

5. Development Description

5.1 Introduction

5.1.1 Under Schedule 5 of the 2017 Regulations, an Environmental Statement should provide a description of the development. This chapter describes the development for which planning permission is sought and sets the basis against which the Environmental Impact Assessment has been conducted.

5.1.2 The development proposals have been formulated following a thorough investigation and assessment of potential environmental impacts from the scheme.

5.1.3 The layout of the proposed facility is described within this chapter together with a description of the processes to be carried out on site.

5.1.4 In preparing the development proposals, consideration has been given to the following constraints:

-) Proximity of receptors and the likely environmental impacts in terms of noise and air quality;
-) Visual and Landscape Impact;
-) Hydrogeology and Ground Conditions; and,
-) Hydrology.

5.2 Summary

5.2.1 In summary, the proposed Energy Facility is designed to process approximately 60,000tpa of waste to deliver approximately 3.48MW of power. It comprises the following three elements:

-) The Fuel Store which will receive and store the materials prior to processing and,
-) The Energy Plant and associated stack which will combust the material to produce energy and heat.
-) Combined heat and power equipment and associated infrastructure.

5.2.2 The proposed layout and associated elevations are provided in plans 012, 020, 021, 022 and 023 Site Elevations respectively.

5.3 The Technology

- 5.3.1 The Energy Facility will utilise moving grate technology which has a proven track record both in the UK and Europe.
- 5.3.2 The flow diagram below provides an illustration of the proposed technology processes:

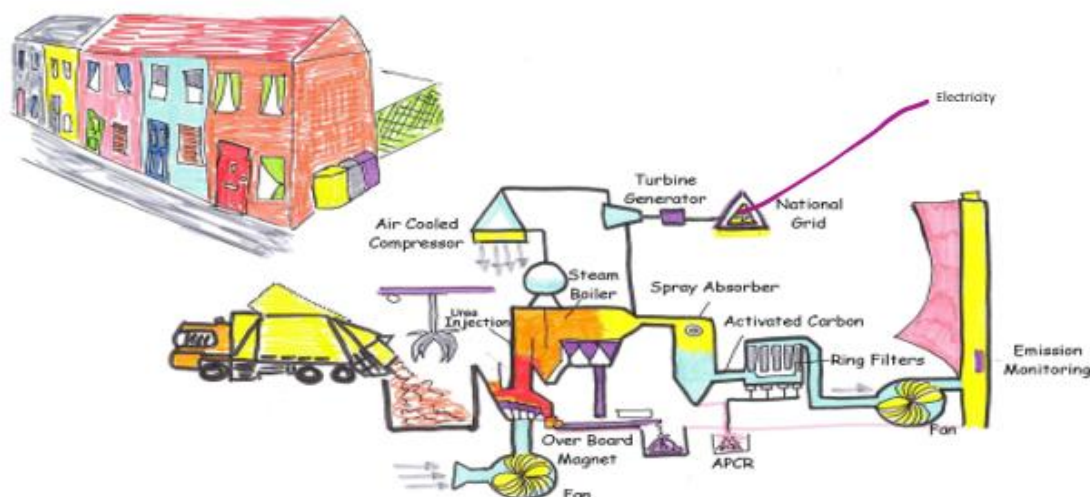


Figure 5.1: Process Diagram.

5.4 Proposed Operational and Technological Processes

Delivery

- 5.4.1 Upon reception at the site, each delivery vehicle will be weighed at the weigh bridge and the waste screened to ensure compliance with the acceptance criteria.
- 5.4.2 Delivery vehicles will then be routed within the site to access the fuel store.
- 5.4.3 The fuel store will operate at negative pressure and air knives will be used to ensure odours are not released as HGVs empty their loads into the building.

Storage and transportation of Materials

- 5.4.4 The material will be removed from the storage silo by an internal crane which will load it onto a push floor.
- 5.4.5 The material will then be pushed by ladders (steel structures) onto a belt conveyor which will move it into the Energy Plant. The material is then transported into a hydraulic infeeding unit which feeds the material into the furnace.



Figure 5.2 Infeeder system

The Furnace & Boiler House

- 5.4.6 The material is transported through the furnace by a hydraulically driven moving grate and is subsequently dried, gasified and combusted.
- 5.4.7 The temperature in the furnace is controlled between 925°C and 975°C. Low NO_x emissions and complete combustion is reached by specially designed stage combustion.
- 5.4.8 The grate is cooled by the fresh air under the grate and flue gas recirculation.
- 5.4.9 Most of the ash falls from the end of the moving grate into the wet ash conveyor. Fine ash that goes through the grate also falls in the wet ash conveyor and is automatically transported to the ash container.
- 5.4.10 The wet system prevents dust from spreading in the boiler house.



Figure 5.3: Wet ash conveyor

Steam Cycle

- 5.4.11 Maximum electrical output is generated by the combination of high-pressure steam within the steam turbine.



Figure 5.4: Steam turbine

Flue gas cleaning

- 5.4.12 The cooled flue gas from the boiler goes into a cyclone where dust is removed. Bicar and active carbon is injected in the fluegas to reduce HCl, SO_x, dioxins and heavy metals.
- 5.4.13 The ash from the boiler and the cyclone is transported to the wet ash system.
- 5.4.14 NO_x emissions are reduced with Urea injection in the furnace. Due to high contents of nitrogen in the fuel, a catalytic deNO_x (SCR) installation will also significantly reduce the NO_x emissions from the Energy Centre.
- 5.4.15 All material will be carefully stored in sealed units in accordance with Environment Agency guidelines.

Outputs

- 5.4.16 The facility will produce approximately 3.48MW of electricity which will be used to power local development and residences.
- 5.4.17 The facility will also produce heat for supply via a district heating scheme to be developed to support adjacent development. The infrastructure for this has been included to the proposed sites boundary, connections will be the subject of further planning applications.

- 5.4.18 The connection will be provided by a DNO and as such falls under the statutory authorities' permitted development rights.

Residual Outputs

- 5.4.19 Residual outputs that cannot be processed, including ash (bottom and fly ash) will be removed for off-site reuse and disposal

Air Emissions

- 5.4.20 All stack emissions will be kept within IED (Industrial Emission Directive) Limits.

Noise Emissions

- 5.4.21 The estimated specifications of noise emission of the installation are as follows:
-) The average sound pressure in the Energy Plant will be approximately 80dB(A). Sound levels outside the plant will be mitigated to a suitable level.
 -) The maximum sound pressure level in the Energy Plant will be lower than 85 dB(A) at 1 metre distance.
- 5.4.22 In the turbine room, control room and stacks will have silencing equipment installed.

Odour Emissions

- 5.4.23 The facility will be equipped with a negative pressure system to prevent fugitive release of odorous air. This is based around 2 systems as follows:
-) Air would be drawn from the Fuel Store into the Energy Plant and used in the combustion process where odours would be destroyed.
 -) The Fuel Store will also be also equipped with a dedicated odour control unit.
- 5.4.24 The primary method of extraction would be via the Energy Plant, supplemented with the 2 stage odour control unit at times when the Energy Plant is off line.

Water Usage

- 5.4.25 The facility will be able to produce high pressure steam by recovering energy from the engine exhaust gases. The steam will be used for heating purposes (process and buildings) and for steam tracing.
- 5.4.26 Condensate will be recovered and re-circulated in the steam turbine.
- 5.4.27 The raw water will be sourced from the public mains supply. The plant will consume approximately 4-5m³/h.

5.4.28 Detailed fire water calculations will be provided as part of the permit. However, the proposed fire water tank has been designed to hold 16m³/hr of fire water to be available if required.

5.5 Operation

5.5.1 The plant will be operating 24 hours a day.

5.5.2 Deliveries will take place over a 15 hour period between 6am and 9pm.

5.6 Built Development

5.6.1 The elevations provided in plan 020, 021, 022, 023 provide details of the proposed built structures including:

) The Energy Plant approximately 35.5m long, 22m high and 32.7m wide.

) The Fuel Store approximately 25.8m long, 22m high and 45.3m wide.

) The stack, at a height of 50m.

) A water tank of 6m long, 6m wide and 25m high.

5.6.2 The following table provides details of the proposed developments ancillary equipment:

Table 5.1: Ancillary Equipment

Equipment	Length	Width	Height	Number
External Silo	4m	3.2	2.1	4No
Dry coolers	11.5m	2.4m	3m	7No.
Ash bins	6.4m	2.3m	2.1	2No
Weighbridge	22m	5m	N/A	1No

5.7 Staff

5.8 There will be three staff working at the facility on each of the three eight hour shifts per day (06:00-14:00, 14:00-22:00 and 22:00 to 06:00).

5.9 Landscape Planting and Management

5.9.1 The proposed landscape management plan is provided in figure 7.25 contained within volume 3. This plan includes additional planting along the south eastern and south western boundaries of the site.

5.10 Site Drainage

Grey Water

5.10.1 Grey water will be collected and recirculated within the Energy Plant. This is detailed within chapter 11 of this Environmental Statement,

Surface Water

5.10.2 Surface water runoff will be directed to a drainage system through drainage gullies located around the perimeter of the buildings and through hard standing areas. Attenuation storage has also been included to manage the run off to greenfield rates.

5.10.3 Full details of the proposed drainage strategy are set out within chapter 11 of this Environmental Statement.

5.11 Ancillary Development

On site circulation

5.11.1 On entering the site, vehicles will be directed around the southern perimeter of the facility.

5.11.2 Vehicles will then drive straight into the fuel reception building and deposit the material. These vehicles will exit the site via the same route.

5.11.3 Due to the relatively low number of vehicles entering and existing the site, queuing is not expected. However, in the unusual event that this occurs, vehicles can wait at the site access without affecting traffic movements through the industrial estate.

Site Management

5.11.4 Upon entry to the site, vehicles will turn into the access road and be admitted into the site via a sliding access gate by staff manning the adjacent security hut.

Parking

5.11.5 7 new parking spaces (one of which will be for disabled users) will be provided for staff and visitors to the east of the proposed development site. A pedestrian route is also proposed to ensure safety.

Fencing

5.11.6 The proposed development will be surrounded by 2.0m powder coated metal fencing.

External Lighting

5.11.7 Lighting will be directional to ensure that light spill is kept to a minimum.

5.12 Access & Traffic

5.12.1 The fuel will be delivered to the facility in 23 tonne capacity articulated containerised trucks with walking floors resulting in 2609 inbound and 2609 outbound movements per year, an average of 9 deliveries or 18.2 vehicle movements per weekday (a single vehicle which delivers to the site and then leaves creates one movement in and one movement out – two movements).

5.12.2 An additional 0.7 vehicle movements per weekday of process chemicals will be delivered to the development site.

5.12.3 The ash output from the operation would be collected from the facility in appropriately secured trucks with a 20 tonne capacity, resulting in 470 inbound and 470 outbound movements per year, an average of 3.3 vehicle movements per weekday.

5.12.4 The total number of vehicle movements per weekday associated with the facility would be 22 HGV movements and a maximum of 18 car movements. On average, there would be less than two HGV movements and no car movements during each weekday network peak hour.

5.13 Substances used on site and storage of hazardous material

5.13.1 The SNCR de-NO_x system will use urea as the reagent. The reagent and treatment chemicals will be stored in suitable containers or stainless steel bunded storage tanks provided with a pressure relief valve and vent scrubber system, as appropriate. In the event of a spillage, the bunds will retain the liquid.

5.13.2 These materials will be stored in accordance with Environment Agency guidelines.

5.14 Utilities

Mains Water

5.14.1 Northumbrian Water is the local water undertaker within Durham. It is responsible for fresh water supply and the wastewater sewerage networks.

Electrical Power

5.14.2 Under normal atmospheric conditions the plant will be rated to produce 3.48MW of electrical output.

5.14.3 This energy will be exported to the national grid for distribution.

5.14.4 The plant is able to run for 8,000 hours per year and will be connected to the Local Smart Grid.

Heat offtake

5.14.5 Excess heat will be exported to the wider regeneration area.

5.14.6 The connections will be subject to a future planning application.

5.15 Facility Inputs and Outputs

Waste Types

5.15.1 The facility will process non-hazardous residual waste materials from a variety of local sources, mainly commercial, which will be collected and delivered to the site.

Capacity

5.15.2 The proposed development will process up to 60,000 tonnes of waste material a year.

5.15.3 In addition to the waste materials other key raw materials into the facility will include:

) Water;

) Bicar;

) Activated Carbon; and,

) Urea.

5.15.4 Approximately 2000 tonnes of process chemicals (as outlined above) will be utilised at the plant per year.

Outputs

5.15.5 In addition to the export of electricity and heat, the facility will produce the following outputs which will be removed off site:

) 7,200 tonnes of fly ash;

) 1,200 tonnes of bottom ash; and

) 1,000 tonnes of spent chemicals.

5.16 Monitoring and Hazard Prevention

5.16.1 The proposed development has incorporated hazard prevention in its design in order to reach Environment Agency standards.

5.16.2 Monitoring of the development will take place under the permit requirements as issued by the EA.

5.17 Plant Maintenance and Shut down

5.17.1 Plant maintenance will be required for four weeks every year.

5.17.2 The proposed development has been designed to hold a maximum of 630 tonnes of waste at any given period. This allows PGL to hold material during emergency shut-downs but ensures that the facility is not at risk of fire.

5.17.3 This accords with the Environment Agencies stringent requirements.

5.18 Decommissioning

5.18.1 Planning Permission is sought for permanent development on the site and therefore it is not considered necessary to consider the impacts of the decommissioning phase within this Environmental Statement.

5.19 Construction

Timescales

5.19.1 The construction phase will take approximately 18 to 21 months.

Hours of Work

5.19.2 Construction operations will generally take place between the following hours;

) 06.00-20.00 Monday to Friday

) 07.00-17.00 Saturday

5.19.3 No construction works will take place on Sundays or Public Holidays without prior agreement with the planning authority.

5.19.4 Any intrusive works outside these hours would be with prior agreement of the planning authority, accept in the case of any emergency.

Access to the Site

5.19.5 Access to the site will be via the existing access arrangements.

Construction Plant

5.19.6 Plant to be used during the construction phase will include the following:

) Tracked Excavators (Excavation and loading);

) Crushing Plant;

) Articulated Dump Trucks;

) Wheeled Back Hoe Loaders;

) Road Vehicles – up to 36 GVW;

) Vibrating Rollers;

) Asphalt Paving Plant;

) Piling Rigs;

) Ready Mixed Concrete Trucks;

) Concrete Pump;

) Cranes; and

-) Diesel Generators.

Construction Stages

5.19.7 The construction stages are as follows:

-) Mitigation: Necessary mitigation measures to be put in place where necessary;
-) Mobilisation: Work to start on site;
-) Level Site and Trenches: There will be minimal material movement at the site as the existing bund will be retained.
-) Retaining Wall, Hardstanding and Roads: The provision of all necessary hardstanding and access road improvements;
-) Piling and Foundations: This is required for both the Fuel Store and Energy Plant;
-) Drainage: Laying of all drainage infrastructure;
-) Steelwork: Erection of all steelwork;
-) Cast Floors;
-) Cladding and Doors;
-) Crane;
-) Builders work and plant delivery;
-) M&E;
-) Tanks;
-) Stacks;
-) Weighbridge;
-) Landscaping.

Operational Practices

5.19.8 The following details set out the operational practices that will be employed during the construction phase in order to minimise the environmental impacts.

5.19.9 Further detail will be provided in a Construction Management Plan which will be provided as part of condition to any planning consent.

Site Security and Safety

5.19.10 Fencing will be erected to ensure the security and safety of the site.

Contractors Compound & Site Facilities

5.19.11 The contractor will utilise the existing offices located within the site.

Set down Areas

5.19.12 The proposed development site has enough space to provide for set down areas.

Loading and Unloading of plant and materials

5.19.13 Construction delivery and plant traffic will be directed by means of prominent signage into the site along the road.

5.19.14 On entry to the site a check point, with gateman/security guard in attendance, will be placed with visible signage requesting delivery drivers to sign in and notify site personnel prior to entry into the construction work area.

5.19.15 All loads and tickets will be checked prior to the offloading of materials and plant on site, or within the designated materials laydown area.

5.19.16 All off-loading activities will be carried out under a permit to work procedure

Wheel Wash Facilities

5.19.17 A wheel wash facility will be provided close to the site entrance.

Measures to control dust and dirt during construction

5.19.18 The site will adopt the following mitigation measures where appropriate:

-) Identify a responsible person in charge, likely to be Site Supervisor who will be on site during working times and will maintain a Log Book of emissions and carry out site inspections;
-) Machinery and dust causing activities will be located away from sensitive receptors where practicable;

-) Temporary roads will be watered to reduce the level of dust emissions;
-) Water will be used as a dust suppressant
-) Measures to Address Contaminated Ground
-) Any contaminants found during the construction phase will be dealt with in accordance with a Construction Management Plan, to be formulated and agreed with the Regulatory Authorities.
-) If contaminated ground is encountered during the construction phase, the contaminated material will be excavated and placed on impervious sheeting. The material will be banded to prevent any liquid run off.
-) A registered laboratory will be brought in to undertake Waste Acceptance Criteria (WAC) tests and identify the type and level of the contaminant. The materials will then be disposed of, via a licensed haulier, at an appropriately licensed facility.

Measures to address groundwater

- 5.19.19 The areas of hardstanding which will be constructed using bound pavement construction and incorporate dedicated drainage. The design, construction and operation of the proposed development will provide environmental enhancement measures, which are in greater detail within Chapter 8 of this Environmental Statement.
- 5.19.20 As part of the site preparation works a site strip will be undertaken along with removal of any existing obstructions. This will remove potential unforeseen contamination sources leading to environmental betterment.

Site Specific Procedures

- 5.19.21 The following site-specific procedures will be in place during the construction period as appropriate:
-) all employees will attend a site induction carried out by the construction contractor on arrival to site. The induction will be project specific emphasising the contractor's safety procedures and rules and site plans phasing;
 -) all employees will have signed onto the contractors Permit to Work/Risk Assessment and will have read and understood the method of work and safety procedures prior to commencing work on site;

-) 'Take Time' risk assessments will be completed by each working gang or persons prior to commencing work;
-) all plant operatives will be competent trained personnel and carry the required certification (CPCS) in line with the contractors approved list;
-) site staff will carry out daily checks as part of safety and quality procedures; and
-) all operatives will be briefed at induction stage on the importance of waste segregation and recycling of materials generated on site.

Staff

5.19.22 Construction is anticipated to employ up to 60 staff.

Residues and Emissions

5.19.23 The following section provides a summary of estimates, by type and quantity, of expected residues and emissions associated with the construction phase of the proposed development. The basis for these estimates, as well as an assessment of their potential impacts and effects are discussed in more detailed within this Environmental Statement.

Emissions to air

5.19.24 There is the potential for dust generation during the construction phase due to earthworks, and movements of mobile plant accessing and operating on the site.

5.19.25 Contractors will be required to use good engineering practices and follow good practice guidance as outlined in the previous section to minimise dust emissions during the construction phase.

Traffic

5.19.26 The busiest phase of construction will generate approximately 5 two way movements per hour.

5.19.27 This traffic is temporary and will be routed within the development site.

Noise

5.19.28 Indicative noise levels for construction plant/activities or the main construction phase are summarised in the table below.

Source	Noise (dBA) at 10m
Vibratory Sheet Piling Rig	88
44ton Tracked 360 deg Excavator (loading)	85
44ton Tracked 360 deg Excavator	82
Articulated Dump Truck	80
14ton Tracked 360 deg Excavator	83
Wheeled Back Hoe Loader	68
Wagon (drive by)	80
Telescopic handlers	71
Roller	79
Water Pump	62
Concrete pump	78
Generators	57
Cement Mixer Truck (discharging)	75
Crane (anticipated worst case scenario)	78

Figure 5.8: Estimated Construction Noise Emissions at Source

Vibration

- 5.19.29 The expected levels of vibration to be generated on the development site and the location of construction activity relative to surrounding buildings and occupiers will not have detrimental effect on receptors outside the site boundary.
- 5.19.30 Vibration assessments will be carried out for personnel using equipment which propose a risk as required under current regulations.