Environmental Statement: Volume I

Chapter 4: Proposed Development

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4.0 THE PROPOSED DEVELOPMENT

4.1 Introduction

4.1.1 The Proposed Development comprises the construction and operation (including maintenance) of a gas-fired Open Cycle Gas Turbine (OCGT) power station with a gross electrical output of up to 299MW.

4.1.2 The Proposed Development would not run continuously but would operate intermittently. It would, however, need to be permanently on standby and available at all times. It is most likely to run during periods of low electricity supply or high demand on the transmission network, or when required to provide technical services to support the National Grid. This is expected to be weighted towards the winter period, for a few hours at a time. However, as the operation of the plant is driven by the dynamics of the energy market, the plant could run for longer periods, at any time of day, up to the maximum allowed under its Environmental Permit.

4.1.3 At this stage in the Project, the final manufacturer selection cannot yet be made, as it will be determined by various technical and economic considerations. The design of the Proposed Development therefore incorporates a necessary degree of flexibility in the choice of manufacturer, and plant dimensions and configuration of any enclosures or buildings, if installed, to allow for the future selection of the preferred equipment manufacturer and construction contractor.

4.1.4 In order to ensure a robust assessment of the likely significant environmental effects of the Proposed Development, the Environmental Impact Assessment (EIA) has been undertaken adopting the principles of the 'Rochdale Envelope' where appropriate, as described in the Planning Inspectorate (PINS) advice note 9 (Ref 4-1). This involves assessing the maximum (and where relevant, minimum) parameters for the elements where flexibility needs to be retained. Where this approach is applied to the specific aspects of the EIA, this has been confirmed within the relevant chapters of this Environmental Statement (ES). Justification for the need to retain flexibility in certain parameters is also outlined where these parameters are presented.

4.1.5 Figure 3.2 (ES Volume II, Application Document Ref. 6.3) shows the areas within which each element of the Proposed Development is anticipated to be constructed. The stack location for the OCGT has been defined within a limit of deviation on the OCGT Power Station Site.

4.1.6 Outline timescales for the construction and operation of the Proposed Development assumed for the purposes of assessment are as follows:

- Subject to the necessary consents being granted and a final investment decision being made, it is envisaged that construction work would commence in Q1 2021 and take approximately 21 months; and
- Commencement of commercial operation could take place from Q4 2022.

4.1.7 It is envisaged that the Proposed Development would have a design and operational life of at least 40 years, therefore decommissioning activities are currently anticipated to commence after 2062.

4.1.8 This chapter is supported by Figures 4.1a and b and Figures 4.2a and b (ES Volume II), illustrating the indicative layouts of the Proposed Development.

4.2 Components of the Proposed Development

4.2.1 This section provides further detail on the components of the Proposed Development within the Development Consent Order (DCO) Order limits, referred to in this ES as 'the Site'.

4.2.2 The Proposed Development will comprise the construction and operation of an Open Cycle Gas Turbine (OCGT) power station with a gross electrical output of up to 299MW, including:

- Work No. 1 – an OCGT power station (the 'OCGT Power Station') with a gross capacity of up to 299MW; comprising:
  - A single gas turbine;
  - An electrical generator;
  - A single stack;
  - Transformer(s);
  - A closed loop fin-fan cooling system and water supply;
  - Switchyard, associated switch gear and ancillary equipment;
  - Gas receiving area, including gas treatment control facilities and a gas reception building;
  - Auxiliary generator and liquid fuel tank for emergency electrical supplies;
  - Lubricating oil, hydraulic oil and chemical storage tanks and equipment;
  - Workshops and stores;
  - Electrical, control, administration and welfare buildings;
  - Above ground raw water and fire water storage tanks;
  - Storm water attenuation system or similar;
  - Internal access roads and car parking;
  - Landscaping and fencing; and,
  - Other infrastructure and auxiliaries.
- Work No. 2 – access works (the 'Access'), comprising access to the Main OCGT Power Station Site and access to Work Nos. 3, 4, 5 and 6;
- Work No. 3 – temporary construction and laydown area ('Temporary Construction and Laydown') comprising hard standing, laydown and open storage areas, contractor compounds and staff welfare facilities, vehicle parking, roadways and haul routes, security fencing and gates, gatehouses, external lighting and lighting columns;
- Work No. 4 – gas supply connection works (the 'Gas Connection') comprising an underground and overground gas pipeline of up to 600 millimetres (nominal internal diameter) and approximately 800 m in length for the transport of natural gas from the Existing Gas Pipeline to Work No. 1;
- Work No. 5 – an electrical connection (the 'Electrical Connection') of up to 400 kilovolts and controls systems; and

- Work No 6 – utilities and services connections (the 'Utilities and Services Connections').

OCGT Power Generation Equipment (Part of Work No. 1)

4.2.3 In an OCGT, natural gas fuel is mixed and combusted with air from the compressor section of the gas turbine (GT) and the hot gases are expanded through the power turbine section of the GT which drives a generator to produce electricity for export to the National Grid electricity transmission system.

4.2.4 Gas turbines are widely used in the power industry as they have multiple advantages when compared to other power plant technologies, such as their flexibility of operation, ease of use and compactness. They are ideally suited to the planned operation of the power station as they can be started and shut down quickly, and operate flexibly across a range of loads.

4.2.5 In this instance, a single OCGT has been selected for the Proposed Development. The OCGT building dimensions are presented in Table 4.1 with a single stack with a maximum height of 56m Above Ordnance Datum (AOD).

4.2.6 The plant would be supported by suitably rated switchgear and ancillary electrical equipment to allow operation of the power plant and export of electricity through the existing National Grid Electricity Transmission equipment located on the adjoining Existing VPI CHP Plant Site.

4.2.7 The use of natural gas means that emissions of sulphur dioxide (SO_2) and particulate matter (PM) from the OCGT will be negligible. Emissions of nitrogen oxides (NO_x) will be controlled by primary means and the use of dry low NO_x burners operated and controlled through an automated process control system in accordance with Best Available Techniques (BAT).

4.2.8 In this way, emissions will be controlled to meet the requirements of the Industrial Emissions Directive (Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control), IED) and the European Large Combustion Plant BAT Reference document (Ref 4-2) which was finalised in 2017 and contained lower annual average emission limits than were included in the IED.

4.2.9 Only limited cooling is required for this type of plant and this would be achieved through a closed loop system utilising fin-fan coolers which require a small supply of water.

4.2.10 A number of auxiliary operations are required to support the operation of the OCGT including a gas pressure control station, demineralised water treatment plant, water and lubricating oil storage tanks, air intake filters, generator transformers, unit transformer(s), and chemical sampling/ dosing plant. The location of these are shown on Figures 4.1a and 4.1b (ES Volume II, Application Document Ref. 6.3), noting that the concept layout is indicative only at this stage.

Auxiliary Generator (Part of Work No. 1)

4.2.11 An auxiliary generator would be required for the safe shut-down of the plant in the event of emergency shutdown or loss of power. The generator would be liquid fuelled (diesel) and the fuel would be stored in appropriately bunded above ground storage tanks (AST) of less than $30m^3$ capacity.

Gas Pipeline Infrastructure (Work No. 4)

4.2.12 Gas would be supplied to the Proposed Development by means of new and existing gas connection pipelines, as described in Chapter 3 (ES Volume I).

4.2.13 The new gas connection pipeline would link into the existing high pressure gas main via the existing Above Ground Installation (AGI) located within the curtilage of the Existing VPI CHP Plant Site. This pipeline would follow one of two routes, both within the curtilage of the Existing VPI CHP Plant Site.

4.2.14 An existing gas pipeline is currently used for fuelling the Existing VPI CHP Plant. The Applicant is not seeking consent for any works to the existing pipeline, but it is included within the DCO Application as the Applicant is seeking compulsory acquisition powers over it, to ensure that the Applicant can use and maintain the pipeline. As a result, this pipeline has been excluded from the scope of the assessments conducted as part of this EIA. The terms 'Proposed Development' and 'Site' used within this ES therefore also exclude this existing pipeline.

Gas Reception Facility (Part of Work No. 1)

4.2.15 A gas receiving station will be installed on the OCGT Power Station Site. This is required to receive the natural gas fuel from the new proposed gas connection pipeline and to treat it in advance of using it as fuel in the Proposed Development. Treatment will include dehydration, filtering and odorising of the natural gas. A 'pigging' facility will also be included, which allows a 'Pipeline Inspection Gauge' (PIG) to be passed along the pipeline for periodic cleaning and maintenance checks.

Electricity Grid Connection (Work No. 5)

4.2.16 The Proposed Development would connect to the existing NG substation within the Existing VPI CHP Plant Site.

4.2.17 The connection between the Proposed Development and NG would comprise either overhead or below ground cables, or a combination of both with a total length of approximately 300m, running between the OCGT Power Station Site and the substation on the Existing VPI CHP Plant Site.

Utilities and Services Connections (Work No. 6)

4.2.18 Additional essential services and control connections will be made between the OCGT Power Station Site and the Existing VPI CHP Plant Site. These are necessary to ensure safe operation and control and include water and compressed air, electrical and control cable connections, telecoms, and fire and security systems. There will also be a water connection between the existing towns mains water main in Rosper Road and the OCGT Power Station Site.

4.2.19 A septic tank or bioreactor is likely to be used for treatment of sanitary or domestic wastewater from offices/ administration/ welfare facilities. Solids from the septic tank will be emptied as required and tankered off site to a waste treatment plant. Clean water from the septic tank or bioreactor will combine with other site clean water including surface water to drain off site via a local land drain.

Water Treatment Plant and Demineralised Water Storage Tank (Part of Work No. 1)

4.2.20 Operation of the Proposed Development will require a supply of demineralised water. This will require a plant for the treatment of towns water in a water treatment plant to demineralise the water suitable for use in the closed loop cooling system, for gas turbine cleaning and other uses.

Fire Fighting Equipment and Fire/ Raw Water Storage Tanks (Part of Work No. 1)

4.2.21 The fire protection strategy for the Proposed Development will be developed to comply with the requirements of the Building Regulations 2010 and the Building Regulations and Fire Safety Procedural Guidelines (Ref 4-3). Appropriate standards will also be referenced to provide the necessary fire safety design. Additional fire protection will be provided with reference to British Standards.

4.2.22 Firefighting equipment will be housed in a dedicated building/ container. In case of a fire, the connection to the surface water drainage system will be closed and surface run-off (firefighting and rain water) will be contained within the Site. Water from the fire water tank will be used to suppress the fire until the arrival of the emergency services.

Administration/ Control Building(s) (Part of Work No. 1)

4.2.23 The administration/ control building(s) will contain the main reception, offices, control room, station electrical equipment and staff welfare facilities.

Gatehouse (Part of Work No. 1)

4.2.24 Gatehouses will be located at the entrances to the OCGT Power Station Site.

Car Parking and Cycle Storage (Part of Work No. 1)

4.2.25 There would be provision for several car parking spaces and cycle storage on-site for operational use.

Workshop and Stores Building(s) (Part of Work No. 1)

4.2.26 Workshop and stores building(s) will be required for operation and maintenance activities and storage of materials.

Permanent Plant Laydown (Part of Work No. 1)

4.2.27 A permanent laydown area will be required for operation and maintenance activities.

Internal Roadways (Part of Work No. 1)

4.2.28 Internal roadways will be required for access within the OCGT Power Station Site. These will be hard surfaced with appropriate drainage systems to manage surface water runoff and pollution risk.

Surface Water Drainage and Stormwater Attenuation (Part of Work No. 1)

4.2.29 A Conceptual Drainage Strategy is included as part of Appendix 12A: Flood Risk Assessment (ES Volume III, Application Document Ref. 6.4).

Security Fencing (Part of Work Nos. 1 and 4B)

4.2.30 Security systems will be provided in respect of the OCGT Power Station Site. This will include paladin (or similar) fencing, intruder alarms and turnstiles for the OCGT Power Station Site to manage people access.

Construction Laydown Area and Contractors' Compound (Work No. 3)

4.2.31 Figure 3.1 (ES Volume II, Application Document Ref. 6.3) shows the area of land to be used for construction laydown and the contractors' compound. These areas would be used for the unloading and storage of construction materials, construction site offices and construction contractor welfare facilities and parking, notwithstanding that plant and equipment would also be used where necessary to support the construction of the infrastructure and power station. Some pre-fabrication of materials and components may also be undertaken.

4.2.32 The area would be underlain by semi-permeable surfacing such that it is a level surface that allows uncontaminated surface water and rainwater to percolate through it. No hazardous materials would be stored unbunded within the laydown area.

Construction Access (Part of Work No. 2)

4.2.33 Due to the undeveloped nature of parts of the Site (particularly the OCGT Power Station Site), new temporary roads are needed to connect the Laydown Areas. Access to the Site for construction vehicles would be by way of a new temporary internal road connected to existing accesses off Rosper Road currently used for the Lindsey Oil Refinery and the Existing VPI CHP Plant road access.

External Lighting and CCTV (relevant to various Work Nos.)

4.2.34 Lighting would be required for the safe construction and operation of the Proposed Development, during the hours of darkness.

4.2.35 At the time of submission of the Application, a contractor will not have been appointed; therefore, detailed design work on lighting for the Proposed Development has not been completed. An indicative Lighting Strategy is included with the application for development consent (Application Document Ref. 5.6), this provides some definition of the type and level of lighting that would be employed in exterior areas of the Proposed Development. It is expected that the lighting levels would be comparable to those on the Existing VPI CHP Plant.

4.2.36 CCTV and other security measures are anticipated to be required for security purposes at the Site.

Carbon Capture Readiness

4.2.37 As the output capacity of the Proposed Development is less than 300MW, the power station does not fall under the provisions of the Carbon Capture Readiness (CCR)

(Electricity Generating Stations) Regulations 2013, which transposed Article 36 of the IED into UK legislation.

4.2.38 The CCR Regulations provide that no order for development consent (in England and Wales) may be made in relation to a combustion plant with a capacity at or over 300MWe unless the relevant authority has determined (on the basis of an assessment carried out by an applicant) whether it is technically and economically feasible to retrofit the equipment necessary to capture the carbon dioxide that would otherwise be emitted from the plant, and to transport and store such carbon dioxide from the site.

4.2.39 As the CCR Regulations do not apply to the Proposed Development, no space allocation for future retrofit of carbon capture technology has been included within the Site.

4.3 Design Parameters

4.3.1 The design of the Proposed Development has followed an iterative process, based on preliminary environmental assessments and consultation with statutory and non-statutory consultees. Section 4.7: Alternatives and Design Evolution below describes this process further, including options that have been considered and discounted or amendments made to the concept design to date.

4.3.2 A number of the design aspects and features of the Proposed Development cannot be confirmed until the tendering process for the design and construction of the generating station has been completed. For example, the enclosure or building sizes may vary, depending on the contractor selected and their specific configuration and selection of plant.

4.3.3 A focussed use of the Rochdale Envelope approach has therefore been adopted to present a worst case assessment of potential environmental effects of the different parameters of the Proposed Development that cannot yet be fixed. These include the specific location of the emission point to air within the OCGT Power Station Site, the size of structures and buildings (to allow flexibility in selection of preferred technology) and the final stack height. Wherever an element of flexibility is maintained, alternatives have been assessed and the worst case impacts have been reported in this ES.

4.3.4 Table 4.1 below sets out the maximum building and fixed designed parameters that have been assessed within this ES. Maximum building heights are given in mAOD, based on the upper limit finished ground level (assumed to be 6m AOD).

Table 4.1. Main Structure Dimensions

Component	Maximum length (m)	Maximum width (m)	Maximum height (m)	Maximum footprint (m^2)
Single Gas Turbine and Generator	30	20	20	600
Gas Turbine building	46	25	29	1,150
Exhaust Stack	Up to 12m in diameter		Up to 56m*	112

Component	Maximum length (m)	Maximum width (m)	Maximum height (m)	Maximum footprint (m^2)
Air Intakes	24	16	40	384
Fin-fan cooler	30	15	17	450
Control room, workshops, stores	35	20	16	700
Kiosks within AGI compound	7	5	3	35
Demin tank, firewater tank	24m (in diameter)		32	450

*This differs from Table 4.1 in Chapter 4 of the Preliminary Environmental Information (PEI) Report, which stated a maximum height of 51m. This was a drafting error and should have read 56m as this is the worst case assessed.

4.3.5 A limited degree of flexibility in terms of the exact location of the stack has been incorporated, to allow for variability in the final design. This does not affect the conclusion of any environmental assessments considered in this ES as sensitivity analysis on the limits of deviation sought for the stack location have been assessed in the respective air and visual impact assessments.

4.4 Proposed Development Construction

Construction Programme and Methods

4.4.1 The Applicant would appoint a contractor to build the Proposed Development. That contractor is likely to appoint sub-contractors to undertake all of the associated civil works.

4.4.2 A Construction Environmental Management Plan (CEMP) would be prepared by the contractor, based on the Framework CEMP submitted with the Application (Appendix 4A, ES Volume III, Application Document Ref. 6.4). The framework CEMP sets out the key measures to be employed during the main works phase to control and minimise the impacts on the environment. It describes how monitoring and auditing activities would be undertaken, in order to ensure that mitigation measures are carried out and are effective.

4.4.3 Construction of the Proposed Development could start as early as Q1 2021. As outlined previously, the shortest construction programme would be circa. 24 months. Table 4.2 below gives an indication of the construction programme.

Table 4.2. Indicative Construction Programme

	2021				2022			
	1	2	3	4	1	2	3	4
OCGT Site Preparation								
Main civil works								
Plant installation								
Gas and electrical connections								
Commissioning								

Earthworks

4.4.4 Earthworks may be required to re-profile the Site, to produce a level platform for the OCGT Power Station Site, excavate foundations or remediate contaminated soils. These works are works are envisaged to be minor in nature and are not expected to generate significant spoil arisings.

Construction Laydown Area

4.4.5 The contractor would provide temporary site facilities within the designated part of the Site (the proposed Construction and Laydown Area, Work No. 3). Owing to the current nature of ground conditions in these areas, it is envisaged that minimal work would be needed to create a usable surface that can accommodate storage of non-hazardous materials and placement of contractor cabins, but allows uncontaminated rainwater to percolate to ground. Any hazardous or potentially polluting materials or chemicals would be stored in separate bunded and controlled areas in accordance with requirements of the CEMP and relevant Environment Agency and DEFRA pollution prevention guidelines (Ref 4-4).

Spoil Storage

4.4.6 If any excess spoil material is generated during construction, it would be stored temporarily within the Site and then reused as part of the construction works in accordance with the CEMP and best practice. It is not envisaged that any significant volume of spoil arisings will be required to be disposed of from the construction site during construction of the Proposed Development.

4.4.7 Soils would be managed in accordance with the Construction Code of Practice for the Sustainable Use of Soil on Development Sites (Ref 4-5) to minimise impacts on soil structure and quality. Appropriate measures to minimise short-term and long-term impacts on land drainage are included in the framework CEMP.

4.4.8 The framework CEMP incorporates measures to prevent an increase in flood risk during the construction works. For example, topsoil and other construction materials would be stored outside of the 1 in 100 year floodplain extent and only moved to the temporary works area immediately prior to use.

Main Civil and Process Works

4.4.9 The contractor would prepare and level the OCGT Power Station Site, followed by piling (if required) and excavation for main foundations. The lighter buildings may be piled or have raft foundations.

4.4.10 Once the buildings are erected, the contractor would commence the erection of plant (e.g. gas turbine, generator and stack) on a phased programme of approximately 9 months.

Construction of Proposed Gas Pipeline

4.4.11 A new gas pipeline is proposed to fuel the OCGT. Dependent on the route chosen, this new pipeline could be constructed using a partially or wholly open cut method whereby the spoil would be excavated from the pipeline route and stored adjacent to it, while the pipeline is laid, before being reinstated. Alternative techniques involve burying the pipe underground using a horizontal drilling technique and/ or installation above ground. The precise construction method will depend on the route chosen and the completion of more detailed design.

4.4.12 Where below ground, the pipeline is likely to be installed to a depth of circa 1.2m to the top of the pipe, which would be circa 500mm in diameter. The new pipeline would link to the Existing AGI on the Existing VPI CHP Plant Site.

Construction Staff

4.4.13 Construction of the Proposed Development is anticipated to create approximately 150 temporary construction jobs at peak. Construction staff are anticipated to travel to the Site via the existing trunk road and local networks. Whilst the Applicant will seek to promote sustainable transport options, such as public transport, cycling and car share, the location of the Site as remote from public transport networks and the lack of footpaths in the area, means that transport options other than private car are limited. Nevertheless it is proposed that a requirement of the draft DCO is included requiring the construction contractor to develop and implement a Construction Workers Travel Plan (CWTP) based on the Framework CWTP included with this Application (ES Volume III, Appendix 7B, Application Document Ref. 6.4).

Construction Hours of Work

4.4.14 Anticipated normal construction hours would be Monday – Friday 07:00 – 19:00 and Saturday 08:00 – 18:00. In addition, the DCO application includes an allowance for start-up and shut-down periods of an additional 30 minutes at the beginning and end of each working day. Should on-site construction works be required outside of these normal construction working hours, they would comply with any restrictions agreed with the planning authorities through the DCO process as well as the CEMP and in particular regarding control of noise and traffic.

Construction Traffic/ Site Access

4.4.15 Access to the Site for construction vehicles is proposed from the existing accesses off the existing entrances from Rosper Road. It is the Applicant's intention to access the OCGT Power Station Site, for construction purposes, via the existing Lindsey Oil Refinery site access, whilst access to other parts of the Proposed Development will be via the existing VPI CHP access. However, some movement of vehicles

between the two areas may be necessary and this would be by way of Rosper Road as existing service and pipelines preclude the creation of an internal road to allow such movement. Movement of vehicles, construction staff and materials between the two areas would be minimised where possible. This will be addressed in the Construction Traffic Management Plan (CTMP). This would be prepared based on the framework CTMP is provided in Appendix 7C (ES Volume III, Application Document Ref. 6.4).

Storage of Construction Plant and Materials

4.4.16 Storage areas for hazardous or potentially polluting materials would be located in a separate secure area and (where appropriate) bunded. Material data sheets would be available for all these materials and the Control of Substances Hazardous to Health (COSHH) assessments kept within the relevant risk assessment for the task.

4.4.17 Site based mobile plant would be kept in a secure overnight plant storage area, where drip trays can be utilised under the various types of plant, if needed.

Lighting

4.4.18 Temporary construction site lighting is proposed to enable safe working during construction in hours of darkness. Temporary construction lighting would be arranged so that glare is minimised outside the Site. An Indicative Lighting Strategy is included as part of the Application (Application Document Ref No. 5.6).

Construction Environmental Management Plan (CEMP) and Site Waste Management Plan (SWMP)

4.4.19 The environmental effects of construction of the Proposed Development will be managed through a CEMP, based on the Framework CEMP provided in Appendix 5A (ES Volume III), which will describe the specific mitigation measures to be followed by the appointed construction contractor to reduce potential nuisance impacts from:

- Use of land within the Site for temporary laydown areas, contractor facilities and offices, etc.;
- Construction traffic (including parking and access requirements);
- Earthworks;
- Noise and vibration;
- Dust generation; and
- Waste generation.

4.4.20 The Framework CEMP provided in Appendix 4A (ES Volume III) identifies the procedures to be adhered to throughout construction; this framework will then be adopted by the appointed contractor in the drafting of their more detailed CEMP prior to commencement of construction.

4.4.21 Contracts with companies involved in the construction works will incorporate environmental control, health and safety regulations and current guidance, with the intention that construction activities are sustainable. All contractors involved with the construction stages would be required to meet agreed best practice and all relevant environmental legislation including: Control of Pollution Act 1974 (COPA, as

amended), Environment Act 1995, and Hazardous Waste (England and Wales) Regulations 2005.

4.4.22 All construction works would adhere to the Construction (Design and Management) Regulations 2015 (The CDM Regulations).

4.4.23 In accordance with policy requirements, through the detailed design process the Applicant would seek to ensure that the Proposed Development is designed, constructed and implemented to minimise the creation of waste, maximise the use of recycled materials and assist the collection, separation, sorting, recycling and recovery of waste arisings, as far as practicable.

4.4.24 In order to manage and monitor waste generated on Site, a framework SWMP has been developed as part of the Framework CEMP (Appendix 4A (ES Volume III)). It allows for waste streams to be estimated and monitored and goals set with regards to the waste produced. The CEMP is secured through a Requirement included in the draft DCO (Application Document Ref. 2.1).

4.4.25 The CEMP and SWMP would require that the contractor separates the waste streams on Site, prior to them being taken to a waste facility for recycling or disposal. All waste removal from Site would be undertaken by licensed waste carriers and taken to licensed waste facilities.

4.5 Proposed Development Operation

Hours of Operation

4.5.1 The Proposed Development would be on standby and needs to be available at all times. It is most likely to run during periods of low electricity supply or high demand on the transmission network, or when required to provide technical services to support the National Grid. This is expected to be weighted towards the winter period, for a few hours at a time. However, as the operation of the plant is driven by the dynamics of the energy market, the plant could run for longer periods, at any time of day, up to the maximum allowed under its Environmental Permit, which is envisaged to be up to 1,500 hours per year averaged over 5 years, and up to 2,250 maximum in any one calendar year.

Site Staff

4.5.2 Operation of the Proposed Development is anticipated to create up to 15 permanent operational roles. Depending on the degree of integration with the Existing VPI CHP Plant and VPI Energy Park A, these may be new jobs or roles undertaken by personnel from the Existing VPI CHP Plant.

Maintenance

4.5.3 Maintenance would be undertaken in accordance with the original manufacturer's recommendations and/ or industry best practice as dictated by the number of running hours or condition/ age of the plant.

4.5.4 OCGT maintenance would be dependent on operating regime but would generally consist of frequent regular operational routines and longer term inspections and overhauls. There would be a number of daily, weekly and monthly plant inspections including plant tours and observations where operating parameters and fluid levels

are checked and adjusted and/or replenished. For a typical modern gas turbine annual maintenance schedules would involve internal inspections either by non-intrusive methods such as with a borescope or by intrusive methods such as removing inspection hatches or partial dismantling to allow access to internal components. These types of inspections typically take a few days to a week.

4.5.5 Major inspections and overhauls consist of hot gas path inspections which can occur after approximately 30,000 hours of operation or a number of starts (as specified by the original manufacturer). Major Inspections can occur after approximately 60,000 hours of operation or around 2,000 starts. For both activities the plant is taken out of service for several weeks, cooled down and dismantled to allow access to critical components. Inspection of hot gas path components such as the turbine, combustor, exhaust and bearings is completed and parts refurbished or renewed as required to provide service life until the next scheduled overhaul. The plant is then rebuilt and brought back into service. It should be noted that the effects of any major overall would be significantly less than the effects of construction.

Hazard Prevention and Emergency Planning

4.5.6 The Applicant aims to protect human health by safely and responsibly managing site activity. A Health and Safety Plan covering the works, commissioning and operation of the Proposed Development would be written. Competent and adequately resourced duty holders as defined in the CDM Regulations would be appointed, such as Principal Designer and Principal Contractor. The Applicant would ensure that its own staff, its designers and contractors follow the Approved Code of Practice (ACoP) laid down by the CDM Regulations.

4.5.7 Written procedures clearly describing responsibilities, actions and communication channels would be available for operational personnel dealing with emergencies.

4.5.8 Management of the gas supply would be carefully controlled in accordance with legislative and consent requirements. The Environmental Permit for the proposed generating station would consider potential abnormal operation scenarios and prevention or minimisation of accidents through management procedures. Hazard Identification (HAZID) and Hazard and Operability (HAZOP) studies would also be undertaken during the design phase of the Proposed Development to identify and mitigate potential hazards.

Environmental Management

4.5.9 The Proposed Development would comply with the IED so that the impact of emissions to air, soil, surface and groundwater, the environment and human health would be minimised. Specific details regarding control of air emissions and a summary of emission limit values for the Proposed Development are set out in Chapter 6: Air Quality (ES Volume I). The operation of the OCGT would be subject to control though an Environmental Permit.

4.6 Decommissioning

4.6.1 The Proposed Development is expected to have a design and operating life of 40 or more years. At the end of its design life it is expected that the Proposed Development will have some residual life remaining and an investment decision would then be made based on the market conditions prevailing at that time. If the

operating life were to be extended the Proposed Development would be upgraded and re-permitted in line with the legislative requirements at that time.

4.6.2 At the end of its operating life, the most likely scenario is that all above-ground equipment associated with the Proposed Development would be shut down and removed from the Site. Prior to removing the plant and equipment, all residues and operating chemicals would be cleaned out from the plant and disposed of in an appropriate manner. The draft DCO (Application Document Ref. 2.1) secures the submission, approval and implementation of a decommissioning plan (see the Requirements in Schedule 2).

4.6.3 The bulk of the plant and equipment would have some limited residual value as scrap or recyclable materials, and the contractor will be encouraged to use materials that could be recycled.

4.6.4 Prohibited materials such as asbestos, polychlorinated biphenyls (PCBs), ozone depleting substances and carcinogenic materials, will not be allowed within the Proposed Development, and other materials recognised to pose a risk to health (but which are not prohibited) will be subject to detailed risk assessment.

4.6.5 Prevention of contamination will be a specific requirement of the Environmental Permit for the operation of the Proposed Development and therefore it is being designed such that it will not create any new areas of ground contamination or pathways to receptors as a result of construction or operation. Once the plant and equipment have been removed to ground level, it is expected that the hard standing and sealed concrete areas will be left in place. Any areas of the OCGT Power Station Site that are below ground level will be backfilled to ground level to leave a levelled area.

4.6.6 A Decommissioning Plan (including Decommissioning Environmental Management Plan) would be produced and agreed with the Environment Agency as part of the environmental permitting and site surrender process. The Decommissioning Environmental Management Plan would consider in detail all potential environmental risks on the site and contain guidance on how risks can be removed or mitigated. This would include details of how surface water drainage should be managed on the Site during the decommissioning and demolition.

4.6.7 The Decommissioning Plan would include an outline programme of works. It is anticipated that it would take nine to twelve months to decommission the site, with demolition following thereafter.

4.6.8 During decommissioning and demolition, there would be an electrical demand, as well as requirement for office, accommodation and welfare facilities.

4.6.9 The Site closure sequence will be devised with reference to the following points:

- Decommissioning and making safe: The sequence would consider how each part of the Proposed Development is isolated and the physical disconnection of feeds and services, including drainage. Careful thought would be given to the handling and management of materials and fluids that have a potential to present an environmental hazard. A permit to work system would be employed to ensure safe hand over of systems;

- Service re-routing: Services may traverse decommissioned areas. If so, these would require an appropriate diversion. All redundant cabling would be removed and redundant drains and ducts filled;
- Management and monitoring of assets: access to decommissioned areas would be controlled to ensure that no unauthorised entry is gained. Access would only be granted for inspections and, where diversions are not possible, emergency egress. A programme of inspections would be prepared to ensure that the integrity of the decommissioned areas are maintained until final demolition is achieved;
- Demolition: Specialist demolition may be required, e.g. the stack; and
- Remediation: If surveys indicate that the land quality has deteriorated because of operational activities then steps would be required to restore the land to its original condition as far as practicable.

4.6.10 The contractor (to be appointed by VPI (or the operator at the time)) will have a legal obligation to consider decommissioning and demolition under the CDM Regulations 2015, or the equivalent prevailing legislation at that time.

4.6.11 Decommissioning activities would be conducted in accordance with the appropriate guidance and legislation at the time of site closure. All decommissioning activities will be carried out in accordance with the waste hierarchy and materials and waste produced during site closure would be stored in segregated areas to maximise reuse and recycling. All materials that cannot be reused or recycled would be removed from site and transferred to suitably licensed waste recovery/ disposal facilities. It is anticipated that a large proportion of the materials resulting from the demolition will be recycled and a record will be kept to demonstrate that the maximum level of recycling and reuse has been achieved.

4.6.12 Upon completion of the decommissioning programme, including any remediation works that might be required, the Environment Agency will be invited to witness a post-decommissioning inspection by site staff. All records from the decommissioning process will be made available for inspection by the Environment Agency and other relevant statutory bodies.

4.7 Design Evolution and Alternatives

4.7.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations') state an environmental statement accompanying an application for development consent should include:

> *"A description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment".*

4.7.2 Under the EIA Regulations there is no requirement to assess alternatives, only a requirement to provide information regarding the alternatives that have been considered.

4.7.3 On the matter of alternatives, National Policy Statement (NPS) EN-1 (Ref 4-6) states that there is no; *"general requirement to consider alternatives or to establish whether the proposed project represents the best option. However, applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they*

have studied. This should include an indication of the main reasons for the applicant's choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility".

4.7.4 EN-1 and the NPS for Fossil Fuel Electricity Generating Infrastructure EN-2 (Ref 4-7) provide the primary basis for decisions on applications for fossil fuels electricity generating stations, including gas-fired power stations such as the Proposed Development (as per section 104 of the Planning Act 2008). Section 2.2 of EN-2 outlines the factors influencing site selection for fossil fuel power stations. These include land use and size of site; transport infrastructure for the delivery and removal or construction materials, fuel, waste and equipment; and water resources. In outlining such factors, paragraph 2.2.1 states that;

> *"…it is for energy companies to decide what application to bring forward and the Government does not seek to direct applicants to particular sites for fossil fuel generating stations."*

4.7.5 The Site has been selected by the Applicant for the development of a generating station, as opposed to other potentially available sites for the following reasons:

- The Site is currently vacant and is situated in an area immediately surrounded by major industry and power generation;
- The Site has excellent electrical grid, gas, and transport links and is a brownfield site which is considered more attractive to redevelop for large scale power generation than a greenfield one;
- The Applicant has the benefit of a site lease option agreement;
- The Site is remote from major conurbations, located in an established industrial area of low sensitivity; and
- The Site is adjacent to the Existing VPI CHP Plant, providing synergies with the existing workforce, services and utilities.

4.7.6 The consideration of alternatives and design evolution has been undertaken with the aims of preventing or reducing adverse environmental effects (following the mitigation hierarchy of avoid, reduce and, if possible, remedy) while maintaining operational efficiency and cost-effectiveness. The design has evolved taking into account response to consultation feedback, environmental surveys and technical studies. Mitigation measures that have been included within the design of the Proposed Development are referenced in each technical chapter (Chapters 6 – 16, ES Volume I).

4.7.7 A number of alternatives have been considered for the Proposed Development, including:

- Alternative technologies;
- Alternative fuels;
- Alternative design options and design evolutions; and
- Alternative routes for the proposed new gas connection.

Alternative Technologies

4.7.8 The Applicant has conducted a technical and commercial evaluation of the available technologies and has determined that a single turbine represents the optimum configuration to meet the commercial and operational objectives of the Proposed Development. As such, alternate technologies such as multiple smaller OCGTs, aero-derivative turbines or gas engines have been considered and excluded in relation to the Proposed Development. The difference in environmental effects of these options is not considered to be significant although multiple units would potentially have increased the landscape and visual impact and noise impacts of the Proposed Development.

4.7.9 Whilst this fixes a number of key design parameters, the exact size and location of the components of the Proposed Development will be dependent on the selection of the Original Equipment Manufacturer (OEM). Where this selection has the potential to materially change the environmental effects of the Proposed Development (i.e. air quality and noise emissions, and landscape and visual impact), the various options have been considered in this ES and a worst-case is presented and assessed – see Chapter 6: Air Quality, Chapter 8: Noise and Vibration and Chapter 10: Landscape and Visual Amenity (ES Volume I).

Alternative Fuels

4.7.10 Diesel (or similar petroleum distillate) is a potential alternative fuel for the proposed power station. However, natural gas is proposed to be the fuel for the Proposed Development, for reasons of environmental impacts, availability and cost, in particular the potential for air quality impacts on the nearby nature conservation sites (which would be higher from the use of liquid fuels). In addition, with diesel there would be a requirement to store large volumes of liquid fuel, which would increase the overall environmental and safety risk.

Alternative Design Options and Design Evolution

4.7.11 As discussed above, the selection of a single gas turbine as the preferred technology reduces the number of potential configurations available. However, there is still some variability in the layout and size of the components of the Proposed Development.

4.7.12 Accordingly, aspects of design that have already been determined include:

- Selection of a design incorporating a single gas turbine;
- Electricity grid and service connection corridors (through the existing infrastructure on the Existing VPI CHP Plant Site);
- Defining a small area of the Site in which the generating station stack can be located;
- The orientation of the turbine in a northeast-southwest orientation; and
- The final minimum and maximum stack height.

4.7.13 The following aspects have not yet been determined, so options have been included and assessed within the ES:

- The manufacturer of the turbine, therefore the final dimensions of the proposed structures and buildings encompass designs provided by several different manufacturers;
- Final stack location, although this is constrained within a defined area of the OCGT Power Station Site; and
- The route of the new gas pipeline, although only two options remain for the routing of this pipeline, with several other options now discounted.

4.7.14 Focussed use of the Rochdale Envelope approach (Ref 4-1) has, therefore, been adopted to present a worst-case assessment of potential environmental effects of the different parameters of the Proposed Development that cannot yet be fixed.

4.7.15 Wherever an element of flexibility is maintained, alternatives have been assessed and the worst-case impacts have been reported in the ES.

Changes since the Preliminary Environmental Information Report

4.7.16 As discussed above, the PEI Report assessed alternative gas pipeline routes to the east and west of the Existing VPI CHP Plant Site. These routes have now been discounted and are no longer part of the Proposed Development. Most of the area to the east of the Existing VPI CHP Plant Site remains within the Proposed Development as temporary construction laydown and access for construction and operation.

4.7.17 Consideration has been given to accessing the existing gas pipeline by way of the existing AGI on the Existing VPI CHP Plant and two potential new pipeline routes are under consideration, both wholly within the curtilage of the Existing VPI CHP Plant site and connected to the OCGT Power Station Site by way of a connection between the OCGT Power Station Site and the Existing VPI CHP Plant Site.

4.7.18 These alternatives in relation to the gas connection are not considered to represent any additional or different environmental impacts compared to those assessed in relation to the Proposed Development, and both options are assessed in this EIA. Selection of the final pipeline route will be made at the detailed design stage.

4.8 References

Ref 4-1 Planning Inspectorate (2018) *Using the Rochdale Envelope Advice Note Nine: Rochdale Envelope*, Version 3, July 2018.

Ref 4-2 European Commission (2017) *Best Available Techniques (BAT) Reference Document for Large Combustion Plants*, 2017.

Ref 4-3 Local Authority Building Control (2015) Building Regulations and Fire Safety Procedural Guidelines. August 2015. (Available at: https://www.labc.co.uk/guidance/resource-library/technical-guide-building-regulations-fire-safety-procedural-guidance [Accessed August 2018]).

Ref 4-4 Defra/ Environment Agency (2016) *Pollution Prevention for Businesses* (available at: https://www.gov.uk/guidance/pollution-prevention-for-businesses#storing-materials-products-and-waste [Accessed August 2018]).

Ref 4-5 Defra (2009) *Construction Code of Practice for the Sustainable Use of Soil on Development Sites.* In force 16th July 2005.

Ref 4-6 Department of Energy and Climate Change (2011), *Overarching National Policy Statement for Energy* (EN-1), July 2011.

Ref 4-7 Department of Energy and Climate Change (2011), *National Policy Statement for Fossil Fuel Electricity Generating Infrastructure* (EN-2)