Swadlincote Energy Recovery Facility (SERF)

Environmental Risk Assessment

on behalf of R&P Clean Power Limited

Application for Environmental Permit

May 2024

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Revision	Author	Date	Quality Check	Date	Review	Date
1	CAB	Sept. 2023	PBD	Nov. 2023	CJB	Nov. 2023

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1 Introduction

This Environmental Risk Assessment (ERA) has been completed for Swadlincote Energy Recovery Facility (SERF) in accordance with prevailing Environment Agency (EA) technical guidance[1].

The proposed SERF (the 'Facility') is located in South Derbyshire at Cadley Hill. Approximately 2 km west of Swadlincote, Derbyshire. The Facility is centred at National Grid Reference SK 268 190, with the nearest postcode at DE11 9EN. The surrounding area is characterised by a mix of rural and residential land. Immediately adjacent land uses include; Willshee's Materials Recycling Facility (MRF), Stanton Sewage Works, the A444 (Burton Road), residential properties to the north and south, and arable farmland to the west and south. See Figure 1 for the site location.

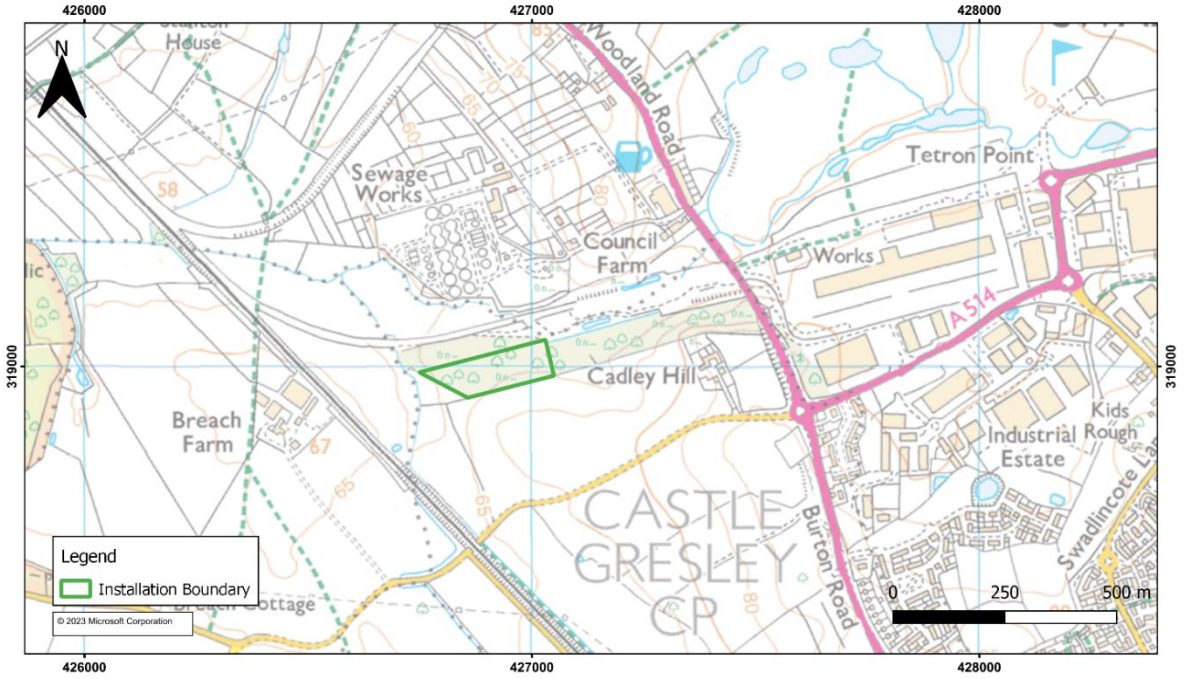


Figure 1: Site Location

The identified local receptors are outlined in Table 1. Distances provided are approximate from the SERF boundary to the nearest point at the receptor boundary. Figure 2 is a local receptors plan, showing the identified local receptors within a 1km radius.

The proposed SERF is approximately 600 m west of the Swadlincote built-up area. The Facility's surroundings are predominantly agricultural, with a small number of residential properties. The SERF adjoins the Willshee's MRF. A wastewater treatment works (WWTW) lies approximately 150 m north. Other industrial and commercial areas lie about 650m east.

The Facility sits in the Mease-Sence Lowlands Landscape Character Area (LCA), a very gently undulating and open, arable farmland landscape with hedgerows and woodland blocks which forms the wider context to the west.

The Facility is also influenced by the immediately adjacent Leicestershire and South Derbyshire Coalfields LCA, which occupies the slightly elevated, rising ground to the east, and is influenced

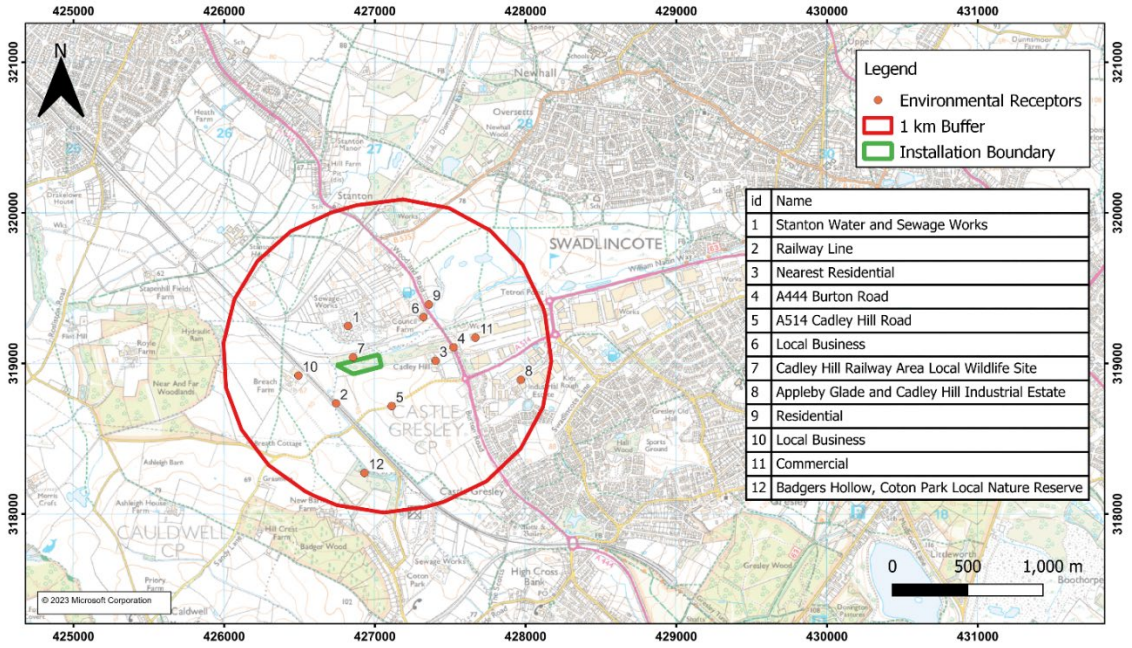
[1] Environment Agency Guidance, Risk assessments for your environmental permit, 2022 (https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit)

by a legacy of coal mining and urban development.

The whole Facility lies within the National Forest designation. The countryside north of the Facility is designated as Green Belt. It is also located within Cadley Hill Railway Area Local Wildlife Site (LWS).

Table 1: Sensitive Receptors

Number	Name	Direction	Distance (metres)
1	Stanton Water and Sewage Works	North	150 m
2	Railway Line	South-west	300 m
3	Nearest Residential	East	420 m
4	A444 Burton Road	East	550 m
5	A514 Cadley Hill Road	South	330 m
6	Local Business	North-east	470 m
7	Cadley Hill Railway Area Local Wildlife Site	North (within Facility)	50 m
8	Appleby Glade and Cadley Hill Industrial Estate	South-east	950 m
9	Residential	North-east	570 m
10	Local Business	West	415 m
11	Commercial	East	650 m
12	Badgers Hollow, Coton Park Local Nature Reserve	South	690 m



id	Name
1	Stanton Water and Sewage Works
2	Railway Line
3	Nearest Residential
4	A444 Burton Road
5	A514 Cadley Hill Road
6	Local Business
7	Cadley Hill Railway Area Local Wildlife Site
8	Appleby Glade and Cadley Hill Industrial Estate
9	Residential
10	Local Business
11	Commercial
12	Badgers Hollow, Coton Park Local Nature Reserve

Figure 2: Local Receptors Plan

2 Objectives of this Environmental Risk Assessment

The objective of this document is to detail the potential environmental risks caused by operations at the Facility, outline the management techniques and immediate actions, and to estimate the level of residual risk. The environmental risk is estimated using the 'risk matrix' provided in Section 3.

Environmental Risk Assessments have been completed for:

- Noise and vibration (Table 3);
- Fugitive emissions to air (Table 4);
- Environmental accidents and incidents (Table 5); and
- Discharges to water (Table 6).

An odour risk assessment is included within the Odour Management Plan. A dust risk assessment is included within the Dust Management Plan.

This ERA does not include specific reference to the training of staff, as this aspect of mitigation stretches across all aspects of risk management for the Facility. On-site staff are provided with training which is specific to their role. The Facility's Environmental Management System (EMS) provides further detail on staff training.

3 Methods of Risk Estimation

3.1 Hazard Pathways

When choosing the receptors, the closest and the most sensitive have been considered in each direction from the hazard. The risk assessment also accounts for the pathway to the identified receptor.

3.2 Probability of Exposure

The probability of exposure is determined by the likelihood of the hazard affecting the receptor.

3.3 Method of Risk Estimation

Table 2 demonstrates the estimation of risk from consideration of the magnitude of consequences and probabilities arising from operations to be carried out on-site. Although the estimation of risk is a simplification that cannot represent the true complexity of assessing risk on the Facility, it has been used as a guide in preparing the ERA included in the subsequent sections of this report.

Table 2: Estimation of Risk

Risk →	*Consequences*			
	Severe	**Moderate**	**Mild**	**Negligible**
Probability				
High	High	High	Medium/low	Near Zero
Medium	High	Medium	Low	Near Zero
Low	High/medium	Medium/low	Low	Near Zero
Negligible	High/medium/low	Medium/low	Low	Near Zero

This risk assessment follows EA guidance on risk assessments for environmental permits[2]. It is noted that this guidance replaces previous EA H1 Guidance (Environment Agency, 2011), however, the H1 methodology is considered to remain appropriate.

[2] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit (accessed 2023)

4 Environmental Risk Assessment

Table 3: Noise and Vibration

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
What has the potential to cause harm?	*What is at risk? What do I wish to protect?*	*How can the hazard get to the receptor?*	*What measures will you take to reduce the risk?*	*How likely is this contact?*	*What is the harm that can be caused?*	*What is the risk that still remains?*
Noise from HGV's making deliveries to Facility	Staff on-site (direct harm), nearest residential located approx. 420 m east of the Facility and nearby local business located approx. 415 m west of the Facility.	Air	• Deliveries will take place during the daytime hours when background noise levels are higher. • Low noise reverse alarms will be operated when required with reverse movements limited through traffic management design. • Vehicle movements are screened from noise sensitive receptors by existing structures.	Medium – Some noise could potentially reach receptors	Mild – Noise is limited to daytime hours	Low – With management techniques utilised
Noise from machinery moving around on-site		Air	• Vehicle movements are screened from noise sensitive receptors by existing structures. • Residual waste fuel and associated inputs/outputs would be delivered 07.00-18.00 Monday to Friday and 07.00-14.00 Saturday. No transport movements will be undertaken on Sundays or Bank Holidays.	Medium – Some noise could potentially reach receptors	Mild – Noise is limited to daytime hours	Low – With management techniques utilised
Noise and vibrations from ERF plant		Air	• All plant to be of low noise design and acoustically treated.	Medium – Some noise could potentially reach receptors	Mild – Nuisance to surrounding receptors	Low – With management techniques utilised

Table 4: Fugitive Emissions to Air

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
What has the potential to cause harm?	*What is at risk? What do I wish to protect?*	*How can the hazard get to the receptor?*	*What measures will you take to reduce the risk?*	*How likely is this contact?*	*What is the harm that can be caused?*	*What is the risk that still remains?*
Dust from waste being delivered to reception hall	Staff on-site (direct harm), nearest residential located approx. 420 m east of the Facility and nearby local businesses located approx. 415 m west of the Facility, and approx. 470 m north-east of the Facility. Local Wildlife Site less than 50 m north of the ERF.	Air (Wind-blown)	Physical Control Procedures: • Ensure that all vehicles delivering waste to the facility are fully enclosed. • Ensure that roller doors on the Waste Reception Hall are only opened for the arrival of a delivery vehicle and that they are closed once the vehicle is fully within the building. Procedural/Managerial Control Measures: • Continuous monitoring of the process using the automatic process control. • A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible. • A preventative maintenance programme will include the regular inspection of all plant and control measures.	Low – Dust could potentially reach the receptors if a strong wind blows in those directions	Mild – Nuisance, dust on private property, cars, etc.	Low – With management techniques utilised
Dust from waste being held in the storage bunker		Air (Wind-blown)	Physical Control Procedures: • All waste held at the Facility will be within buildings maintained under negative pressure. Procedural/Managerial Control Measures: • Continuous monitoring of the process using the automatic process control. • A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible. • A preventative maintenance programme will include the regular inspection of all plant and control measures.	Low – Dust could potentially reach the receptors if a strong wind blows in those directions	Mild – Nuisance, dust on private property, cars, etc.	Low – With management techniques utilised
Dust emission from ash handling		Air (Wind-blown)	Physical Control Procedures: • Bottom ash from grate handled in quenched collection system and deposited into dedicated storage area.	Low – Dust could potentially reach the receptors if a strong	Mild – Nuisance, dust on private property, cars, etc.	Low – With management techniques utilised

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
			• Air Pollution Control materials (from bag filters) transported and stored within sealed system. • All transport off-site to reprocessing/disposal within enclosed or sheeted vehicles. Procedural/Managerial Control Measures: • Continuous monitoring of the process and storage capacity using the automatic process control. • A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible. • A preventative maintenance programme will include the regular inspection of all plant and control measures.	wind blows in those directions		
Particulate and dust from stack emission	Nearest residential located approx. 420 m east of the Facility and nearby local businesses located approx. 415 m west of the Facility, and approx. 470 m north-east of the Facility. Water and Sewage Works located 150 m north of Facility. Sensitive ecological receptors at distance from Facility due to deposition, including Local Wildlife Site less than 50 m north of the ERF, and Local Nature Reserve 690 m south of the Facility.	Air (Wind-blown)	Physical Control Procedures: • Installation of effective bag filters and other air pollution techniques to minimise any dust or particulates in the exhaust Procedural/Managerial Control Measures: • Continuous monitoring of the process using the automatic process control. All emissions to air in accordance with emission limit values. • A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible. • A preventative maintenance programme will include the regular inspection of all plant and control measures.	Low – Particulates and dust could travel and be deposited on receptors if a strong wind blows in those directions	Moderate – Nuisance, dust on private property, cars, etc. Sensitive receptors could be affected	Medium/low – With management techniques utilised

Table 5: Environmental Accidents and Incidents

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
What has the potential to cause harm?	*What is at risk? What do I wish to protect?*	*How can the hazard get to the receptor?*	*What measures will you take to reduce the risk?*	*How likely is this contact?*	*What is the harm that can be caused?*	*What is the risk that still remains?*
Spillages of waste during unloading in reception hall	Staff on-site (direct harm), immediate area. Local Wildlife Site less than 50 m north of the ERF.	Air (Wind-blown)	• Waste will be delivered to the Facility in covered lorries. • Fuel unloading will take place within the designated area of the reception hall only. • Minor spills to be immediately cleaned up. • Follow the Accident Management Plan.	Low – Contained within the reception hall, therefore fuel is unlikely to be transported from wind	Mild – Nuisance, dust on private property, cars, etc. Sensitive receptors could be affected	Low – With management techniques utilised
Bottom ash discharge when handling	Staff on-site (direct harm), nearest residential located approx. 420 m east of the Facility and nearby local businesses located approx. 415 m west of the Facility, and approx. 470 m north-east of the Facility. Local Wildlife Site less than 50 m north of the ERF.	Air (Wind-blown)	• Incinerator Bottom Ash (IBA) is discharged into the storage area after passing through a quench bath, which will limit the mobility of the ash. • The vehicles leaving the Facility will be covered. • Minor spills to be immediately cleaned up.	Low – IBA could potentially reach the receptors if a strong wind blows in those directions	Mild – Nuisance, dust on private property, cars, etc. Sensitive receptors could be affected	Low – With management techniques utilised
Release of APC residues when emptying silos		Air (Wind-blown)	• Any spillage of APC residues will be cleared at the earliest opportunity. • Minor spills to be cleaned up immediately. This will be applied immediately upon spillage to ensure exposure to atmosphere is limited.	Low – APC residues could potentially reach the receptors if a strong wind blows in those directions	Mild – Nuisance, dust on private property, cars, etc. Sensitive receptors could be affected	Low – With management techniques utilised
	Site drainage system	Surface water run-off, infiltration	• Any Air Pollution Control (APC) residues shall be contained and transported off-site for disposal. • In the event of a major spill all residues shall be contained within the Facility and the Facility's emergency response plan shall be implemented.	Low – Facility design will ensure full containment of any APC residues should they be released from containment systems	Mild – Impact on the water treatment plant	Low – With management techniques utilised

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
Loss of lime or activated carbon during injection into the APC system	Staff on-site (direct harm), immediate area. Off-site receptors	Air	• Storage of raw materials with appropriate bunding. The injection system is fully enclosed. • Emergency shutdown if required and inspection of systems. • Staff on-site will wear appropriate PPE to prevent exposure to lime and activated carbon.	Low – Contained within sealed silos, preventing releases outside of the building	Moderate – Negative health implications, including skin irritation, eye damage, and respiratory irritation	Medium/low – With management techniques utilised
Spillage/leak of liquid chemicals when tanker off-loading		Surface water run-off, infiltration	• Deliveries will be from sealed tankers and off-loaded via a hose. Spillage will be prevented by good operating procedures, high tank level alarm/trips etc. Tanks will be located within suitably designed secondary containment. • Spill kits and operator training will contain spillages/leaks.	Low – Facility design and secondary containment will contain spillages/leaks	Mild – Impact on the water treatment plant	Low – With management techniques utilised
Loss of containment due to damage caused by vandalism or theft		Surface water run-off, infiltration	• Facility has fencing, CCTV, and lockable gates. • All visitors to the Facility (including personnel) must report to the Facility office to sign in. • Chemicals stored inside of building or in secure containment on part of the Facility well away from public access or interference. • Tanks will be located within suitably designed secondary containment.	Low – Facility security is in place to prevent vandalism and theft	Mild – Impact on the water treatment plant	Low – With management techniques utilised
Operator Error / Failure of Equipment		Direct – harm/injury, spread of fire, explosions. Air (wind-blown)	• Technically competent staff will oversee the management of activities on the Facility. • Training (including refresher training) will be given to all Facility staff regarding the Environmental Permit, health and safety and incident response. • The Facility is equipped with spare plant and equipment which can be used in the event of a single plant breakdown (e.g., loading shovels etc.). • The Facility has been designed with fail safe and automatic shutdown systems to prevent accidental emissions in the event of equipment failure.	Low – All operators are trained and technically competent for activities on-site; refresher training is also in place	Mild – Nuisance from smoke arising from fire	Low – With management techniques utilised

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
			• Emergency response plan will be in place.			
Failure of emission abatement or monitoring equipment	Nearest residential located approx. 420 m east of the Facility and nearby local businesses located approx. 415 m west of the Facility, and approx. 470 m north-east of the Facility. Water and Sewage Works located 150 m north of Facility. Sensitive ecological receptors at distance from Facility due to deposition, including Local Wildlife Site less than 50 m north of the ERF, and Local Nature Reserve 690 m south of the Facility.	Air (Wind-blown)	• Regular maintenance and inspections. A back-up system will be available. • Emergency shutdown if required and inspection of systems.	Low – Back-up system available if regular system fails	Moderate – Accidental exposure to emissions	Medium/low – With management techniques utilised
Failure of mains services e.g., water or electricity	Plant operations	Direct – harm/injury, spread of fire, explosions. Air (wind-blown)	In the event that mains services of water and electricity supplied to the Facility are unavailable, the following actions will occur: • All conveyors will cease operating so no further transfer of material can occur. • The software control systems are all backed up with an Unlimited Power Supply system that will ensure that a controlled shutdown takes place.	Medium – Potential to happen in extreme weather, or if there's a power cut in the local area	Mild – Facility operations will have to stop, reducing output	Low – With management techniques utilised

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
			• The boiler plant shall shutdown, thus rendering the plant inoperable. • There is back-up generation for combustion control systems. • Controlled shutdown of the water treatment plant. • The facility has been designed with a number of fail safe and automatic shutdown systems. • Should the facilities storage capacities be exceeded, incoming waste will be diverted to a nearby waste processing / landfill site.			
Residues handling failure	Staff on-site (direct harm), immediate area. Local Wildlife Site less than 50 m north of the ERF.	Direct contact	• Training in residue handling practices. • Contained transfer systems. Impervious surfaces in residue handling areas with designated drainage systems in areas where residues are stored. • Emergency shutdown if required and inspections of systems.	Low – Training and emergency shutdown systems in place	Moderate – Staff will come into contact with residues	Medium/low – With management techniques utilised
Fire in furnace / feed system	Staff on-site (direct harm), immediate area. Local Wildlife Site less than 50 m north of the ERF.	Direct – spread of fire Air (wind-blown)	• Furnace charging procedures / training. • Fire detection and fire-fighting systems. • Follow the Fire Prevention Plan.	Low – Fire-fighting systems in place	Mild – Nuisance from smoke arising from fire	Low – With management techniques utilised
Contamination of drainage network with water used for fire fighting	Sustainable urban drainage system (SuDS)	Site drainage network	• Follow the Fire Prevention Plan. • All fire waters to be contained on-site. • Penstock to prevent flows to SuDS system (automatic).	Low – Secondary containment and penstock would prevent flow reaching the SuDS	Mild – Nuisance from smoke arising from fire	Low – With management techniques utilised

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
Fires in all waste reception storage and handling areas	Staff on-site (direct harm), nearest residential located approx. 420 m east of the Facility and nearby local businesses located approx. 415 m west of the Facility, and approx. 470 m north-east of the Facility. Local Wildlife Site less than 50 m north of the ERF.	Direct – spread of fire Air (wind-blown)	• The Facility is fitted with a fire detection and suppression system to meet the objective of a fire on a waste pile being extinguished within a maximum timeframe of 4 hours. • Follow the Fire Prevention Plan.	Low – All waste held at the Facility will be within buildings maintained under negative pressure	Mild – Nuisance from smoke arising from fire	Low – With management techniques utilised
Flooding	Staff on-site (direct harm), immediate area. Local Wildlife Site less than 50 m north of the ERF.	Direct	• The Facility is mostly within Flood Zone 1, and part of the Facility on the eastern boundary appears to be located in flood zone 2 and flood zone 3. • Proposed mitigation includes a range of SuDS, including a SuDS basin, swale, and wetland pond on the wider site. Runoff will be attenuated on-site and discharged to surface water.	Low – SuDS system in place	Moderate – Nuisance, could transport waste on-site	Medium/low – With management techniques utilised
Flooding from blocked drains and burst pipes	Staff on-site (direct harm), immediate area. Local Wildlife Site less than 50 m north of the ERF.	Overwhelmed drainage system and resulting surface water-runoff	• Facility and general informal drainage will be checked frequently to ensure it is in good condition and free from ponding. • Any ponding of surface water found will be removed immediately, or where this is not possible as soon as it is practical.	Low – Maintenance and inspection programme in place	Mild – Minor flooding / ponding on-site due to impermeable surfacing	Low – With management techniques utilised

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
Incompatible feedstock, unable to receive fuel	Plant operations	Feedstock	• The following methods will be implemented to ensure that incompatible feedstocks do not compromise the safe operation of the plant: • All fuel accepted onto Facility have been subject to 'pre-acceptance' in accordance to established procedure. • Incoming fuel is inspected in accordance with established procedures. • Any non-conforming fuel will be removed prior to acceptance in accordance with established procedure. • Records of incidents involving incompatible feedstock will be kept on-site together with a summary of the remedial action taken. • All operations will be closely monitored to allow immediate deployment of mitigation measures in the event of a spillage. • All wastes will be stored in containers/bays and/or suitably engineered areas of impermeable concrete. All treatment operations are conducted upon an impermeable concrete pad. • Vehicles for dispatch will not be overfilled and will be supervised during loading.	Low – Pre-acceptance prevents most unacceptable feedstock/waste reaching site	Mild – Potential fire risk if unacceptable waste accepted	Low – With management techniques utilised

Table 6: Discharges to Water

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
What has the potential to cause harm?	*What is at risk? What do I wish to protect?*	*How can the hazard get to the receptor?*	*What measures will you take to reduce the risk?*	*How likely is this contact?*	*What is the harm that can be caused?*	*What is the risk that still remains?*
Escape of process effluents	Sustainable urban drainage system (SuDS) / Controlled waters	Site surface water drainage system	• Process effluents arising from boiler blowdown, the demineralisation unit and the cleaning/draining of equipment will be collected in the on-site wastewater pit to be re-used in the Facility. • Any excess process effluents will be tankered off-site under a suitable waste collection contract. • No process effluent will be discharged to surface water or sewer.	Negligible – System is designed to contain process water	Mild – Ecological impact	Low – With management techniques utilised
Foul water	Sustainable urban drainage system (SuDS) / Controlled waters	Site foul water drainage system	• Foul waters arising from domestic water use will drain to a new private package treatment plant. • Treated flows will discharge to the proposed swale and wetland area which can provide further polishing ahead of outfall to the downstream watercourse. • The final discharge of treated foul waters will be in accordance with the general binding rules for small sewage discharges with effect from 2 October 2023. • The treatment plant will be a domestic grade plant.	Negligible – System is designed to contain foul water	Mild – Ecological impact	Low – With management techniques utilised
Contamination of surface water system arising from spills (e.g., chemicals)	Sustainable urban drainage system (SuDS) / Controlled waters	Surface water runoff	• Surface water runoff from the proposed buildings and infrastructure will be collected and transferred via private storm networks towards a series of attenuation features. • Prior to release into any attenuation features, runoff will first drain through a series of pollution control measures (i.e., trapped gullies, manholes with catch pits etc).	Low – Secondary containment and penstock would prevent flow reaching the SuDS	Mild – Ecological impact	Low – With management techniques utilised

Hazard	Receptor	Pathway	Management Techniques	Probability of Exposure	Consequence	What is the Overall Risk?
			• The attenuation features will include a combination of belowground tank storage, together with above-ground Sustainable Drainage Systems (SuDS), each sized to accommodate up to the 100-year return period storm, including 40% allowance for climate change. • Training in unloading practices. • Under manual control, continual observation. Impervious surfacing. • Cover drains and contain spillage using spill kit equipment provided. • Protect groundwater well manholes with spill kit absorbent socks. • Penstock to prevent flows to SuDS system (automatic).			
Contamination of drainage network with water used for fire fighting	Sustainable urban drainage system (SuDS) / Controlled waters	Site drainage system	• Follow Fire Prevention Plan. • On-site bunding will contain fire waters.	Low – Secondary containment and penstock would prevent flow reaching the SuDS	Mild – Ecological impact	Low – With management techniques utilised

5 Conclusions

The risk assessments detailed in this document indicate that the proposed Facility is considered unlikely to cause any significant disturbance to the identified receptors. Although there are various receptors within proximity to the Facility, the implementation of a range of management techniques will mitigate any potential impacts relating to noise and vibration, fugitive emissions to air, environmental accidents and incidents, and discharges to water.

The Facility will be operated in accordance with a written EMS which will include procedures and forms to provide instruction to on-site operatives.

This ERA concludes that, accounting for the implementation of the management techniques, it is considered that the proposed Facility will not have a significant impact on the environment.