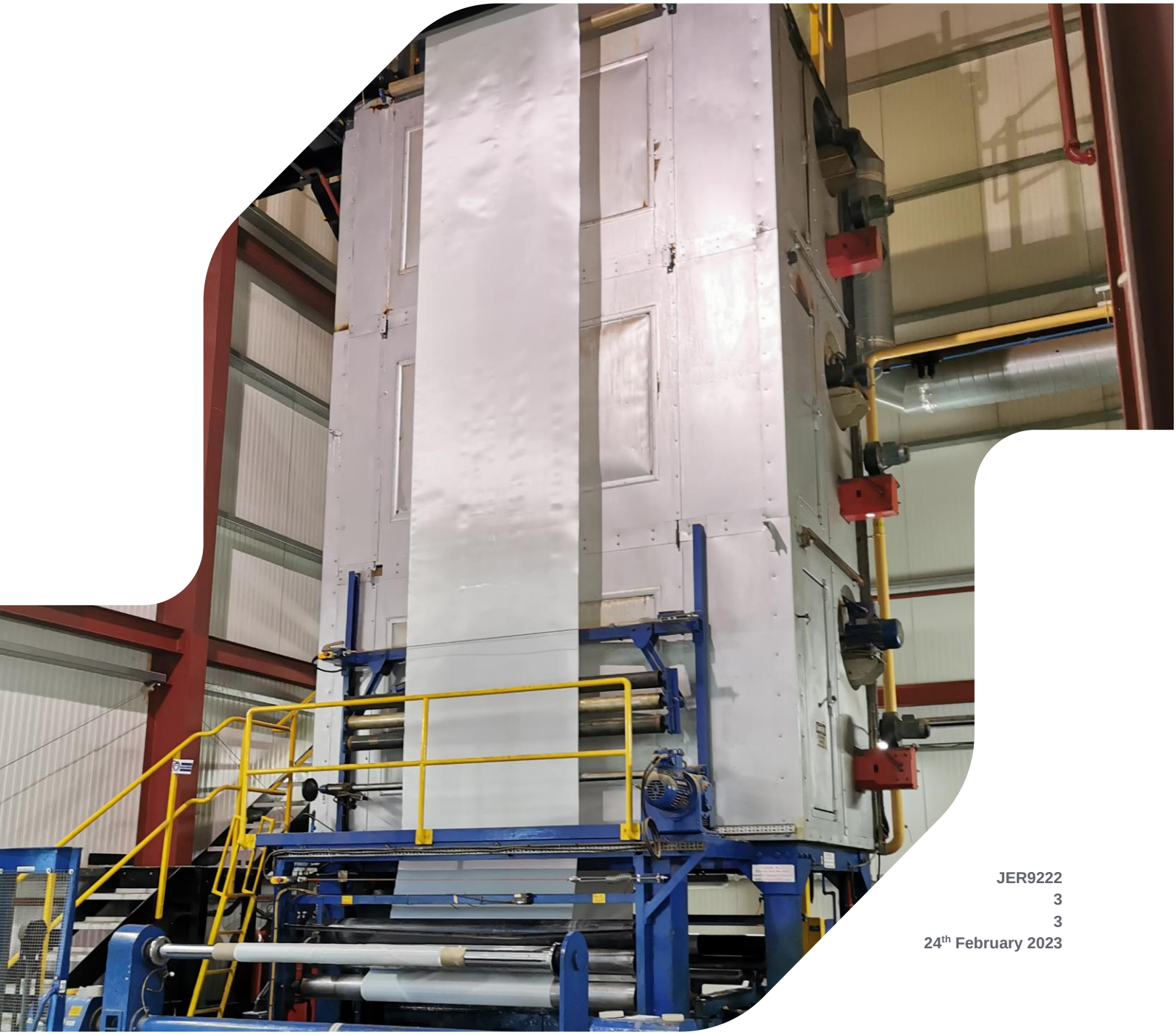
APPLICATION FOR AN ENVIRONMENTAL PERMIT

Application Supporting Information

Permali Gloucester Limited



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NON-TECHNICAL SUMMARY

Permali Gloucester Limited (PGL) produces composites, mouldings, sandwich panel systems, fibre reinforced plastic (FRP) composite laminates and thermoplastic polyurethane films, chiefly for the defence and aerospace industries. Consolidation of several separate operations onto the Gloucester site means that consumption of materials will now exceed the thresholds for which an Environmental Permit will be required from the local authority under the Environmental Permitting (England & Wales) Regulations 2016 (the EP Regs).

The site is located on Bristol Road in the West of Gloucester to the South of Gloucester Docks. To the North and South of the site is mixed industrial / commercial property. Immediately to the West is the Gloucester and Sharpness Canal and, beyond that, residential developments. To the East is an area of dense housing.

There are two activities carried out on site which are prescribed for control, namely the impregnation of textiles in a plant with a consumption capacity of more than 200 tonnes per year (Section 6.4 A(2)(a) of Schedule 1, Part 2 to the EP Regs) and the polymerisation or co-polymerisation of a resin involving more than 100 tonnes of unsaturated hydrocarbon in a year (Section 4.1 B(c) of Schedule 1, Part 2 to the EP Regs).

In addition, the associated activities of chemical storage, machining and spray coating of products are also considered in this application.

Two on-site gas-fired boilers provide heat for the activities. The boilers are classed as Medium Combustion Plant for which a separate application for a Permit has been submitted to the Environment Agency.

The processes involve the mixing of resins in dedicated mixing rooms and the subsequent impregnation with the resins of narrow tapes or braids, collectively referred to as “yarn”, or wide-web woven glass fibre textile. Subsequent stages of winding, cutting pressing and curing followed by machining and cutting to shape produce the products which are either packed for shipping or subject to a final spray-coating in proprietary booths.

The site activities have the potential to give rise to emissions to air of organic solvent, odour and particulate matter and potentially releases to ground and controlled water of hazardous chemicals through spills, leaks and accidents. There is no release of trade effluent to sewer and only surface water run-off to surface water drainage.

To control emissions, raw materials are regularly assessed for potential replacement with materials with less polluting properties. Emissions are captured as far as reasonably practicable and ducted to abatement plant, as appropriate. Abatement plant comprises a regenerative thermal oxidiser to destroy organic solvent, a wet scrubber to eliminate odour, and high-performance cartridge filters to remove particulate matter in air flows.

The site will operate under an Environmental Management System (EMS), with the stated aim of achieving accreditation to the ISO14001 standard in 2023. The EMS will incorporate the elements required by the current Best Available Techniques Reference Document (BRef), published in December 2020, including:

- Scheduled Preventative Maintenance
- Competence and Training of Staff
- Accident and Incident Management
- Energy Efficiency
- Efficient use of raw materials, including water
- Elimination and minimisation of waste.

To support this application a Site Condition Report, a Noise Impact Assessment, an Environmental Risk Assessment and an Air Quality Impact Assessment have been undertaken. The reports are included as appendices to this report.

An assessment of Best Available Techniques (BAT) compliance has been performed. The site is still under development and is not, therefore, currently fully compliant with BAT. Where BAT is not currently employed, plans are in place to achieve compliance.

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1 INTRODUCTION

1.1.1 This document and associated appendices form the application to Worcester County Council for an Environmental Permit (EP) to operate a facility for the manufacture of coating materials, and the coating of woven glass fibre and glass fibre tissue, under the Environmental Permitting Regulations 2016 (as amended)[1].

1.1.2 The application is made by Permali Gloucester Limited (PGL) which is the legal entity that will be responsible for operating the installation.

1.2 Background

1.2.1 PGL undertakes coating activities in relation the production of composite materials for the defence, automotive, aerospace and rail industries. PGL specialises in producing composites, mouldings, sandwich panel systems, fibre reinforced plastic (FRP) composite laminates and thermoplastic polyurethane films.

1.2.2 The existing Permali operation that currently operates at the Gloucester site has not previously fallen above the thresholds requiring an Environmental Permit. However, the consolidation of a number of manufacturing activities involving the transfer of production lines to the Gloucester site means that the company will now meet the thresholds requiring an Environmental Permit to operate.

1.3 The Site

1.3.1 The site is located at the following address:

Permali Gloucester Limited

Bristol Road

Gloucester

Gloucestershire

GL1 5TT

1.3.2 The centre of the site is at National Grid Reference (NGR) SO 82313 17107.

1.3.3 Site location and site layout plans can be found in Appendix B.

1.4 Sensitive Receptors

1.4.1 A 2km radius screening of designated ecological receptors has identified two local nature reserves (LNR) as follows:

- Alney Island LNR (to the north)
- Robinswood Hill LNR (to the southeast)

1.4.2 There are no identified Ramsar, Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Sites of Special Scientific Interest (SSSI) within 2km.

1.4.3 A 10km radius screening of designated ecological receptors has identified the following sites:

[1] https://www.legislation.gov.uk/uksi/2016/1154/contents/made

Local Nature Reserves

- Alney Island
- Barnwood Arboretum
- Coopers Hill, Gloucester
- Hucclecote Meadows
- Robinswood Hill
- Green Farm Orchard
- Quedgeley Arboretum
- Saintbridge Balancing Pond

National Nature Reserve

- Cotswold Commons and Beechwoods

Ramsar Sites

- Walmore Common

Sites of Special Scientific Interest

- Badgeworth SSSI
- Coombe Hill Canal SSSI
- Robin's Wood Hill Quarry SSSI
- Cotswold Commons and Beechwoods SSSI
- Edge Common SSSI
- Range Farm Fields SSSI
- Crickley Hill and Barrow Wake SSSI
- Haresfield Beacon SSSI
- Hucclecote Meadows SSSI
- Wainlode Cliff SSSI
- Innsworth Meadow SSSI
- Walmore Common SSSI
- Ashleworth Ham SSSI

Special Areas of Conservation

- Cotswold Beechwoods

Special Protection Areas

- Walmore Common

1.4.4 The closest residential properties are located on the eastern boundary of the site with the Bristol Road. There are further residential properties approximately 0.07km to the west of the site located at Mainsail Lane on the opposite side of the Gloucester and Sharpness Canal.

1.4.5 The Gloucester and Sharpness Canal runs along the western boundary of the facility.

1.4.6 The site is not situated in an air quality management area (AQMA)[2].

1.5 Surrounding Area

1.5.1 The site is located within an area of mixed use which includes residential, commercial and industrial properties. The immediate surrounding area is as follows:

- **North** – Manufacturing/commercial and industrial units
- **South** - Manufacturing/commercial and industrial units
- **East** – Residential properties on the Bristol Road. There are further residential properties across the Bristol Road located on Linden Road, Cecil Road and Granville Street
- **West –** The Gloucester and Sharpness Canal is located on the boundary of the site, across the canal there are residential properties on Quayside Way, Mainsail Lane and Canal Court.

1.6 Regulated Installation and Applicable Guidance

1.6.1 The activities to be carried out at the site fall under the requirements to be permitted as a Part A (2) installation under the Environmental Permitting (England and Wales) Regulations 2016[3] but also includes a Part B process as follows:

- *Section 4.1 Organic chemicals – Part B*
  - (c) Any activity for the polymerisation or co-polymerisation of any pre-formulated resin or pre-formulated gel coat which contains any unsaturated hydrocarbon, where the activity is likely to involve, in any 12-month period, the polymerisation or co-polymerisation of 100 or more tonnes of unsaturated hydrocarbon.
- *Section 6.4 Coating activities, printing and textile treatments – Part A2*
  - (a) Unless falling within Part A (1) of this Section, surface treating substances, objects or products using organic solvents, in particular for dressing, printing, coating, degreasing, waterproofing, sizing, painting, cleaning or impregnating, in plant with a consumption capacity of more than 150kg or more per hour than 200 tonnes per year.

1.6.2 In addition to the main activity, the following directly associated activities (DAAs) will be carried out at the site:

- pressing, machining and spray painting of products;
- surface water - discharge of clean uncontaminated site surface water from roofs, paths and roads;
- raw materials storage;
- chemical storage; and
- waste storage.

[2] https://uk-air.defra.gov.uk/aqma/maps/

[3] https://www.legislation.gov.uk/uksi/2016/1154/contents/made

1.6.3 There are two existing 1.16 MWth boilers at the site and two new 700 kWth boilers. By virtue of each new boiler being rated at less than 1 MWth input and since the aggregation rule does not apply to boilers less than 1 MWth, the new boilers fall outside the scope of the Medium Combustion Plant Directive[4] (MCPD). The existing boilers were put into operation prior to 20 December 2018. Therefore, the existing boilers will require to have a MCPD permit in place by 1 January 2029. They will be separately permitted by the Environment Agency at the appropriate time and are, therefore, not considered further in this application, other than the emissions from the boilers being considered within the air quality assessment.

1.6.4 The site operates on a three-shift system over 24 hours a day, seven days a week. The spray-booths are currently only operated Monday to Friday during one daytime shift.

1.7 Structure of the Application Document

1.7.1 This section provides an overview of the proposals. This is supplemented by further details in Sections 2 – 5 as follows:

- Section 2 details the proposed management practices which will be in place at the plant, with specific detail covering:
  - accident management;
  - energy efficiency;
  - efficient use of raw materials and water; and
  - avoidance, recovery and disposal of wastes.
- Section 3 describes the processes and addresses the operational measures which will be in place to prevent and/or control any potential environmental effects of the proposal.
- Section 4 identifies the nature of emissions from the installation.
- Section 5 summarises the conclusions from the impact assessments undertaken to predict any environmental effects from the installation.
- Section 6 summarises the outcome of the assessments of Best Available Techniques (BAT) for the key plant and abatement systems proposed.

1.7.2 Supporting documents, assessments and application forms are provided within the appendices as detailed in the contents page.

1.8 Pre-application Discussions

1.8.1 Pre-application discussions were undertaken with Worcester Regulatory Services who confirmed that the permitted activities are as above.

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193

2 MANAGEMENT OF ACTIVITIES

2.1 Environmental Management System

2.1.1 A written environmental management system (EMS) will be developed to cover the permitted activities at the site with the stated aim of Permali to achieve accreditation to ISO14001.

2.1.2 Permali's environmental policy can be found at CSR & Sustainability Policy - Permali .

2.1.3 An aspects and impacts register has been compiled. Many procedures and policies are already in place.

2.1.4 The completed EMS will include plans and procedures to minimise risks to the environment and local residents from the operations at the facility and will include an accident management plan, records, reviews, a site closure plan and policies to ensure compliance with all environmental permit conditions. A summary of key aspects of the EMS is provided below.

2.2 Operations and Maintenance

2.2.1 PGL will identify the operations and activities that are associated with significant environmental aspects at the site and will ensure that such operations and activities, including maintenance, will be carried out under specified conditions in order to reduce the significance of the identified aspects. Management systems and procedures will be developed which cover:

- preparation of the impregnating resins,
- operation of the impregnation plant,
- maintenance of equipment,
- waste handling and storage,
- spill contingency,
- start-up and shutdown.

2.2.2 Procedures will not only cover normal operation but will also address abnormal operation, including start-up and shutdown.

2.2.3 Planned maintenance routines will be established to ensure all key plant components which have the potential to affect the environmental performance of the facility remain in good working order. Maintenance procedures will be informed by manufacturers recommended inspection and maintenance regimes, good industry practice and/or other regulatory requirements.

2.2.4 Daily inspections of all plant with the potential to impact on the environment will be undertaken and recorded.

2.3 Competence and Training

2.3.1 PGL will provide operator training to ensure the facility is managed and operated by a trained workforce. Training will not only address normal operations but will also include those actions required in the event of abnormal operations and emergencies.

2.3.2 A training policy and training plans will be in place for all staff roles at the facility, these will include specific training relevant to the environmental permit and operation of the facility in accordance with documented procedures that will have been developed to minimise risk to the environment. Training records for all staff are kept demonstrating competency.

2.3.3 Job specifications will be defined and will include details on relevant qualifications and training (including where relevant on the job training) required for that role.

2.4 Accident Management

2.4.1 An Accident Management Plan (AMP) will be established for the facility. The AMP will detail those actions required in the event of an emergency or accident/incident. This will include small incidents such as minor spills and leaks and complaints, as well as major incidents such as fire and major spills. In particular, a system for recording and allocating appropriate follow-up for accidents, incidents and non-conformances will be established.

2.4.2 To support this application, an initial Environmental Risk Assessment (ERA) is provided in Appendix G, which includes an assessment of potential accident risks. This will be reviewed when establishing the AMP and maintained throughout the operational life of the installation.

2.5 Site Security

2.5.1 As a subcontractor to the MOD, security arrangements are commensurate with their requirements.

2.5.2 Access to the site is controlled via a 24-hour staffed security hut.

2.6 Energy Efficiency

2.6.1 The following section provides information on energy consumption and basic energy efficiency measures, for the site. The gas boilers have an efficiency of 96 to 98%.

Basic Energy Requirements

2.6.2 Table 2.1 below provides a breakdown of the energy requirements of the installation:

Table 2.1: Energy Consumption by Source

Energy Source	Annual Energy Consumption (MWh)	
	Delivered	Primary
Electricity	2,911	7,569[1]
Heat	4,361	4,274[2]
Other (Diesel for Emergency Generator)	127.6 [3]	127.6

1. Electricity supplied from the grid; primary energy calculated using a factor of 2.6 to convert delivered energy to primary energy.

2. Based on 4,361 MWh delivered as gas to the boilers and assuming a 98% boiler efficiency

3. Based on an expected annual consumption of 1,200 l of diesel. and using a factor of 10.63 kWh/litre from https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019

2.6.3 Basic energy saving techniques will be employed at the facility, these will include:

- Use of low energy equipment where practicable such as energy efficient lighting.
- Insulation of pipework where possible.
- Preventative maintenance schedule for relevant plant to ensure they remain efficient.

2.6.4 During the operational life of the facility, energy use will be monitored and recorded. Periodically usage will be reviewed to identify areas for improvement and ensure that any abnormal increase in energy use is investigated and appropriate action taken to resolve the issue.

2.6.5 Any areas where improvements are identified will be incorporated within the energy efficiency plan for the Site. This plan will be incorporated within the EMS to ensure that it is regularly reviewed and maintained up to date in the light of technology developments.

2.7 Efficient Use of Raw Materials

2.7.1 The main raw material requirements for the facility will be woven glass fibre, resin and solvents for coating.

2.7.2 Approximately 80 tonnes of solvent will be stored at any one time, these are mainly industrial alcohols, acetone and hexamine. Full details of the types and amounts of raw materials can be found in Appendix C.

2.7.3 Raw materials will be stored appropriately in a bespoke, bunded and fully contained building, flammables cabinets, refrigerators or stored securely where they are needed in the process building, for example in the mixing rooms, prior to use.

2.8 Water Usage

2.8.1 Water use within the process is limited to cleaning and cooling cycle on the presses and water-jet cutting.

2.8.2 The cooling system is closed loop and therefore water consumption is minimised.

2.8.3 After recovering garnett sand from the water-jet cutting water, the remaining contaminated water is held in IBC's prior to collection from site by a licenced waste carrier.

2.9 Avoidance, Recovery and Disposal of Wastes

2.9.1 Operational waste will be managed through a Waste Management Plan (WMP) which will be produced as part of the EMS prior to the operation of the facility.

2.9.2 Table 2.2 below lists the predicted waste streams from the site along with their expected volume per annum.

Table 2.2: Waste Streams

Description	Source	Expected Amount (tpa)	Storage Details	Recovery or Disposal
Waste solvents	Washings from plant cleaning	40 Tonnes	Drums held on pallet in an external bund	Substances subject to solvent recovery
Waste Oil/Water Mix	Hydraulic press, collected in the sump/pit	15 Tonnes	IBC on external bund	Water / oil from the press machines is collected and separated using a centrifuge system for re-use in the process. Resulting contaminated waters are sent for recovery/disposal to an appropriately permitted site.
Waste wood	MDF sacrificial machining boards / Ply sandwich board for water jet cutting	36 Tonnes	Dedicated 40-yard waste container	For energy generation by incineration
General waste and dry mixed recycling	Machining waste / Pressing waste	216 Tonnes	40-yard waste container	For energy generation by incineration
Garnett sand (used as a cutting abrasive media on the waterjets)	General factory waste	89 Tonnes	IBC on pallets	To aggregate recycler

Description	Source	Expected Amount (tpa)	Storage Details	Recovery or Disposal
Cardboard	Packaging from raw materials	10 Tonnes	Compacted container	Cardboard recycler
Filter dust	Extraction from the machine shops		Sealed bulk storage bags	Removed from site by licensed waste carrier

2.9.3 Annual reviews of waste production along with manufactured goods volumes will be undertaken. Annual targets will be implemented, these will include targets for waste produced per tonne of manufactured goods which will be reviewed over time where efficiency improvements are identified.

2.9.4 Waste oil from the presses is collected in a sump/pit in factory and then pumped to externally stored IBC's. Waste oil/water is separated using a centrifugal separator system with oil being reused and wastewater being sent off site for disposal. IBC storage area is to be bunded.

2.9.5 Waste data for 2020 and 2021 can be found in Appendix I.

3 SITE OPERATIONS

3.1 Process Description

3.1.1 The activities to be permitted at the site are

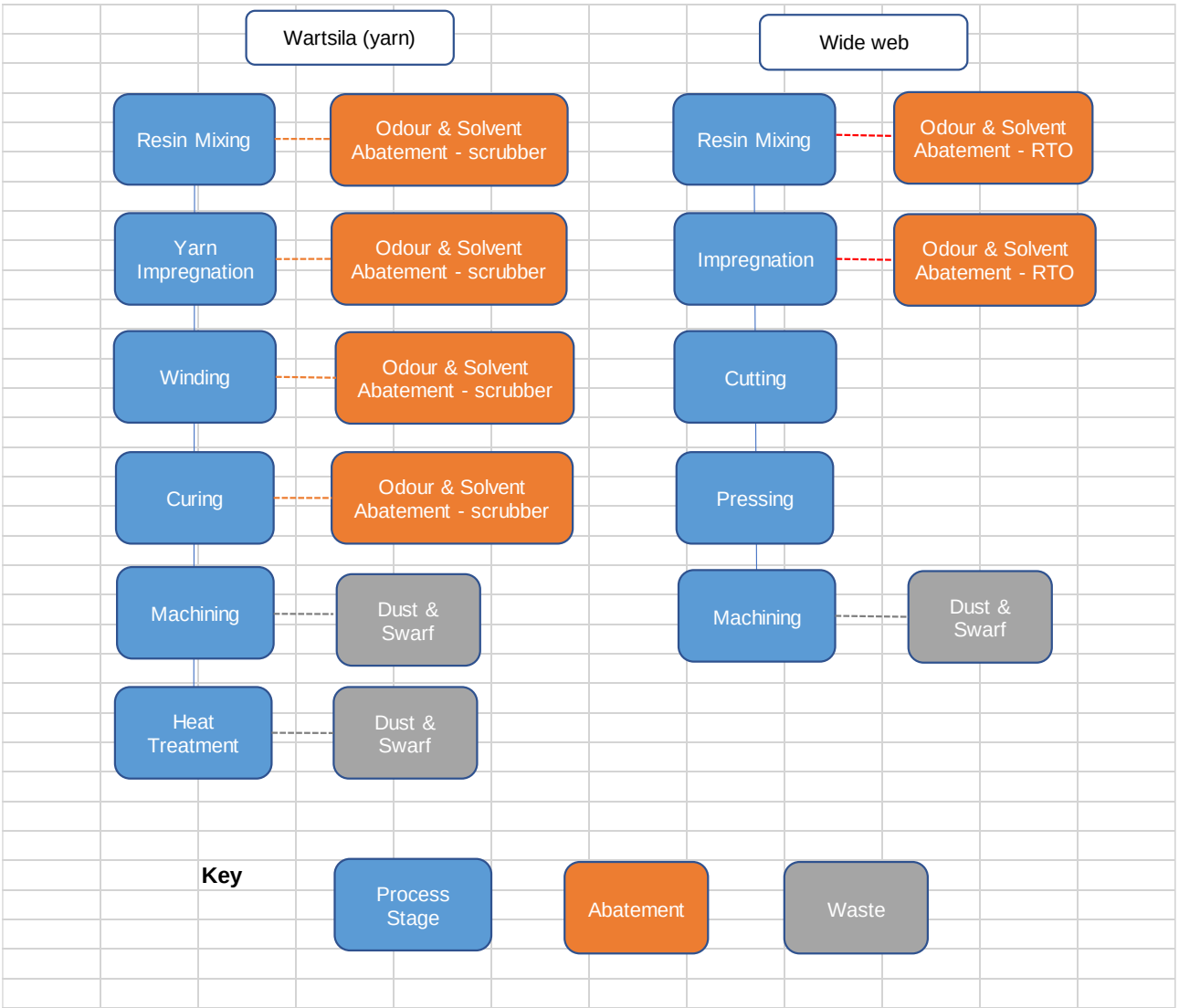
- the polymerisation/co-polymerisation of unsaturated hydrocarbons in the production of coating materials (resins).
- the impregnation of woven glass fibre cloths and tissue using pre-formulated resins and subsequent conversion to a composite laminate material

3.1.2 The process flow diagram in Figure 3.1 below show the steps in the manufacturing process with the permitted activities relating to the resin mixing and impregnation steps through to cure and machining.

The two main impregnation process on site are:

- The Wartsila lines where narrow tapes and braids are impregnated with solventless resin systems
- The wide web impregnation lines, of which there are three; 1 vertical and 2 horizontal production lines.

Figure 3.1: Process Flow



3.1.3 In addition to the two main impregnation processes a small hand-dipping process is carried out, known as the NF process. This is discussed further below.

3.1.4 The key process stages comprise:

- mixing and formulation of the resin,
- coating of the fibre textile,
- drying and B-staging of coated textiles,
- curing of billets,
- hydraulic pressing and coating of coated (B-staged) wide-web materials to form a densified laminate structure,
- machining and cutting,
- spray-painting of machined parts.

Resin Mixing and Formulation

Wartsila Process

3.1.5 This process uses two resin systems, phenolic/cresylic resin and epoxy anhydride cured resin ("epoxide") for the impregnation of narrow tape / braid, collectively referred to as "yarn". There is no volatile organic compound content in either of the Wartsila resin systems although the process may produce an odour and is therefore subject to extraction and abatement.

3.1.6 Resin mixing and formulation is a batch process. There is a separate process line for each of the Wartsila resin systems.

3.1.7 Phenolic/cresylic resin is delivered to the site in IBC's. The resin is stored in a self-contained, temperature controlled, bunded, sheltered store prior to use.

3.1.8 Phenolic/cresylic resin is pumped from an IBC into the mixing tank where innocuous powdered friction modifiers may be added, such as graphite, carbonaceous minerals, or milled glass fibre. Mixing vessels are stirred and agitated, there is no heat required for this operation.

3.1.9 Epoxy anhydride resin is a two-component system requiring the mixing of the resin and a hardener. These are stored in separate containers.

3.1.10 Epoxy anhydride resin and hardener are pumped from their containers to a mixing tank and blended together. A catalyst and colouring pigment are added at this stage and the mixture is kept cool (less than 25 °C) until required.

3.1.11 Epoxy anhydride resin is pumped from the mixing tank into drums where powdered filling materials are added, and further mixing occurs.

3.1.12 Whilst some resin and solvents are premixed in the mixing room, as described above, they can also be delivered from the supplier pre-mixed, and then a recirculation pump is used to feed the process bath which is the tank used within the impregnation stage.

3.1.13 The mixing room for preparing the resins is internally bunded and has an impermeable surface. Resins and hardeners are stored in low volumes in the mixing room with the remainder stored in a large external bunded storage room.

3.1.14 A procedure is in place for resin mixing which staff are trained to follow.

Wide-Web Process

3.1.15 The resins used for the wide web impregnation are formulations of resins such as phenolic, epoxy and, polyimides. These are delivered in IBC's and drums.

3.1.16 Bulk mixing of the resins is carried out in a large tank with an integral, rotating, paddle stirrer.

3.1.17 The resin is pumped from the bulk mixing tank, drum or IBC into batch mixing drums where it is combined with the required powdered fillers and or additives in accordance with the formulation required.

Impregnation

3.1.18 This stage is common to yarn and wide-web lines.

3.1.19 The impregnation stage involves impregnating a substrate, glass fibre textile, tissue or yarn with resin or resin mixture. The process is similar in all cases but differs slightly depending on the substrate.

3.1.20 The Wartsila process involves passing yarn, braid or tape, collectively referred to here as “yarns”, through a resin bath. The yarn may be made from natural, synthetic or inorganic fibres, either singly or as a mixed fibre yarn. Yarns may be dried prior to the resin coating.

3.1.21 Coated yarn is normally, but not always, wound around a creel. A standing period is allowed for the resin to permeate the yarn after which the creels may be stored at less than 20°C.

3.1.22 Wide-web impregnation is carried out on one vertical coating tower and two horizontal impregnation lines.

3.1.23 Woven glass fibre cloth or tissue is loaded onto a winder roll from where it is drawn through a resin bath to impregnate or coat the cloth/tissue. This stage may be repeated multiple times to achieve the required finish.

3.1.24 The web is then passed between a series of rollers that control the resin content of the cloth by the setting of the roller gap to squeeze excess resin from the cloth.

3.1.25 The coated web is passed through several heated zones in ovens in either a vertical or horizontal orientation to dry and “B-stage” the coated material producing “prepreg”.

3.1.26 The prepreg is cooled and either rerolled or guillotined on the process line ready to forward to the pressing/forming operations.

Winding and Curing

3.1.27 Winding is only applicable to the Wartsila process.

3.1.28 Coated yarn is wound from a creel to a mandrel, having the correct dimensions to form the required billet. Mandrel preparation includes the application of release agent to assist in the removal of the billet from the mandrel.

3.1.29 Resin in billets from the Wartsila process is cured by one of two different methods. Either in an autoclave at elevated temperature (>100º C), and pressure (up to 15 bar), or in an oven at lower temperatures (<100º C) for a longer duration of time. The latter method is used for Epoxy anhydride resin.

3.1.30 Once the resin curing process is complete, the mandrel is removed, and the billet is ready for secondary or final machining into a bearing or seal.

3.1.31 Machined items, (bearings and/or seals) may require additional treatments such as heat-treatment (>100º C), or oil impregnation (<100º C).

Cutting and Pressing

3.1.32 Cutting and pressing stages are performed on the wide-web materials.

3.1.33 On one of the horizontal web lines, the web is cut into sheets of the required size. The other horizontal and the vertical web line both wind the pre-preg web.

3.1.34 Multiple prepreg cloth strips are fed into the pressing machine to produce the final laminated composite material.

3.1.35 This stage is carried out on several presses which consolidate and cure the prepreg materials, forming them into composite components. The presses are heated using circulating thermal oil with heat provided by two gas-fired boilers to heat the oil. Externally there is also a cooling tower for the presses. Extraction is straight to atmosphere.

Machining

3.1.36 Machining is common to both the Wartsila and wide-web materials and takes place in several machine shops

3.1.37 Composite materials are taken to a machining room where they are cut to the required size and shape for the customer and then packaged prior to storage and delivery. Processes employed are CNC machining, milling, drilling and waterjet cutting.

3.1.38 Localised extraction collects dust and machining debris from individual machines in the machine shop with the exception of the water-jet cutting. Dust in the extracted air is collected by a cartridge filter.

3.1.39 Filtered dust is collected, bagged and stored securely prior to collection from site by a licenced waste contractor.

3.1.40 Wastewater from water-jet cutting is collected in IBC's and removed from site by a licenced waste contractor. A trade effluent consent may be sought in the future.

Spray Booths

3.1.41 Two spray booths are used for spray painting of parts in the assembly process. The booths are fitted with extraction systems discharging to atmosphere via a particulate filter. One booth is used for standard paint application epoxy and pu. The second booth is used for the spray application of a 2-part polyurea polymer coating.

3.1.42 The coatings used within the paint spray-booth are solvated and the polyurea system applied in the second spray booth is solvent free. Both spray booths operate a manual spraying technique.

3.1.43 Prior to spraying, panels may be prepared at tables fitted with dust extraction

Hand-Dipping Process

3.1.44 A small hand-dipping and squeezing process, known as the 'NF' process, is carried out on a batch basis at infrequent intervals

3.1.45 The NF process is solvent free but is a potential source of odour. Emissions will be extracted and discharged to atmosphere via the thermal oxidiser to eliminate this source of odour.

Boiler

3.1.46 Four on-site boilers supply heat and steam for running the presses. Two of these boilers are classed as existing MCP plant between 1 and 5 MWth input (the existing boilers are rated at 1.16 MWth each) These boilers will operate under a separate MCP permit issued by the EA in due course. The two new boilers are rated at less than 1 MWth and are outside the scope of the MCPD. See detail previously provided in paragraph 1.6.3 in respect of the permitting of the MCP activities. .

Cleaning

3.1.47 Coating equipment is cleaned using organic solvents by a flushing system and wipes for non-enclosed items. Cleaning operations are carried out with extraction running and captured organic solvent vapour is emitted to atmosphere via the thermal oxidiser. Used wipes are held in closed containers prior to collection by a licenced waste carrier for solvent recovery or appropriate disposal.

3.2 Process Controls

3.2.1 Resin baths are visually monitored during the process and manually topped up with the resin as required. The feed of web or yarn is automatic.

3.2.2 Temperatures and pressures on the presses are monitored and controlled by an automated system.

3.2.3 Equipment critical to controlling emissions has been identified in the aspects register of the site EMS. Planned preventative maintenance will be carried out on all critical equipment.

3.3 Emissions Controls

3.3.1 The principal sources of releases to air from the process are:

a. Resin odours/VOC emissions from the mixing/ coating process

b. Resin odours / VOC emissions from the resin curing and heat-treatment operations

c. VOC emissions from machine cleaning

d. Fugitive VOC emissions from winding

e. Particulate matter emissions from machining

f. Particulate emissions from spray-booths

g. Odour emissions from the hand-dipping process.

3.3.2 Epoxide resin and epoxide hardener do not have any component classified as a VOC, i.e. the Wartsila system is solvent free.

3.3.3 Emissions are captured and controlled by extraction to the thermal oxidiser, wet scrubber unit or dust extraction plant, as appropriate.

3.3.4 A gas-fired regenerative thermal oxidiser (RTO) is to be used for treating VOC emissions from the resin mixing rooms, the impregnation, and cleaning processes for the manufacture of the wide web prepreg materials. The thermal oxidiser utilises a low NOx burner and is located externally with a stack height of 15 metres as determined by the dispersion modelling undertaken as part of the Air Quality Assessment in Appendix E.

3.3.5 A two-stage wet scrubbing plant is used to neutralise the odours from the mixing, curing and winding operations of the Wartsila process. The scrubber is located directly outside the main process building within a bunded area. The emissions point to atmosphere from the scrubber is elevated to 3 meters above the roof height.

3.3.6 The scrubber uses aqueous alkaline solution to capture and neutralise the odours and emissions from the processes. The solution concentration is maintained by closed loop pH monitoring linked to an automatic sodium hydroxide pumped dosing system. The solution is regularly tested to determine status and any liquor exchange or purge requirements.

3.3.7 Dust collection systems are used for the extraction and collection of dust and machining debris from the machine shop activity. Dust is separated from the extracted air from the machine shops by high efficiency cartridge filtration units. Collected dust is sealed in bags and secured prior to collection by a licenced waste contractor.

4 EMISSIONS AND MONITORING

4.1 Point Source Emissions to Air

4.1.1 Point source emissions to air will comprise emissions from the thermal oxidiser, scrubber and the dust removal systems.

4.1.2 The locations of these emissions points are illustrated on the emissions plan included in Appendix B. The stacks are designated release points A1 – A7, as detailed in table 4.1.

4.1.3 The four boiler stacks are designated A8 to A11. However, the boiler stacks do not fall under the scope of this application, as detailed in paragraph 1.6.3

4.1.4 Point source emissions to air are detailed in Table 4.1 below alongside details on emission limits, emissions monitoring and proposed monitoring methods:

4.1.5 The facility will include the following emission points to air:

- thermal oxidiser
- scrubber
- dust abatement (x3)
- spray booths (x2)

Table 4.1: Point Source Emissions to Air

Emission Point Reference	Source	Parameter	Emission Limit	Indicative Emission Level	Monitoring Frequency	Monitoring Standard or Method
A1	Thermal Oxidiser	VOC	20 mg/m^3	-		
		NOx	130 mg/m^3	-	Once every year (Daily average or average over the sampling period)	EN 14792
		CO	No BAT-AEL	150 mg/m^3	Once every year	EN 15058
A2	Scrubber	VOC	20 mg/m^3	-	Once every year	
A3	Dust Abatement Plant 1	Particulates	20 mg/m^3	-	Once every year	EN 13284-1
A4	Dust Abatement Plant 2	Particulates	20 mg/m^3	-	Once every year	EN 13284-1
A5	Dust Abatement Plant 3	Particulates	20 mg/m^3	-	Once every year	EN 13284-1
A6	Spray Booth 1	Particulate	< 1–3 mg/m^3	-	Once every year	EN 13284-1
A7	Spray Booth 2	Particulate	< 1–3 mg/m^3	-	Once every year	EN 13284-1
A8	Boiler 1 (not part of the Permit application – see paragraph 1.6.3)	N/A	N/A	N/A	N/A	N/A
A9	Boiler 2 (not part of the Permit application – see paragraph 1.6.3)	N/A	N/A	N/A	N/A	N/A
A10	Boiler 3 (below the threshold of the EP Regulations or MCPD)	N/A	N/A	N/A	N/A	N/A
A11	Boiler 4 (below the threshold of the EP Regulations or MCPD)	N/A	N/A	N/A	N/A	N/A

4.2 Point Source Emissions to Surface Water (Other than Sewers)

4.2.1 The permitted processes do not give rise to wastewaters and therefore there are no associated point source emissions to water from the permitted operations. Only clean, uncontaminated surface water will be discharged to surface water, namely the Gloucester and Sharpness Canal adjacent to the site.

4.3 Point Source Emissions to Sewers, Effluent Treatment Plants or Other Transfers off Site

4.3.1 There will be no point source emissions to sewer from the permitted activities at the facility, although a trade effluent consent may be sought in the future as an alternative to off-site disposal of wastewaters from the water-jet cutting process.

4.4 Point Source Emissions to Land

4.4.1 There will be no point source emissions to land from the permitted activities at the facility,

4.5 Fugitive Emissions

4.5.1 Potential fugitive emissions from the site comprise leaks and spillages from external storage areas, dust, and VOCs from solvent storage.

4.5.2 It is acknowledged that there are sensitive receptors in close proximity to the site that could be adversely affected by fugitive emissions, in particular, local residents and the Gloucester and Sharpness Canal,

4.5.3 Process controls to contain emissions from production processes together with careful handling of raw materials, preventative maintenance on vessels, pipework and containment structures and robust incident response plans and training regimes will minimise the risk of fugitive emissions.

4.5.4 The risk of fugitive emissions from the site is, therefore, considered to be low

4.6 Odour

4.6.1 Potential odours from the site are managed through the emissions abatement systems (thermal oxidiser and scrubber).

4.6.2 The site has not had any substantiated odour complaints. Whilst odour complaints are periodically received, to date they have been attributed to other manufacturing processes in the area.

4.6.3 A complaints procedure is to be developed as part of the site EMS. This will detail actions to take when a complaint is received and forms a record of the investigation and actions undertaken at the time.

4.7 Noise and Vibration

4.7.1 The site operates on a twenty-four hour a day, seven day a week basis. It is recognised that, without effective mitigation measures, noise from site operations has the potential to give rise to complaints from nearby residents.

4.7.2 The site has not received any substantiated noise complaints to date. A complaints procedure will be developed as part of the site EMS. This will detail actions to take when a complaint is received and forms a record of the investigation and action taken at the time.

4.7.3 A Noise Impact Assessment of the site activities has been undertaken. Further detail is provided in section 5.6, below, and in Appendix F.

4.8 Monitoring and Reporting of Emissions

4.8.1 Sampling ports for the emissions monitoring will meet the requirements of the EA technical guidance note (TGN) M1[5] Sampling requirements for stack emission monitoring guidance.

4.8.2 An appropriate periodic monitoring technique and standard for monitoring stack emissions to air will be followed as detailed in Table 4.1 above, or as agreed with the regulator, and having regard to EA guidance monitoring stack emissions: techniques and standards for periodic monitoring[6].

4.8.3 A monitoring procedure will be put in place prior to operation of the facility to include daily olfactory and visual assessments.

[5] https://www.gov.uk/government/publications/m1-sampling-requirements-for-stack-emission-monitoring

[6] https://www.gov.uk/government/publications/monitoring-stack-emissions-techniques-and-standards-for-periodic-monitoring

5 ENVIRONMENTAL IMPACTS

5.1.1 To support this application several environmental assessments have been performed. The full details of these assessments are appended to this application and a reference to the full assessment is given where relevant for the environmental issues detailed below.

5.1.2 The environmental assessments have considered the cumulative impact of the permitted activities and the on-site boilers.

5.2 Emissions to Air

5.2.1 An air quality assessment to model the impacts from NO_x, VOC and particulate emissions from the facility has been undertaken. A copy of the air quality assessment can be found in Appendix E.

VOC Emissions

5.2.2 VOC emissions were assumed to be in the form of formaldehyde since this is the most hazardous VOC used on site and thus represents a worst-case scenario. When the Predicted Environmental Contribution (PEC) as a percentage of the Environmental Action Level (EAL) for formaldehyde is considered, concentrations at all sensitive receptors are below the EAL criteria.

Particulate Emissions

5.2.3 Emissions of fine particulate matter (PM_{10}) from each of the emission points serving dust abatement plant are below the relevant EAL criteria and are, therefore, not considered to be significant.

Combustion Emissions

5.2.4 When the Predicted Environmental Contribution (PEC) as a percentage of the Environmental Action Level (EAL) for Nitrogen Dioxide (NO_2) is considered at the sensitive receptors identified impacts of NO_2 are not considered to be significant.

5.3 Assessment of Impacts at Ecological Receptors

5.4 Fugitive Emissions

5.4.1 Fugitive emissions are discussed in section 4.5 of this report which details the potential fugitive emissions and management controls in place. The risk from fugitive emissions is considered to be low.

5.5 Odour

5.5.1 An odour assessment is included in the air quality assessment in Appendix E. There are several other manufacturing processes (including spray booths) in the area which sometimes lead to odour complaints from local housing.

5.5.2 The outcome of the odour modelling is that the scrubber is considered not likely to give rise to an odour issue. Further details are included in the air quality assessment in Appendix E.

5.6 Noise and Vibration

5.6.1 A Noise Impact Assessment has been undertaken. A copy of this assessment can be found in Appendix F.

5.6.2 The Noise Impact Assessment involved an environmental sound survey to establish baseline conditions at locations representative of the nearest noise sensitive receptors NSRs).

5.6.3 A 3D sound model of the facility was then built to predict specific sound levels from the facility at the NSRs based on the noise ratings of the proposed plant provided by the client. The sound model takes into account the contour data of the site and surroundings plus the site buildings.

5.6.4 A BS4142:2014 assessment was also carried out as part of the Noise Impact Assessment

5.6.5 The assessment concluded that, as a result of on-site activities, the nearest noise sensitive receptors on Bristol Road would not be adversely impacted during the day but that there is a low risk of adverse impact from noise at these receptors during the night.

5.6.6 At the nearest noise sensitive receptors to the West of the site at Wharfside Close / Quayside Close, on the opposite side of the Gloucester and Sharpness Canal, a significant increase in noise levels is predicted.

5.6.7 In order to reduce the predicted specific sound levels from the site operation at the nearest noise sensitive receptors, the Noise Impact Assessment recommends the following reduction in the plant noise emissions:

- 30 dB mitigation will be required for the noise emissions of the Cyclofilter outlet.
- 15 dB mitigation for the noise emissions of the thermal oxidiser,
- 12 dB mitigation will be required for the noise emissions of each boiler,
- 10 dB mitigation will be required for the noise emissions of the Cyclofilter casing, the Nederman dust plant and dust plant 3.

5.6.8 With the recommended mitigation it is considered that the risk of an adverse impact during the night at the NSRs on Bristol Road and Wharfside Close / Quayside Close is low.

6 BEST AVAILABLE TECHNIQUES (BAT) ASSESSMENT

6.1.1 This section contains a review against the Best Available Techniques (BAT) Conclusions for surface treatment using solvents[7].

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2020.414.01.0019.01.ENG&toc=OJ%3AL%3A2020%3A414%3ATOC

6.2 Assessment Against the Best Available Techniques (BAT) Conclusions from the BAT Reference Document for surface treatment using organic solvents including preservation of wood and wood products with chemicals

6.2.1 The BAT assessment can be found in Table 6.1 below:

Table 6.1: Assessment of BAT Conclusions Requirements

BAT Number	Summary of BAT Conclusions Requirements	Operator Evidence of Compliance	Status One of the following: Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
General BAT conclusions			
Environmental management system:			
1	In order to improve the overall environmental performance, BAT is to elaborate and implement an Environmental Management System (EMS) that incorporates all of the following features: (i) - commitment, leadership, and accountability of the management, including senior management, for the implementation of an effective EMS; (ii) an analysis that includes the determination of the organisation's context, the identification of the needs and expectations of interested parties, the identification of characteristics of the installation that are associated with possible risks for the environment (or human health) as well as of the applicable legal requirements relating to the environment; (iii) development of an environmental policy that includes the continuous improvement of the environmental performance of the installation; (iv) establishing objectives and performance indicators in relation to significant environmental aspects, including safeguarding compliance with applicable legal requirements; (v) planning and implementing the necessary procedures and actions (including corrective and preventive actions where needed), to achieve the environmental objectives and avoid environmental risks; (vi) determination of structures, roles and responsibilities in relation to environmental aspects and objectives and provision of the financial and human resources needed; (vii) ensuring the necessary competence and awareness of staff whose work may affect the environmental performance of the installation (e.g. by providing information and training); (viii) internal and external communication; (ix) fostering employee involvement in good environmental management practices; (x) establishing and maintaining a management manual and written procedures to control activities with significant environmental impact as well as relevant records; xi) effective operational planning and process control; (xii) implementation of appropriate maintenance programmes; (xiii) emergency preparedness and response protocols, including the prevention and/or mitigation of the adverse (environmental) impacts of emergency situations; (xiv) when (re)designing a (new) installation or a part thereof, consideration of its environmental impacts throughout its life, which includes construction, maintenance, operation and decommissioning; (xv) implementation of a monitoring and measurement programme; if necessary, information can be found in the Reference Report on Monitoring of Emissions to Air and Water from IED Installations; (xvi) application of sectoral benchmarking on a regular basis; (xvii) periodic independent (as far as practicable) internal auditing and periodic independent external auditing in order to assess the environmental performance and to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; (xviii) evaluation of causes of nonconformities, implementation of corrective actions in response to nonconformities, review of the effectiveness of corrective actions, and determination of whether similar nonconformities exist or could potentially occur; (xix) periodic review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness; (xx) following and taking into account the development of cleaner techniques. Specifically for surface treatment using organic solvents, BAT is also to incorporate the following features in the	Permali Gloucester Ltd is developing an EMS for the Gloucester site. The structure of the EMS is in place, including an Environmental Policy (which is posted on their website), commitment from senior management and an aspects and impact register. Systems and procedures are largely in place with others being prepared. The EMS will identify: • the risks that the activities pose to the environment are identified; • the measures that are required to minimise the risks are identified; • the activities are managed in accordance with the management system; • performance against the management system is audited at regular intervals; • clear roles, responsibilities, and a commitment from senior management; and • measures to ensure the environmental permit is complied with. Procedures will be in place for the regular inspection and maintenance of plant, equipment, storage areas and associated infrastructure including site surfacing, drainage systems and containment systems. The site operators will be trained in the safe operation of plant and emergency procedures. The management system will be reviewed at least once every four years or in response to significant changes to the activities, or in the event of accidents or other non-compliances. Once complete, the EMS will meet all the requirements of BATC 1.	Compliant in the future; a compliant EMS will be implemented on the site.

BAT Number	Summary of BAT Conclusions Requirements	Operator Evidence of Compliance	Status **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	EMS: (i) Interaction with quality control and assurance as well as health and safety considerations. (ii) Planning to reduce the environmental footprint of an installation. In particular, this involves the following: (a) assessing the overall environmental performance of the plant (see BAT 2); (b) taking into account cross-media considerations, especially the maintenance of a proper balance between solvent emissions reduction and consumption of energy (see BAT 19), water (see BAT 20) and raw materials (see BAT 6); (c) reducing VOC emissions from cleaning processes (see BAT 9). (iii) The inclusion of: (a) a plan for the prevention and control of leaks and spillages (see BAT 5 (a)); (b) a raw material evaluation system to use raw materials with low environmental impact and a plan to optimise the use of solvents in the process (see BAT 3); (c) a solvent mass balance (see BAT 10); (d) a maintenance programme to reduce the frequency and environmental consequences of OTNOC (see BAT 13); (e) an energy efficiency plan (see BAT 19 (a)); (f) a water management plan (see BAT 20 (a)); (g) a waste management plan (see BAT 22 (a)); (h) an odour management plan (see BAT 23).		
Overall environmental performance:			
2	In order to improve the overall environmental performance of the plant, in particular concerning VOC emissions and energy consumption, BAT is to: - identify the process areas/sections/steps that represent the greatest contribution to the VOC emissions and energy consumption and the greatest potential for improvement (see also BAT 1); - identify and implement actions to minimise VOC emissions and energy consumption; - regularly (at least once every year) update the situation and follow up the implementation of the identified actions.	EMS systems and procedures are currently being prepared. Once in place the EMS will include details of measures to minimise VOC emissions and ongoing reductions including annual updates on actions agreed and implemented where improvements are identified.	Compliant in the future; a compliant EMS will be implemented on the site.
Selection of raw materials:			
3	In order to prevent or reduce the environmental impact of the raw materials used, BAT is to use both of the techniques given below. (a) Use of raw materials with a low environmental impact (b) Optimisation of the use of solvents in the process	Company objective in 2023 is to achieve ISO14001 accreditation and BAT will be factored into site environmental aspects and impacts. As part of measures to implement ISO14001, the company will review raw materials to ensure those with low environmental impacts are used where possible and also optimise the use of solvents in the process. Ongoing targets will be introduced to optimise solvent usage year on year,	Not currently compliant. Systems will be put in place to comply with any Permit condition relating to raw material review and optimisation.
4	In order to reduce solvent consumption, VOC emissions and the overall environmental impact of the raw materials used, BAT is to use one or a combination of the techniques given below. (a) Use of high-solids solvent-based paints/coatings/ varnishes/inks/ adhesives (b) Use of water-based paints/coatings/inks/ varnishes/adhesives (c) Use of radiation-cured inks/coatings/paints/ varnishes/adhesives (d) Use of solvent-free two-component adhesives (e) Use of hot-melt adhesives (f) Use of powder coatings (g) Use of laminate film for web or coil coatings (h) Use of substances which are not VOCs or are VOCs of a lower volatility	The materials used in the Wartsila, NF and spray-coating processes are organic solvent free. Permali will work with their upstream and downstream customers to identify alternatives to high VOC based solvents	Currently compliant
Storage and handling of raw materials			
5	In order to prevent or reduce fugitive VOC emissions during storage and handling of solvent containing materials and/or hazardous materials, BAT is to apply the principles of good housekeeping by using all of the techniques given below. (a) Preparation and implementation of a plan for the prevention and control of leaks and spillages (b) Sealing or covering of containers and bunded storage area (c) Minimisation of storage of hazardous materials in production areas (d) Techniques to prevent leaks and spillages during pumping	Permali will ensure compliance with BAT 5 by: a. Including a preventative inspection and maintenance plan for all aspects of storage and handling of chemicals as part of the EMS. Written procedures are in place for receipt into storage of raw materials and for the movement of raw materials from storage to the production area	Not currently fully compliant. The required equipment, procedures and systems to fully comply with BAT 5 and any related Permit conditions will be put in place.

BAT Number	Summary of BAT Conclusions Requirements	Operator Evidence of Compliance	Status **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	(e) Techniques to prevent overflows during pumping (f) Capture of VOC vapour during solvent-containing material delivery (g) Containment for spills and/or rapid take-up when handling solvent containing materials	b. Ensuring all chemicals/solvents are stored in sealed containers within bunded storerooms or flammable stores. c. Service level agreements are to be established for stock levels of hazardous materials stored on site. d. Operational controls and emergency procedures are in place for transfer of hazardous materials e. Not applicable, there is no bulk storage or delivery of materials f. As per e. g. Appropriate emergency spill kits are in place and training of staff is undertaken to ensure spills are dealt with swiftly and safely	
Distribution of raw materials:			
6	In order to reduce raw material consumption and VOC emissions, BAT is to use one or a combination of the techniques given below: (a) Centralised supply of VOC-containing materials (e.g. inks, coatings, adhesives, cleaning agents) (b) Advanced mixing systems (c) Supply of VOC-containing materials (e.g. inks, coatings, adhesives, cleaning agents) at the point of application using a closed system (d) Automation of colour change (e) Colour grouping (f) Soft purge in spraying	The current mixing room and associated processes will be updated and improved with particular reference to items (a) to (f) of this BAT conclusion	Not currently compliant
Coating application:			
7	In order to reduce raw material consumption and the overall environmental impact of the coating application processes, BAT is to use one or a combination of the techniques given below. ***Techniques for non-spraying application*** (a) Roller coating (b) Doctor blade over roller (c) No-rinse (dry-in-place) application in the coating of coil (d) Curtain coating (casting) (e) Electrocoating (e-coat) (f) Flooding (g) Co-extrusion ***Spraying atomisation techniques*** (h) Air-assisted airless spraying (i) Pneumatic atomisation with inert gases (j) High-volume low pressure (HVLP) atomisation (k) Electrostatic atomisation (fully automated) (l) Electrostatically assisted air or airless spraying (m) Hot spraying (n) ‘Spray, squeegee and rinse’ application in the coating of coil ***Automation of spray application*** (o) Robot application (p) Machine application	The spray-coating booths employ an automated spray application system: technique (o). All other techniques listed are not applicable to the spray-coating activity at Permali.	Compliant
Drying/curing			
8	In order to reduce energy consumption and the overall environmental impact from drying/curing processes, BAT is to use one or a combination of the techniques given below. (a) Inert gas convection drying/curing (b) Induction drying/curing (c) Microwave and high frequency drying (d) Radiation curing	Currently installed drying/curing systems do not have any of the systems listed. However, these will be considered when the drying/curing lines are updated in the future.	Not currently compliant.

BAT Number	Summary of BAT Conclusions Requirements	Operator Evidence of Compliance	Status **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	(e) Combined convection/IR radiation drying (f) Convection drying/curing combined with heat recovery		
Cleaning			
9	In order to reduce VOC emissions from cleaning processes, BAT is to minimise the use of solvent-based cleaning agents and to use a combination of the techniques given below. (a) Protection of spraying areas and equipment (b) Solids removal prior to complete cleaning (c) Manual cleaning with pre-impregnated wipes (d) Use of low-volatility cleaning agents (e) Water-based cleaning (f) Enclosed washing machines (g) Purging with solvent recovery (h) Cleaning with high pressure water spray (i) Ultrasonic cleaning (j) Dry ice (CO_2) cleaning (k) Plastic shot-blast cleaning	Upon clean down of equipment, solids/heavy contaminants are removed prior to final cleaning with pre-impregnated wipes in accordance with techniques (b) and (c).	Compliant
Monitoring			
Solvent Mass Balance			
10	BAT is to monitor total and fugitive VOC emissions by compiling, at least once every year, a solvent mass balance of the solvent inputs and outputs of the plant, as defined in Part 7(2) of Annex VII to Directive 2010/75/EU and to minimise the uncertainty of the solvent mass balance data by using all of the techniques given below. (a) Full identification and quantification of the relevant solvent inputs and outputs, including the associated uncertainty (b) Implementation of a solvent tracking system (c) Monitoring of changes that may influence the uncertainty of the solvent mass balance data	PGL will establish total and fugitive VOC emissions via a combination of the following techniques: a) Full identification and quantification of the relevant solvent inputs and outputs, including the associated uncertainty will be implemented at site.	Compliant in the future.
Emissions in Waste Gases			
11	BAT is to monitor emissions in waste gases 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. • Dust • TVOC • NOx • CO	Operator will monitor all stipulated emissions at the required frequency as detailed in Table 4.1.	Compliant
Emissions to Water			
12	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. • TSS • COD • TOC • Cr(VI) • Cr • Ni • Zn • AOX • F	N/A - there are no emissions to surface water from the permitted activity. Only clean uncontaminated surface water is discharged.	N/A
Emissions during OTNOC			

BAT Number	Summary of BAT Conclusions Requirements	Operator Evidence of Compliance	Status **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
13	In order to reduce the frequency of the occurrence of OTNOC and to reduce emissions during OTNOC, BAT is to use both of the techniques given below. (a) Identification of critical equipment (b) Inspection, maintenance and monitoring	The following techniques are used to reduce emissions during OTNOC: a) As per aspects and impacts register critical equipment has been identified for abnormal/normal/emergency conditions e.g., gasing-off from post drying b) Preventative Maintenance is carried out on all critical equipment	Currently compliant
Emissions in Waste Gases			
VOC Emissions			
14	In order to reduce VOC emissions from the production and storage areas, BAT is to use technique (a) and an appropriate combination of the other techniques given below. (a) System selection, design and optimisation (b) Air extraction as close as possible to the point of application of VOC containing materials (c) Air extraction as close as possible to the point of preparing paints/coatings/adhesives/inks (d) Extraction of air from the drying/curing processes (e) Minimisation of fugitive emissions and heat losses from the ovens/dryers either by sealing the entrance and the exit of the curing ovens/dryers or by applying sub-atmospheric pressure in drying (f) Extraction of air from the cooling zone (g) Extraction of air from storage of raw materials, solvents and solvent-containing wastes (h) Extraction of air from cleaning areas	The facility employs a combination of techniques a) b) c) d) e) and h). Current dust extraction units to be replaced by new V9 LEV systems by the end of Q1 2023	Currently compliant
15	In order to reduce VOC emissions in waste gases and increase resource efficiency, BAT is to use one or a combination of the techniques given below. ***I. Capture and recovery of solvents in off-gases*** (a) Condensation (b) Adsorption using activated carbon or zeolites (c) Absorption using a suitable liquid **II. Thermal treatment of solvents in off-gases with energy recovery** (d) Sending off-gases to a combustion plant (e) Recuperative thermal oxidation (f) Regenerative thermal oxidation with multiple beds or with a valveless rotating air distributor (g) Catalytic oxidation ***III. Treatment of solvents in off-gases without solvent or energy recovery*** (h) Biological off-gas treatment (i) Thermal oxidation	To comply with BAT 15 technique f) will be employed i.e., extracted gases from the impregnation processes will be treated using a regenerative thermal oxidiser.	Compliant in the future. Plans are in place to comply
16	In order to reduce the energy consumption of the VOC abatement system, BAT is to use one or a combination of the techniques given below. (a) Maintaining the VOC concentration sent to the off-gas treatment system by using variable-frequency drive fans (b) Internal concentration of solvents in the off gases (c) External concentration of solvents in the off gases through adsorption (d) Plenum technique to reduce waste gas volume	a. The thermal oxidiser will use a variable frequency drive fan to maintain the VOC concentration in extracted gases, thus reducing the energy consumption of the abatement plant.	Compliant in the future. Plans are in place to comply
NO_x and CO emissions			
17	In order to reduce NO_x emissions in waste gases while limiting CO emissions from the thermal treatment of solvents in off-gases, BAT is to use technique (a) or both of the techniques given below. (a) Optimisation of thermal treatment conditions (design and operation) (b) Use of low-NO_x burners	a. The thermal oxidiser will both optimise thermal treatment conditions and include low-NO_x burners	Compliant in the future. Plans are in place to comply
Dust Emissions			
18	In order to reduce dust emissions in waste gases from substrate surface preparation, cutting, coating application, and finishing processes for the sectors and processes listed in Table 2, BAT is to use one or a combination of the techniques given below. (a) Wet separation spray booth (flushed impact panel) (b) Wet scrubbing (c) Dry overspray separation with pre-coated material (d) Dry overspray separation using filters	The facility includes the following systems which together meet this BAT requirement: b) Wet scrubber abatement system for non-solvent, odorous emissions.	Currently Compliant

BAT Number	Summary of BAT Conclusions Requirements	Operator Evidence of Compliance	Status **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
	(e) Electrostatic precipitator	d) Dry filtration system with LEV for addressing potential overspray from spray-booths plus dust extraction tables for surface preparation on panels prior to spray paint process	
Energy efficiency			
19	In order to use energy efficiently, BAT is to use techniques (a) and (b) and an appropriate combination of the techniques (c) to (h) given below. ***Management techniques*** (a) Energy efficiency plan (b) Energy balance record ***Process-related techniques*** (c) Thermal insulation of tanks and vats containing cooled or heated liquids, and of combustion and steam systems (d) Heat recovery by cogeneration – CHP (combined heat and power) or CCHP (combined cooling, heat and power) (e) Heat recovery from hot gas streams (f) Flow adjustment of process air and off-gases (g) Spray booth off-gas recirculation (h) Optimised circulation of warm air in a large volume curing booth using an air turbulator	Management techniques - an EMS is being developed for the facility which will include an energy efficiency plan (EEP). As part of the EEP, an energy balance record will be kept. Utilities delivered to the site are already being closely metered. The thermal oxidiser will incorporate a variable frequency drive in accordance with technique (f).	Compliant in the future Improvements will be put in place
Water use and wastewater generation			
20	In order to reduce water consumption and wastewater generation from aqueous processes (e.g. degreasing, cleaning, surface treatment, wet scrubbing), BAT is to use technique (a) and an appropriate combination of the other techniques given below. (a) Water management plan and water audits (b) Reverse cascade rinsing (c) Reuse and/or recycling of water	a) Site water usage will be monitored and a water management plan / audits will form part of the site EMS. c) Wastewater regeneration to be implemented with machine shop waterjet machines, as part of the site and business KPI's. The wet scrubber liquor operates on a closed loop system with pH monitoring and automatic dosing of sodium hydroxide. When the system needs to be purged the effluent is removed from site by a road tanker.	Compliant in the future Improvements will be put in place
Emissions to water			
21	In order to reduce emissions to water and/or to facilitate water reuse and recycling from aqueous processes (e.g. degreasing, cleaning, surface treatment, wet scrubbing), BAT is to use a combination of the techniques given below. ***Preliminary, primary and general treatment*** (a) Equalisation (b) Neutralisation (c) Physical separation, for example, by using screens, sieves, grit separators, primary settlement tanks and magnetic separation ***Physico-chemical treatment*** (d) Adsorption (e) Vacuum distillation (f) Precipitation (g) Chemical reduction (h) Ion exchange (i) Stripping ***Biological treatment*** (j) Biological treatment ***Final solids removal*** (k) Coagulation and flocculation (l) Sedimentation (m) Filtration (n) Flotation	There are no discharges from the facility to any surface water bodies apart from clean uncontaminated surface waters Water / oil from the press machines is collected and separated using a centrifuge system for re-use in the process. Resulting contaminated waters are sent for recovery/disposal to an appropriately permitted site.	Compliant
Waste management			

BAT Number	Summary of BAT Conclusions Requirements	Operator Evidence of Compliance	Status **One of the following:** Not Applicable, Currently Compliant, Compliant in the future (within 4 years of publication of BAT conclusions), Not Compliant
22	In order to reduce the quantity of waste sent for disposal, BAT is to use the techniques (a) and (b) and one or both of the techniques (c) and (d) given below. (a) Waste management plan (b) Monitoring of waste quantities (c) Recovery/recycling of solvents (d) Waste-stream-specific techniques	In line with BAT 1 (EMS), the waste management plan to be inclusive of techniques b), c) and d). Waste streams will be reviewed to identify the most appropriate reuse, recovery or disposal route,	Compliant in the future Improvements will be put in place
Odour emissions			
23	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 protocol for response to identified odour incidents, e.g. complaints; — an odour prevention and reduction programme designed to identify the source(s), to characterise the contributions of the source(s), and to implement prevention and/or reduction measures.	Solvents in use at the site are odorous by nature. Odours have not been identified as significant from the facility. An Odour Management Plan, including a protocol for responding to and investigating complaints, will be produced as part of the site EMS. A wet scrubber is installed on site to eliminate odours in emissions that do not pass through the RTO. Modelling of emissions from the scrubber indicates that receptors are not likely to be affected by odour from the scrubber.	Compliant in the future Improvements will be put in place
BAT conclusions for the coating of vehicles – BAT 24 is not applicable to the facility			
BAT conclusions for the coating of other metal and plastic surfaces			
BAT conclusions for the coating of ships and yachts - BAT 25 is not applicable to the facility			
BAT conclusions for the coating of aircraft – BAT 26 is not applicable to the facility			
BAT conclusions for coil coating are not applicable to the facility			
BAT conclusions for the manufacturing of adhesive tapes are not applicable to the facility			
BAT conclusions for the coating of textiles, foils and paper			
Table 18	**BAT-associated emission level (BAT-AEL) for fugitive emissions of VOCs from the coating of textiles, foils and paper** Fugitive VOC emissions as calculated by the solvent mass balance Percentage (%) of the solvent input BAT-AEL (Yearly average) < 1–5%	Please see the response to BAT 10 which confirms that all solvent inputs and outputs will be identified and quantified and that a solvent mass balance, including fugitive emission calculation will be undertaken.	Compliant in the future Improvements will be put in place
Table 19	BAT-associated emission level (BAT-AEL) for VOC emissions in waste gases from the coating of textiles, foils and paper TVOC mg C/Nm^3 BAT-AEL (Daily average or average over the sampling period) 5–20 mg C/Nm^3 (1)(2) (1) The upper end of the BAT-AEL range is 50 mg C/Nm^3 if techniques are used which allow the reuse/recycling of the recovered solvent. (2) For plants using BAT 16 (c) in combination with an off-gas treatment technique, an additional BAT-AEL of less than 50 mg C/Nm^3 applies to the waste gas of the concentrator.	All Bat AELs will be met by appropriate abatement where necessary, i.e., the installation of the RTO. Monitoring to demonstrate compliance will be undertaken in accordance with BAT 11	Compliant in the future
BAT conclusions for the manufacturing of winding wire – BAT 27 is not applicable to the facility			
BAT conclusions for the coating and printing of metal packaging are not applicable to the facility			
BAT conclusions for heat set web offset printing – BAT 28 is not applicable to the facility			
BAT conclusions for flexography and non-publication rotogravure printing are not applicable to the facility			
BAT conclusions for publication rotogravure printing – BAT 29 is not applicable to the facility			
BAT conclusions for the coating of wooden surfaces are not applicable to the facility			
BAT conclusions for preservation of wood and wood products with chemicals – BAT 30 to BAT 53 are not applicable to the facility			

6.3 Conclusions

6.3.1 Based on a review of the available information it has been assessed the site/operator will be compliant with the majority of requirements of the above applicable BAT conclusions by the time the facility starts to operate.

6.3.2 There are no BAT conclusions from which the operator requires derogation at this point in time.

6.3.3 Compliance with a number of BAT conclusions is dependent upon the installation and commissioning of plant and equipment which, once in place, will allow management systems to be implemented ensuring full compliance. Where compliance with Permit conditions is not currently achieved, an action plan with indicative timescales for compliance will be drawn up and submitted to the regulator.

REFERENCES

1. DEFRA Air Quality Management Area Maps - https://uk-air.defra.gov.uk/aqma/maps/
2. The Environmental Permitting (England and Wales) Regulations 2016 - https://www.legislation.gov.uk/uksi/2016/1154/contents/made
3. Medium Combustion Plant - https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193
4. BAT Reference Documents - https://eippcb.jrc.ec.europa.eu/reference

Appendix A
APPLICATION FORM

Appendix B
SITE PLANS

Appendix C
RAW MATERIALS INVENTORY

Appendix D
SITE CONDITION REPORT

Appendix E
AIR QUALITY ASSESSMENT

Appendix F
NOISE ASSESSMENT

Appendix G
ENVIRONMENTAL RISK ASSESSMENT

Appendix H
WASTE INVENTORY 2020 & 2021

APPLICATION FOR AN ENVIRONMENTAL PERMIT

Permali Gloucester Limited

Supporting Information

2023-02-24

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