BRIDGEND PAPER MILL

VESTA

Application for a Variation to Environmental Permit

Number EPR/EP3738NG

Environmental Risk Assessment

6 August 2026

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1 Introduction

1.1 Application Overview

This Environmental Risk Assessment (ERA) has been prepared on behalf of WEPA UK Ltd ('the Operator') for the whole of the permitted installation at the Bridgend Paper Mill, Llangynwyd, Maesteg, CF34 9RS, regulated under Environmental Permit EPR/EP3738NG. It is submitted in support of an application for a substantial variation to that permit for the installation and operation of a new tissue paper machine, 'Vesta', which will replace the existing 'Jupiter' paper machine.

Unlike a variation-only assessment, this ERA addresses the installation as a whole – the continuing permitted activities as well as the changes introduced by the Vesta project – so that the cumulative environmental risk of the operating site is captured in a single source–pathway–receptor assessment. The activity falls within Section 6.1 A(1)(b) of Schedule 1, Part 2 to the Environmental Permitting (England and Wales) Regulations 2016: producing, in industrial plant, paper and board where the plant has a production capacity of more than 20 tonnes per day.

The assessment follows the methodology set out in the Natural Resources Wales (NRW) guidance '*How to carry out a risk assessment for an Environmental Permit*', identifying hazards, receptors and pathways, assessing the probability of exposure and consequence of each risk, describing the risk management measures in place, and stating the residual (overall) risk. Quantitative technical assessments (air quality dispersion modelling, noise, flood risk and the water mass balance) are used as evidence to support the qualitative classifications.

1.2 The installation and its activities

The Bridgend Paper Mill is an established papermaking and tissue-converting installation where papermaking has taken place since 1950. The permitted installation comprises the following principal activities and plant:

- Papermaking – The permit currently includes the 'Jupiter' machine (installed in the 1970s) and the 'Neptune' machine (installed under the earlier extension in 2020). Jupiter will be decommissioned and dismantled before the new 'Vesta' tissue machine (maximum 227 tonnes/day; annual capacity 65,000 tonnes) is commissioned. The Jupiter building will be reused as jumbo reel storage.
- Energy plant – two natural-gas-fired boilers (rated 9.23 MW_{th} each; 18.46 MW_{th} aggregate net rated thermal input), installed in the new Steam Boiler House on the west side of the Neptune building and each regulated as a Medium Combustion Plant (MCP), supplying the steam demand of the mill. These two boilers have replaced the former natural-gas-fired Combined Heat and Power (CHP) plant (two gas turbines and a shell boiler). The former CHP plant has been decommissioned and removed. The two boilers have a lower aggregate thermal input than the former CHP plant and operate to tighter emission limits for oxides of nitrogen (NO_x); electrical power for the mill is imported from the grid.
- Converting and finishing – multiple converting lines and halls, jumbo reel storage, finished product storage and shipping, with associated dust-extraction and scrubber systems.
- Raw material handling and storage – pulp storage, bale handling and enclosed raw-material storage for virgin fibre and recovered paper.
- Effluent treatment – an on-site Effluent Treatment Plant (ETP, installed 1991) using activated-sludge biological treatment, discharging treated effluent to the River Llynfi (release point W1); process and potable water abstracted from the River Llynfi and the Nant Gwyn Stream under the current licence.

- Chemical and oil storage – bunded storage of papermaking additives, lubricating oil and transformer oil.

1.3 Site setting

The installation is situated at Llangynwyd in the Llynfi Valley, South Wales, approximately 5 km south of Maesteg and 10 km north of Bridgend, in a semi-rural location. The site covers approximately 25 hectares, of which buildings and other hardstanding extend to approximately 17 hectares. It is bound to the south and west by the A4063, to the east by the River Llynfi, and to the north by open farmland. The site is centred on approximate National Grid Reference (NGR) X: 288005, Y: 187080. The topography rises to the north-east and south-west, from a base of approximately 80 m AOD at the site to a maximum of approximately 250 m AOD within 1.5 km.

1.4 Scope

This ERA covers the operational phase of the whole installation (including commissioning of the Vesta machine), the decommissioning phase, and the eventual decommissioning of the installation at the end of its life (Section 4.7). Fugitive emissions are assessed in Section 4.3. Construction-phase dust has been assessed qualitatively (IAQM methodology) in the supporting Air Quality assessments and is temporary and short-term. The nearest local authority Air Quality Management Area (the 'Park Street, Bridgend AQMA', declared for annual-mean NO_2) lies approximately 7.6 km south-south-east of the installation and, given that distance, is not affected by the installation.

2 Methodology

In accordance with the NRW guidance, for each risk that applies, each actual or possible hazard is identified and the following are stated in tabular form: the hazard; the process that causes the hazard; the receptors; the pathways by which the hazard can reach a receptor; the risk management measures; the probability of exposure; the consequence; and the overall residual risk.

2.1 Risk classification

A simple qualitative classification of High, Medium, Low or Negligible risk is used. The overall risk is judged from the combination of the probability of exposure (after risk management measures are applied) and the consequence (severity of harm). Where the residual risk depends on the continued application of documented procedures, this is stated.

2.2 Screening and quantitative evidence

Potential risks from emissions to air, discharges to water or deposition onto land may be 'screened out' where testing demonstrates they are within acceptable limits or environmental standards. The following screening conclusions from the supporting technical assessments are relied upon across the installation:

- Air quality: detailed atmospheric dispersion modelling of the combustion emissions from the installation's stacks (the modelled combustion sources are the two new gas boilers A14/A15, which have replaced the former CHP plant) concluded that operational-phase combustion emissions are 'not significant' at all human receptors, with no predicted exceedances of any air quality objective at a location of relevant exposure, and 'no likely significant effects (alone and in-combination)' at all ecological receptors (Section 5). Operational road-traffic emissions were screened out against the EPUK/IAQM indicative traffic criteria.

- Ecological designations: there are no designated ecological sites, and no Sites of Special Scientific Interest, within a 2 km search radius. Three Special Areas of Conservation lie within the 10 km screening radius (Kenfig / Cynffig SAC; Glaswelltiroedd Cefn Cribwr / Cefn Cribwr Grasslands SAC; Blackmill Woodlands SAC).
- Noise: BS 4142:2014+A1:2019 assessments of the installation's operations concluded that specific sound levels at the nearest residential receptors are well below background, with rating levels at least 10–13 dB below background at the majority of receptors and significance assessed as 'Negligible' or 'None'.
- Water: the maximum discharge to the River Llynfi (release point W1) is well within the permitted maximum flow rate, and no additional abstraction is required, as the Vesta machine consumes considerably less water than Jupiter. Total effluent volume falls once Jupiter is shut down.

3 Receptors

The receptors potentially at risk from the installation are identified below. The human receptor set is the full list of discrete receptors modelled in the dispersion assessment; the nearest residential receptors (R1 Brynllywarch-Fach at approximately 160 m, R3 Brynllywarch-Fawr and R2 Bryn-y-Fro) are the most sensitive for air and noise.

Table 3-1: Human receptors (discrete modelled receptors)

ID	Receptor	Type	NGR X	NGR Y
R1	Brynllywarch-Fach	Residential	287469	187415.8
R2	Bryn-y-Fro Farm	Residential	287152.3	187230.8
R3	Brynllywarch-Fawr	Residential	287893.4	187404.1
R4	Cefn Ydfa	Residential	287767.4	186630.6
R5	Gelli-Las Fawr	Residential	288105.6	186585.1
R6	Llynfi Villa	Residential	288705.6	186578.1
R7	Ty Isaf	Residential	288747.7	187049.4
R8	Llwyn Brain	Residential	288215.5	187979.1
R9	The Brackens	Residential	288001.1	188702.1
R10	Lletty Brongu 1	Residential	288302.5	188588.9
R11	Lletty Brongu 2	Residential	288437.2	188541.6
R12	Celfyddifan	Residential	288736.7	187906.2
R13	Tyle-Coch	Residential	289049.7	187544.5
R14	Nyth-Y-Cwm Farm	Residential	289236.5	187344
R15	Green Field Terrace 6	Residential	289125.9	186924.5
R16	Shwt	Residential	288996.9	186819.7
R17	Nantmwth Fach Farm	Residential	289189.3	186534.1
R18	Nicholls Road	Residential	288990	185816.5
R19	Pen-Twyn	Residential	288905.4	186139.1
R20	Maes-Cadlawr	Residential	286661.7	187126.1
R21	A4603 (property 10)	Residential	287048	187684
R22	Greenmeadow Farm	Residential	286880.5	187713
R23	A4603 (property 12)	Residential	286989.2	188224.9
R24	Ysgol Gyfun Gymraeg Llangynwyd	School	286967.5	188263.3
R25	Gelli-Siriol Farmhouse	Residential	287647.3	188001.4

Note: Brynllywarch-Fawr also has a southerly aspect directly across the mill site and is relevant as a visual/amenity receptor. Ysgol Gyfun Gymraeg Llangynwyd (R24) is a school and is treated as a sensitive human-health receptor.

Table 3-2: Environmental (water and ecological) receptors

Receptor	Designation / type	Relationship to installation
River Llynfi	Surface watercourse	Bounds the site to the east; receives the treated effluent discharge (W1) and roof storm water; source of process and potable water abstraction (within the current licence)
Nant Gwyn Stream	Surface watercourse (culverted below the mill)	Runs west to east beneath the site into the River Llynfi; contributes to freshwater abstraction; the final culvert section is being re-routed north of the Vesta building
Groundwater	Groundwater beneath the site	No proposed point source releases to groundwater; protected via containment and drainage design
ER1 – Kenfig / Cynffig	SAC (coastal stable dune grasslands – acid type)	Within 10 km screening radius; grassland deposition velocities applied in modelling
ER2 – Glaswelltiroedd Cefn Cribwr / Cefn Cribwr Grasslands	SAC (non-Mediterranean dry acid and neutral closed grassland)	Within 10 km screening radius
ER3 – Blackmill Woodlands	SAC (acidophilous Quercus-dominated woodland)	Within 10 km screening radius; woodland deposition velocities applied in modelling
Local land and soils	Agricultural land / open farmland to the north	Adjacent to the northern boundary
Adjacent commercial developments; site personnel	Human receptors on and adjoining the site	On and adjacent to the installation

No Sites of Special Scientific Interest are located within 2 km of the installation, and no designated ecological sites lie within 50 m of the site boundary.

Table 3-3: Baseline conditions at ecological receptors (APIS)

ID	APIS habitat class (most sensitive)	Baseline NO_x (µg/m³)	Baseline SO_2 (µg/m³)	Applied N critical load (kg N/ha/yr)
ER1	Coastal stable dune grasslands – acid type	8.36	1.17	8 (range 8–10)
ER2	Non-Mediterranean dry acid and neutral closed grassland	14.37	1.78	10 (range 10–15)
ER3	Acidophilous Quercus-dominated woodland	10.72	1.64	10 (range 10–15)

4 Risk assessment

The following tables present the environmental risk assessment for the whole installation, using the source–pathway–receptor format required by the NRW guidance. Risk management measures are those committed to in the EP Application Report and its appendices; the residual risk assumes these measures are implemented and maintained. Deposition to land of pollutants from air emissions does not occur, and the installation generates no point source emissions to land, so those are screened out.

4.1 Point source emissions to air

Table 4-1: Emissions to air – risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Point source emissions to air – oxides of nitrogen (NO_x), sulphur di oxide (SO_2), carbon monoxide (CO) and particulates from combustion (two gas boilers A14/A15, which have replaced the former CHP gas turbines A1 and shell boiler A2, now decommissioned; Jupiter A4 / Vesta A17 Yankee hoods to be decommissioned)	Local resid ents (R1– R25, incl. school R 24); site personnel; vegetation and designated habitats (E R1–ER3)	Air dispersion from stacks	• Combustion plant designed and operated to Best Available Techniques (BAT) with efficient, complete combustion minimising NO_x and CO formation • Emission limit of 40 mg/Nm³ for oxides of nitrogen at the Vesta Machine (Yankee) Hood Exhaust Vent, emission point A17 (stack height 30.4 m); existing permit sets limits and monitoring for major release points • Detailed ADMS 6.0 dispersion modelling (five-year met dataset, terrain and building downwash) undertaken for the installation's stacks; results summarised in Section 5 • Automatic NO_x measurement at A17; annual MCERTS spot sampling to BS EN 14792; sampling ports to NRW Guidance Note M1 • Replacement of the former CHP plant by the two new gas boilers (2 × 9.23 MW_{th}; variation PAN-026789), now completed, and of Jupiter by the more efficient Vesta machine reduces overall combustion emissions; scope 1 CO_2 reduces by 9,489 t CO_2/year vs Jupiter	Low continuous operation but emissions controlled to permit limits and dispersed from tall stacks	Predicted process contributions are a small percentage of the relevant air quality assessment levels; modelling predicts no exceedance of any AQO at relevant- exposure locations and 'not significant' combustion effects (Section 5)	Low

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
			• Operation and maintenance under the ISO 14001 Environmental Management System (EMS)			
Elevated NO_x during com missioning of a new ma chine (approximately 3–4 w eeks)	Local residents (R1–R25); local air quality	Air	• Commissioning limited to approximately 3–4 weeks (‘first paper’ and full-speed-reduced-load operation); no sustained full-speed operation for the majority of commissioning • No overall increase in emission mass flow rates – flue gas mass flow substantially lower than at full speed • Commissioning plan and monitoring agreed with NRW as a pre-operation condition	Low short, defined duration	Temporary NO_x concentrations above 40 mg/Nm³ with no increase in mass e missions	Low
Minor point source releases – dust- extraction / scrubber systems serving converting halls (A8, A9, A10); wet dust and mi st-removal roof exhausts (A12 /A13, A16/ A18); natural-gas safety vents (A6, A7); steam vents	Local residents; site personnel	Air	• Wet scrubbers and dust-extraction systems on converting-hall exhausts; release points at height (27.4–30.4 m) aiding dispersion • Emissions from steam, dust and gas safety vents are insignificant in normal operation • Scheduled maintenance of plant and abatement equipment under the EMS	Low	Localised, minor and short-lived releases of dust, steam or unburned hydrocarbons	Negligible

4.2 Emissions to water

Table 4-2: Emissions to water – risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Discharge of treated process effluent to the River Llynfi (release point W1)	River Llynfi – water quality, aquatic ecology and downstream users	Direct discharge to surface water	• All papermaking process wastewater treated at the on-site ETP (activated-sludge biological treatment, installed 1991) before discharge; nutrient conditioning applied to the biological process • Existing permit strictly controls the discharge with limits for suspended solids, BOD, pH and temperature amongst others • Maximum future discharge (whole site including Vesta) of 1,677 m³/day against the permitted maximum of 27,300 m³/day (approximately 6% utilisation); ETP has ample capacity for all machines • Vesta starts up only after Jupiter is shut down, so total effluent volumes fall; extensive water recycling at the ETP reduces fresh water taken from the River Llynfi • Continuous monitoring of ETP performance under the EMS	Low continuous but treated, well within existing permitted allowances	Deterioration of water quality in the River Llynfi if treatment under performs	Lo w
Contaminated surface- water run-off from hardstanding, roads and parking (oils, fuels)	River Llynfi; Nant Gwyn Stream; site drainage system	Surface water drainage system	• Drainage design incorporates oil interceptors and traps; contaminated water routed with other run-off to the ETP for treatment prior to discharge; interceptors regularly inspected, emptied and de-sludged • Development complies with the Statutory Standards for Sustainable Drainage Systems (Welsh Government) and the CIRIA SuDS Manual (C753); approved SuDS scheme (BCBC Application No. D-2025-05-SAB, dated 03 September 2025)	Low	Localised contamination of surface waters by oils or fuels	Negligible

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
			• Storm water collection adjusted for new paved areas; roof storm water discharged to the River Llynfi • Spill kits maintained to seal drains and confine spills; maintenance and testing under the ISO 14001 EMS			
Abstraction of process water from the River Llynfi and Nant Gwyn Stream	River Llynfi; Nant Gwyn St ream – flow and aquatic eco logy	Direct abstraction	• Abstraction within the current licence; no additional abstraction required as Vesta consumes considerably less water than Jupiter • Extensive water recycling at the ETP reduces fresh-water demand; water use monitored and minimised through the EMS	Low	Reduced flow / ecological effect in the watercourses	Negligible
Discharge to groundwater	Groundwater beneath the site	Infiltration through ground	• No proposed point source releases to groundwater • Chemical and oil storage in impermeable bunded enclosures (see fugitive-emissions and accidents tables) • Baseline ground and water environment established by intrusive site investigation, providing a reference for future comparison	Negligible – no pathway in normal operation	Contamination of groundwater	Negligible

4.3 Fugitive emissions

Table 4-3: Fugitive emissions (dust, litter, gas, spillages, pests) – risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Fugitive dust and litter from delivery, unloading and storage of fibre (recovered paper and bales)	Local residents (R1–R25); adjacent commercial developments; local land	Air wind entrainment	• Trucks unloaded within the raw-material storage building; bales and loose recovered paper stored inside, with sufficient capacity so no paper is unloaded or stored outside; doors and gates kept closed at all times • Loose paper and waste paper re-fed to the process through a paper reject system • Good housekeeping and general management techniques under the EMS	Low all handling enclosed within buildings	Dust soiling, airborne particulate matter (PM_{10}) and litter in the vicinity of the site	Negligible
Fugitive release of unburned natural gas	Site personnel; local air quality; climate (methane)	Air	• Scheduled maintenance of natural-gas containment; fuel-gas leak detection systems and alarms • New tie-in for the Vesta building designed and tested to relevant standards	Low	Release of methane and other non-methane hydrocarbons; fire/ explosion hazard in extreme cases (see accidents table)	Negligible
Carbon dioxide releases from the deluge fire-fighting system	Site personnel	Air	• Restricted to emergency fire-fighting events and routine testing or	Low	Short-lived, localised CO_2 release	Negligible

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
			maintenance, documented in the EMS	infrequent e vents only		
Fugitive emissions to water – leaks and s pills from chemical/oil storage, loading /unloading and vehicle areas	River Llynfi; Nant Gwyn Stream; groundwater	Site drainage; infiltration	• Bunded enclosures around equipment containing oil and process chemicals, sized to hold at least 110% of the largest tank (or 25% of total contents where tanks share a bund), plus any f ire-protection-water allowance • Bunds impermeable and resistant, no outlets or penetrations, draining to blind sumps, with fill points inside the bund; storage areas marked with maximum capacities • Leakage monitoring system in the constantly manned control room; spill kits and spill contingency procedures under the ISO 14001 EMS • Drainage sump procedures: contents checked before treatment or disposal; high-level alarms with automatic pump to storage (not to discharge)	Low	Contamination of surface water or groundwater by process chemicals or oils	Low

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Pests attracted to raw material or waste storage	Local residents; site hygiene	Air / l and – vermin and birds	• All fibre stored within buildings with doors and gates kept closed; wastes stored in sealed, labelled containers with regular inspections under the EMS; good housekeeping	Low	Nuisance to neighbouring receptors	Negligible

4.4 Odour

Table 4-4: Odour – risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Odour from papermaking, chemical storage and effluent treatment	Local residents (R1–R25); adjacent commercial developments	Air	• None of the air emissions from the plant give rise to odours beyond the site boundary; process buildings enclosed • Sludge from the ETP collected, treated and reintroduced to the process, or dried for alternative agricultural products; excess handled without off-site odour • Complaints procedure: complaints recorded and acted upon, with NRW informed	Low	Odour annoyance at nearby receptors	Negligible

4.5 Noise and vibration

Table 4-5: Noise and vibration – risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Noise from general operation of the installation (continuous, 24/7 – machines, converting, energy plant, HGV and loading operations)	Residential receptors (nearest: R1 Brynllywarch / NSR01 ~65 m; NSR02 Brynsiriol ~75 m; NSR03 Cefn Ydfa; NSR04 Ty Isaf); ad jacent commercial developments	Air	• Use of inherently quiet plant, silencers, sound insulation and enclosure of exposed units; buildings designed to sound-insulation targets in the Noise Assessment • Operational arrangements at night-time to avoid excessive noise; plant controlled to minimise impulsive or tonal noise; distance attenuation and maintenance • Where required at the closest receptor, mitigation (e.g. acoustic barrier, reduced night-time HGV movements, single-vehicle external loading) applied to satisfy the LPA 10 dB-below-background criterion • BS 4142:2014+A1:2019 environmental noise survey within twelve months of commissioning; results retained 5 years; thereafter 5-yearly external noise monitoring; action plan if planning-consent limits exceeded • Complaints procedure: record and act on complaints and inform NRW	Medium – the installation operates continuously and thus gene rates noise continuously	BS 4142 assessments predict specific sound levels well below background, with rating levels typically 10–13 dB below background and significance ‘Negligible’ or ‘None’ at all receptors; where a receptor approaches the criterion, the identified mitigation restores compliance	Negligible
Vibration from operation of the paper machines and site traffic	Adjacent developments; nearest residential receptors	Land – ground - borne transmission	• Any plant vibration issues resolved during commissioning and controlled under preventative maintenance schedules • During normal operation, vibration or inadmissible low-frequency noise does not occur • Complaints procedure: record and act on complaints and inform NRW	Low	Vibration levels well below the human perception threshold; traffic vibration sources already exist with no significant change – effects not significant	Negligible

4.6 Accidents, waste and their consequences

Table 4-6: Accidents and waste – risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this con act?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Operator error	Air, land and water receptors (dependent on the nature of the error)	Various – dependent on nature of error	• Plant automatically controlled under normal operation, minimising the potential for operator error; alarms triggered with sufficient safety margin to permit intervention before an actual problem occurs • All operational staff fully trained against site operating procedures; preventative measures under continuous review as part of the EMS • In the event of a major operator error, the plant shuts down automatically • Assumed (per NRW guidance) that operator error will occur at least once every 100 operations – procedures designed accordingly	Low	Variable depending upon the nature of the incident	Not significant
Fire (including natural-gas fire/ explosion)	Local water courses; local air quality; site personnel; neighbouring premises	Air; surface water drainage system	• Responsibilities assigned in the plant EMS with full staff training on documented procedures; emergency management plan; communication routes with authorities and emergency services • Comprehensive fire detection and suppression systems (external hydrants, portable extinguishers); fire-resistant oils supplied wherever possible • Fuel-gas leak detection and alarms; scheduled maintenance of natural-gas containment	Low fire- prevention measures ensure such e vents will be rare	Potential explosion hazard; release of e missions to air from oxygen -starved combustion of natural gas	Not significant

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this con act?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
Failure to contain fire water	River Llynfi; local wate recourses	Surface water drainage system	• Fire response systems ensure a rapid response, addressing fire at the earliest point to minimise firewater volumes • The ETP is used to retain firewater; the emergency firewater collection system accounts for additional firewater flows and fire-fighting foams; drain isolation and spill kits available	Low sufficient retention volume to contain fire water	Moderate (although firewater would not be discharged to surface water)	Low
Flooding of the site	Local water courses; site in fracture	Water	• The majority of the site is in Flood Zone A, partially within Flood Zone B • All systems designed for the 1 in 100 year + 40% climate change event; storm-water design accounts for a 100-year winter event (maximum rainwater discharge approximately 1,300 m³/day) • Flood warning alert procedures followed	Low the site is considered to be at low to no risk	Potential contamination of flood waters	Not significant
Loss of containment – spillage of chemicals or oils during storage, transfer or delivery; tank overfilling; bund failure	Land; groundwater; River Llynfi; Nant Gwyn Stream	Land; site drainage; infiltration	• Bunded storage sized to 110% of the largest tank / 25% of total contents; impermeable bunds with no outlets, draining to blind sumps; fill points inside bunds • Overfill-prevention on storage tanks: level measurement, independent high-level alarms, high-level cut-off and batch metering • Chemical systems designed so substances cannot leak in normal operation; obligatory pre-operation inspection by a technical expert; leakage monitoring in the manned control room • Vehicle barriers and a 10 mph site speed limit; spill contingency	Low	Contamination of land, groundwater or surface water by process chemicals or oils	Low

Hazard What has the potential to cause harm?	**Receptor** What is at risk?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will be taken to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this con act?	**Consequence** What is the harm that can be caused?	**Overall risk** What is the risk that still remains?
			procedures; contaminated waters routed to the effluent system with provision for surges and storm flows, treated before emission to controlled waters			
Accidental emissions from vents and safety relief valves / bur sting discs	Local air quality; site personnel	Air	• Containment or abatement of accidental emissions considered; attention focused on reducing the probability of the emission through design, maintenance and interlocks • Incident log recording all incidents, near misses and abnormal events; procedures to identify, respond to and learn from incidents	Low	Short- duration release of process materials or combustion gases to air	**Not significant**
Waste handling and storage (waste oils/lubricants, packaging waste, ETP sludge, general waste)	and; surface water; local amenity	Land; site drainage	• Wastes segregated and stored in labelled containers until disposal off-site by a qualified contractor under Duty of Care • ETP sludge treated and reintroduced to the process where possible; excess dried and used for alternative agricultural products • Regular inspections of waste storage and transfer areas; records of all waste transfers retained on site; waste minimisation audits under the EMS	Low	Contamination of land or water; local nuisance from poorly managed waste	**Negligible**

4.7 Decommissioning and demolition phase

In line with the NRW guidance, the decommissioning phase is assessed using the same source–pathway–receptor approach. Two situations are covered: the near-term demolition works consented as part of the current proposals (dismantling of the Jupiter machine before Vesta is commissioned), and the eventual decommissioning of the installation at the end of its operational life. The rows below consolidate the site construction/demolition risk register into the required format; the register's severity × occurrence scores (all reduced to a residual score of ≤5 of 25 with controls applied) support the qualitative classifications.

Table 4-7: Decommissioning and demolition – risk assessment and management plan

Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	Overall risk
Dust from demolition works and vehicle movements within the CDM site	Local residents (R1–R25); site personnel; adjacent farmland	Air – windblown dust	Demolition carried out under a construction/demolition management plan (CDM); dust-control measures including wetting-down of working areas during dry periods; enclosed chutes and covered loads; daily visual monitoring	Low – temporary works with controls applied	Increase in local PM10 and PM2.5 concentrations; dust soiling; health effects from inhalation	Low
Exhaust emissions from demolition plant and vehicles operating within the CDM area	Local residents; local air quality	Air	All vehicles and plant compliant with the relevant emissions legislation and maintained fit for use; no-idling policy; efficient traffic routing on site	Low	Local air-quality impacts; contribution to greenhouse-gas emissions	Low
Over-pumping of the Nant Gwyn Stream and pumping of site drains to allow excavation works	Nant Gwyn Stream; River Llynfi; aquatic ecology	Direct discharge to the watercourse / site drainage	All pumps approved by WEPA before use; water testing before discharge to confirm the water is clean; silt and sediment management; discharge stopped if contamination is detected	Low	Contamination or silting of the watercourse; damage to the aquatic ecosystem	Low
Excavated soils and rubble generated through demolition of buildings	Land; groundwater; off-site disposal chain	Direct contact; site drainage; off-site transfer	WAC and WM3 characterisation testing before any soil or rubble leaves site; waste transfer documentation completed for all movements; Duty of Care applied to carriers and receiving facilities	Low	Misclassification and wrong-facility disposal of contaminated material; ground contamination	Low
Asbestos arising from demolition works, including potential windblown fibre release	Site personnel; local residents	Air; direct contact	Asbestos survey and testing before removal; removal by licensed contractor with work areas encased and controlled so that material is not released; hazardous-waste consignment notes for all movements	Low	Inhalation of or contact with hazardous fibres	Low
General waste from demolition works	Land; local amenity	Site drainage; wind	Segregation at source; covered skips; removal by licensed carriers with waste transfer notes	Low	Contamination; windblown litter	Negligible

Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	Overall risk
Use of resources (electricity and water) during the works	Natural resources	Not applicable – resource consumption	Use of WEPA electricity and water approved in advance by the WEPA electrical engineers / environmental team; consumption metered	Low	Additional resource use during the works	Negligible
Odour during demolition (exposed residues, works adjacent to the ETP)	Local residents	Air	Weekly odour checks by the environmental team; prompt removal of odorous materials	Low	Odour nuisance; neighbour complaints	Negligible
Noise and vibration from demolition works	Local residents (nearest: R1 Brynllywarch-Fach, ~160 m)	Air; ground-borne transmission	Working hours restricted to 07:30–18:00; selection and maintenance of low-noise plant; complaints procedure with records and notification to NRW	Low	Noise nuisance; neighbour complaints	Low
Flooding and extreme rainfall during the works	Watercourses; site infrastructure	Surface run-off; flood waters	Contractor flood-protection procedure in place; pumps on standby in case of flooding; flood-warning alert procedures followed	Low	Release of materials or hazardous substances in flood waters; damage to buildings	Low
High winds during demolition	Adjacent land; local amenity	Air	Materials weighted down or secured in the event of high winds; work suspended in extreme conditions	Low	Windblown materials and litter around and beyond the site	Negligible

Table 4-8: Final decommissioning (site closure) – risk assessment and management plan

Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	Overall risk
Residual chemicals, oils and process residues in tanks, lines and bunds at final decommissioning	Land; groundwater; River Llynfi; Nant Gwyn Stream	Spillage during drain-down; infiltration to ground	Decommissioning/closure plan agreed with NRW before cessation of activities; tanks and lines drained and cleaned; chemicals and oils returned to suppliers or removed by licensed waste contractors; bunds and containment retained until the tanks they serve are removed; site condition assessed against the baseline Site Condition Report	Low	Contamination of land, groundwater or surface waters	Low
Dismantling of redundant plant and buildings at closure	Local amenity; land; local residents	Air (dust, noise); off-site transfer of wastes	Phased demolition under CDM controls (as above); materials segregated for re-use and recycling; wastes removed under Duty of Care	Low	Dust, noise and waste generation during closure works	Low

4.8 Reconciliation with the site aspect–impact register

The operational rows of the site's aspect–impact risk register (severity × occurrence matrix) have been checked against this assessment. All register items are captured in the tables above; the table below maps each register item, and any additional operational controls it records, to the corresponding ERA table so that the two documents are consistent.

Table 4-9: Register reconciliation

Aspect–impact register item (site risk matrix)	Where addressed in this ERA
Point-source NOx emissions – annual EPR permit testing at the papermaking exhaust vents (A4 Jupiter / A11 Neptune); burner and heat-recovery scrubber maintenance	Table 4-1. For Vesta (A17), automatic NOx measurement (AMS to BS EN 14181) plus annual MCERTS sampling apply.
Engineering-workshop local exhaust ventilation (LEV); Yankee blade re-grinds sent off-site for the Vesta machine	Table 4-1 (minor point sources).
VOC emissions from solvent use, minimised by broke and chemical control	Tables 4-1 and 4-3; solvent storage bunded (Table 4-6).
All Vesta drains connect to the common effluent drainage system; biological treatment before discharge to the River Llynfi; capability to fully recycle effluent to eliminate out-of-consent discharges	Table 4-2.
ETP sludge dewatered in a mechanical press and used as animal bedding under a regulatory position statement; diversion to landfill available as a contingency	Table 4-6 (waste handling row).
Scrap metal (baler wire) and other process wastes segregated and recycled by the on-site waste contractor	Table 4-6.
Water minimisation – re-use of clarified water rather than fresh river water (fresh-water use reduced by approximately 60% since 2008); BREF target tracking	Table 4-2 (abstraction row).
Automatic chemical dosing with conductivity trending; sodium hypochlorite removed from site in 2025	Tables 4-2 and 4-6; chemical inventory reduction noted.
Windblown-paper procedure for secondary fibre and broke storage; weekly security inspections; regular litter picking	Table 4-3 (fugitive litter row).
Fugitive dust from machine houses – scrubber maintenance and housekeeping; new air filter on the waste-removal system	Table 4-3.
Loss of oil during maintenance – collection barrels, pre-prepared spill containment, spill kits, spill-event procedure available to all employees	Tables 4-2 and 4-6.
Operation of the pressure-relief valve – baffle silencer installed (2011)	Table 4-5 (noise).
Secondary fibre and broke stored inside under a fixed roof; department drains connected to the ETP drainage system, removing risk to surface-water drains	Table 4-6 (fire-water containment row).
Energy management via PI / MessDas monitoring; FSC fibre sourcing; broke re-use through the secondary fibre plant with KPI targets	Resource-use controls supporting Tables 4-2 and 4-6.

5 Supporting air dispersion modelling

Detailed atmospheric dispersion modelling of the installation's combustion emissions was undertaken for the Vesta variation using ADMS 6.0 (Air Quality Assessment, EAME 30 July 2026). Five years of meteorological data were tested (St Athan, Cardiff and numerical weather prediction (NWP) data, 2021–2025); the coastal NWP dataset is taken as most representative, and the highest-impact year is carried forward. The model included terrain and building downwash (both shown to increase predicted concentrations, i.e. conservative). A worst-case NO_x-to-NO_2 conversion of 100% (annual mean) and 50% (99.8th-percentile hourly) was applied. Emission rates were set at the permitted / applied-for limits, including 40 mg/Nm³ NO_x at the Vesta Yankee-hood exhaust (emission point A17).

Three scenarios were modelled: the existing installation (Scenario 1), the Vesta machine alone (Scenario 2 — the specific change assessed) and the combined whole installation with Vesta (Scenario 3 — the site-wide case). Carbon monoxide was screened out of detailed assessment (no CO emission limit is set, and no CO is released to atmosphere from the machine). Sulphur dioxide and particulate matter are negligible because the plant is natural gas fired.

The results below characterise the installation's combustion emissions and are the quantitative evidence supporting the 'Low' / 'Negligible' residual air risk in Table 4-1. The peak ground-level increment occurs within about 100 m of the installation.

Table 5-1: Maximum predicted NO_2 impacts at human receptors (whole-site combined and Vesta-specific increment)

Pollutant / metric	AQAL (µg/m³)	Vesta increment (Scenario 2)	Whole-site max PC (Scenario 3)	PC as % AQAL	PEC as % AQAL
NO_2 – annual mean	40	+1.18 µg/m³ (2.9%)	3.06 µg/m³	7.7%	~33%
NO_2 – 1-hour (99.8%ile)	200	+3.5 µg/m³ (1.8%)	~6.4 µg/m³	3.2%	<20%
CO – 8-hour	10,000	screened out	–	–	–
SO_2 / PM_{10}	(natural-gas firing)	negligible	negligible	<1%	<35%

PEC uses an annual NO_2 background of 10.1 µg/m³. Magnitude and significance follow the EPUK/IAQM methodology: all impacts are 'negligible' and there are no predicted exceedances of any air quality objective at any location of relevant exposure. The overall combustion effect at human receptors is 'not significant'. The Vesta machine increases the maximum off-site annual-mean process contribution by 1.18 µg/m³ (from 1.88 to 3.06 µg/m³) and the 1-hour 99.8th-percentile by 3.5 µg/m³ (1.8% of the AQAL); because the annual-mean PC exceeds 1% of the EAL, insignificance is demonstrated via the PEC test (PEC ≈ 33% < 70% of the EAL).

Table 5-2: Predicted impacts at ecological receptors

Receptor class	Metric	Max PC (% of standard)	Result
SACs – Kenfig/Cynffig; Cefn Cribwr Grasslands; Blackmill Woodlands	NO_x critical level; N & acid critical loads	<1%	Insignificant; no likely significant effect (alone / in-combination)
Non-statutory ancient woodland (E1–E7)	NO_x critical level / critical load	≤2.9% (E4)	<100% – no further assessment required
Acid critical-load function (E4, E10; APIS tool)	PEC vs critical-load function	≤1.1% (E4)	PEC below the CLF – no exceedance

All process contributions at the SACs are below 1% of the annual-mean critical levels and critical loads. Following the EA's Operational Instruction 66_12, impacts on critical levels and on nutrient-nitrogen and acid critical loads are all assessed as resulting in 'no likely significant effects (alone and in-combination)' at all considered ecological receptors.

6 Conclusions

This Environmental Risk Assessment has considered the amenity, emission and accident risks presented by the operation and decommissioning of the whole permitted installation at the Bridgend Paper Mill – including the continuing papermaking, converting, energy and effluent-treatment activities and the changes introduced by the Vesta tissue machine – following the source–pathway–receptor methodology in the NRW guidance 'How to carry out a risk assessment for an Environmental Permit'.

Overall, the results show that the proposed management and control measures in place at the installation give adequate protection. All residual risks are assessed as Negligible, Low or Not significant, provided that the documented operating, maintenance and emergency procedures are adhered to. The installation is low risk and will not cause a significant impact on the nearby environment or local residents.

The decommissioning-phase risks (Section 4.7) are temporary, controlled through the construction/demolition management plan and standard Duty-of-Care controls, and are likewise assessed as Low or Negligible. The replacement of Jupiter by the more efficient Vesta machine reduces the installation's overall water consumption, effluent discharge volume, energy demand and scope 1 CO_2 emissions.

The supporting quantitative assessments confirm the qualitative classifications: the ADMS 6.0 dispersion modelling predicts 'not significant' combustion effects at all human receptors with no AQO exceedances at relevant-exposure locations, and 'no likely significant effects' at all ecological receptors; the BS 4142 noise assessments predict 'Negligible' or 'None' significance at all receptors; and the water mass balance and flood-risk design criteria confirm low residual risk to the water environment.

7 References

- Natural Resources Wales: How to carry out a risk assessment for an Environmental Permit
- WEPA UK Ltd: Application for a Variation to Environmental Permit Number EPR/EP3738NG, Bridgend Paper Mill – Vesta, 31 October 2025
- WEPA UK Ltd / SLR: EP Application Report, Bridgend Paper Mill, 02 February 2021
- Documents 59200-0048 and 59200-0052: Air Quality Assessment and Environmental Statement, Vesta, 18 March 2025
- BS 4142:2014+A1:2019 – Method for rating and assessing industrial and commercial sound; BS EN 14792 (NO_x monitoring)
- Environmental Permitting (England and Wales) Regulations 2016; BAT Reference Document for the Production of Pulp, Paper and Board (EU EA Operational Instruction 66_12; EA AQTAG06; CIRIA SuDS Manual (C753) and Welsh