The results are shown on SCADA.<br>7. Visual check on appearance and level of digesters (crust, foam, mixing speed)<br>***On-site testing:***<br>8. The on-site testing equipment is used to test:<br>• FOS/TAC in digesters on a weekly basis<br>• pH and dry matter in digesters on a weekly basis<br>• Dry matter testing of the 2 No. Pre-storage tanks on a weekly basis<br>• Feedstock testing - dry matter content, pH and chlorides<br>***Samples for laboratory testing:***<br>1. Feedstock - chlorides and bullet biochemical methane potential.<br>2. A sample is taken from each of the digesters approximately quarterly and sent off for analysis including:<br>• pH<br>• FOS/TAC<br>• Dry matter<br>• Ammonia<br>• Volatile fatty acid speciation<br>• Trace elements<br>3. Additional final digestate samples will be taken to undertake analysis in accordance with PAS110/ADQP requirements (generally monthly). |

| | | |
|---|---|---|
| **BAT 38** | **In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.** | |
| | | Frequency of testing is increased if required to enhance process monitoring around abnormal operation events.<br><br>Process monitoring data is used by the AD Manager to inform process decisions including the feed plan, mixing regime and the addition of trace elements. |

BAT 39-53 Not applicable (other waste treatment activities)

# 3. Compliance with Medium Combustion Plant Directive (MCPD) & Specified Generator Regulations

<table>
<tr><th colspan="2">MCPD & Specified Generator requirements Error! Bookmark not defined.</th></tr>
<tr><td>Identification of Medium Combustion Plant (MCP). MCPD controls apply to all in-scope MCPs with a rated thermal input of each unit equal to or greater than 1MWth and less than 50MWth, regardless of the type of fuel used or the number of hours of operation.</td><td>The thermal input of the CHP, boiler and the emergency generator has been calculated in accordance with Annex B of the AMPS Technical Committee document – Determination of the thermal input power of an engine driven generator.[14]<br><br>$P_{th} = P_{(r)} * 100/n_e$<br><br>Where:<br>$P_{th}$ = thermal input power<br>$P_{(r)}$ = rated power (mechanical or electrical, whichever is available)<br>$n_e$ = effective efficiency (relevant for mechanical or electrical power)<br><br>Table 6 Thermal input calculation
<table>
<tr><th>Combustion plant / Generator</th><th>Rated power (electrical) kW</th><th>Effective efficiency (electrical) (%)</th><th>Thermal input power kWthi</th></tr>
<tr><td>CHP</td><td>1,013</td><td>43 (at full load)</td><td>2,356</td></tr>
<tr><td>Boiler</td><td>800kWtho (thermal output)</td><td>92</td><td>870</td></tr>
<tr><td>Emergency generator</td><td>100</td><td>33*</td><td>303</td></tr>
<tr><td colspan="3">Aggregated thermal input</td><td>3,529</td></tr>
</table>
* Used suggested efficiency from AMPS guidance for a <1MW compression ignition generator using liquid fuel.<br><br>The emergency generator is not a combustion plant in terms of MCPD as it is not a device that burns fuel to generate heat. The biogas boiler is not an MCP as the net rated thermal input is <1MWth.</td></tr>
</table>

[14] Determination of thermal input power of an engine driven generator, Association of Manufacturers of Power generating Systems (AMPS) Technical Committee, 2016

| **MCPD & Specified Generator requirements** Error! Bookmark not defined. | |
|---|---|
| MCP 'new' or 'existing' | The proposed CHP is a new MCP and has a rated power (electrical) of 1,013kWel. The thermal input power is 2,356kWthi. The CHP is 'new' with respect to the MCPD and associated emission limit values (ELVs). |
| Compliance with Emission Limit Values (ELVs) - Part 2 of Annex II of MCPD | The CHP will meet the following ELVs (dry gas, 273K, 15% $O_2$):<br>• Total Volatile Organic Compounds (TVOCs)- 1,000 mg/$Nm^3$<br>• Nitrogen oxides - 250 mg/$Nm^3$<br>• Carbon monoxide - 1,400 mg/$Nm^3$<br>There is no ELV for sulphur dioxide as the fuel is natural gas. |
| Identifying specified generators. | A generator is a combustion plant that generates electricity and therefore the CHP is also a specified generator. The emergency generator is excluded. |
| Identify if specified generator controls apply | Specified generator controls, unless excluded, apply to generators with a rated thermal input between 1MWth and 50MWth. Therefore specified generator controls apply to the CHP. |

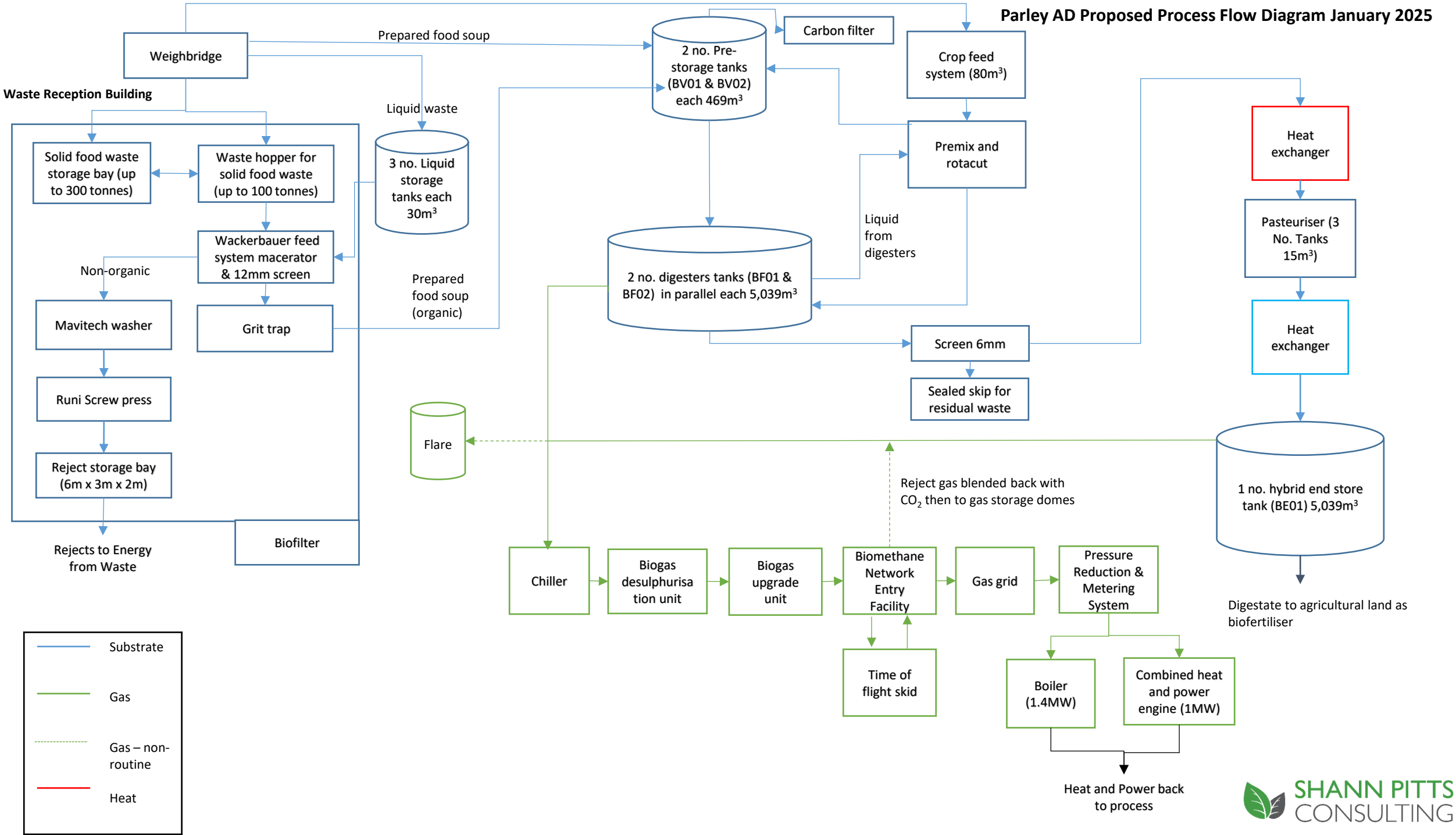
# 4. Conclusions and Recommendations

The BAT review has highlighted that proposals are generally compliant with indicative BAT as stated in Best Available Techniques Reference Document for Waste Treatment, the relevant Appropriate Measures Environment Agency Technical Guidance, the Medium Combustion Plant Directive (MCPD) and the Specified generator regulations.

However, as the design of the SRF plant is not finalised and as such any abatement technologies have not been determined, it has not been possible to fully assess this element of the proposals against the relevant standards. We propose that this information is provided for assessment by the Environment Agency through a Pre-operational or Improvement Condition.

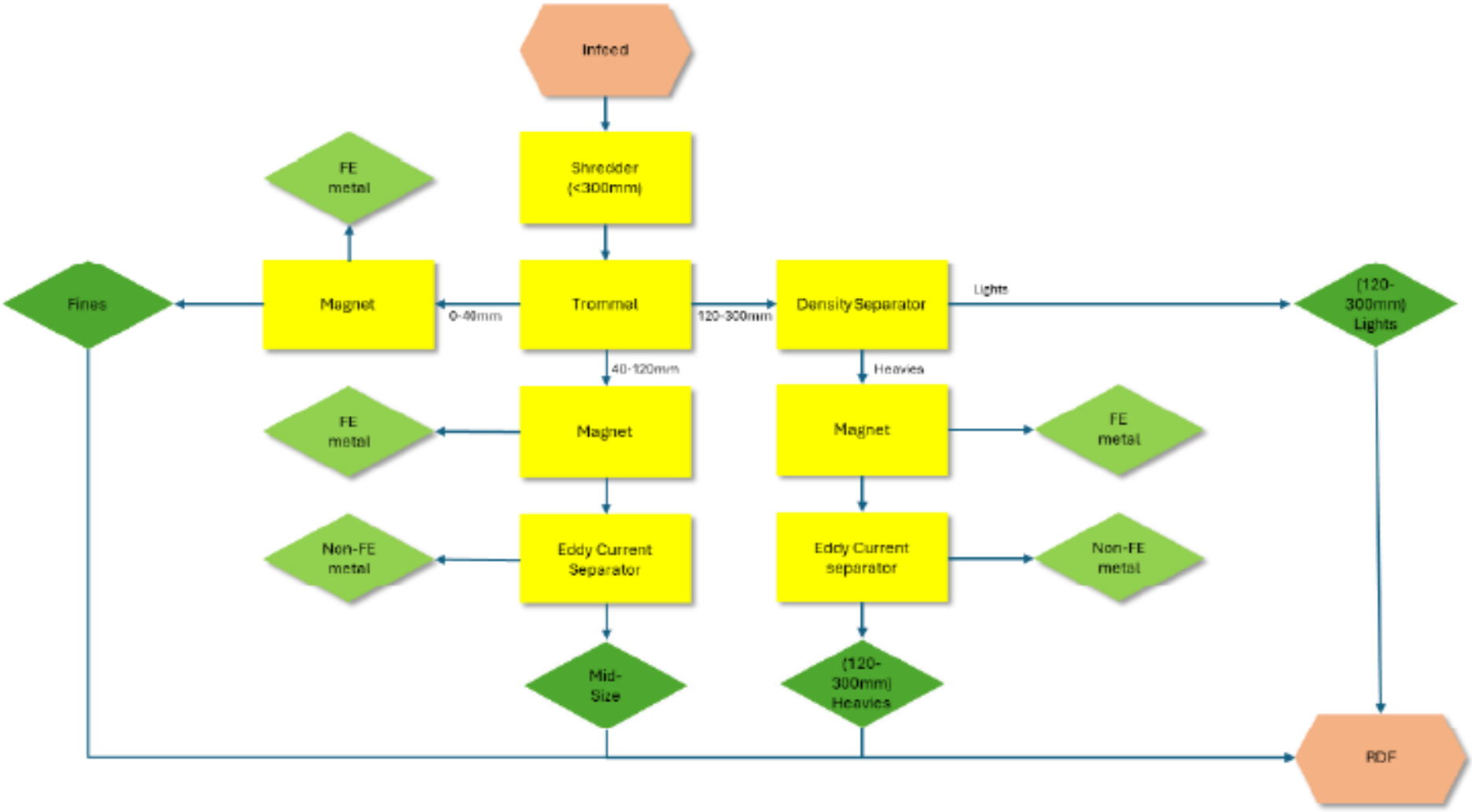
## Appendix A – AD Process Flow Diagram

# Parley AD Proposed Process Flow Diagram January 2025




SHANN PITTS CONSULTING

## Appendix B – SRF Process Flow Diagram


Infeed
Shredder (<300mm)
FE metal
Magnet
Fines
Trommel
0-40mm
120-300mm
Density Separator
Lights
(120-300mm) Lights
40-120mm
Heavies
FE metal
Magnet
Magnet
FE metal
Non-FE metal
Eddy Current Separator
Eddy Current separator
Non-FE metal
Mid-Size
(120-300mm) Heavies
RDF

## Appendix C – Containment Design Compliance Review

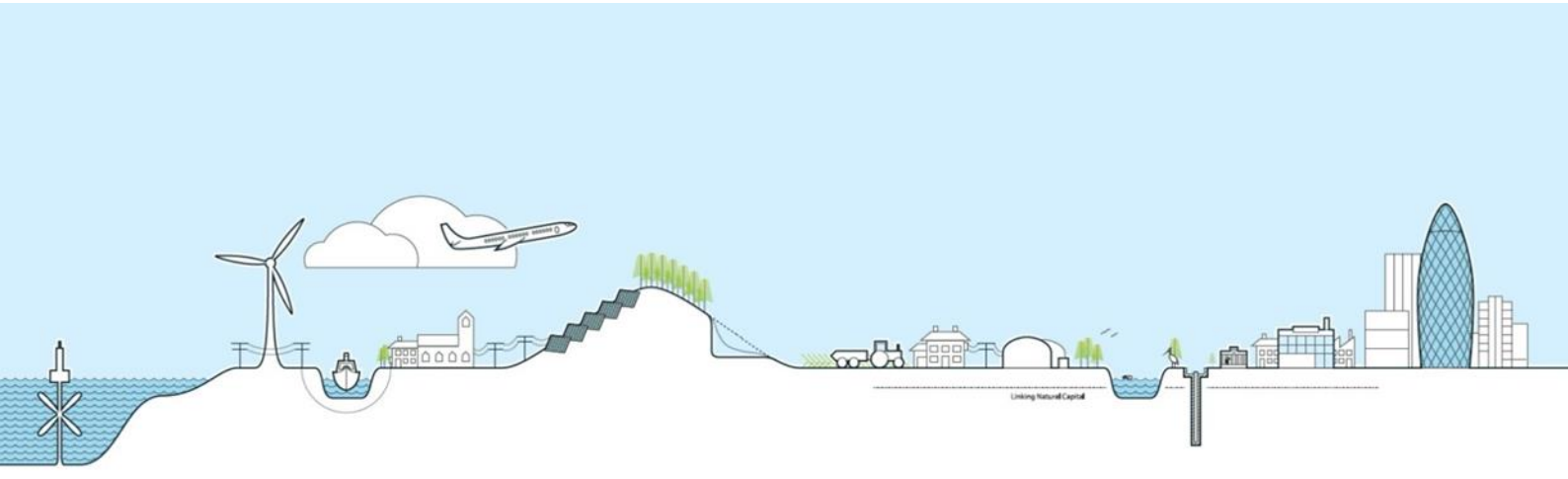
# Eco Sustainable Solutions

# Containment Design Compliance Review

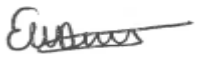
**February 2025**

**Prepared By**

aardvark
environment matters



# Project Quality Control Sheet

| ORIGINAL | Author | Checked by | Approved by |
|---|---|---|---|
| **Signature** |  |  |  |
| **Date** | 06/02/2025 | 06/02/2025 | 06/02/2025 |
| **Company** | Aardvark EM Ltd | Aardvark EM Ltd | Aardvark EM Ltd |

**Location:** Eco Park, Chapel Lane, Parley, Christchurch, BH23 6BG

**Grid Reference:** SZ 1035 9897

**Project Manager:** Alan Taylor AMRINA MEI CEng

**Report Author:** Ellen Denny BSc AIEMA

Paul Hartley Ceng MICE

**Report Number:** 2391-R001

**Report Status:** FINAL



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# Contents

## Figures



## Tables



## Appendix

# 1 Introduction

## *1.1 Overview*

Aardvark EM have been commissioned by Eco Sustainable Solutions to review the proposed AD plan for the Parley AD site. The design review will then be assessed and signed off by Ollie Jones of PDC, a chartered engineer, to ensure compliance. To fully understand the requirements for secondary containment at the site, the plant design has been reviewed against the CIRIA C736 standards and the ADBA secondary containment tool has been applied.

## *1.2 Site Summary*

The AD facility will process up to 70,000 tonnes of organic waste annually. The proposed feedstock is maize silage, food waste soup, straw and rice fodder, flour etc.

The layout of the site is included with appendix 1.

The bunded area comprises:

- 2 no. pre-storage (buffer) tanks of 469m$^3$ each,
- 2 no. digester tanks of 5,039m$^3$ each,
- A hybrid tank 5,039 m$^3$,
- Pre-storage tank of 75m$^3$,
- Building with pasteurisation unit and plastics removal,
- 2 no. containers with heat supply 40ft and 20ft,
- 1 no. containers with pump block and control system 40ft,
- A dosing feeder of 80m$^3$ capacity
- Rough desulphurisation unit,
- Macerator and pre-mix with housing.

## *1.3 Site Location*

The Eco Parley site is located in Parley, approximately 7.5km north of Bournemouth Town Centre and 2.7km to the east of Ferndown. The site shares a boundary with Bournemouth Airport to the south and solar arrays to the north and west. The proposed site for the AD plant is located centrally and to the north of the wider Eco Sustainable Solutions site (Proposed AD site labelled in green, wider site displayed in red on figure 1 below). The site is accessed via Chapel Lane, accessed from Chapel Gate and the B3073.

**Figure 1: Site Location**

# 2 Risk Assessment and Classification

To identify the risks associated with the site the ADBA Secondary containment tool has been utilised. The tool is based on the CIRIA C736 guidance and uses a source, receptor, pathway model, identifying any potential hazards associated with the operation of the plant and assigning a class level.

- Class 1 generally applies to sites with small volumes, light contamination risk and few sensitive receptors and good primary containment,
- Class 2 applies to sites with medium volumes, a medium risk of contamination, some sensitive receptors and good primary containment,
- Class 3 generally refers to sites with larger volumes, high risk material with a high risk of contamination, with very sensitive areas and poor primary containment.

The aim of the containment system in the context of the site risk assessment is to break the pathway between the source and receptor.

The following framework will be utilised to determine the site hazard and risk rating, determining the sites class.

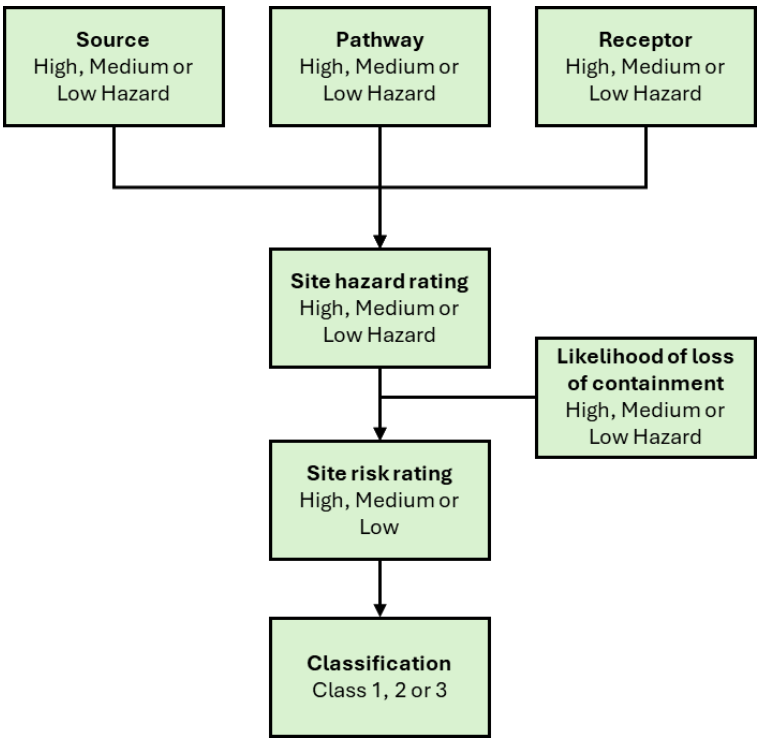



**Figure 2: CIRIA Risk Assessment Framework**

The ADBA Secondary Containment Risk Assessment Tool was utilised to determine the correct classification for the site, please see the results of the assessment summarised in the below sections.

## *2.1 Source*

In the context of assessing hazard, the source refers to; the inventory, rainwater or surface water runoff contaminated by the inventory, firefighting agents that are harmful to the environment in their

own right and/or are contaminated by the inventory and firefighting and cooling water contaminated by the inventory.

The following have been identified as possible source considerations:

| | Material | Flammability | Corrosive | Ecotoxicity | Environmental hazard rating | Justification |
|---|---|---|---|---|---|---|
| Feedstock | Maize silage | No | No | No | Low | Not Hazardous |
| | Food waste soup | No | No | No | Low | |
| | Straw | No | No | No | Low | |
| | Rice Fodder, Flour | No | No | No | Low | |
| | Water | No | No | No | Low | |
| Process | Feedstock | No | No | No | Low | Not Hazardous |
| | Digestate | No | No | No | Low | |
| | Sludge | No | No | No | Low | |
| Fire incidents | Firefighting agents | No | No | No | Low | Due to above materials, it is unlikely there would be a fire incident at the site |
| | Firefighting water | No | No | No | Low | |

**Table 1: Material Sources at the Site**

## *2.2 Pathway*

The following has been considered under the ADBA Secondary Containment Assessment:

- **Site layout -**

  If a spill were to occur on site, material would be contained either within the site's secondary containment bund (as specified within this document), or within the site's tertiary containment, the wider Eco site. All site storage will be monitored and maintained to ensure it is fit for purpose.

- **Site drainage -**

  All of the sites surface water will be cvollected and pumped into the AD plants buffer tanks to be used within the AD process. If the tanks are at capacity any surface water will be pumped to the sites foul water sewer. If the surface water is contaminated, it will be pumped back into the AD system or tankered off site if at capacity. Within the secondary containment, the typography of the site will be generally flat, with a slight decrease in gradient towards a sump

which will pump to the sites drainage system. A drainage channel will run north to south, with a gradient of approximately 1:100, with the sump located near to the sites centre.

- **Topography, geology and hydrology –**

  A concrete pad will be laid as part of the construction of the AD site and will be built to specification and fit for purpose. The site is underlain by superficial river terrace deposits, with bedrock classified under Branksome Sand Formation. The site is an area designated as Secondary A aquifer, with the superficial aquifer also being classified as Secondary A. Groundwater vulnerability is designated as medium – high. There are a number of boreholes located at the site, (please see the figure below) all active boreholes are located a distance from the site, any investigative boreholes located near to the AD site will be capped and filled in before commencement of site activities.


**Figure 3: Site Borehole Location**

- **Climatic conditions –**

  A 1 in 10-year rainfall event must be accounted for within the bund containment calculations. The runoff potential at the site is categorised as 'low overland flows, unless ground is excessively dry or saturated'.

- **Fire Fighting –**

  There will be quantities of flammable gases on site, however this is unlikely to cause a fire/explosion issue due to relevant assessments being undertaken (DSEAR assessment) to mitigate this. Fire risk and use of firefighting water and firefighting agents will not be considered as part of this assessment.

- **Flood Risk –**

  There is considered medium risk of surface water flooding (between 1 and 3.3% per year) and very low risk of flooding from rivers and the sea.

## *2.3 Potential Receptors*

### 2.3.1 Watercourses and Waterbodies

The closest waterways to the site are a number of ditches which run into the Moors River to the east of the site. The Moors River joins the River Stour at Blackwater, later draining into Christchurch Harbour alongside the Hampshire Avon. The Moors water body is located within the Stour Dorset Operational Catchment, located within the Dorset Management Catchment.

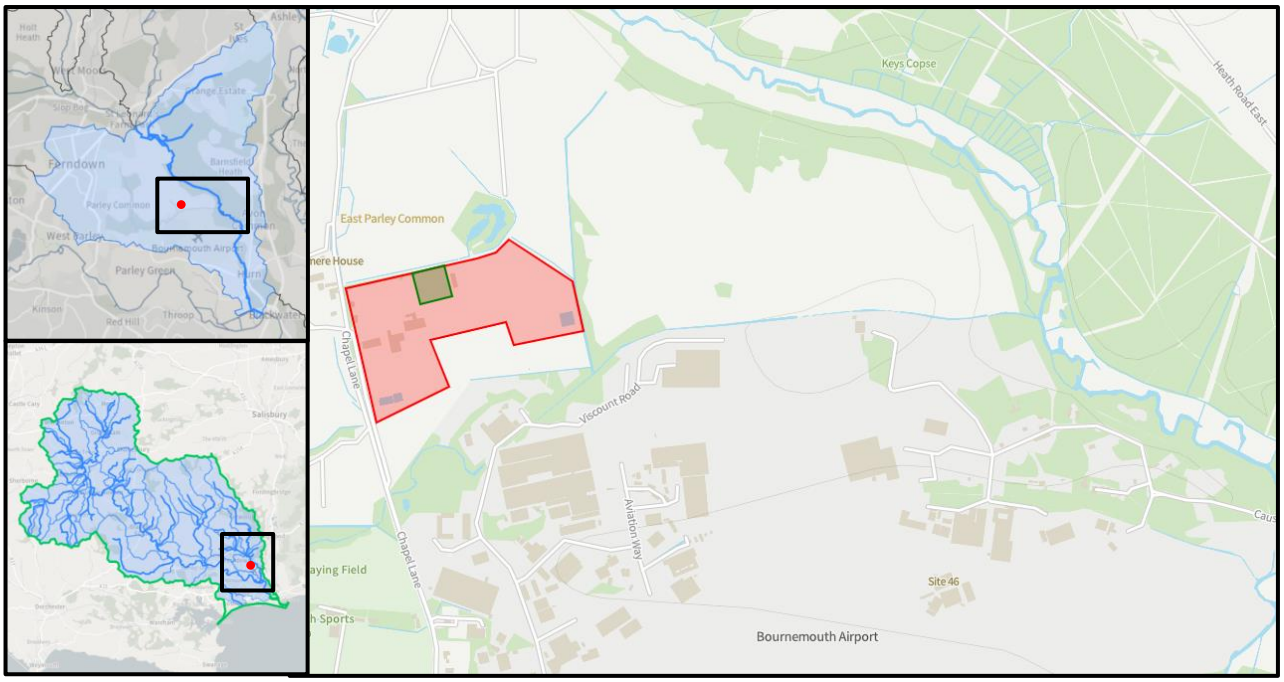
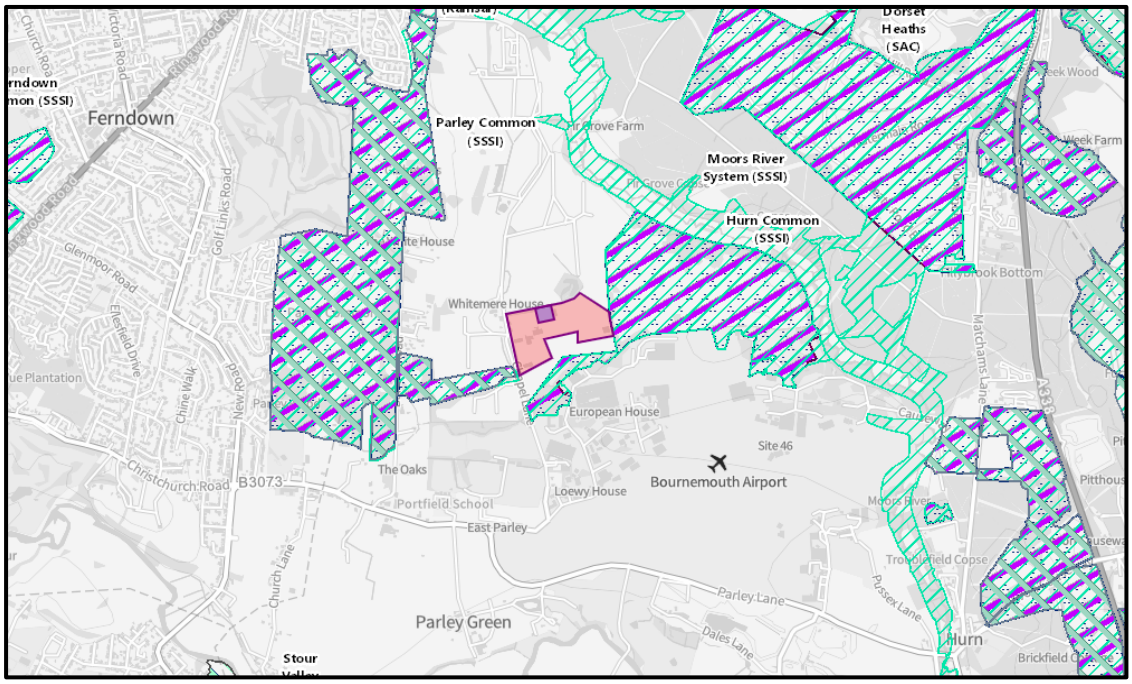



**Figure 4: Nearby Watercourses and Waterbodies**

### 2.3.2 European Sites

There are a number of sensitive receptors, including Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar Sites in the vicinity of the site (Figure 5).




| | Designation | Name | Distance and direction from site |
|---|---|---|---|
| | Site of Special Scientific Interest (SSSI) | Hurn Common | South and east of the site |
| | | Parley Common | South-west of the site<br>650m to the west |
| | | Moors River System | 600m to the north-east |
| | | St Leonard and St. Ives Heaths | 1,500m to the north-east |
| | Special Areas of Conservation (SACs) | Dorset heaths | Parcel to the south-east of the site<br>Parcel to the south-west of the site<br>Parcel 650m to the west<br>Parcel 1,500m to the north-east |
| | Special Protection Areas (SPAs) | Dorset Heathlands | Parcel to the south-east of the site<br>Parcel to the south-west of the site<br>Parcel 650m to the west<br>Parcel 1,500m to the north-east |
| | Ramsar Sites | Dorset Heathlands | Parcel to the south-west of the site<br>Parcel 650m to the west |
| | Local Nature Reserves | NA | NA |

**Figure 5: Nearby European Sites**

### 2.3.3 Habitation

The following are the closest sensitive receptors within the vicinity of the site:

| Location | Use | Distance/direction | Description |
|---|---|---|---|
| Eco Sustainable Solutions | Workplace | Bordering the site | The Parley AD site is located within the wider Eco Sustainable Solutions site. There will be a number of site operatives working in the areas surrounding the site. |
| Whitmere house | Dwelling | 250m west | The closest dwelling is Whitemere house, located just outside the wider Eco Sustainable Solutions site. |
| The fencing centre | Workplace / business | 250m east | A fencing business is located adjacent to the wider site entrance. |
| Bournemouth airport | Workplace / business | 500m south-east | Bournemouth airport is located to the south of the site. |
| Sports pitches | Recreation | 600m south-west | There are a number of pitches located to the south-west of the site, utilised by Bournemouth University. |

**Table 2: Nearby Habitation**

## *2.4 Risk Assessment Summary*

Based upon the above assessment of Source, Pathway, Receptor, the Sites Site Hazard Rating has been graded as **Moderate**.

The ADBA Secondary Containment Risk Assessment Tool (based on the CIRIA C736 guidance) and the information included above was utilised to accurately determine the Site Hazard Rating. Using this tool the following ratings were assigned to the site:

- Source – Low,
- Pathway – Medium,
- Receptor – High.

Using the below hazard rating combinations the site was graded as having a Site Hazard Rating of Moderate.

| **Site Hazard Rating** | | |
|---|---|---|
| H = High rating<br>M = Moderate rating<br>L = Low rating | | |
| **Source**<br>(hazard rating )<br>May be H, M or L | **Pathway**<br>(transport potential)<br>May be H, M or L | **Receptor**<br>(damage potential)<br>May be H, M or L |
| **Possible combination of ratings:** | | |
| **High:** | HHH or HHM or HMM | |
| **Moderate:** | HHL or MMM or HML | |
| **Low:** | MML or HLL or MLL or LLL | |

**Figure 6: Combinations Giving Overall Hazard Rating**

Based on the Site Hazard Rating and the Likelihood of Loss of Containment (based upon the primary containment), the site has been graded as having a **Medium** overall Site Risk Rating. This grading was based upon a Site utilising primary containment, not secondary, to adequately assess the needs of the site in addition to the annual probability of loss of containment as discussed in CIRIA C736.

| Risk of loss of containment | Annual probability of loss of containment |
|---|---|
| High | Greater than 1% (1 in 100) |
| Medium | Between 1% (1 in 100) and 0.001% (1 in 1 million) |
| Low | Less than 0.001% (1 in 1 million) |

**Table 3: Frequency of Loss of Containment**

| **Site hazard rating** | |
|---|---|
| May be high (H), Moderate (M) or Low (L) | |
| **Frequency of loss of containment** | |
| May be high (H), Medium (M) or Low (L) | |
| **Possible combination of ratings:** | |
| **High:** | HH or HM or MH |
| **Moderate:** | HL or MM or LH |
| **Low:** | ML or LM or LL |

**Figure 7: Overall Site Risk Rating as Defined by Combining Ratings of Site Hazard and Probability of Containment Failure**

The sites secondary containment requirements have been classified as **Class 2** (moderate).

The ADBA Secondary Containment Risk Assessment Tool is included in Appendix 1.

# 3 Containment System Capacity

The bund and equipment capacity summary calculations are contained within appendix 1 and 2.

## *3.1 110% and 25% Bund Capacity Rules*

At the Eco AD Site the bund capacity must be calculated to ensure that 110% of the capacity of the largest tank or 25% of the overall tank capacity can be contained within the bund. The following was calculated to determine whether the 110% rule or the 25% rule was the most applicable.

| Calculation | Capacity |
|---|---|
| 100% of the largest tank | 5,039 $m^3$ |
| 110% of the largest tank | 5,543 $m^3$ |
| Total tank capacity on Site | 16,130 $m^3$ |
| 25% of the Sites tanks | 4,033 $m^3$ |

**Figure 8: Capacity Calculations**

As the capacity calculated for 110% of the Sites largest tank is greater than the capacity calculated for 25% of the Sites tanks, the volume derived from the 110% rule will be used going forward.

## *3.2 110% Bund Capacity*

CIRIA C736 states that the additional 10% margin should be added to 100% of the largest tank capacity to cover a range of factors which include:

- Overtopping of the bund related to the surge of liquid caused by catastrophic failure of the sites largest tank,
- Overtopping caused by wind-induced wave action following failure of the sites largest tank,
- Overtopping caused by a rain event either directly before, during or after a failure of the sites largest tank,
- Overtopping related overfilling of the sites largest tank, combined with a catastrophic failure of the tank,
- An allowance for firefighting agents, including a foam blanket on the surface or firefighting water, in addition to liquid contained within the bund caused by a catastrophic failure.

Calculations were completed to determine the appropriate bund wall height required for the containment of the sites largest tank.

The bunded area has been calculated at approximately **6,027m²**.

The footprint of the equipment contained within the bund (that will displace liquid) has been calculated at approximately **2,291m²**. Calculated based on the dimensions of the following equipment:

- Both digester tanks,
- Hybrid tank,
- Pre-storage tanks,

- Heat supply containers,
- Container housing the pump block and control systems,
- Emergency flare,
- Rough desulphurisation unit.

Also, a precautionary 5% has been added to account for any additional equipment contained within the bund which may displace liquid caused by a catastrophic failure of the largest tank. The final footprint of equipment within the bunded area is therefore **2,406m²**. The remaining internal area of the bund is **3,621m²**. However, if the largest tank was to rupture, then liquid would partially remain within the ruptured tank, and thus the total area within the bund that could be flooded in this event is **4,282m²**.

The largest tanks located at the site are the Digester and Hybrid tanks all with a diameter of **28.41m**, standing at a height of **8.80m**. The gross volume of the tanks is approximately **5,577m³** with a maximum fill volume of **5,039m³** (8.05m level height inside the tanks). The additional 10% buffer, as discussed within the CIRIA C736 guidance raises the required containment volume to **5,543m³**.

The site includes a drainage fall and this has been calculated as an additional volume capacity to the main bunded area. The volume contained within the drainage fall area is **426m³** and this can be subtracted from the total capacity required. This reduces the required capacity of the bund to **5,117m³**.


**Figure 9: Drainage Fall**

Taking into account the area of the bund, equipment thought to be capable of displacing liquid in a catastrophic failure and the required containment capacity of the bund, the required bund height has been calculated at approximately **1.19m**.

## *3.3 Assessing 110% Containment Rule Capacity Adequacy*

The method of assessing the containment capacity is based on the principle that the containment should be capable of retaining:

- The total volume of inventory that could be released during a credible incident,
- The maximum rainfall that would be likely to accumulate within the containment before, during and/or after an incident, and
- Firefighting agents (water and/or foam), including cooling water.

The CIRIA C736 guidance requires that additional assessment is undertaken to ensure that providing secondary containment in accordance with the 110% capacity rule is sufficient, once rainfall, fire-fighting agents and dynamic effects are taken into account.

As before the drainage fall volume capacity can be accounted for thus the required containment capacity to retain 100% of the largest tank is **5,039m³**. **426m³** will be contained within the drainage fall, reducing the required capacity of the main bund area to **4,613m³**. Taking into account the

structures within the bund as before, the bund wall height requirements have therefore been calculated at **1.08m**.

However, additional containment is required to take account of rainfall, firefighting agents and freeboard for dynamic effects.

### 3.3.1 Rainfall

It is possible that a rainfall event occurs either, immediately before a catastrophic failure, during or directly after. To ensure the 110% containment calculations are suitable for the site this will be compared to an allowance for the total volume of accumulated rainfall in response to a 10 per cent Annual Exceedance Probability (AEP) event, in addition to the volume of the sites largest tank.

The rainfall allowance for the site has been calculated based upon:

- a 24-hour period preceding an incident, and,
- an eight-day period following an incident.

The depth-duration-frequency rainfall model from the Flood Estimation Handbook (FEH) will be utilised as it provides location specific rainfall totals for given durations and return periods.

- For a 24-hour flood event the total has been calculated as **61mm**, and,
- For an 8-day rainfall event the total is **119mm**,
- This totals **180mm** of rainfall.

The total volume of rainfall within the bunded area is thus **1,083m$^3$** in this event.

### 3.3.2 Firefighting Water and Firefighting Agents

In a fire event firefighting water or firefighting agents may be used to tackle a fire related to equipment located within the bund. As a result, fire water and firefighting agents may partially fill the bund, leaving reduced capacity for liquid spill due to a catastrophic failure.

CIRIA C736 recommends a freeboard of no less than **100mm** should be added in addition to the containment provided for the sites largest tank. It is also recommended that the local fire authority is consulted to determine:

- Whether fire water can be recycled, reducing build-up of liquid within the bund, and
- The volume of fire water that may be required to extinguish the fire on site.

However, due to the low risk of fire related to the activities to be undertaken within the site's bund, the recommended freeboard will not be added.

### 3.3.3 Freeboard in Bunds and Dynamic Effects

In addition, the surge effects of the catastrophic failure of the primary storage vessel should be considered, either through the design of the containment, or provision of a suitable freeboard allowance. The CIRIA C736 guidance suggests adding an additional allowance of **250mm** for 'in situ reinforced concrete and blockwork bunds'.

### 3.3.4 Assessing Containment Capacity Summary

The 110% containment capacity will now be compared to the capacity required for a 100% capacity tank failure, 1 in 10-year rainfall event, firefighting allowance and an additional freeboard to ensure it is sufficient for a worst-case event.

The below table summarises the calculations, assuming that liquid remains within the largest tank:

| | Volume ($m^3$) | Bund wall height (m) |
|---|---|---|
| 100% tank capacity required | 5,039 | 1.18 |
| Drainage fall capacity | 426 | 0.10 |
| Containment requirement (allowing for capacity of drainage fall) | 4,613 | 1.08 |
| Rainfall event allowance | 1,083 | 0.25 |
| Firefighting allowance | NA | NA |
| Freeboard | 1,070 | 0.25 |
| **Total** | **6,766** | **1.58** |

**Table 4: Containment Capacity Assessment**

The containment capacity assessment finds that a higher wall is required than if using the 110% capacity rule, once detailed rainfall analysis and freeboard has been factored in. The 110% capacity equates to a wall height of **1.19m**. However, to allow sufficient capacity for the worst-case rainfall events assessed and the height of freeboard to protect against dynamic effects, a bund wall height of **1.58m** is required to ensure adequate capacity. The bund wall height from the lowest point of the bund (including the bund height + the additional height of the drainage fall) totals 1.96m.

# 4 Bund Design Considerations

## *4.1 General Arrangement*

The shape of a bund should be kept as simple as possible, taking operability requirements into consideration. Complicated footprint shapes are more likely to fail due to the increased complexity of the structure.

The bund shape has been kept as simple as possible whilst allowing for traffic flow around the outside of the bund and supplying adequate space within the bund for plant, equipment and service areas.

The bund is mostly square apart from the eastern wall which has an added area housing the pre-storage tanks. The eastern wall is chamfered providing a larger turning area for site vehicles, whilst also allowing for easy use of the floodgate which is located on the chamfer.

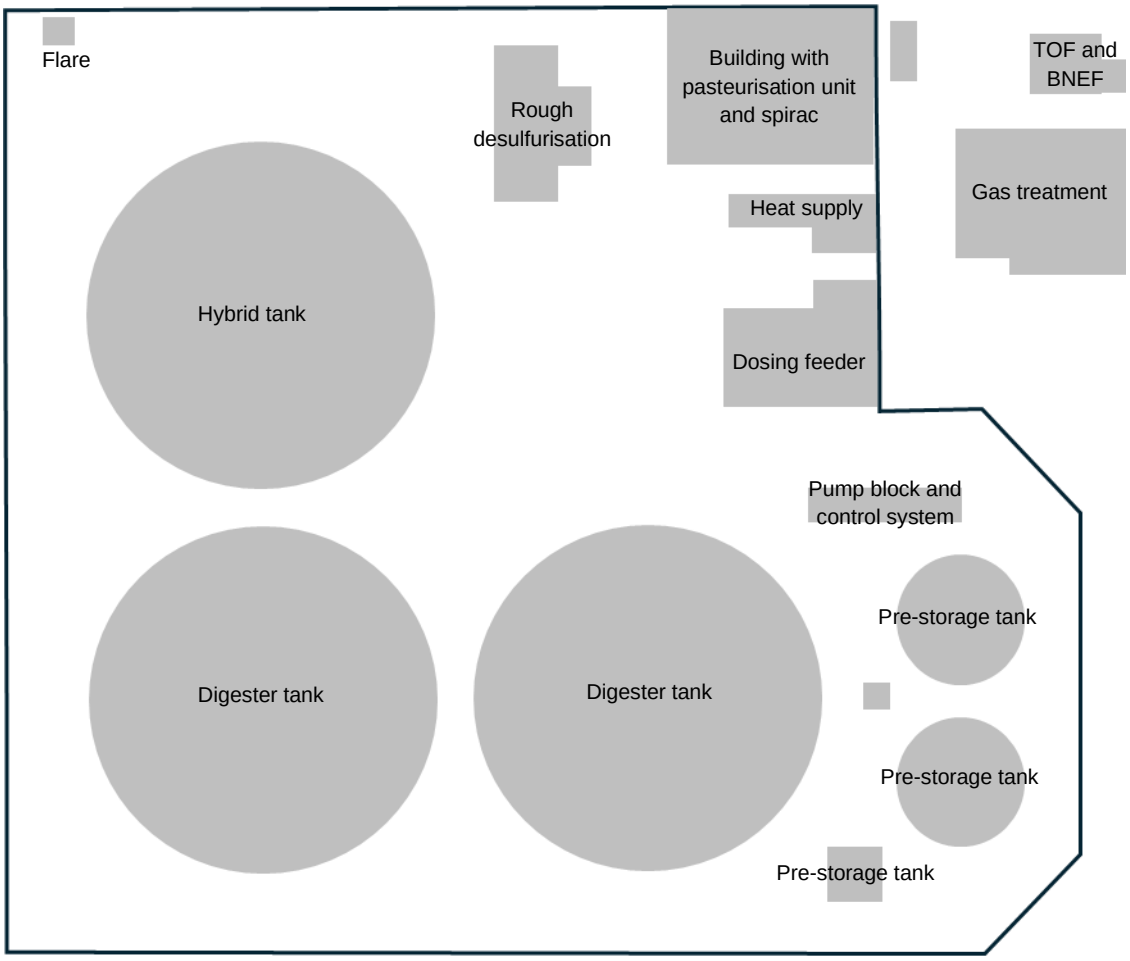



**Figure 10: Site Layout**

### 4.1.1 Height of bund wall

The bund wall height has been conservatively calculated at a height of **1.58m,** to ensure compliance with the capacity requirements of the CIRIA C736 guidance.

CIRIA C736 states that bund walls should not generally exceed **1.50m**, this is to ensure that:

- Visual inspections of the bund wall and floor can be easily undertaken,
- Firefighting operations can be undertaken over the bund wall,
- There is natural ventilation, avoiding the bund being considered a confined space,
- In an emergency situation operatives can evacuate the bund.

Although the proposed wall height is in excess of 1.50m, lowering the wall would provide reduced containment in a catastrophic spill incident and increase the likelihood of overspill from the bund. The containment assessment calculations will therefore be used to determine the bund height.

Emergency evacuation equipment will be installed within the bund, as required, to ensure the height of the bund is not unsafe for site operatives. There is a staircase which will be located along the northern wall of the bund, adjacent to the pasteurisation building.

### 4.1.2 Proximity to primary Storage

CIRIA C736 suggests that the distance between the bund wall and primary containment should be maximised to reduce the impact of a surge or jetting event. The following equation has been used to calculate the distance of the bund to the primary storage required to contain a jetting event at the site:

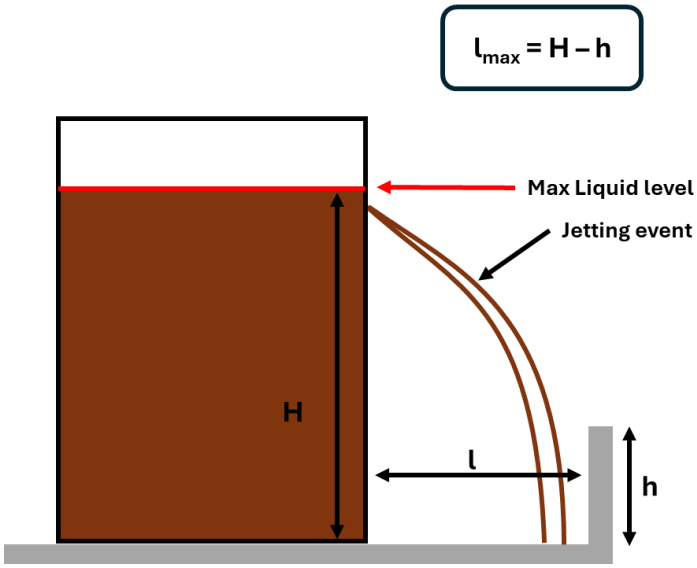



**Figure 11: Jetting Event Equation**

Based on the maximum liquid level contained within the sites largest tank of **8.05m** and the proposed wall height of **1.58m**, the distance from the tank to the bund wall should therefore be **6.47m**. The bund wall is located approximately **6m** from the tanks along the western boundary and approximately **5m** along the southern boundary. Where the bund wall is located under the suggested distance from the tank, where jetting may occur and overspill the bund, additional jetting measures will be put in place located along the bund wall for containment.

Based upon the maximum liquid level contained within the pre-storage tanks of **6.30m** and the proposed wall height of **1.58m**, the distance from the tank to the bund wall should therefore be **4.72m**. the distance between the bund wall and the pre-storage tanks is over **4m** and so additional measures to account for jetting will also need to be installed.

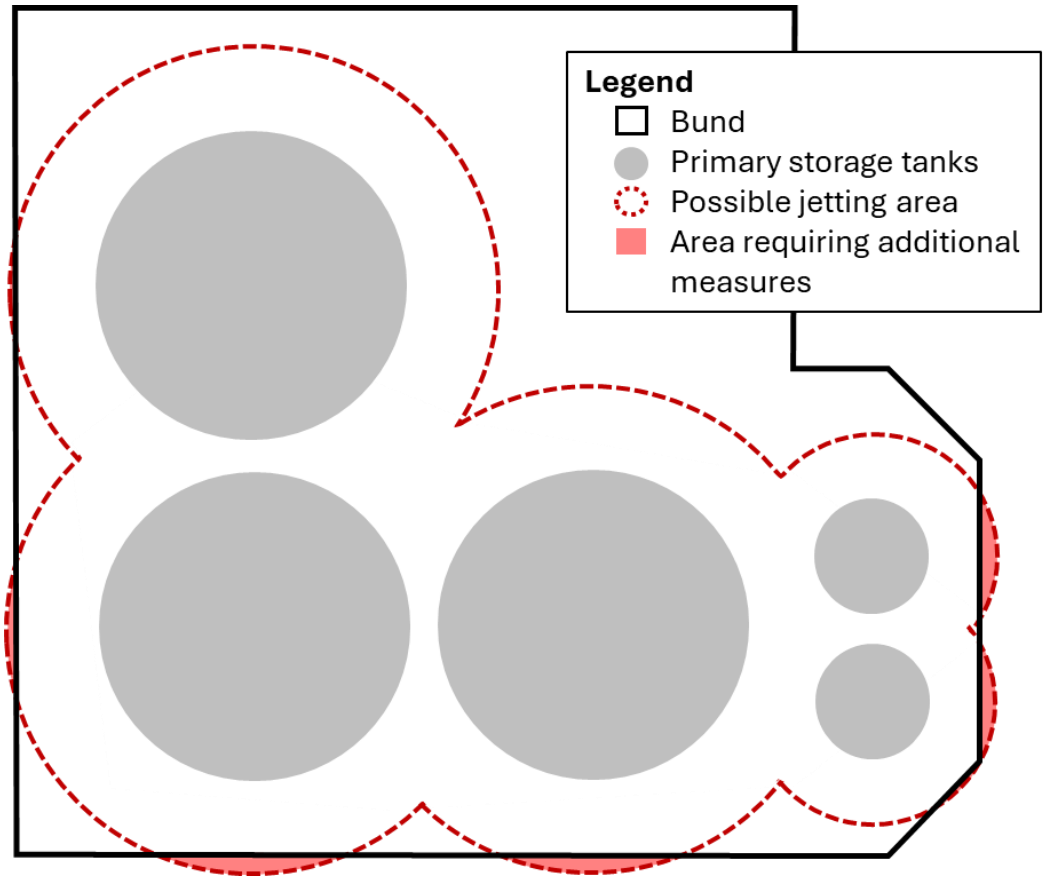



**Figure 12: Illustrative Jetting Event Extent**

## *4.2 Drainage and Leakage protection*

### 4.2.1 Drainage within bunds

The bund will be gradually sloped towards the centre, with a minimum fall of at least 1% (1 in 100) to prevent rainwater or any leakage from the tank from ponding. The drainage system utilised will be an ACO drain which will be designed into the bund base with the bund floor cast around it. A sump will be located in a central location at the low point within the bund floor, facilitating the drainage of the site. An automatic pump will be used to drain the sump, with the following hierarchy:

- Effluent will be pumped back into the buffer tanks for reuse,
- If the buffer tanks are at capacity the surface water will be pumped to the foul water sewer once it has been tested to ensure compliance,
- If a leak, spill or other incident is detected within the bund the automatic pump will be switched off. Any effluent contained within the bund will be tested and if the discharge is unsuitable for the foul water sewer it will be pumped back into the AD system for reuse or tankered off-site to a suitably permitted facility.

The pump can be operated from outside of the bund walls to ensure that in an emergency situation where a spillage is contained within the bund, site operatives are still able to drain the bund and do not have to enter the liquid contained within the bund.

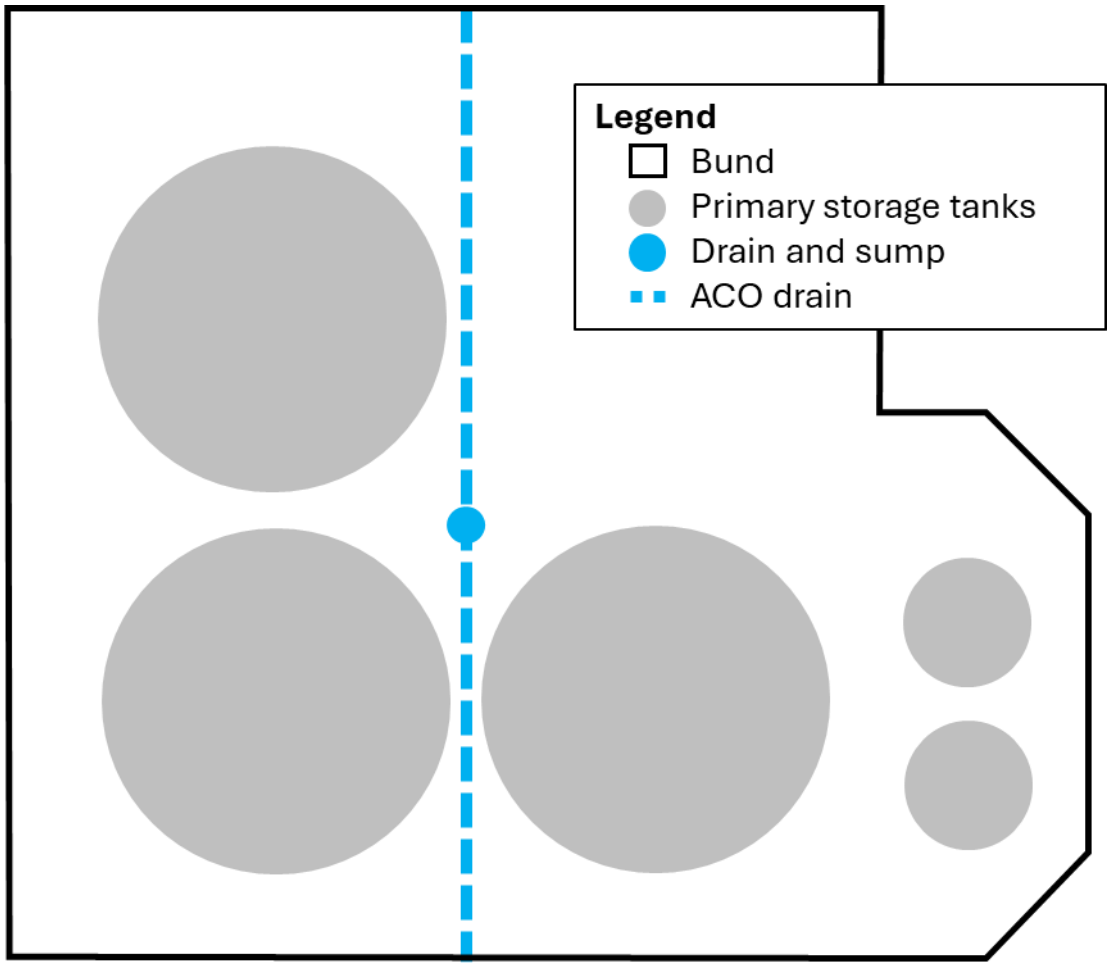



**Figure 13: Site Drainage**

#### 4.2.1.1 Leakage detection from primary containment

The tanks will be constructed atop a concrete plinth to account for drainage falls, the plinth height will be in line with the base of the shortest sections of wall, located to the east and west of the bund.

As the tanks will be located atop a concrete plinth, leaks from the primary containment will be easy to detect as they will form a visible accumulation of liquid at the base of the tank and run down the side of the concrete plinth. In the event that the tank base becomes compromised a bentonite layer will be located below the concrete tank base as a form of secondary containment.

There is no leak detection system installed at the site, however a tank base inspection will be undertaken before the tank is filled and also when the de-grit process is undertaken, approximately every 3-5 years.

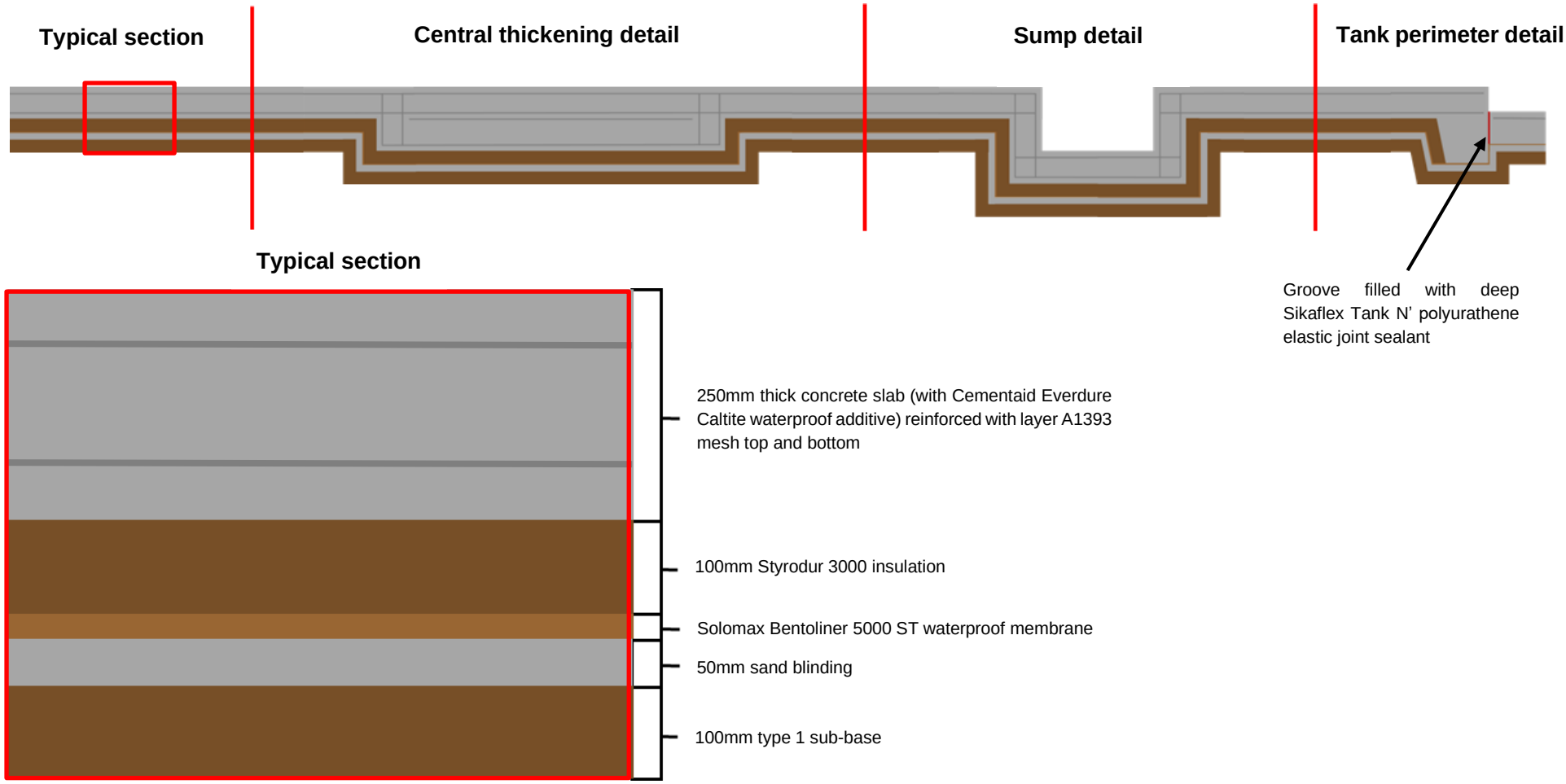



**Figure 14: Tank Base Design**

#### 4.2.1.2 Drainage from Bunds

The material contained within the bund will be inspected for signs of contamination and testing will be undertaken where required, determining the contamination levels.

If the material contained within the bund tests to be suitable for disposal at the site, it will be pumped either:

- Back into the AD system for reuse, or
- If the AD system is at capacity, it will be tested and if suitable drained to the foul water sewer in line with the sites trade effluent consent.
- If material has been tested and is confirmed to be contaminated and cannot be fed back into the AD system it will be tankered to a suitably permitted facility for disposal.

### 4.2.2 Pipework and Associated equipment

There will be no pipework, ducts or control cables piercing the wall of the bund or the base of the slab, reducing the source of potential leakage from the bund. All pipework, ducts and control cables will instead be routed over the bund wall as required.

Pipework will be routed at high level using a metal support structure mounted on its own separately poured concrete base, to ensure there are no bund penetrations.

### 4.2.3 Retention Period

Where the bund has been utilised for the containment of materials, including rainwater and material from a catastrophic tank failure. This will be drained from the site as soon as reasonably practicable, either into the site's foul sewer (if testing allows), tankered off-site to a suitably permitted facility or fed back into the system.

Material will be removed as soon as practicable as:

- There may be additional leakage from other tanks contained within the bund, causing the bund to overtop,
- The bund may have become damaged due to the aggressive or damaging materials being contained within it,
- The bund may have become damaged physically due to a catastrophic failure of the tanks,
- There may be an incident of unprecedented rainfall, which could not be accounted for in the above calculations.

### 4.2.4 Impermeability

The bund has been designed and constructed to ensure a suitable level of permeability. The tank bases, bund base slab and bund walls will be built to be water retaining.

- The tank bases will have a waterproof additive (Cermentaid Everdure Caltite) which has a 20 year guarantee,
- The joint between the slab and the tank bases will be filled with 'Sikaflex Tank N' polyurethane elastic joint sealant,

- A Solmax Bentoliner 5000 ST waterproof membrane will be installed beneath the slab by a specialist subcontractor in strict accordance with all manufacturer's instructions and details. Following installation all membranes will be integrity tested and a verification report issued.

The materials used within construction and the construction methods utilised will account for the intrinsic porosity of the materials to be contained within the tank and bund.

### 4.2.5 Testing for Leakage

To ensure water tightness the following will be undertaken:

- Stringent quality checks during construction,
- Visual inspection following completion and verification report issued prior to operation,
- Regular inspection and maintenance regime during operation.

Where seals are manufactured off-site under factory-controlled conditions in accordance with an appropriate British Standard or code of practise, leak testing can be undertaken at the place of manufacture. For example, the flood gate, which can be tested for water tightness prior to installation.

### 4.2.6 Strength

The materials utilised within the construction of the bund will be designed and built to withstand mechanical, chemical and physical events.

For concrete this includes, but is not limited to the following:

- Mechanical – Impact, overload, movement and vibration,
- Chemical – Aggressive agents, biological action, alkali-aggregate reaction,
- Physical - Freeze/thaw, thermal effects, salt crystallisation, shrinkage, erosion, wear.

For example to ensure the containment base is fit for purpose plate bearing tests will be undertaken to verify modules of subgrade reaction.

### 4.2.7 Durability

CIRIA C736 states that bunds should typically have a design life of 50 years and should be capable of withstanding the following:

| | |
|---|---|
| **Weather** | The bund will be vulnerable to the weather from multiple directions and will also be impacted by the effects of atmospheric corrosion. The materials used will be suitable for varying weather conditions to ensure the durability of the bund. |
| **Aggressive materials** | Aggressive materials may be contained within the ground. A site investigation has been undertaken to ensure that the ground conditions are suitable for the construction of the bund. Any concrete that will be in contact with possibly contaminated land will be specified in accordance with BS 8500 – 1:2006+A1:2012. |
| **Disturbance** | The bund should be resistant to a number of disturbances such as tree roots. |
| **Abrasion** | The bund may be subject to wear and tear, if required a surface treatment or finish may be utilised to prolong the life of the site surfaces. It is important the site surfaces |

| | |
|---|---|
| | are kept in good condition, as it is much harder to identify faults and issues within eroded concrete. |
| **Fire** | Although it is unlikely that a fire would break out within the bund (due to the activities being undertaken and the materials being stored within it) it is important that the bund can withstand high temperatures. |
| **Material Escape** | The bund should be specified to resist damage from the inventory stored within the primary storage vessel. The bund should be capable of containing material from the primary storage tank for a minimum of 8 days. |
| **Environmental factors** | All components of the bund should be able to withstand environmental factors to ensure durability. This includes Water stops and joint fillers which can easily perish in harsh weather etc. |

**Table 5: Durability Issues**

The bund will be constructed in accordance with BS8500-1:2023 exposure class designation is XC3/4 + XF1 - 40+δc. This ensures that the concrete mix is designed and formulated in accordance with the sites designated exposure class.

In accordance with the site investigation the concrete mix chosen for all below ground concrete will be in line with sulphate class DS-1 and ACEC class AC-1 to BS8500.

### 4.2.8 Structural Independence

According to CIRIA C736 the bund should be built so that it is independent of the primary containment and other key infrastructure, this will ensure that if there are any issues with the primary containment, that the bund is not compromised.

To ensure this the concrete of the bund will be cast independently to the concrete of the tank bases. A 10mm wide joint filler using Fosroc Hydrocell xl Polyethylene non-absorbent fillerboard will be utilised to ensure separation between the bund and tank bases. The top 10mm will then be removed and the groove filled with deep Sikaflex Tank N' polyurathene elastic joint sealant by a specialist.

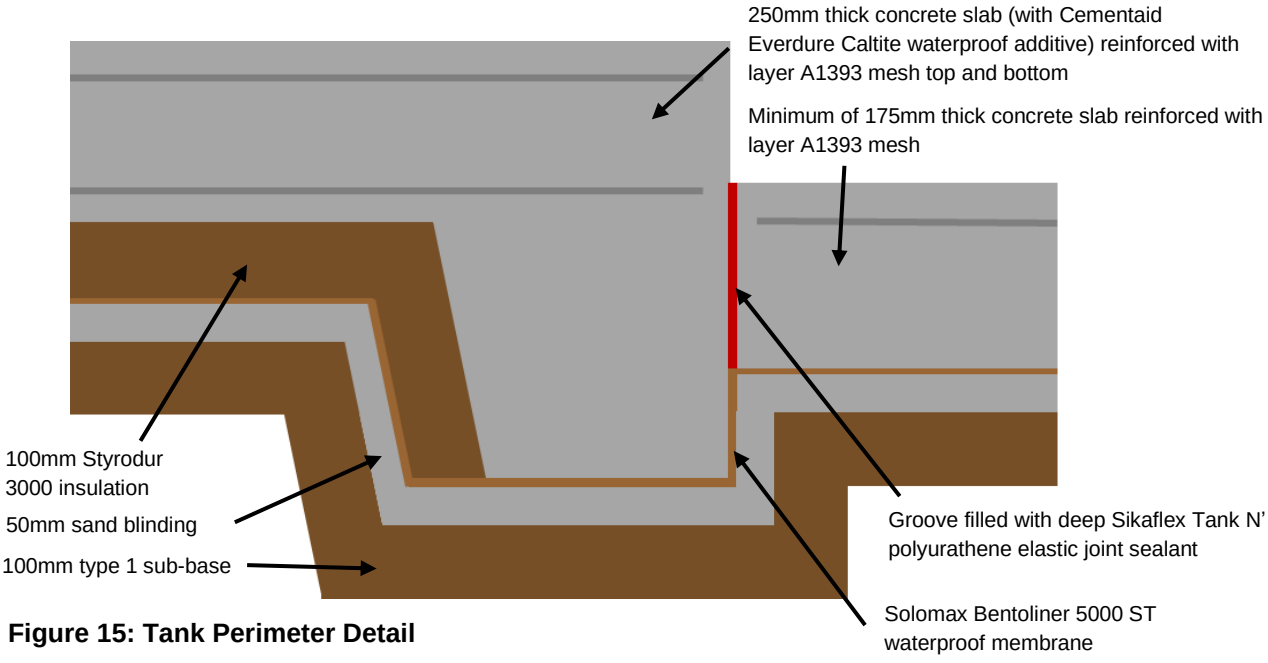



**Figure 15: Tank Perimeter Detail**

Similarly, where the bund base meets the bund wall a 10mm wide joint filler using Fosroc Hydrocell xl Polyethylene non-absorbent fillerboard will be utilised to ensure separation between the bund and tank bases. The top 10mm will then be removed and the groove filled with deep Sikaflex Tank N' polyurathene elastic joint sealant by a specialist. The construction joint where the wall base meets the main wall structure will utilise a hydrophilic strip.

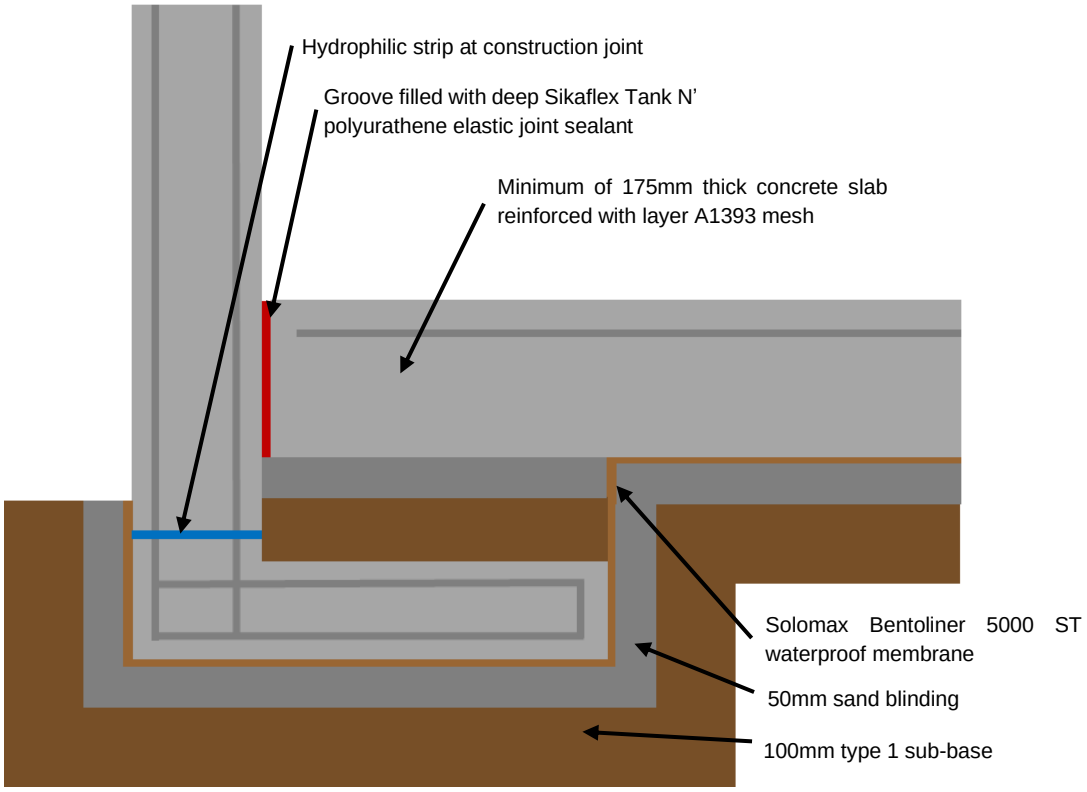



**Figure 16: Bund Perimeter Detail**

The following notes have been included within the site drawings:

- All kickers are to be formed integrally with unit of structure. Top surface of all kickers will be wire brushed to expose aggregate whilst concrete is still 'green'.
- Jointing strips are to be provided at all horizontal and vertical joints. All jointing strips to be positioned along the centre line of the walls / bases. Jointing strips to be of solid hydrophilic rubber - Servistrip AH 205 by Servicised or similar approved. Jointing strips to be positioned, applied and fixed in strict accordance with manufacturers instruction and recommendations.

#### 4.2.8.1 Accessibility

Adequate accessibility is important to ensure the following:

- Permit visual monitoring for leakage from the primary containment,
- Allow inspection of the inside face of the bund for signs of deterioration,
- Facilitate maintenance of the bund.

CIRIA C736 requires a minimum clearance distance of 0.75m from the bund wall for inspection, a buffer of at least 0.75m has been provided within the bund wall to ensure it is accessible for inspection and repair works.

As the bund is below the recommended 1.5m for accessibility, feasibly site operatives could exit the bund over the bund wall at the east and western sides of the bund. In addition, a staircase will be fitted on the northern wall of the bund near to the pasteuriser building to allow site operatives to enter and exit the bund.

# 5 In Situ Reinforced Concrete and Masonry Bunds

## *5.1 Design Approach*

The containment will be designed and build in line with BS EN 1992-3:2006.

## *5.2 Crack Control*

Non-structural cracking occurs in many structures due to:

- stresses due to applied loads,
- thermal expansion or contraction,
- shrinkage as the concrete dries, hardens and cures,
- settlement of the concrete in its wet state,
- poorly constructed daywork joints,
- differential settlement of the underlying ground,
- application of service loads before the concrete has fully cured.

The design will adhere to BS EN 1992-3:2006 tightness class 1 to limit predictable structural cracking to acceptable limits.

The following notes have been included within the site drawing pack:

- All foundations have been designed for an allowable increase in bearing pressure of a maximum of 150kn/m² after vibro-compaction ground improvement. A Building inspector will sign off the ground improvement works to ensure it has been completed satisfactorily.
- All concrete will be in accordance with the national structural concrete specification for building construction.
- Nominal cover to all reinforcement to be 50mm.
- All concrete to bases and retaining walls will be reinforced concrete, of strength C32/40 with 20mm max. Aggregate in accordance with BS8500-2 & BS EN 206-1.
- In accordance with the site investigation all concrete laid below ground will be laid in compliance with sulphate class DS-1 and ACEC class AC-1 to BS8500.
- In accordance with BS8500-1:2023 exposure class designation is XS3/4 + XF1 - 40+δc.
- The allowance for the concrete, is for a maximum crack width of 0.2mm.

## *5.3 Joint Detailing*

The number of joints will be minimised to reduce the likelihood of leakage and meet the strength requirements for containment. The joints utilised will allow for compression and expansion movement related to long-term drying shrinkage, thermal movement and exceptional movement (for example in the event of a fire). To prevent plane of movement dowels will be provided across all joints. Waterstops will be installed resistant to resistant to attack from the primary inventory.

Please see drawing reference 24854-MCL-XX-FN-GA-SE-113 for joint details of joint type and location and Drawing reference 24854-MCL-XX-FN-GA-SE-112 for bund wall joint details.

All movement joints have been specified to ensure compliance.

Jointing strips are to be provided at all horizontal and vertical joints. All jointing strips to be positioned along the centre line of the walls / bases. Jointing strips to be of solid hydrophilic rubber - Servistrip

AH 205 by Servicised or similar approved. Jointing strips to be positioned, applied and fixed in strict accordance with manufacturers instruction and recommendations.

### *5.4 Surface Protection Systems*

The bund has been designed to be water retaining and the tank bases will utilise a Cementaid Everdure Caltite waterproof additive, which provides a 20 year guarantee.

### *5.5 Concrete Production*

Ready mixed concrete will be obtained from suppliers who are registered with the Quality Scheme for Ready Mix Concrete (QSRMC), ensuring the quality of the concrete used.

Concrete will be specified in accordance with BS EN 206-1:2000 and BS 8500-1:2006+A1:2012.

All concrete used will be in accordance with the national structural concrete specification for building construction.

### *5.6 Shuttering and Formwork*

Formwork will be erected such that:

- Any joints are impervious,
- It will withstand the hydrostatic pressure of the fresh concrete,
- It forms a seal against previous concrete construction (kickers etc).

#### 5.6.1 Reinforcement Fixing

Reinforcement will be fixed accurately and securely to prevent it being displaced while the concrete is being placed and compacted. Reinforcement fixing will ensure there is no displacement which can result in serious structural weakening and/or durability problems.

The reinforcement will be layer A393 mesh top and bottom with 50mm cover to all faces.

#### 5.6.2 Slip Membrane

No Slip membrane is required as any primary containment concrete bases will be poured directly onto the Bentoliner or onto the insulation on the Bentoliner.

In general, the workmanship should follow the recommendations by Concrete Society (2009a).

# 6 Transfers

## *6.1 Trade Effluent*

The site's drainage system will run into a sump. An automatic pump will be used to drain the sump, this pipeline will have a T section with a sampling point where the material will be tested for suspended solids.

- The effluent will be pumped back into the system for reuse, or if the AD system has no capacity it will be pumped to the sites foul water sewer,

If any liquid appears to be contaminated it will be contained within the bunded area until it can be tested. Test kits will be kept on site within the site office to ensure testing can be undertaken quickly, this will include ammonia test kits which provide results instantaneously. If the material is deemed to be contaminated and cannot be reused in the AD system or discharged into the foul water sewer, it will be tankered off-site to a suitably permitted facility.

## *6.2 Gravity and Pumped Transfer Systems*

The system to be utilised within the bund is a mixture of gravity and pumped transfer. The bund will be built so that the base is a gradient of at least 1% (1 in 100) to allow all liquid to slowly drain to the centre of the site. The drained liquid will then flow into a sump system, in order for the liquid to exit the bund it must be pumped out of the sump system.

## *6.3 Tanker Offloading and Loading Facilities*

Tanker offloading will be undertaken outside of the bund wall, via a hosed connection point. The connection point will be located atop a large, grated drain, flowing to a sump. Any spillage will be collected in the sump and pumped out as required.

# Appendix 1 – ADBA Secondary Containment Tool

Although this tool works as a standalone tool, we recommend you read this first:  ADBA CIRIA736 Bund Classification Assessment

**There are 5 steps to follow:**

1) Identify the hazard posed to the environment by the inventory of materials held on the site and the location of the site
   a. Categorise the source
   b. Identify the pathways
   c. Identify the receptor

2) The Site Hazard Rating is derived by this tool from the combination of the hazards assessed above

3) Calculate the likelihood of a loss of primary containment event occurring

4) The combination of the Site Hazard Rating and the likelihood of a loss of containment occuring gives the site risk rating and required secondary containment classification

5) From the class of containment needed, identify suitable designs from the 'Standard Containment Designs' sheet


**Additional Guidance**

As detailed in section 2.4 of CIRIA C736, determining an overall hazard rating for the site is largely subjective, and assessing the combined effects is a judgement based on knowledge, experience and the degree of confidence in the information available.

Section 2.4 of CIRIA C736 states: "*where there is uncertainty about the correct categorisation of any of the individual source, pathway or receptor hazard ratings, it may be appropriate to move the overall site hazard category to the next higher rating*".

The worksheets in this spreadsheet are protected to prevent inadvertant damage to the tool.  To remove the protection, the password is CIRIA736

The table below is partially completed to show what needs to be considered and its suggested Hazard Rating. Complete this table for your site to act as a reference and then use your judgement to assign hazard ratings in the yellow boxes. The tool then combines these to calculate the overall source hazard rating.

| Material | Material | Total Enclosed Quantity | units | Storage | Flammability | Corrosive | Ecotoxicity (based on LD and quantity) | Environmental hazard rating | Justification |
|---|---|---|---|---|---|---|---|---|---|
| **Feedstock** | | | | | | | | | |
| Maize Silage | Solid | 27.40 | t/d | Pre-storage tank (gross volume 394m$^3$) | Not flammable | No | Low | L | Permitted waste types are non hazardous and the volume is not significant |
| Food waste soup | Liquid | 27.40 | t/d | Pre-storage tank (gross volume 394m$^3$) | Not flammable | No | Low | L | Permitted waste types are non hazardous and the volume is not significant |
| Straw | Solid | 13.70 | t/d | Pre-storage tank (gross volume 394m$^3$) | Not flammable | No | Low | L | Permitted waste types are non hazardous and the volume is not significant |
| Rice Fodder, Flour, Yellow | Solid | 17.81 | t/d | Pre-storage tank (gross volume 394m$^3$) | Not flammable | No | Low | L | Permitted waste types are non hazardous and the volume is not significant |
| Water | Liquid | 54.79 | t/d | Pre-storage tank (gross volume 394m$^3$) | Not flammable | No | Low | L | Permitted waste types are non hazardous and the volume is not significant |
| Water | Liquid | 57.19 | t/d | Pre-storage tank (gross volume 394m$^3$) | Not flammable | No | Low | L | Permitted waste types are non hazardous and the volume is not significant |
| Overall feedstock rating | | | | | | | | L | Any material with a "High" rating means the overall rating is High |
| **Process** | | | | | | | | | |
| Feedstock | Liquid | 798 | m$^3$ | Pre-storage tank x2 | Not flammable | No | Low | L | Permitted waste types are non hazardous |
| Digesting Sludge | Liquid | 11,154 | m$^3$ | Digester tanks x2 | Not flammable | No | Low | L | Permitted waste types are non hazardous |
| Digested Sludge | Liquid | 5,577 | m$^3$ | Hybrid tank | Not flammable | No | Low | L | Permitted waste types are non hazardous |
| Overall process rating | | | | | | | | L | |
| **Additives and site chemicals** | | | | | | | | | |
| Overall additives and chemicals rating | | | | | | | | | |
| **Fire fighting agents and cooling water spillages** | | | | | | | | | |
| Fire fighting agents harmful in their own right or contaminated by inventory | Liquid | >25 | m$^3$ | NA | Not flammable | No | Low | L | Not considered an environmental risk due to the amounts of flammable liquids stored on site therefore an insignificant amount of fire fighting water/foam would be required. |
| Fire fighting and colling water contaminated by inventory | Liquid | >25 | m$^3$ | NA | Not flammable | No | Low | L | Not considered an environmental risk due to the amounts of flammable liquids stored on site therefore an insignificant amount of fire fighting water/foam would be required. |
| Spillages fire fighting agents and cooling water spillages rating | | | | | | | | L | All the hazards are "Low" threfore the overall rating is low |

| Risk quantification | | |
|---|---|---|
| Material | Volume (m3) | Environmental |
| Wet Sludge | 0-99 | Low |
| | 100-999 | Medium |

**Sources Overall Hazard Rating** L

H
M
L

The table shows what needs to be considered and its suggested Hazard Rating. Complete this table for your site to act as a reference and then use your judgement to assign hazard ratings in the yellow boxes. The tool then combines these to calculate the overall pathway hazard rating.

Postcode

| Pathway - the route from primary containment to receptor | Environmental hazard rating | Notes | Source | Link | Image |
|---|---|---|---|---|---|
| **Site layout and drainage** | | | | | |
| If any of the site inventory has a runoff time of a few minutes… | L | It is assumed that if there were a spill event on site, material would be contained either within the sites secondary containment, or within the wider Eco site (tertiary containment). | | | |
| If any of the site inventory has a runoff time of a few hours…. | L | | | | |
| If any of the site inventory has a runoff time of a few days… | L | | | | |
| If any of the site inventory has a runoff time of a few weeks… | L | | | | |
| Path and mitigation overall rating | L | | | | |
| **Topography, geology and hydrology** | | | | | |
| Made ground (artificial ground) | M | A concrete pad will be laid as part of the construction of the AD sit and containment system. The site will be built to specifcaion, fit for purpose. | | | |
| Superficial deposits | M | River Terrace Deposits - Sand and Gravel<br>In an area with a secondary A aquifer designation | BGS Geoviewer<br>Magic Maps | GeoIndex - British Geological Survey (bgs.ac.uk) |  |
| Bedrock | M | Branksome Sand Formation - Sand<br>In an area with a secondary A aquifer designation | BGS Geoviewer<br>Magic Maps | |  |
| Drainage | M | Site drainage system drains to the foul sewer or a drainage ditch to the north of the site. Within the secondary containement, the typography of the site will be generally flat, with a slight decrease in gradient towards the site drainage system. Tertiary containment will be provided through the wider site which is made up of hardstanding and drains to the sites lagoons. | | GeoIndex - British Geological Survey (bgs.ac.uk) | |
| Path and mitigation overall rating | L | | | | |
| **Mitigation - do these apply?** | | | | | |
| Secondary containment | M | Containment to be proposed as per this assessment | | | |
| Tertiary containment | M | Containment to be proposed as per this assessment | | | |
| Path and mitigation overall rating | M | | | | |
| **Climatic conditions** | | | | | |
| 24 hour 1 in 10 year rainfall event | L | 59.01mm | FEH22 rainfall data | | |
| 8 Day (192 hours) 1 in 10 year rainfall event | L | 118.74mm | FEH22 rainfall data | | |
| 10 days (240 hours) 1 in 10 year rainfall event | L | 134.04mm | FEH22 rainfall data | | |
| Geographical runoff potential | L | Low overland flows, unless ground is excessively dry or saturated | BGS Geoviewer | GeoIndex - British Geological Survey (bgs.ac.uk) |  |
| Path and mitigation overall rating | L | | | | |
| **Fire Fighting Water** | | | | | |
| Inflammable materials normally present on site in large quantities | L | Very small amounts of flammable material will be stored on site | | | |
| Path and mitigation overall rating | L | | | | |
| **Location** | | | | | |
| Flooding | M | Medium Risk of Surface water flooding ( between 1 and 3.3% per year).<br>Very low risk of flooding from river and the sea. | GOV.uk | Your long term flood risk assessment - Check your long term flood risk - GOV.UK (check-long-term-flood-risk.service.gov.uk) | |
| Path and mitigation overall rating | M | | | | |

M

The table shows what needs to be considered and its suggested Hazard Rating. Complete this table for your site to act as a reference and then use your judgement to assign hazard ratings in the yellow boxes. The tool then combines these to calculate the overall receptors hazard rating.

Postcode

| Receptors | Within | units | direction | Environmental hazard rating | Notes | Source | Link | Image |
|---|---|---|---|---|---|---|---|---|
| **Watercourses and bodies** | | | | | | | | |
| Drainage ditches | 25 | m | north | H | A number of drainage ditches run around the wider ECO site, this includes a drain to the north of the proposed AD site. The ditch travels south along an access road to the north of the site before joining the Moors River system. | magic maps | Magic Map Application (defra.gov.uk) | |
| Artificial ponds | 200 | m | north-east | L | NA | | | |
| Moors river | 600 | m | north-east | H | The Moors River joins the River Stour at Blackwater, later draining into Christchurch Harbour alongside the Hampshire Avon. The Moors River system SSSI is approximately 600m to the north-east of the site. The Moors water body is located within the Stour Dorset operational Catchment, located within the Dorset Management Catchment. | Catchement data explorer | England \| Catchment Data Explorer | |
| Abstraction<br>SZ09/41<br>SU00/41<br>SZ19/18 | <br>1250<br>2000<br>2500 | m | <br>South-west<br>North-west<br>South-west | M | There are a number of water wells located within 3km of the site. | BGS Geoviewer | GeoIndex - British Geological Survey (bgs.ac.uk) | |
| Overall rating | | | | M | | | | |
| **Habitation** | | | | | | | | |
| Dwelling | 250 | m | west | M | The closest dwelling is whitmere house, located just outside the wider ECO sustainable solutions site. It is not thought that the activities undertaken at the site will impact the operatives any more than the existing site activities. | Google earth (2024) | | |
| Workplace - ECO sustainable solutions | 0 | m | east, south, west | L | The Parley Ad site is located within the wider ECO sustainable solutions site. There will be a number of site operatives working in the areas surrounding the site, however it is not thought that the activities undertaken at the site will impact the operatives any more than the existing site activities. | Google earth (2024) | | |
| Workplace - The fencing centre | 250 | m | east | M | A fencing business is located adjacent to the wider site entrance, it is not thought that the activities undertaken at the site will impact nearby human receptors any more than the existing site activities. | Google earth (2024) | | |
| Sports pitches | 600 | m | south-west | L | There are a number of pitches located to the south-west of the site, utilised by Bournemouth University. It is not thought that the activities undertaken at the site will impact nearby human receptors any more than the existing site activities. | Google earth (2024) | | |
| Bouremouth airport | 500 | m | south-east | L | Bournemouth airport is located to the south of the site. It is not thought that the activities undertaken at the site will impact nearby human receptors any more than the existing site activities. | Google earth (2024) | | |
| Overall rating | | | | M | | | | |
| **Other** | | | | | | | | |
| SSSI | 200 | m | Hurn Common: south-east of the site<br>Parley Common: south-west of the site and 650m to the west<br>Moors River System: 600m to the north-east<br>St Leonard and St Ives Heaths: 1,500m to the north-east | H | There are a number of sensitive designations located near to the site. | magic maps | Magic Map Application (defra.gov.uk) | |
| SPA | 200 | m | Dorset Heathlands:<br>Parcel to the south-east of the site,<br>Parcel to the south-west of the site,<br>Parcel 650m to the west,<br>Parcel 1,500m to the north-east | H | | magic maps | Magic Map Application (defra.gov.uk) | |
| SAC | 200 | m | Dorset Heaths:<br>Parcel to the south-east of the site,<br>Parcel to the south-west of the site,<br>Parcel 650m to the west,<br>Parcel 1,500m to the north-east | H | | magic maps | Magic Map Application (defra.gov.uk) | |
| Ramsar | 200 | m | Dorset Heathlands:<br>Parcel to the south-west of the site,<br>Parcel 650m to the west | H | | magic maps | Magic Map Application (defra.gov.uk) | |
| Overall rating | | | | H | | | | |

H

In terms of likelihood of a loss of containment, CIRIA 736 provides these guidelines on quantifying the likelihood...

| Risk of loss of containment | Annual probability of loss of containment |
|---|---|
| High | Greater than 1% (1 in 100) |
| Medium | Between 1% (1 in 100) an 0.0001% (1 in 1 million) |
| Low | Less than 0.0001% (1 in a million) |

**Rational for the assessment of likelihood**

Identification of risks is based on the individual sources of potentially polluting material (sludge tanks, etc.) and on the general site risk identified in the CIRIA guidance
Assessment of the unmitigated risk of emissions from each source is based on the potential for failure of any containment measures provided.
This considers the primary, secondary and tertiary containment associate with each source and the potential breach of these containment measures.
The likelihood of failure is quantified, based on the guidelines provided in CIRIA 736 and United Utilities experience of containment failures on their sites.
Basing the quantification of containment failure on United Utilities experience on their own sites therefore accounts for the United Utiltiies design specification, makin The identification of the likelihood of the loss of containment ad subsequent release of contaminants
The mitigation applied to the risks considers the operational and maintenance procedures, including regular inspecting and testing of containment measures.
Based on the regular inspecting and testing of containment measures it is considered that the potential for catastrophic failures would be identified prior to failure and either decommissioned and replaced (for example tanks) or repairs (e.g. pipelines)

To derive the likelihood for your site, firstly, using the completed risk descriptions and any additional risks identified at your site ask yourself how often will the risk occur and cause a loss of ***primary*** containment.

Secondly, consider any mitigation (see the examples provided in the table starting below row 50 for guidance) and apply the reduced likelihood.

Finally, select the likelihood by applying the fact that the highest likelihood gives the site's overall likelihood.

| Risk | Description of Risk | UNMITIGATED LIKELIHOOD | Mitigation applied | MITIGATED LIKELIHOOD | Medium | Site Overall Likelihood |
|---|---|---|---|---|---|---|
| 1 | Operational failures, such as failure of plant, or human failure by operators | M | Procedures are in place on operation (SOPs) and control of the site assets. Operator training is undertaken to ensure competence to operate equipment. A scheduled maintenance plan is in operation to allocate the correct resource for both preventative and reactive jobs. Contingency measures are in place should a failure occur on site. | M | | |
| 2 | Shortfalls in design – lack of alarms and fail-safe devices | M | SCADA systems are in place for the Anaerobic processes in order to monitor and control operations including remote alarms raised to the central Incident Control Centre out of hours. The maximum storage capacity of the tanks is adequate for the process flow and sludge storage tanks are fitted with level detectors. The Digesters are provided with overfill protection, including hydrostatic level and foam radar sensors. | L | | |
| 3 | Structural failure – materials, components, detailing, corrosion or when exposed to heat and flame | M | Structures will be built to British Standards with contractors that work under ISO9000. All kit will be built to the deisgn specification by a suitably qualified engineer. Kit will be monitored regularly and kept well maintained by site operatives. The sites design will be reviewed against the relevent guidance before construction is undertaken. | L | | |
| 4 | Abuse – inappropriate change of use or other misuse | M | All site operatives have recieved an appropriate level of training before they undertake operation of the plant. SOPs will be availble for all site operatives. Change Management procedures are in place which are initiated should a process change be required, any changes to site processes and procedures will require appropriate sign off by the site manager. | L | | |
| 5 | Impact, e.g. from a vehicle | M | Vehicle movements are controlled by access via the site security. Vehicle routes are adequately signed and new site attendees are briefed. Tanks are contained within the site bund, if required bollards will be installed to protect the bund walls and any kit located outside it. | L | | |
| 6 | Vandalism, terrorism, force majeure etc. | L | Site is surrounded by security fencing to prevent intruders and is regularly inspected and recorded as per the daily site checks. Access to site is controlled. The site has CCTV systems and related signage to deter vandals. Kit will be locked where possible. | L | | |
| 7 | Fire or explosion | L | DSEAR assessment and zoning undertaken for permitted area. Signage present and permit access is required for contractor/maintenance work. Monitoring of the Anaerobic Digestion process is routinely undertaken so as to detect any changes in the gas composition which may lead to an explosion risk. Risk is managed by the removal of ignition sources and appropriate purging, isolation procedures and staff training is put in place. Firefighting systems and an Emergency Response procedure are in place. | L | | |
| 8 | Geological factors -subsidence etc. | M | Site investigations were undertaken prior to assets constructed therefore identifying the subsurface composition. All site investigations have been provided to the civils contractor. | L | | |
| 9 | Ageing or deteriorating assets/sub-components. | M | When constructed all assets have an expected lifespan which is monitored over the course of their use. Asset management plans include provision to replace kit at the end of life. Moniotring is undertaken regularly to identify any faulty or deteriorating kit and replacements are made as required. | L | | |
| 10 | Lightning strike | M | Site kit is fitted with lightning protection as required. Monitoring is undertaken regularly to ensure lightning protection equipment is kept well maintained and is in good working order. | L | | |
| 11 | Flooding | L | Site ensure that surface water drains are adequately maintained and periodically cleaned out to maximise through flow. Site Flood & Spill plan to be regularly reviewed and followed should a flood event occur. | L | | |

The table below is filled in based on your inputs in the "Site Hazard Rating" worksheet and "Likelihood" worksheet. The tool then combines these to calculate the overall site hazard rating and the consequent class of secondary containment required.

| Activity | Site Hazard Rating | Likelihood | Overall Site Risk Rating | Indicated Class of Secondary Containment Required |
|---|---|---|---|---|
| Site - overall summary score | Medium | Medium | **Medium** | **Class 2** |

# Appendix 2 – Bund Wall Height Calculation Summary

| Summary Table | Wall height (m) | | Volume ($m^3$) |
|---|---|---|---|
| | Without drainage fall | With drainage fall | |
| 100% of largest tank | 1.18 | 1.08 | 5039.00 |
| 110% of largest tank | 1.29 | 1.19 | 5542.90 |
| 25% of all tanks | 0.94 | 0.84 | 4032.50 |
| 100% + rainfall +firefighting +freeboard | 1.68 | 1.58 | 6766.31 |

| 100% of the largest tank | | Unit |
|---|---|---|
| 100% tank capacity | 5039.00 | $m^3$ |
| 100% tank capacity bund wall height | 1.18 | m |
| Drainage fall capacity | 426.00 | $m^3$ |
| 100% tank capacity - drainage fall capacity | 4613.00 | $m^3$ |
| Bund wall height | 1.08 | m |

| 110% of the largest tank | | Unit |
|---|---|---|
| 110% tank capacity | 5542.90 | $m^3$ |
| 110% tank capacity bund wall height | 1.29 | m |
| Drainage fall capacity | 426.00 | $m^3$ |
| 110% tank capacity - drainage fall capacity | 5116.90 | $m^3$ |
| Bund wall height | 1.19 | m |

| 25% of all tanks | | Unit |
|---|---|---|
| 100% of all tank capacities | 16130.00 | $m^3$ |
| 25% of all tank capacities | 4032.50 | $m^3$ |
| 25% of all tank capacities bund wall height | 0.94 | m |
| Drainage fall capacity | 426.00 | $m^3$ |
| 25% of all tank capacities - drainage fall capacity | 3606.50 | $m^3$ |
| Bund wall height | 0.84 | m |

| 100% + rainfall + firefighting + freeboard | Wall height (m) | Volume ($m^3$) |
|---|---|---|
| 100% tank capacity | 1.18 | 5039.00 |
| Drainage fall capacity | 0.10 | 426.00 |
| 100% tank capacity - drainage fall capacity | 1.08 | 4613.00 |
| Rainfall allowance | 0.25 | 1082.81 |
| Firefighting allowance | 0.00 | 0.00 |
| Freeboard and dynamic effects allowance | 0.25 | 1070.50 |
| Final bund wall allowance | 1.58 | 6766.31 |

# Appendix 3 – Containment Area Calculation Summary

| Containment area calculations ($m^2$) | |
|---|---|
| Bunded area | 6027.00 |
| Equipment total area | 2291.44 |
| Equipment total area + 5% | 2406.01 |
| Remaining internal containment area | 3620.99 |
| Remaining internal containment area + largest tank | 4281.99 |

| Bunded equipment | Code | Area ($m^2$) | Volume ($m^3$) |
|---|---|---|---|
| Bunded area | NA | 6027.00 | NA |
| Digester tank | BF01 | 661.00 | 5039.00 |
| Digester tank | BF02 | 661.00 | 5039.00 |
| Hybrid tank | BE01 | 661.00 | 5039.00 |
| Dosing feeder | BD01 | NA | NA |
| Pre-storage tank | BV01 | 88.00 | 469.00 |
| Pre-storage tank | BV02 | 88.00 | 469.00 |
| Pre-storage tank | BV04 | 13.00 | 75.00 |
| Building with pasteurising unit | BY01 | NA | NA |
| Heat supply container | M005 | 31.00 | NA |
| Heat supply container | M006 | 15.00 | NA |
| Pump block and control system | BP01 | 31.00 | NA |
| Condensate shaft | BK01 | NA | NA |
| Emergency flare | A001 | 1.44 | NA |
| Rough desulfurization container | 3 | 31.00 | NA |
| Rough desulfurization column | 3 | 10.00 | NA |
| Macerator and pre-mix with housing | 4 | NA | NA |